Operative Dictations in Ophthalmology

Eric D. Rosenberg
Alanna S. Nattis
Richard J. Nattis
Editors

Springer

Operative Dictations in Ophthalmology

Eric D. Rosenberg • Alanna S. Nattis
Richard J. Nattis
Editors

Operative Dictations in Ophthalmology

Springer

Editors
Eric D. Rosenberg
Ophthalmology Resident
Department of Ophthalmology
New York Medical College
Valhalla, NY, USA

Alanna S. Nattis
Cornea and Refractive Surgery Fellow
Ophthalmic Consultants of Long Island
Rockville Centre, NY, USA

Richard J. Nattis
Chief of Ophthalmology
and Clinical Professor
Department of Ophthalmology
Good Samaritan Hospital
West Islip, NY, USA

ISBN 978-3-319-45494-8 ISBN 978-3-319-45495-5 (eBook)
DOI 10.1007/978-3-319-45495-5

Library of Congress Control Number: 2017932292

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Introduction

1. All dictations will consist of a standard template specific to the state or institution. In an attempt to limit repetition, we have only included the sample dictation. It will pay dividends later to get a familiarity with your institution's dictation practice, which often includes:

    Preoperative Diagnosis
    Procedure
    Postoperative Diagnosis
    Surgeon
    Assistant(s)
    Anesthesia
    Anesthesiologist
    Specimens
    Implants
    Estimated Blood Loss
    Complications

2. Dictations differ amongst attending surgeons, geography, institutions, etc. So long as there are cats, there will be multiple ways to skin them. Italics, _____, and (/) have been installed to help guide and prepare you for the variability that may exist.
3. Out-of-date procedures have been included. Although most may feel that these procedures would be better relegated to the history books, we strongly believe in the importance of understanding surgical evolution.
4. The timing of "time-out" procedures varies. Be mindful of when they take place in your OR.

Preface

Great things are not done by impulse, but by a series of small things brought together.

—Vincent van Gogh (Letter to Theo, October 1882)

I began writing this book while I was a categorical general surgery resident. Encouraged to pursue what deeply riveted me by my wife, family, and friends, I made the bold leap into a truly inspiring field, Ophthalmology. After becoming friendly with the OR staff, it always made me smile when they asked something to the effect of "why are you leaving surgery, you know, *real* surgery?" Instead of countering with "Ophthalmology is *real* surgery," I simply answered that general surgery was not for me—and that was the truth. Instead, I was entering a field reserved for the select elite. Not only are we surgeons, clinicians, medical and surgical diagnosticians, and solo comprehensive practitioners, but we are enigmatic, furtive, perfectionists. If someone cannot figure out why this field is the quintessence of medicine, then what else can you do but smile.

We would like to take this special opportunity to thank our friends, colleagues, and mentors who helped make this script a reality and dedicate it to those of you who may have taken the nontraditional route. Learn as much as you can, acquire patience, and develop precision, because it is you who will be the only real surgeon that ever maintains and reserves the privilege to operate on the eye.

Valhalla, NY, USA — Eric D. Rosenberg
Rockville Centre, NY, USA — Alanna S. Nattis
West Islip, NY, USA — Richard J. Nattis

Contents

Brow

Facial and Miscellaneous

Reconstructive

Lacrimal

The original version of this book was revised. An erratum to this book can be found at DOI 10.1007/978-3-319-45495-5_161

Contributors

Ike K. Ahmed Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada

David Alevi Department of Ophthalmology, Ophthalmic Consultants of Long Island, Rockville Center, NY, USA

Amro Ali Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Jorge L. Alió Division of Ophthalmology, Vissum Corporation, Universidad Miguel Hernandez, Alicante, Spain

Maan Alkharashi Department of Ophthalmology, Boston Children's Hospital, Harvard Medical School, Boston, MA, USA

Guillermo Amescua Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

James V. Aquavella Department of Ophthalmology, Flaum Eye Institute, University of Rochester Medical Center, Rochester, NY, USA

Lisa B. Arbisser Department of Ophthalmology, John A. Moran Eye Center, University of Utah, Salt Lake City, UT, USA

Marwan Atallah Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Nathan Blessing Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Kenneth V. Cahill Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA

Department of Ophthalmology, The Ohio State University, Columbus, OH, USA

Reginald Camillo Department of Ophthalmology, Metropolitan Hospital, New York, NY, USA

Nisha Chadha Department of Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY, USA

Winston Chamberlain Department of Ophthalmology, Casey Eye Institute, Oregon Health & Science University, Portland, OR, USA

Steve Charles Charles Retina Institute, University of Tennessee, Memphis, TN, USA

Anny M.S. Cheng Ocular Surface Center, Miami, FL, USA

Florida International University, Herbert Wertheim College of Medicine, FL, USA

James Chodosh Department of Ophthalmology, Massachusetts Eye and Ear, Harvard Medical School, Boston, MA, USA

Ashley Crane Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Craig N. Czyz Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA

Eric Donnenfeld Department of Ophthalmology, New York University, New York, NY, USA

Michael Engelbert Department of Ophthalmology, Manhattan Eye, Ear, & Throat Hospital, New York University, New York, NY, USA

Department of Ophthalmology, New York University, New York, NY, USA

Benjamin Erickson Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Kelly R. Everman Oculoplastic and Reconstructive Surgery, Tennessee Oculoplastics, Nashville, TN, USA

Scott Forman Department of Ophthalmology, Westchester Medical Center, Valhalla, NY, USA

Jill A. Foster Nationwide Children's Hospital, Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Department of Ophthalmoloby, The Ohio State University, Columbus, OH, USA

Larissa Ghadiali Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA

Quraish Ghadiali Department of Ophthalmology, Manhattan Eye, Ear, & Throat Hospital, New York, NY, USA

Department of Ophthalmology, New York University, New York, NY, USA

Stephen Huddleston Charles Retina Institute, University of Tennessee, Memphis, TN, USA

Daniel Lee Glaucoma Service, Wills Eye Hospital, Philadelphia, PA, USA

Jessica Lee Department of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, New York, NY, USA

Wendy W. Lee Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Paymohn Mahdavi Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Iason S. Mantagos Department of Ophthalmology, Boston Children's Hospital, Harvard Medical School, Boston, MA, USA

Edward Marcus Mount Sinai Medical Center, New York, NY, USA

Marguerite McDonald Department of Ophthalmology, New York University, New York, NY, USA

Jonathan S. Myers Glaucoma Service, Wills Eye Hospital, Philadelphia, PA, USA

Cameron B. Nabavi Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Alanna S. Nattis Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA

Richard J. Nattis Chief of Ophthalmology and Clinical Professor, Department of Ophthalmology, Good Samaritan Hospital, West Islip, NY, USA

Nimesh Patel Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Vivek Patel USC Roski Eye Institute, Keck School of Medicine, Los Angeles, CA, USA

Nathan Radcliffe Department of Ophthalmology, New York University, New York, NY, USA

Shani S. Reich Department of Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY, USA

Antonio Renna Division of Ophthalmology, Vissum Corporation, Universidad Miguel Hernandez, Alicante, Spain

Department of Medical and Biological Sciences—Ophthalmology, University of Udine, Udine, Italy

Andrew Rong Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Richard Rosen Department of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, New York, NY, USA

Eric D. Rosenberg Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Dawn Rush Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Hajirah N. Saeed Department of Ophthalmology, Massachusetts Eye and Ear, Harvard Medical School, Boston, MA, USA

Matthew B. Schlenker Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada

Janet B. Serle Department of Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY, USA

Shakeel Shareef Department of Ophthalmology, University of Rochester Medical Center, Rochester, NY, USA

Sansar Sharma Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Steven B. Siepser Wills Eye Surgery Center in Plymouth Meeting, Conshohocken, PA, USA

Laurence Sperber Department of Ophthalmology, New York University School of Medicine, New York, NY, USA

Daniel Straka Department of Ophthalmology, The Ohio State University, Columbus, OH, USA

Mehdi Tavakoli Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Tarika Thareja Department of Ophthalmology, New York University, New York, NY, USA

Paul E. Tornambe San Diego Retina Research Foundation, San Diego, CA, USA

Retina Consultants San Diego, San Diego, CA, USA

Kimberly D. Tran Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Scheffer C.G. Tseng Ocular Surface Center, Miami, FL, USA

Deborah VanderVeen Department of Ophthalmology, Boston Children's Hospital, Harvard Medical School, Boston, MA, USA

Thaddeus Wandel Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Bryan Winn Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA

Jennifer Yong Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Gerald Zaidman Department of Ophthalmology, New York Medical College, Valhalla, NY, USA

Part I
Anterior Segment

Chapter 1
Pterygium Excision with Conjunctival Autograft

Alanna S. Nattis and Eric D. Rosenberg

Abstract Pterygium is characterized by encroachment of an abnormal fibrovascular tissue from the bulbar conjunctiva onto the cornea (Arch Ophthalmol 115:1235–1240, 1997). Upon reaching the corneal surface, this fibrovascular tissue exerts cicatricial traction that flattens the caruncle and obliterates the semilunar fold (Arch Ophthalmol 130:39–49, 2012). The indications for pterygium surgery include reduced vision due to obscuration of the optical center of the cornea, irregular astigmatism, chronic irritation, recurrent inflammation, motility restriction, and cosmesis. Numerous surgical techniques have been described, but the main concern of pterygium surgery is the unpredictable rate and timing of recurrence (Ocul Surf 12:112–119, 2014). The underlying cause of pterygia is thought to be secondary to UV light exposure and arid conditions. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Pterygium • Actinic elastosis • Fibrovascular proliferation • Conjunctival autograft • Autograft • Sunlight

Indications

Symptomatic and/or cosmetic pterygium

Essential Steps

1. Identification of boarders of pterygium
2. Identification of the plica semiluminaris
3. Excision of pterygium
4. Excision of redundant Tenon's capsule

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_1

5. Smooth corneal surface
6. Measure size of defect of excised pterygium
7. Mark the superotemporal donor site
8. Excision of donor graft
9. Implantation of graft
10. Application of collagen shield/antibiotic

Complications

– Graft dehiscence
– Corneal abrasions
– Endophthalmitis
– Failure of graft
– Recurrence of pterygium
– Change in visual acuity

Template Operative Dictation

Preoperative diagnosis: Pterygium *(OD/OS)*

Procedure: Pterygium excision *(OD/OS)* with conjunctival autograft

Postoperative diagnosis: *Same*

Indication: This ____- year-old *male/female* had developed a pterygium over the past _____*months/years* and on workup was found to have a ___×___mm pterygium, with crossing of the pterygium into the visual axis causing significant discomfort (*and astigmatism, if present)*. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. General anesthesia was induced. A *(LMA/ETT)* was placed and local anesthetic was injected in the standard *(retrobulbar/peribulbar)* fashion using ____ml of lidocaine and marcaine in a 50:50 mix. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed in the eye. The pterygium was identified and

[Choose one]

If shaving technique*—the head of the pterygium is grasped with 0.12 forceps, and a beaver blade was used to perform a partial lamellar keratectomy to excise the head of the pterygium from the corneal surface. The body of the pterygium was also partially excised from the scleral bed with the beaver blade and Westcott scissors.*

Careful attention was paid to preserving normal conjunctiva. Excessive scar tissue and Tenons were excised using the Westcott scissors.

If avulsion technique*—a radial incision was made around the body of the pterygium using Westcott scissors and 0.12 forceps. Using blunt dissection the pterygium was removed from scleral bed. Careful attention was paid to preserving normal conjunctiva. An avulsion technique was then used to remove the head of the pterygium. After the entirety of the pterygium was removed and submitted for specimen, the remaining conjunctiva was undermined and inspected for remaining Tenon's capsule and/or fibrous tissue which was then excised.*

The diamond burr was used to smooth the corneal defect, limbal bed, and scleral bed. Wet-field cautery was used as needed to maintain hemostasis on the scleral bed. The previous site of pterygium was measured using calipers and noted to be __×__mm. At this time, the 0.12 forceps were used to turn the eye inferiorly to mark the donor graft site at the superotemporal conjunctiva. A graft sized __×__ mm was measured and outlined with a marking pen. The conjunctival autograft was then excised using Westcott scissors. Once excised, the graft was transposed to the pterygium excision site with extra care taken to place limbus to limbus on the scleral bed. _#_ interrupted *8-0 vicryl* sutures were then used to secure the graft into place, followed by _#_ interrupted plain gut sutures to close the donor site superiorly. Once the graft was secured, antibiotic ointment was applied to the (right/left) eye, and the eyelid speculum was removed. A pressure patch was placed over the (right/left) eye, and the patient was transferred to the postanesthesia care unit in stable condition.

References

1. Tan DT, Chee S-P, Dear KB, Lim AS. Effect of pterygium morphology on pterygium recurrence in a controlled trial comparing conjunctival autografting with bare sclera excision. Arch Ophthalmol. 1997;115:1235–40.
2. Liu J, Fu Y, Xu Y, Tseng SC. New grading system to improve the surgical outcome of multirecurrent pterygia. Arch Ophthalmol. 2012;130(1):39–49.
3. Janson BJ, Sikder S. Surgical management of pterygium. Ocul Surf. 2014;12(2):112–9.

Chapter 2
Pterygium Excision with Conjunctival Pedicle Graft

Alanna S. Nattis and Eric D. Rosenberg

Abstract Pterygium is characterized by encroachment of an abnormal fibrovascular tissue from the bulbar conjunctiva onto the cornea (Arch Ophthalmol 115:1235–1240, 1997). Upon reaching the corneal surface, this fibrovascular tissue exerts cicatricial traction that flattens the caruncle and obliterates the semilunar fold (Arch Ophthalmol 130:39–49, 2012). The indications for pterygium surgery include reduced vision due to obscuration of the optical center of cornea, irregular astigmatism, chronic irritation, recurrent inflammation, motility restriction, and cosmesis. Numerous surgical techniques have been described, but the main concern of pterygium surgery is the unpredictable rate and timing of recurrence (Ocul Surf 12:112–119, 2014). The underlying cause of pterygia is thought to be secondary to UV light exposure and arid conditions. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Pterygium • Actinic elastosis • Fibrovascular proliferation • Conjunctival autograft • Transposition • Autograft • Sunlight

Indications

Symptomatic and/or cosmetic pterygium

Essential Steps

1. Identification of boarders of pterygium
2. Identification of the plica semiluminaris
3. Excision of pterygium
4. Excision of redundant Tenon's capsule

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_2

5. Smooth corneal surface
6. Mitomycin application to surface of bare sclera
7. Transposition of the pedicle graft
8. Application of collagen shield/antibiotic

Complications

– Graft dehiscence
– Corneal abrasions
– Endophthalmitis
– Failure of graft
– Recurrence of pterygium
– Change in visual acuity

Template Operative Dictation

Preoperative diagnosis: Pterygium *(OD/OS)*

Procedure: *(Recurrent*) pterygium excision *(OD/OS)* with conjunctival pedicle graft

Postoperative diagnosis: *Same*

Indication: This ____- year-old *male/female* had developed a pterygium over the past _____*months/years* and on workup was found to have a ___×___mm pterygium, with crossing of the pterygium into the visual axis causing significant discomfort (*and astigmatism, if present)*. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. General anesthesia was induced. A *(LMA/ETT)* was placed, and local anesthetic was injected in the standard *(retrobulbar/peribulbar)* fashion using ____ml of lidocaine and marcaine in a 50:50 mix. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed in the eye. The pterygium was identified and

[Choose one]

If shaving technique*—the head of the pterygium is grasped with 0.12 forceps, and a beaver blade was used to perform a partial lamellar keratectomy to excise the head of the pterygium from the corneal surface. The body of the pterygium was also partially excised from the scleral bed with the beaver blade and Westcott scissors. Careful attention was paid to preserving normal conjunctiva. Excessive scar tissue and Tenons were excised using the Westcott scissors.*

If avulsion technique*—a radial incision was made around the body of the pterygium using Westcott scissors and 0.12 forceps. Using blunt dissection the pterygium was removed from scleral bed. Careful attention was paid to preserving normal conjunctiva. An avulsion technique was then used to remove the head of the pterygium. After the entirety of the pterygium was removed and submitted for specimen, the remaining conjunctiva was undermined and inspected for remaining Tenon's capsule and/or fibrous tissue which was then excised.*

The diamond burr was used to smooth the corneal defect, limbal bed, and scleral bed. Wet-field cautery was used as needed to maintain hemostasis on the scleral bed. 0.02 mg/cm^3 of mitomycin was applied to the surface of the bare sclera using a Weck-Cel over a period of __×__minutes. This was followed by a copious irrigation of the bare scleral surface with balanced saline solution. An inferonasal conjunctival peritomy was performed using Westcott scissors, around the inferior limbus. A vertical conjunctival relaxing incision was then made at the lateral edge of the peritomy to fashion a pedicle graft. The pedicle graft was then transposed to the site of the pterygium excision and sutured in place using _#_ 8-0 vicryl-interrupted sutures. Once the graft was secured, a collagen shield soaked in Maxitrol was placed over the (right/left) cornea, and the eyelid speculum was removed. A pressure patch was placed over the (right/left) eye, and the patient was transferred to the postanesthesia care unit in stable condition.

References

1. Tan DT, Chee S-P, Dear KB, Lim AS. Effect of pterygium morphology on pterygium recurrence in a controlled trial comparing conjunctival autografting with bare sclera excision. Arch Ophthalmol. 1997;115:1235–40.
2. Liu J, Fu Y, Xu Y, Tseng SC. New grading system to improve the surgical outcome of multirecurrent pterygia. Arch Ophthalmol. 2012;130(1):39–49.
3. Janson BJ, Sikder S. Surgical management of pterygium. Ocul Surf. 2014;12(2):112–9.

Chapter 3
Pterygium Excision with Amniotic Membrane Graft

Alanna S. Nattis and Eric D. Rosenberg

Abstract Pterygium is characterized by encroachment of an abnormal fibrovascular tissue from the bulbar conjunctiva onto the cornea (Arch Ophthalmol 115:1235–1240, 1997). Upon reaching the corneal surface, this fibrovascular tissue exerts cicatricial traction that flattens the caruncle and obliterates the semilunar fold (Arch Ophthalmol 130:39–49, 2012). The indications for pterygium surgery include reduced vision due to obscuration of the optical center of cornea, irregular astigmatism, chronic irritation, recurrent inflammation, motility restriction, and cosmesis. Numerous surgical techniques have been described, but the main concern of pterygium surgery is the unpredictable rate and timing of recurrence (Ocul Surf 12:112–119, 2014). The underlying cause of pterygia is thought to be secondary to UV light exposure and arid conditions. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Pterygium • Actinic elastosis • Fibrovascular proliferation • Conjunctiva • Amniotic membrane • Graft • Sunlight

Indications

Symptomatic and/or cosmetic pterygium. Can be used as a primary graft or for use in recurrence.

Essential Steps

1. Identification of boarders of pterygium
2. Identification of the plica semiluminaris
3. Excision of pterygium

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_3

4. Excision of redundant Tenon's capsule
5. Smooth corneal surface
6. Measure size of defect of excised pterygium
7. Construction of graft
8. Implantation of graft
9. Application of collagen shield/antibiotic

Complications

– Graft dehiscence
– Corneal abrasions
– Endophthalmitis
– Failure of graft
– Recurrence of Pterygium
– Change in visual acuity

Template Operative Dictation

Preoperative diagnosis: *Pterygium/recurrent pterygium (OD/OS)*

Procedure: *(Recurrent*) pterygium excision *(OD/OS)* with amniotic membrane graft

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* had developed a pterygium over the past _____*months/years* and on workup was found to have a ___×___mm pterygium, with crossing of the pterygium into the visual axis causing significant discomfort (*and astigmatism, if present)*. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. General anesthesia was induced. A *(LMA/ETT)* was placed, and local anesthetic was injected in the standard *(retrobulbar/peribulbar)* fashion using ____ml of lidocaine and marcaine in a 50:50 mix. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed in the eye. The pterygium was identified and

[Choose one]

If shaving technique*—the head of the pterygium is grasped with 0.12 forceps*, *and a beaver blade was used to perform a partial lamellar keratectomy to excise the head of the pterygium from the corneal surface. The body of the pterygium was also partially excised from the scleral bed with the beaver blade and Westcott scissors.*

Careful attention was paid to preserving normal conjunctiva. Excessive scar tissue and Tenons were excised using the Westcott scissors.

If avulsion technique*—a radial incision was made around the body of the pterygium using Westcott scissors and 0.12 forceps. Using blunt dissection the pterygium was removed from scleral bed. Careful attention was paid to preserving normal conjunctiva. An avulsion technique was then used to remove the head of the pterygium. After the entirety of the pterygium was removed and submitted for specimen, the remaining conjunctiva was undermined and inspected for remaining Tenon*'*s capsule and/or fibrous tissue which was then excised.*

The diamond burr was used to smooth the corneal defect, limbal bed, and scleral bed. Wet-field cautery was used as needed to maintain hemostasis on the scleral bed. The previous site of pterygium was measured using calipers and noted to be __×__ mm. At this time, the amniotic membrane (Lot #__) was cut into a __×__mm size to provide an overlapping coverage of the defect site. The edges of the graft were tucked into the corners of the conjunctiva over the scleral bed defect and were secured into place with _#_ 8-0 vicryl sutures. Once the graft was secured, antibiotic ointment was applied to the (right/left) eye, and the eyelid speculum was removed. A pressure patch was placed over the (right/left) eye, and the patient was transferred to the postanesthesia care unit in stable condition.

References

1. Tan DT, Chee S-P, Dear KB, Lim AS. Effect of pterygium morphology on pterygium recurrence in a controlled trial comparing conjunctival autografting with bare sclera excision. Arch Ophthalmol. 1997;115:1235–40.
2. Liu J, Fu Y, Xu Y, Tseng SC. New grading system to improve the surgical outcome of multirecurrent pterygia. Arch Ophthalmol. 2012;130(1):39–49.
3. Janson BJ, Sikder S. Surgical management of pterygium. Ocul Surf. 2014;12(2):112–9.

Chapter 4
Sealing the Gap with Amniotic Membrane Transplantation for Primary and Recurrent Pterygium

Anny M.S. Cheng and Scheffer C.G. Tseng

Abstract Pterygium is characterized by encroachment of an abnormal fibrovascular tissue from the bulbar conjunctiva onto the cornea (Arch Ophthalmol 115:1235–1240, 1997). Upon reaching the corneal surface, this fibrovascular tissue exerts cicatricial traction that flattens the caruncle and obliterates the semilunar fold (Arch Ophthalmol 130:39–49, 2012). The indications for pterygium surgery include reduced vision due to obscuration of the optical center of cornea, irregular astigmatism, chronic irritation, recurrent inflammation, motility restriction, and cosmetic reasons. Numerous surgical techniques have been described, but the main concern of pterygium surgery is the unpredictable rate and timing of recurrence (Ocul Surf 12:112–119, 2014). After pterygium excision and thorough removal of the abnormal fibrovascular tissue, a gap is created between the recessed edge of the conjunctiva and underlying healthy Tenon (Arch Ophthalmol 130:39–49, 2012; Am J Ophthalmol 160:438–446, 2015). Such gap serves as the main avenue for pterygium recurrence. In this chapter, we summarize a novel surgical technique termed as "sealing the gap" combined with amniotic membrane transplantation to restore the caruncle morphology, create a mechanical barrier against the truncated fibrovascular tissue, and prevent recurrence without the use of mitomycin-C. The same procedure can be used for both primary and recurrent pterygium (Arch Ophthalmol 130:39–49, 2012).

Keywords Amniotic membrane • Anti-inflammation • Anti-scarring • Anti-vascularization • Caruncle • Cryopreserved • Fibrovascular tissue • Gap • Pterygium • Recurrence • Sealing

A.M.S. Cheng (✉)
Ocular Surface Center, Miami, FL, USA

Florida International University, Herbert Wertheim College of Medicine, FL, USA
e-mail: aCheng@ocularsurface.com

S.C.G. Tseng
Ocular Surface Center, Miami, FL, USA
e-mail: stseng@ocularsurface.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_4

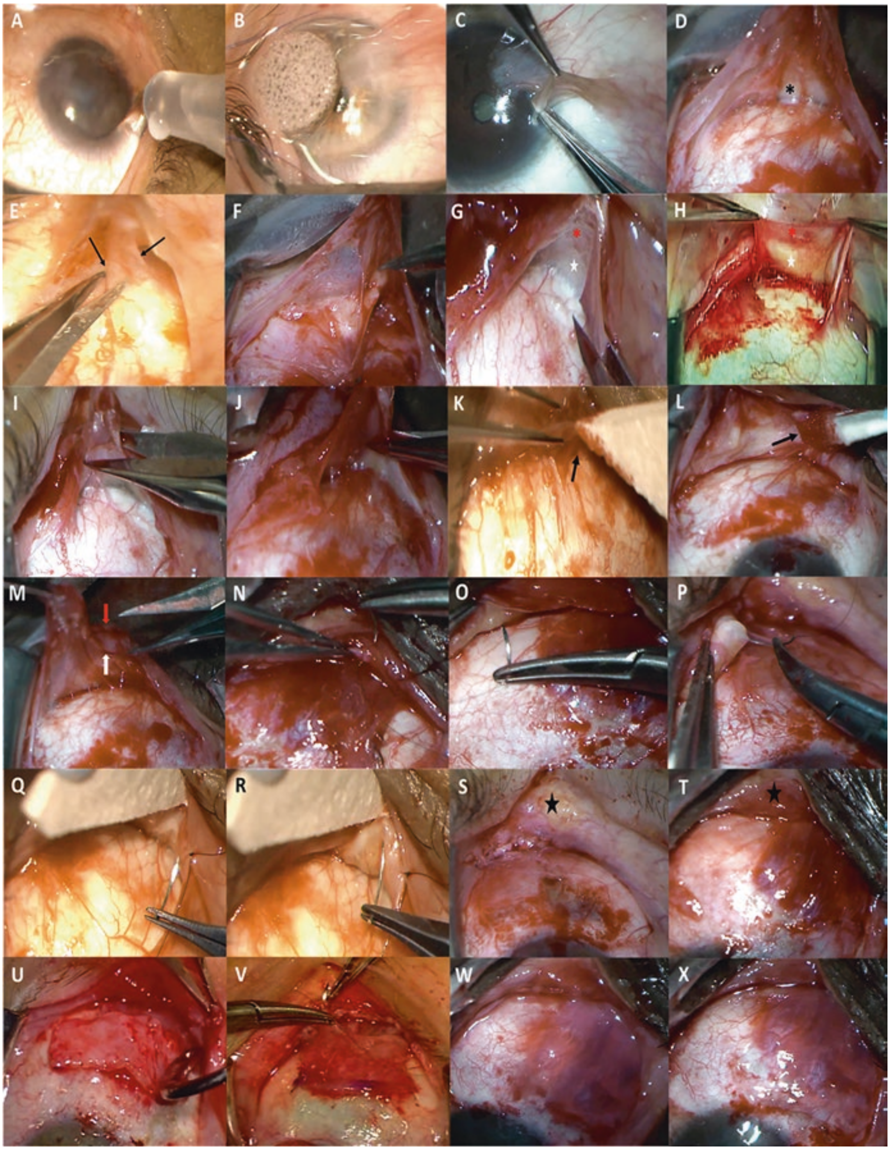

Fig. 4.1 Surgical steps of pterygium by amniotic membrane transplantation. The surgery is performed under topical anesthesia (**a**), hemostasis, and akinesia achieved by traction sutures (**b**). For primary pterygium, blunt dissection is used to separate the head of the pterygium from the corneal surface (**c**). Complete symblepharon lysis by relaxing incisions at the borders to recess the pterygium head to a tension-free state so as to identify the white healthy Tenon's capsule (*asterisk*) above (**d**, an example of recurrent pterygium) the bare sclera. The recessed pterygial head is lifted up by a forceps to illustrate the abnormal fibrovascular tissue (*arrow*) that is distributed under the overlying conjunctival epithelial tissue and adherent over the bare sclera (**e**). The abnormal fibrovascular tissue is grabbed and dissected off from the overlying conjunctival epithelial tissue tip of triangle by a sharp scissors (**f**), whereas the identified healthy Tenon was directly underneath in primary pterygium. Abnormal fibrovascular tissue is stretchable and vascular (*asterisk*) adheres to the normal Tenon, which is identified as a non-stretchable and dense white fascia (*star*) when the conjunctiva is pulled up in primary (**g**) and recurrent (**h**) pterygium, respectively. The abnormal

Indications

Symptomatic pterygium, reduced vision due to encroachment on the visual axis, irregular astigmatism, chronic irritation, recurrent inflammation, motility restriction, and cosmetic preference (Figs. 4.1 and 4.2).

Essential Steps

1. Separation of pterygium head from cornea
2. Relaxing incision to identify healthy Tenon
3. Identification and separation of abnormal fibrovascular tissue from the recessed conjunctival epithelial tissue [2]
4. Removal of abnormal fibrovascular tissue and trim off the pterygium head
5. Fornix and caruncle reconstruction by sealing the gap with a 10-0 (primary) or 9-0 (recurrent) nylon running suture [2, 4]
6. Amniotic membrane transplantation covering the rectus muscle (first layer) and the bare sclera (second layer) for ocular surface reconstruction [4]

Complications

– Pyogenic granuloma
– Symblepharon
– Recurrent pterygium

Template Operative Dictation

Preoperative diagnosis: (*Primary/Recurrent*) pterygium (*OD/OS*)
(CPT code: 68115, 65870, 68326)

Procedure: (1) Excision of pterygium, (2) fornix and caruncle reconstruction by sealing the gap, and (3) amniotic membrane transplantation, multiple layers (*OD/OS*)

Postoperative diagnosis: *Same*

Fig. 4.1 (continued) fibrovascular tissue (*asterisk*) is thoroughly removed and truncated (**i**, **j** for primary and recurrent, respectively). The residual sticky abnormal fibrovascular tissue is caught by a dry Weck-Cel when applied on the sclera (**k**, *arrow*) and subjacent to the conjunctival tissue (**l**, *arrow*). The gap is identified as the space between the edge of the healthy Tenon (**m**, *white arrow*) and the recessed conjunctival edge (**m**, *red arrow*). The gap is sealed with a 10-0 and 9-0 nylon running suture from the superior fornix across the caruncle to the inferior fornix in primary pterygium (**n**–**p**) and recurrent pterygium (**q**, **r**), respectively. Sealing the gap facilitates the bending and rounding of the recessed conjunctiva due to the natural retraction of the healthy Tenon to restore the normal caruncle configuration for both primary (**s**, *star*) and recurrent pterygium (**t**, *star*). For multi-recurrent pterygia eyes without sufficient residual conjunctiva in the caruncle, small conjunctival autograft (**u**) or oral mucosal graft (**v**) is attached to the sealed gap as the epithelial tissue for healing. Two layers of amniotic membrane are used to cover the exposed muscle (**w**) and the entire bare sclera (**x**), respectively, by fibrin glue

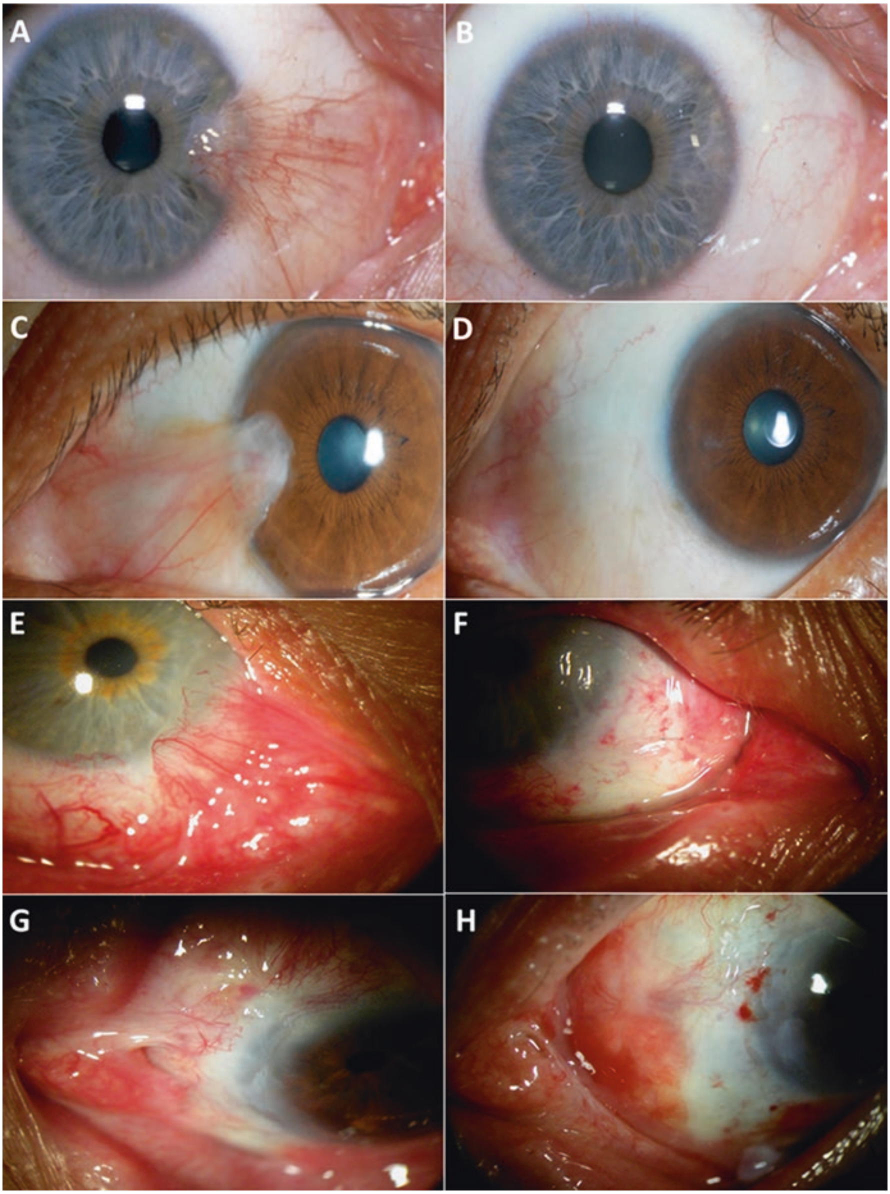

Fig. 4.2 Representative surgical outcome. Preoperative (**a**, **c**) and postoperative (**b**, **d**) of representative patients with sealing the gap in primary (**a**, **b**) and recurrent (**c**, **d**) pterygium, respectively. For patients with insufficient residual conjunctiva in the caruncle, conjunctival autograft (**e**), or oral mucosal graft (**f**) is used to attach to the sealed gap to help provide the epithelial healing source. The caruncle morphology (**b**, **d**, **f**, and **h**) is restored after surgery, and motility restriction is also corrected (**f**, **h**)

Indication: This ____-year-old (*male/female*) had developed (*decreased vision/ ocular redness/ severe photophobia/ foreign body sensation/ motility restriction*) caused by progressive growth of the above problem over the past _____ (*months/ years*) despite the conventional maximal medical therapies including ______. After a detailed review of alternatives, risks, and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. After intravenous sedation, the *(right/left)* eye was prepped and draped in the usual sterile fashion.

The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed in the eye. 1:1000 epinephrine was instilled to create vasoconstriction for subsequent hemostasis control. Topical anesthesia was achieved by 2% Xylocaine gel instilled onto the ocular surface. A *7-0 Vicryl* suture was placed in the superior and inferior limbal sclera taking episcleral bites as a traction suture by hanging down with a heavy locking needle holder. The eye was reflected temporally. The pterygium head was lifted off from the corneal surface using a blunt dissection technique to allow the tissue to recess. A relaxing incision was made along the pterygium border in both superior and inferior bulbar quadrants toward the fornix to reach the bare sclera so as to recess the pterygial head and body and conjunctival tissue to a tension-free position.

A 0.12 forceps was used to pick up the pterygial head, and the abnormal fibrovascular tissue under the overlying conjunctival epithelial tissue and adherent over the bare sclera was identified. Careful dissection of the abnormal fibrovascular tissue from the pterygium head and body along the overlying conjunctival epithelium was completed using sharp scissors. The abnormal fibrovascular tissue was removed by truncating both the superior and inferior fornix toward the nasal caruncle region. Residual abnormal fibrovascular tissue was detected by contact with a dry Weck-Cel due to its stickiness and was selectively removed from both the episcleral surface and the posterior subjacent healthy Tenon region. The abnormal fibrovascular tissue was further removed from the bare sclera, limbus, and cornea by brushing with a #64 Beaver blade and fine dissection with 0.12 forceps *and/or* a dental burr. The recessed pterygial head was then trimmed to allow sufficient tissue for the caruncle reconstruction. The gap sandwiched between the recessed conjunctival epithelial tissue and the underlying healthy Tenon's capsule was identified by two 0.12 forceps; one grabbed the recessed conjunctival edge while the other grabbed the healthy Tenon.

For primary or single-recurrent pterygium with sufficient residual conjunctiva in the caruncle*—This gap was sealed by a running (10-0 nylon (for primary) -or- 9-0 nylon (for recurrent)) from one corner of the fornix to the other, across the caruncle where the imaginary semilunar fold was recreated. Due to the posterior location and the natural traction of the normal Tenon's capsule, the recessed conjunctiva was bent and rounded to restore the caruncle morphology after sealing the gap completely.*

For multi-recurrent pterygium where there is no sufficient residual conjunctiva in the caruncle—*(A small conjunctival autograft from fellow/operated eye -or- oral mucosal graft when both eyes do not have any healthy conjunctiva) was attached to the sealed gap in the caruncle area with a 8-0 Vicryl suture. They are then anchored to the side of muscle belly with two interrupted 10-0 nylon sutures to provide the healing epithelial source.*

A single layer of cryopreserved amniotic membrane was used to cover the medial rectus muscle with the stromal surface facing down using fibrin glue. Another layer of amniotic membrane was used to cover the entire bare sclera with fibrin glue. Excessive fibrin glue and membrane were trimmed off from the borders, and the traction suture was removed.

After topical application of antibiotic (with or without steroid) ointment, the eye was patched A,B and E,F are over the right eyes C,D and G,H are over the left eyes, and the patient was transferred to the post anesthesia care unit in stable condition.

References

1. Tan DT, Chee S-P, Dear KB, Lim AS. Effect of pterygium morphology on pterygium recurrence in a controlled trial comparing conjunctival autografting with bare sclera excision. Arch Ophthalmol. 1997;115:1235–40.
2. Liu J, Fu Y, Xu Y, Tseng SC. New grading system to improve the surgical outcome of multirecurrent pterygia. Arch Ophthalmol. 2012;130(1):39–49.
3. Janson BJ, Sikder S. Surgical management of pterygium. Ocul Surf. 2014;12(2):112–9.
4. Zhao D, Yin HY, Cheng A, Chen R, Sheha H, Tseng SC. Sealing of the gap between the conjunctiva and tenon capsule to improve symblepharon surgery. Am J Ophthalmol. 2015;160(3):438–46.

Chapter 5
Repair of Conjunctivochalasis

Laurence Sperber

Abstract Conjunctivochalasis is defined as nonedematous, redundant conjunctiva which can cause a wide range of symptoms related to the ocular surface and disruption of the tear film. Conjunctivochalasis causes symptoms by the mechanical action of the redundant conjunctiva interfering with tear flow and disruption of the tear film. This is a frequently overlooked condition as the symptoms are similar to those caused by the most common causes of ocular surface disease, dry eye and blepharitis, both of which are also associated with aging. On slit-lamp examination, one sees prolapse of the conjunctiva over the lower lid margin. It is most commonly seen temporally, but it can extend nasally as well. Once recognized, the indication for surgical correction is when the symptoms cannot be controlled by medical management of the ocular surface.

Keywords Repair of conjunctivochalasis • Redundant conjunctiva • Interruption of tear flow • Disruption of tear film • DED • Ocular surface • Anterior segment

Indications

Symptomatic conjunctivochalasis explained by tear meniscus dysfunction or the mechanical action of redundant conjunctiva

Essential Steps

1. Topical anesthetic (if needed—subconjunctival or retrobulbar anesthesia)
2. Marking of crescent tissue to be excised
3. Semilunar-shaped incision of conjunctiva
4. Dissection of conjunctiva from Tenon's capsule
5. Removal of crescent-shaped conjunctiva
6. Hemostasis
7. Suturing or gluing of the conjunctival wound

L. Sperber (✉)
Department of Ophthalmology, New York University School of Medicine,
New York, NY, USA
e-mail: Laurence.Sperber@nyumc.org

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_5

Complications

– Giant papillary conjunctivitis
– Subconjunctival hemorrhage
– Recurrence of the conjunctivochalasis
– Procedure failure
– Conjunctival dehiscence
– Infection or abscess formation
– Restriction of gaze

Template Operative Dictation

Preoperative diagnosis: Conjunctivochalasis *(OD/OS)*

Procedure: Repair of conjunctivochalasis *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old *male/female* presenting with (*a Meller and Tseng grade 1–4* [1]) conjunctivochalasis for ___ (*months/years*) duration. Despite aggressive medical treatment, the patient's symptoms did not resolve, and surgical options were discussed. After a detailed review of risks, benefits, and alternatives, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the operating room and placed on the operating table in the supine position. After a proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, the *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed. Several drops of topical Tetracaine were instilled into the *(right/left)* eye.

If subconjunctival injection was performed—*(2 or 4) % lidocaine was injected in a subconjunctival fashion.*

If retro or peribulbar injection was performed—*A (retro/peri) bulbar injection of 50/50 mix of (2 or 4) % lidocaine and 0.75 % bupivacaine was given (with/without) hyaluronidase.*

The exact area of conjunctiva to be excised was identified *inferiorly*, extending ___ degrees, from the __ to __ o'clock position. A (*marking pen/handheld cautery*) was used to outline the area to be excised. A semilunar-shaped area of conjunctiva was incised then dissected off Tenon's using a Westcott scissors. Special care was taken to ensure that no underlying structures were removed with conjunctiva. Hemostasis was achieved with electrocautery.

[Choose one]:

If the conjunctiva was primarily reapproximated—A total of # interrupted 8-0 *Vicryl* sutures were used to close the conjunctival wound. The eyelid speculum and drape were removed. Antibiotic ointment was instilled in the inferior fornix, and a shield was placed over the eye. The patient was transferred to the post-anesthesia care unit in stable condition.

If amniotic membrane used—The size of the defect was measured to approximately ___ × ___mm, and an amniotic membrane graft was trimmed to ___ × ___mm. The graft was then *glued/sutured* to the area of the conjunctival defect with *fibrin tissue glue/a total of # interrupted 8-0 Vicryl sutures*. The eyelid speculum and drape were removed. Antibiotic ointment was instilled in the inferior fornix, and a shield was placed over the eye. The patient was transferred to the post anesthesia care unit in stable condition.

Reference

1. Meller D, Tseng SC. Conjunctivochalasis: literature review and possible pathophysiology. Surv Ophthalmol. 1998;43:225–32.

Chapter 6
Restoration of Fornix Tear Reservoir by Amniotic Membrane Transplantation in Conjunctivochalasis

Anny M.S. Cheng and Scheffer C.G. Tseng

Abstract Conjunctivochalasis (CCh) presents as loose and redundant conjunctival folds interspersed between the globe and eyelids (Surv Ophthalmol 43:225–232, 1998) and may cause a variety of ocular symptoms that mimic dry eye (Br J Ophthalmol 88:388–392, 2004). CCh disturbs the preocular tear film by blocking the tear drainage, disrupting the tear meniscus, and obliterating the fornix tear reservoir (Cornea 35:736–740, 2016) to interfere tear flow from the fornix reservoir to the tear meniscus (Ophthalmology 120:1681–1687, 2013). A number of surgical procedures have been advocated to treat CCh. Most of these procedures focus on elimination of conjunctival folds close to the tear meniscus but do not address obliterated tear reservoir in the fornix. In this chapter, we summarize a novel surgical technique not only to eliminate the wrinkled conjunctiva in the tear meniscus but also to restore the tear reservoir in the fornix by a significant rearrangement of conjunctival tissue by recession from the limbus to the fornix and by ocular surface reconstruction with amniotic membrane transplantation for the missing Tenon's capsule and the bulbar conjunctiva. Consequently, such a procedure addresses a major disturbance of the tear spread from the fornix to the tear meniscus, which is one important strategy as a practical and effective clinical management algorithm for dry eye (Cornea 35:736–740, 2016).

Keywords Amniotic membrane • Anti-inflammation • Anti-scarring • Anti-vascularization • Aqueous tear deficiency • Conjunctivochalasis • Cryopreserved • Dry eye • Fornix • Recess • Tear • Forniceal restoration

A.M.S. Cheng (✉)
Ocular Surface Center, Miami, FL, USA

Florida International University, Herbert Wertheim College of Medicine, FL, USA
e-mail: aCheng@ocularsurface.com

S.C.G. Tseng
Ocular Surface Center, Miami, FL, USA
e-mail: stseng@ocularsurface.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_6

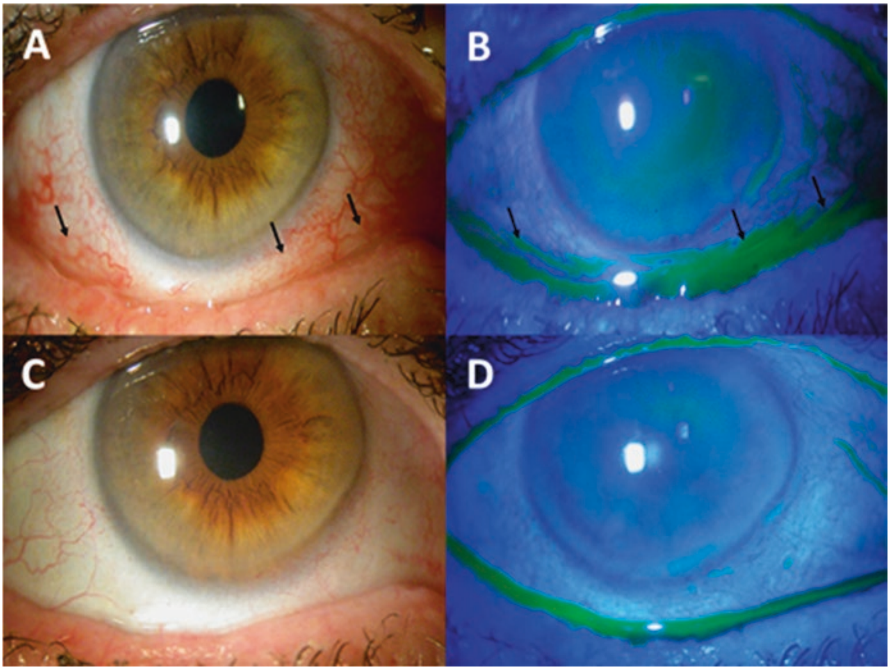

Fig. 6.1 Representative surgical outcome. Preoperative (**a**, **b**) and postoperative (**c**, **d**) of representative patient with fornix reconstruction. This patient presented with chronic redness and epiphora due to redundant conjunctival folds (*arrow*) interposed between the lid margin, and the eye globe obliterated the tear meniscus (**a**, **b**) and the tear reservoir in the fornix. One month after reservoir restoration by amniotic membrane transplantation, the eye regained a smooth, quiet, and noninflamed bulbar conjunctiva (**c**) and a continuous tear meniscus without epiphora (**d**)

Indications

Ocular surface dry eye irritation that remains symptomatic despite maximal medical therapies including topical artificial tears and anti-inflammatory drops; [2] recurrent subconjunctival hemorrhage; [2] visual disturbance due to redundant conjunctival tissue interposed between the lid margin and the eye globe (Fig. 6.1).

Essential Steps

1. Excision of pingueculae (Fig. 6.2)
2. Conjunctiva recession from the limbus to the fornix following peritomy [3, 4]
3. Thorough removal of degenerated Tenon's capsule [3, 4]
4. Restoration of tear reservoir in the fornix by significant rearrangement of recessed conjunctiva to the fornix [3, 4]
5. Amniotic membrane transplantation (multiple layers) to replace Tenon and conjunctival tissue [3, 4]

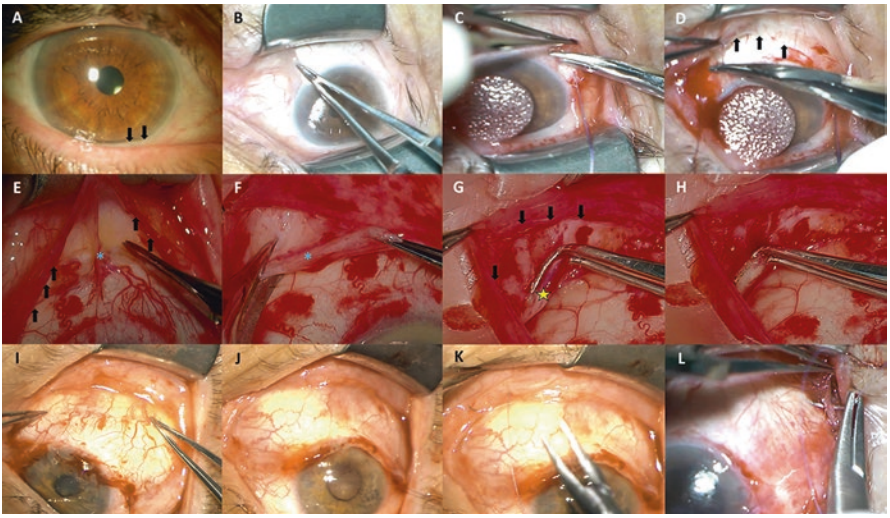

Fig. 6.2 Surgical steps of reservoir restoration procedure by fornix reconstruction, conjunctival recession, and amniotic membrane transplantation. Poor conjunctival adhesion to the sclera from dissolution of the Tenon capsule is noted as evidenced by easy separation of the conjunctiva from the sclera simply by forceps grabbing (**a** *arrow*, **b**). After using several drops of epinephrine 1:1000 for hemostasis and 2 % lidocaine gel for anesthesia, a traction suture made of 7-0 Vicryl is placed 2 mm posterior to the limbus at the 3 and 9 o'clock position and used to rotate the eye upward. An inferior conjunctival peritomy is created 2–3 mm posterior to the limbus (**c**) and extends to remove pinguecula, if present. Rearrangement of conjunctiva by recessing (**d**, *arrow*) from the limbus to the fornix. The abnormal Tenon's capsule (*asterisk*) is grabbed and dissected off from the overlying conjunctival epithelial tissue and thoroughly removed by a pair of sharp scissors (**f**). The recessed conjunctiva (*arrow*) is lifted up by a forceps to identify the prolapsed fat (*star*) that is distributed in the fornix (**g**) and cauterized to create a gap (**h**) for prevention of fat herniation through fornix. Two separate layers of cryopreserved amniotic membrane are laid down to replace Tenon (**i**) and the conjunctival tissue (**j**), respectively. The recessed conjunctiva is anchored at the fornix with 8-0 Vicryl (**k**, **l**)

Complications

- Focal conjunctival inflammation
- Focal conjunctival scar

Template Operative Dictation

Preoperative diagnosis: Conjunctivochalasis (*OD/OS*) (CPT code: 68115, 65870)

Procedure: (1) Excision of conjunctival lesion, (2) fornix reconstruction with significant rearrangement of the conjunctiva, and (3) amniotic membrane transplantation, multiple layers for ocular surface reconstruction (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) had developed (*decreased vision/ocular irritation/pain/redness/photophobia/gritty sensation/dryness/tearing*) despite the conventional maximal medical therapies including ______. After a detailed review of alternatives, risks, and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. After intravenous sedation, the *(right/left)* eye was prepped and draped in the usual sterile fashion.

The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed in the eye. A 1:1000 epinephrine was instilled to create vasoconstriction for subsequent hemostasis control. Topical anesthesia was achieved by 2% Xylocaine gel instilled onto the ocular surface. A pair of 0.12 forceps was used to identify the loose and prolapsed conjunctiva distributed in the entire inferior fornix. (*Nasal/Temporal*) pingueculae were excised, and hemostasis was achieved with eraser. A *7-0 Vicryl* suture was placed in the nasal and temporal limbal sclera with episcleral bites as a traction suture by hanging it with a heavy locking needle holder. The eye was reflected superiorly. A ___mm inferior conjunctival peritomy was created to connect both nasal and temporal bare sclera. The loose and wrinkled conjunctiva were readily separated from the sclera with blunt dissection due to the underneath degenerated and dissolved Tenon's capsule. The abnormal Tenon's capsule, which was distributed under the overlying recessed conjunctival epithelial tissue and adherent over the bare sclera, was dissected off from the overlying conjunctival epithelial tissue and thoroughly removed by a pair of sharp scissors toward the fornix region. The recessed conjunctiva was lifted up by a 0.12 forceps in order to identify the prolapsed fat that was distributed in the fornix, while the gap was cauterized using bipolar in order to create a strong orbital septum that prevented fat herniation through the fornix. Such thermal cauterization further recessed the conjunctiva, achieving a significant rearrangement of conjunctiva to deepen the fornix. Cryopreserved amniotic membrane was removed from the storage medium and cut into two layers. The first smaller layer was laid down to cover the inferior rectus muscle region as a new Tenon's capsule. The second, larger layer was used to replace the missing conjunctiva over the entire bare bulbar sclera with fibrin glue. The recessed conjunctiva was re-anchored back to the fornix with *8-0 Vicryl* suture placed in a mattress fashion at inferior nasal and temporal quadrants, respectively.

If the eye also exhibited superior conjunctivochalasis*—The eye was then reflected downward by the traction suture. Peritomy was performed about* <u>*1–2*</u> *mm from the superior limbus. The underlying degenerate mobile Tenon's capsule was removed by a sharp scissors. One layer of amniotic membrane was secured onto the bare sclera by fibrin glue as a new Tenon's capsule. The incised conjunctiva was closed by an 8-0 Vicryl suture in a running fashion.*

The traction suture was removed. Additional touchups were made at the limbal region that allowed the remaining limbal tissue to be flush with the edge of the amniotic membrane. After topical application of antibiotics (*with/without steroid*) ointment, the (*right/left*) eye was patched, and the patient was transferred to the post anesthesia care unit in stable condition.

References

1. Meller D, Tseng SC. Conjunctivochalasis: literature review and possible pathophysiology. Surv Ophthalmol. 1998;43(3):225–32.
2. Di Pascuale MA, Espana EM, Kawakita T, Tseng SC. Clinical characteristics of conjunctivochalasis with or without aqueous tear deficiency. Br J Ophthalmol. 2004;88(3):388–92.
3. Cheng AM, Yin HY, Chen R, Tighe S, Sheha H, Zhao D, Casas V, Tseng SC. Restoration of fornix tear reservoir in conjunctivochalasis with fornix reconstruction. Cornea. 2016;35(6):736–40.
4. Huang Y, Sheha H, Tseng SC. Conjunctivochalasis interferes with tear flow from fornix to tear meniscus. Ophthalmology. 2013;120(8):1681–7.

Chapter 7
Amniotic Membrane Transplantation in Stevens–Johnson Syndrome

Hajirah N. Saeed, Iason S. Mantagos, and James Chodosh

Abstract Stevens–Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN) represent a spectrum of severe, immune-mediated, mucocutaneous disease secondary to exposure to drugs or infection. SJS/TEN has up to a 35 % mortality rate. Ocular sequelae are the most significant chronic complications of SJS/TEN in survivors. These chronic sequelae can be prevented or lessened by appropriate management in the acute phase of the disease. Visual prognosis and long-term health of the ocular surface lies in the presence and degree of acute eye and eyelid involvement. Amniotic membrane transplantation (AMT), when done correctly in the acute phase, has been shown to decrease chronic ocular surface disease from SJS/TEN. AMT involves the use of amniotic membrane, the innermost layer of the placenta, which consists of a thick basement membrane and an avascular mesenchymal layer. The exact mechanism by which AMT is beneficial is not fully understood, but amnion has antimicrobial and immunomodulatory properties and promotes epithelialization. This procedure can either be done at bedside or in the operating room. Patients who are in a burn intensive care unit and sedated may not need additional anesthesia and the procedure can be done at bedside. Adults who are awake and alert can oftentimes have the procedure performed at bedside with local anesthetic only. Children who are awake and alert will need general anesthesia requiring an operating room setting. The commercial source of amnion in the USA, Bio-Tissue, now has 10 × 5 cm amnion sheets available. However, if unavailable, three of the smaller 3.5 cm^2 amnion pieces can be sutured together to create a single 3.5 × 10.5 cm piece.

H.N. Saeed • J. Chodosh (✉)
Department of Ophthalmology, Massachusetts Eye and Ear,
Harvard Medical School, Boston, MA, USA
e-mail: James_Chodosh@meei.harvard.edu

I.S. Mantagos
Department of Ophthalmology, Boston Children's Hospital,
Harvard Medical School, Boston, MA, USA

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_7

Keywords Amniotic membrane • Stevens–Johnson syndrome • Toxic epidermal necrolysis • Ocular surface disease • Ocular surface reconstruction

Indications

Ocular surface epithelial defects, pseudomembrane formation, or any eyelid margin defects during the first week after onset of SJS/TEN should be considered for AMT.

Essential Steps

1. Fashion a custom-made symblepharon ring with IV tubing or use a ready-made symblepharon ring (Fig. 7.1)
2. Upper and lower eyelashes trimmed
3. Amniotic membrane (AM) laid over the eye with the basement membrane side up
4. AM secured to the upper eyelid with or without bolsters
5. AM deposited into upper fornix
6. Symblepharon ring inserted
7. AM deposited into lower fornix
8. Symblepharon ring adjusted
9. AM secured to lower eyelid with or without bolsters
10. Excess AM trimmed

Complications

Very few complications reported. Those reported include:

– Microbial infection (*it is difficult to make any direct relationship between AMT and infection*)
– Hemorrhage beneath the amnion
– Detachment of the membrane

Template Operative Dictation

Preoperative diagnosis: (*Stevens–Johnson syndrome/toxic epidermal necrolysis*) with (*OS/OD/OU*) involvement

Procedure: Amniotic membrane transplantation (*OD/OS/OU*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) was admitted for management of SJS/TEN. Ophthalmic examination warrants placement of AMT. After a detailed review of risks and benefits, the patient (*or legal surrogate if patient sedated*) elected to undergo the procedure.

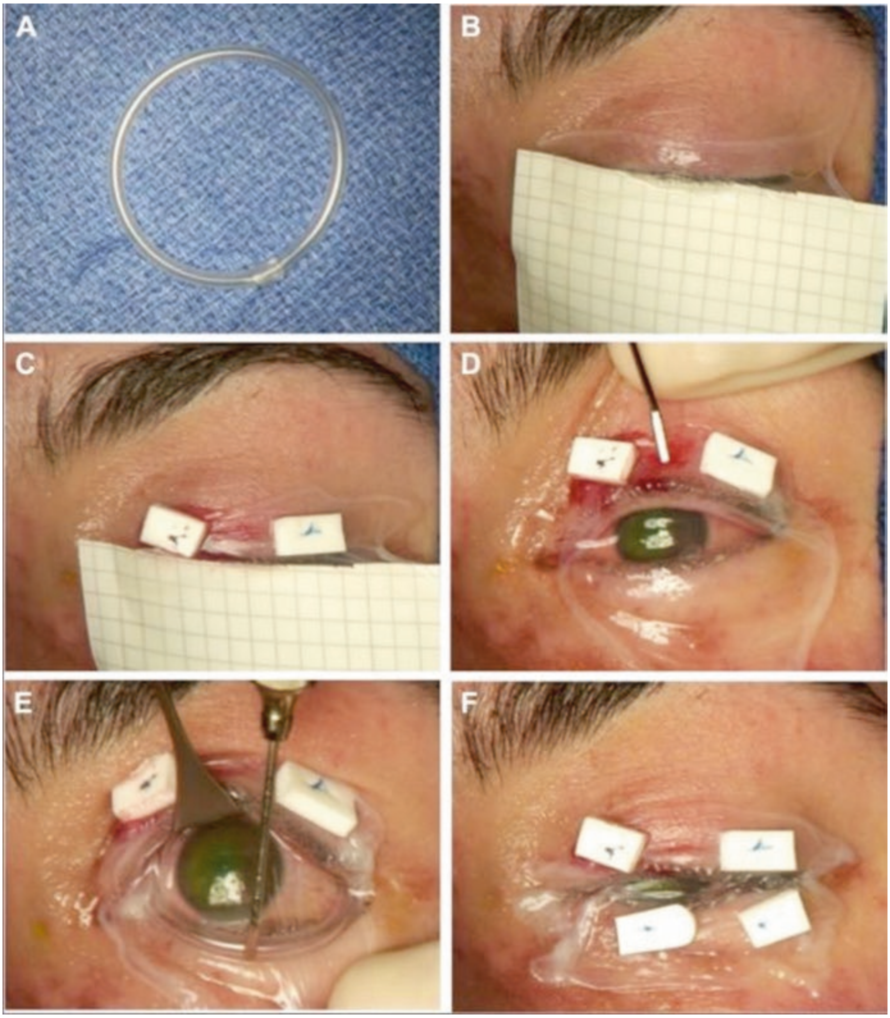

Fig. 7.1 Amniotic membrane (AM) transplantation utilizing a single 5 × 10 cm sheet. (**a**) Creation of symblepharon ring with intravenous tubing. (**b**) Placement of AM over upper eyelid. (**c**) Anchoring of AM using 6-0 polypropylene mattress sutures and bolsters. (**d**) Unfolding of AM over the ocular surface. (**e**) Placement of the custom-made symblepharon ring in the fornices. The ring is already pushed into the upper fornix and is being gently deposited into the lower fornix. (**f**) Anchoring of AM to lower eyelid. Permissions from: Elsevier Limited. Article: Ma KN, Thanos A, Chodosh J, Shah AS, Mantagos IS. A Novel Technique for Amniotic Membrane Transplantation in Patients with Acute Stevens-Johnson Syndrome. Ocular Surface Jan;14(1):31–6. doi: 10.1016/j.jtos.2015.07.002. Epub 2015 Sep 24. Figure on Page 33

Description of the procedure: The patient was identified in the holding area, and the (*right*/*left*/*both*) eye(s) was/were marked with a marking pen (*or if done at bed-side*, *indicate so*). The patient was brought into the OR on an eye stretcher in the supine position. The patient was prepped in the usual sterile ophthalmic fashion. Non-adhesive drapes were used to protect the skin. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, local anesthesia was administered (*if general anesthesia used*, *indicate so*).

The distance between the superior and inferior orbital rims was measured at ___cm and used to estimate the diameter of the symblepharon ring to be constructed. Sterile intravenous tubing was cut so that one edge was oblique and the other edge blunt. The oblique edge was threaded into the blunt opening.

Attention was then turned to the patient's (*right*/*left*) eye. The eyelashes were trimmed short. A _*5 × 10*_ cm piece of amniotic membrane (Bio-Tissue, serial number __; exp. date __/__/__) was removed from its sterile packaging and placed over the eye with the basement membrane side up. Styrofoam bolsters made from the suture packaging (*or plastic if IV tubing was used instead*) were used to secure the amniotic membrane to the upper eyelid with *6-0 Prolene* sutures in a partial thickness fashion about _*2–3*_ mm superior to the lash line.

An eyelid retractor was then used to lift the upper lid, allowing deposition of the amniotic membrane into the upper fornix. The previously fashioned symblepharon ring was then inserted into the upper fornix. The lower eyelid was then retracted to allow deposition of the amniotic membrane into the lower fornix. The membrane extending over the eyelid inferiorly was then sutured to the lower eyelid in the same manner as described above. Care was taken to spread the membrane over the entire ocular surface. Excess membrane was trimmed with Westcott scissors.

If procedure was performed bilaterally—*Attention was then turned to the patient's* (*left*/*right*) *eye*, *and the same exact procedure was then performed using another _5 × 10_ cm piece of amniotic membrane (Bio-Tissue, serial number __; exp. date __/__/__).*

The drapes were removed and (*antibiotic*/*steroid*) ointment was placed on the eye(s). The patient tolerated the procedure well (*and was transferred to the recovery room in stable condition—if done in operating room*).

Chapter 8
Gundersen's Conjunctival Flap

Marguerite McDonald

Abstract The Gundersen's conjunctival flap involves the transposition of conjunctiva over a deepithelialized cornea. Patients with refractory infectious ulcerations, ocular surface disorders with persistent epithelial defect, neurotrophic ulcer, severe dry eye conditions, exposure keratopathy, refractory stromal thinning, peripheral ulcerative keratitis, bullous keratopathy in an eye with poor visual potential, or Mooren's ulcer can be considered for this procedure. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Gundersen's conjunctival flap • Flap • Conjunctiva • 360° peritomy • Conjunctival flap

Indications

Refractory infectious ulcerations, ocular surface disorders with persistent epithelial defect, neurotrophic ulcer, severe dry eye conditions, exposure keratopathy, refractory stromal thinning, peripheral ulcerative keratitis, bullous keratopathy in an eye with poor visual potential, and Mooren's ulcer.

Essential Steps

1. Retrobulbar or subconjunctival and topical anesthetic
2. Placement of a superior rectus traction suture (a long 4-0 silk, double armed; remove needles)
3. Removal of corneal epithelium and scarification of the peripheral cornea with a 75 (3 mm) blade
4. Passage of absolute alcohol on an amputated Weck-Cel sponge over the cornea, to kill any remaining epithelial cells
5. Superior conjunctival incision
6. Dissection of conjunctiva from Tenon's capsule

M. McDonald (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: margueritemcdmd@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_8

7. Creation of a thin "bucket handle" flap that is—ideally—still vascularized at 3 and 9 o'clock
8. Perimetry incision
9. Rotation of flap over the cornea
10. Suture into place

Complications

- Flap retraction
- Button holes
- Epithelial inclusion cysts, or epithelium growing in sheets under the flap
- Subconjunctival hemorrhage
- Recurrence of infection

Template Operative Dictation

Preoperative diagnosis: *Corneal ulcer*, *refractory infectious* (*OD*/*OS*)

Procedure: Gundersen's conjunctival flap (*OD*/*OS*)

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*male*/*female*) who was previously diagnosed with ____________ that has been present for ___ (*months*/*years*). Despite aggressive medical treatment for ________, and in attempts to preserve vision/integrity of the globe by promoting healing, surgical options were discussed with the patient. After a detailed review of risks, benefits, and alternatives, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, local anesthetic was injected in the standard (*retrobulbar*/*peribulbar*) fashion using ____ml of *4 % lidocaine with sodium hyaluronidase*. The (*right*/*left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right*/*left*) eye and an eyelid speculum was placed.

A #____ Beaver Blade was used to remove the corneal epithelium. Absolute alcohol was applied to the cornea to loosen adherent epithelium. After ensuring the complete removal of the epithelial layer, the peripheral cornea was scarified with a *75* (*3 mm*) blade, to increase the likelihood of flap adhesion. Then, a _4_-0 *silk* traction suture was placed through the superior conjunctiva and Tenon's capsule, as far superiorly as possible. The globe was then rotated inferiorly. The conjunctiva was ballooned with local anesthetic with epinephrine to aid in separating the conjunctiva from Tenon's capsule. This was performed at a site distant from the center of the graft so that the conjunctival hole was not overlying the cornea. Westcott scissors were then used to make a _*2*_mm snip incision in the conjunctiva as superiorly as possible, and the conjunctiva was dissected from Tenon's capsule to the limbus at the *3* and *9* o'clock positions. Following the dissection, a 360° perimetry was made separating the conjunctiva from the limbus, and the traction suture was removed. The conjunctival flap was then rotated over the cornea, and sutured into place using at least _*#*_ interrupted _*8*_-0 Vicryl sutures. Special care was taken to pass all sutures through the conjunctival graft and episclera, ensuring a secured graft placement, and a low tension environment.

Eyelid speculum and drape were removed. A drop of atropine 1 % was instilled. Antibiotic eye ointment was placed in the inferior fornix and a shield was placed over the eye. The patient was transferred to the post anesthesia care unit in stable condition.

Chapter 9
EDTA Chelation for Calcific Band Keratopathy

Alanna S. Nattis and Richard J. Nattis

Abstract Calcific band keratopathy is a chronic degenerative condition characterized by the deposition of gray-white opacities in the superficial layers of the cornea, most frequently in the interpalpebral zone. Many chronic ocular and systemic conditions have been associated with band keratopathy, such as hypercalcemia, chronic uveitis, corneal ulcers, chronic corneal edema, corneal chemical burns, and phthisical eyes. Once band keratopathy has extended into the visual axis, it results in significant glare and visual disturbance. Additionally, accumulation of calcium may disrupt the ocular surface, leading to irritation, photophobia, and recurrent corneal erosions. Ethylenediaminetetraacetic acid (EDTA) chelation is the most commonly applied method for removal of band keratopathy and, in most cases, leads to visual recovery and ocular surface rehabilitation.

Keywords Band keratopathy • Juvenile RA • Uveitis • Calcific keratopathy • EDTA • Chelation

Indications

Calcific band keratopathy causing significant visual disturbance, irritation, pain, and destruction of ocular surface.

Essential Steps

1. Application of topical anesthetic to cornea
2. EDTA application to cornea

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

R.J. Nattis
Chief of Ophthalmology and Clinical Professor, Department of Ophthalmology, Good Samaritan Hospital, West Islip, NY, USA
e-mail: rdameye@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_9

3. Removal of calcific keratopathy by Weck-Cel sponge, cotton tipped applicator, or blade
4. Application of antibiotic and cycloplegic eye drops to eye
5. Placement of bandage contact lens

Complications

– Infection
– Inflammation
– Irregular corneal surface causing visual disturbances
– Persistence of corneal irritation
– Corneal abrasion
– Corneal perforation
– Persistent corneal epithelial defect
– Recurrence of band keratopathy

Template Operative Dictation

Preoperative diagnosis: Calcific band keratopathy (*OD*/*OS*)

Procedure: EDTA chelation (*OD*/*OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male*/*female*) was found to have symptomatic calcific band keratopathy leading to symptoms of ocular discomfort and visual disturbance (*OD/OS*). After a detailed review of the risks, benefits, and alternatives, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right*/*left*) eye was marked with a marking pen. The patient was brought into the minor procedure room and placed in the supine position. Topical anesthetic was instilled × 2 into the operative eye. The (*right*/*left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right*/*left*) eye, and an eyelid speculum was placed. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

EDTA was drawn up into a tuberculin syringe and was used to saturate a Weck-Cel sponge. The saturated Weck-Cel sponge was applied to the area of band keratopathy for 1–2 min. The Weck-Cel sponge was then removed from the eye, and the band keratopathy was debrided using a Tooke spatula. Larger calcific plaques were removed using forceps. Application of EDTA was repeated in an area of persistent calcific keratopathy. This was then followed by repeated debridement until the calcium was sufficiently cleared from the ocular surface.

After all visible calcific band keratopathy was removed from the cornea, balanced saline solution was used to copiously irrigate the ocular surface. Following one drop each of Cyclogyl and an antibiotic, the eyelid speculum was removed. A bandage contact lens was placed on the eye. The patient tolerated the procedure well and was carefully monitored for any adverse reactions.

Chapter 10
Penetrating Keratoplasty (PKP)

Alanna S. Nattis and Gerald Zaidman

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Penetrating keratoplasty • PK • Corneal transplant • Keratoconus • Corneal dystrophies • Trauma

Indications

dystrophy, infectious or traumatic stromal scarring, bullous keratopathy, herpetic scaring, corneal perforation, irregular healing, corneal ectasia, iridocorneal endothelial syndrome, or prior failed corneal grafts.

Essential Steps

1. Corneal diameter measurement
2. Corneal donor diameter measurement
3. Scleral support ring application
4. Preparation and punch of donor cornea
5. Partial thickness corneal groove
6. Trephination
7. Excision of patient's cornea
8. Implantation of donor cornea
9. Watertight wound and anterior chamber
10. Application of antibiotic/patch/and shield

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

G. Zaidman
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: pedkera@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_10

Complications

- Rejection of graft
- Endophthalmitis
- Wound dehiscence
- Wound leak
- Flat anterior chamber
- Iris prolapse
- Expulsive hemorrhage
- Cataract formation
- Irregular astigmatism
- Suture abscess/erosion
- Intraocular hypertension

Template Operative Dictation

Preoperative diagnosis: *Corneal scar* (*OD*/*OS*)

Procedure: Penetrating keratoplasty (*OD*/*OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) developed a full thickness corneal scar following a traumatic event. The patient's vision did not improve with (*spectacle/rigid contact lens*) over a period of _____years. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the preoperative area, and the (*right*/*left*) eye was marked with a marking pen. The patient was brought into the OR. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, (*general/local*) anesthesia was induced. The (*right*/*left*) eye was prepped and draped in the usual sterile fashion. (*Steri-Strips*/*tegaderm*/*others*) were used to retract the eyelashes out of the field. The operating microscope was centered over the (*right*/*left*) eye, and an eyelid speculum was placed in the (*right*/*left*) eye.

The corneal diameter was measured with calipers, and it was determined that performing an __×__mm excision with an __×__mm donor would be appropriate. A scleral support fixation ring was sutured onto the globe using _#_ interrupted *7-0 silk* sutures. A moist ophthalmic sponge was placed on the patient's cornea. Attention was turned to the donor cornea, which had come from a ____-year-old (*male/female*) who had died of ____ on (*month*, *day*, *year*), which was rated in (*fair/good/excellent*) condition with a cell count of _#_ and collected on (*month, day*, *year*) by the eye bank. The donor cornea was removed from the corneal storage media and placed on the __×__mm corneal punch. Care was taken to ensure that the endothelial side was face up. Corneal storage media was added to the donor corneal punch and set aside.

Attention was then turned to the patient's cornea, and a partial thickness corneal groove was then made with the __×__mm trephination blade and handle. The anterior chamber was entered perpendicularly with a micro-sharp, and the cornea was excised using right and left corneal scissors following the injection of viscoelastic into the anterior chamber. The donor cornea was transplanted into place using _#_ cardinal sutures of *9-0 nylon* at the *12 o'clock*, *3 o'clock*, *6 o'clock*, *and 9 o'clock positions* (*or more*).

The wound was then closed with _#_ additional sutures of *10-0 nylon*. The previously placed cardinal sutures were then removed and replaced with *10-0 nylon sutures*. All the suture knots were trimmed and buried. The wound was tested and noted to be watertight. The anterior chamber was deep and well formed. The fixation ring was then removed. Subconjunctival injections of (*antibiotics/steroids*) were given. Topical steroid ointment was placed in the (*right/left*) eye, and the speculum was removed. A patch and shield was placed over the (*right/left*) eye. The patient tolerated the procedure well and was transferred to the post anesthesia care unit in stable condition.

Chapter 11
Manual Deep Anterior Lamellar Keratoplasty (Manual DALK)

Alanna S. Nattis and Eric D. Rosenberg

Abstract Deep anterior lamellar keratoplasty is a partial thickness corneal graft technique void of endothelium. DALK technique offers several advantages over penetrating keratoplasty such as it being a partial thickness procedure, and decreased risk of endothelial graft rejection. DALK has shown similar VA outcomes when compared to PKP. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Manual deep anterior lamellar keratoplasty • MDALK • DALK • Cornea • Transplant • Corneal dystrophy • Keratoconus

Indications

Corneal scaring, keratoconus, corneal ectasia, stromal dystrophy, stromal opacities, and superficial recurrence of corneal dystrophy post-corneal transplant.

Essential Steps

1. Measurement of donor graft/cornea punch size
2. Lamellar dissection
3. Preparation of donor cornea
4. Suturing of donor cornea to recipient bed
5. Suture knot burial
6. Injection of subconjunctival antibiotics and steroid

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_11

Complications

- Graft rejection
- Opacification at the graft-donor interface
- Interface haze
- Corneal perforation
- Wound leakage
- Graft dehiscence
- Pseudoanterior chamber
- Keratitis

Template Operative Dictation

Preoperative diagnosis: *Corneal dystrophy* (*OD/OS*)

Procedure: *Deep anterior lamellar keratoplasty* (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This _____-year-old (*male/female*) with a well-known and documented history of (*pellucid marginal degeneration/post-LASIK ectasia/lattice stromal dystrophy/granular stromal dystrophy/macular stromal dystrophy/superficial recurrence of corneal dystrophy in corneal graft/superficial corneal opacity*) complained of decreased vision despite the use of spectacles/contact lenses. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying the correct patient, procedure, site, position, and special equipment prior to starting the case. General anesthesia was induced. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye.
Following anesthesia and ophthalmic akinesia, a wire lid speculum was placed into the patient's (*right/left*) eye. After examination under anesthesia, it was determined that a ____-mm excision with an _____-mm donor size would be appropriate. A marking pen was used to outline the site of trephination on the cornea. A partial thickness trephination of approximately two-thirds corneal thickness (up to 350 μm) was performed using a ____-mm trephination blade into the lamellar bed.
Attention was turned toward the donor cornea which had come from a ____-year-old (*M/F*) that died of ____ on (*date*) that was rated in (*good/very good/excellent*) condition with a ____ cell count. The cornea was removed from the Optisol media and placed on the ____-mm Barron corneal punch with special attention paid to

keeping the endothelial side up. The donor cornea was then dried using a Weck-Cel sponge and placed under the operating microscope where an anterior lamellar dissection was performed using a crescent blade. The anterior layer of the donor cornea was stored back into the Optisol media, while the posterior layer was discarded.

[Choose one]

If layer by layer technique*—Using a series of successively larger bevel-up crescent lamellar dissectors, attention was turned back toward the dissection into the deep stroma of the patient's cornea. The cornea was then excised layer by layer using right and left corneal scissors. The excised recipient cornea was sent for histo-pathological analysis.*

If air-guided deep stromal technique (Melles')*—Attention was turned back toward the lamellar dissection into the deep stroma of the patient's cornea. Using a guarded diamond blade, a 50% depth scleral incision approximately ___mm in width was made ___mm from the limbus. A sclerocorneal tunnel was then dissected extending ___mm into the clear cornea. A paracentesis incision was created at ___o'clock, and anterior chamber aqueous was exchanged for a sufficient amount of air. The air to endothelium interface was used as a reference plane to visualize the corneal thickness and ensure adequate depth of dissection. Through the scleral pocket, a bevel-up crescent blade was inserted and gradually advanced. Using the mirror reflex, the deep stroma was dissected until a corneal depth of 95% was attained. A blunt spatula was used to create a continuous dissection plane at the correct depth. The air bubble was partially evacuated, so as to reduce IOP, and viscoelastic injected within the dissection bed in order to displace the posterior layers toward. The excision of the anterior stroma is completed by trephination.*

If big bubble technique (Anwar's)*—Using a crescent blade, attention was turned back toward the lamellar dissection into the deep stroma of the patient's cornea. ___% of the patient's anterior stromal tissue was removed. A pointed dissector was then used to create a peripheral pocket in the residual deep stromal tissue (located at a depth of approximately ___microns from the endothelium). A bottom port, blunt-tipped, air injection cannula was then placed into the pocket, where air was injected with sufficient pressure. A large pneumatic dissection plane was noted. (A paracentesis incision was created to reduce aqueous and intraocular pressure.) The pneumatic pressure was released using a sharp mini-diamond blade. A spatula was introduced into the plane, and the anterior stromal tissue incised over the spatula using a sharp knife. Four quadrants were created in this fashion. The anterior stromal tissue was then excised using right and left corneal scissors. The excised recipient cornea was sent for histopathological analysis.*

If viscoelastic dissection technique*—Using a crescent blade, attention was turned back toward the lamellar dissection into the deep stroma of the patient's cornea. ___% of the patient's anterior stromal tissue was removed. A pointed dissector was then used to create a peripheral pocket in the residual deep stromal tissue (located* *at a depth of approximately ___microns from the endothelium). A bottom port, blunt-tipped, viscoelastic injection cannula was then placed into the pocket, where viscoelastic was injected with sufficient pressure to create a dissection plane. (A paracentesis incision was created to reduce aqueous and intraocular pressure. Air was then injected into the anterior chamber) The viscoelastic bubble was deflated using a sharp mini-diamond blade. Corneal scissors were used to carry out the remainder of the incision, and four quadrants were created in this fashion. The anterior stromal tissue was then excised using right and left corneal scissors. The excised recipient cornea was sent for histopathological analysis. Air was exchanged for BSS, and the wound checked for leaks.*

If hydrodelamination technique*—Balanced saline solution (BSS) was injected intrastromally in all four quadrants of the partially trephined central disk using a ___-gauge needle. The central disk was noted to be completely opaque and swollen when compared to the peripheral cornea. (A paracentesis incision was created to reduce aqueous and intraocular pressure.) As the stoma swelled, layers were removed using a spatula and right and left corneal scissors. Upon deeper stromal manipulation, Descemet's membrane was noted to detach from the anterior lamina and at this point dissection was stopped.*

The donor cornea was then taken and placed in position on the recipient cornea using four cardinal interrupted *9-0 nylon* sutures. The wound was then closed with multiple interrupted sutures of *10-0 nylon*. The cardinal sutures were cut and replaced with *10-0 nylon*. All the suture knots were trimmed and buried. Subconjunctival injections of antibiotic and steroid were given. Antibiotic ointment was placed on the eye, and the eyelid speculum was removed. The eye was closed with a patch and shield. The patient tolerated the procedure well and left the operating room in good condition.

Chapter 12
IntraLase-Enabled Deep Anterior Lamellar Keratoplasty (IEDALK)

Winston Chamberlain and Eric D. Rosenberg

Abstract Deep anterior lamellar keratoplasty is a partial thickness corneal graft technique void of endothelium. DALK technique offers several advantages over penetrating keratoplasty such as it being an extraocular procedure, never entering into the anterior chamber. Additionally, there is no risk of endothelial rejection, and no need for immunosuppressive medications. DALK has shown similar VA outcomes when compared to PKP. IntraLase-enabled DALK offers a more accurately prepared and matched transplant. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords IntraLase-enabled deep anterior lamellar keratoplasty • IEDALK • DALK • Femtosecond laser • Cornea • Transplant • Corneal dystrophy • Keratoconus

Indications

Corneal scaring and other stromal opacities, keratoconus, corneal ectasia, stromal dystrophy, and superficial recurrence of corneal dystrophy.

Essential Steps

1. Measurement of patient's cornea at slit lamp (diameter).
2. Pachymetry of host cornea with ultrasound or optical coherence tomography.
3. Selection of graft size and cut pattern: standard sizes include ((a) 8.0 mm, (b) 8.5 mm, and (c) 9.0 mm). Standard cut patterns include zigzag, top hat, and mushroom. (*Note: donor tissue is frequently cut at the eye bank to same size specifications in advance.*)

W. Chamberlain
Department of Ophthalmology, Casey Eye Institute, Oregon Health & Science University, Portland, OR, USA
e-mail: chamberw@ohsu.edu

E.D. Rosenberg (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_12

4. IntraLase-assisted cut performed on the patient: a partial thickness trephination based on predetermined corneal thickness. Sparing 70–100 μm of the posterior cornea. (*Optional*, *30 (angled) × 15° (arc) channel for a pneumodissection cannula which can be placed inside the trephination area at <8.0 mm diameter, sparing 40–70 μm of posterior stroma.*)
5. Patient transferred to OR.
6. Prep and drape.
7. Previously obtained IntraLase cut donor cornea from the eye bank was placed onto the sterile field and prepared for transplantation.
8. Paracentesis.
9. Small air bubble placed into the AC.
10. Host partial trephination cut opened with sinskey hook.
11. Insertion of pneumodissection cannula into deep stroma (*using the preplaced channel if available*) and rapid infusion of air to generate a big bubble with Descemet's barring.
12. Lamellar dissection and removal of stroma over big bubble.
13. Stromal stab to decompress the big bubble.
14. Big bubble refilled with cohesive viscoelastic.
15. Sequential removal of remaining stroma in a divide-and-conquer fashion.
16. Wash off any remaining viscoelastic barred on to Descemet's membrane.
17. Strip Descemet's membrane from donor cornea under microscope with Trypan Blue staining to assist in visualization.
18. Suturing of donor cornea to recipient bed.
19. Suture knot burial.
20. Reduce air bubble in the AC to ~30 % in order to prevent pupillary block. (*Note: bubble will also promote Descemet reattachement to the graft.*)
21. Injection of subconjunctival antibiotics and steroid.

Complications

– Graft rejection (stromal or epithelial)
– Interface haze
– Descemet's perforation/rupture
– Wound leakage
– Graft dehiscence
– Double anterior chamber (failure of Descemet to reattach to donor cornea)
– Infectious keratitis
– Recurrence of pathology in donor graft

Template Operative Dictation

Preoperative diagnosis: *Corneal dystrophy* (*OD/OS*)

Procedure: *IntraLase-enabled deep anterior lamellar keratoplasty (OD/OS)*

Postoperative diagnosis: *Same*

Indication: This _____-year-old (*male/female*) with a well-known and documented history of (*pellucid marginal degeneration/post-LASIK ectasia/lattice stromal dystrophy/granular stromal dystrophy/macular stromal dystrophy/superficial recurrence of corneal dystrophy in corneal graft/superficial corneal opacity/keratoconus/corneal degeneration*) complained of decreased vision despite the use of spectacles/contact lenses and medical management. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the patient's (*right/left*) eye was initially marked at the slit lamp for corneal centration. (*He/she*) was then taken into the refractive suite where a time-out was performed verifying correct patient, procedure, and site. Settings for a *9.0* mm (*mushroom/zig-square/zigzag*) C IntraLase-assisted cut was performed leaving residual stromal bed of *70* μm based on the previously taken pachymetry map. An additional *15* ° channel was cut at *30* ° at an approximately *8.0* mm diameter to a depth of *530* μm based on pachymetry measurements to assist in the formation of a dissection plane. The patient was then patched and transported to the OR on an eye stretcher in the supine position. A second proper time-out was performed verifying the correct patient, procedure, site, position, and special equipment prior to starting the case. General anesthesia was induced. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye. Following anesthesia and ophthalmic akinesia, a wire lid speculum was placed into the patient's (*right/left*) eye.

[Choose one]

If big bubble technique (Anwar's)*—Using a sinskey hook, attention was turned toward the lamellar dissection and separation of the precut host corneal button. A paracentesis wound was fashioned over the temporal quadrant, and a small air bubble was placed into the anterior chamber. A bottom port, blunt-tipped, air injection cannula was then introduced into the lamellar pocket to the appropriate depth, where air was injected with sufficient pressure. A large pneumatic dissection plane was noted. Approximately 50 % of the anterior stroma was removed with a crescent blade. The pneumatic pressure was released using a sharp mini-diamond blade. The big bubble space was re-inflated with cohesive viscoelastic. A spatula was introduced into the plane, and the remaining portions of anterior stromal tissue were incised using blunt-tipped Fogla curved cornea scissors and viscodissection. The excised recipient cornea was sent for histopathological analysis.*

If viscoelastic dissection technique*—Using a sinskey hook, attention was turned toward the lamellar dissection and separation of the precut host corneal button. A paracentesis wound was fashioned over the temporal quadrant, and a small air bubble was placed into the anterior chamber. A bottom port, blunt-tipped, viscoelastic injection cannula was then placed into the lamellar pocket to the appropriate depth, where viscoelastic was injected with sufficient pressure to create a dissection* *plane. The viscoelastic bubble was deflated using a sharp mini-diamond blade. A spatula was introduced into the plane, and the remaining portions of anterior stromal tissue were incised using blunt-tipped Fogla curved cornea scissors. The excised recipient cornea was sent for histopathological analysis.*

If hydrodelamination technique*—Balanced saline solution (BSS) was injected intrastromally in all four quadrants of the partially trephined central disk using a ___-gauge needle. The central disk was noted to be completely opaque and swollen when compared to the peripheral cornea. A paracentesis wound was fashioned over the temporal quadrant, and a small air bubble was placed into the anterior chamber. As the stoma swelled, layers were removed using a lamellar blade and right and left blunt-tipped Fogla corneal scissors. Upon deeper stromal manipulation, Descemet's membrane was noted to detach from the anterior lamina, and at this point dissection was stopped. The excised recipient cornea was sent for histopathological analysis.*

The previously IntraLase cut donor cornea was obtained from the eye bank which had come from a ____-year-old (*M/F*) that died of ____ on (*date*) that was rated in (*good/very good/excellent*) condition with a ____-cell count. The cornea was removed from the Optisol media, stained with Trypan Blue and stripped with forceps under the operating microscope in media. The anterior layer of the donor cornea was stored back into the Optisol media, while the posterior layer was discarded.

The donor cornea was then taken and placed into position on the recipient cornea. Radial alignment marks were used to guide _#_ interrupted cardinal sutures that were placed with *10-0 nylon* sutures, and knots were buried. A 16-bite running *10-0 nylon* suture was placed around the donor cornea and adjusted to provide even tension. The corneal running suture knot was buried at the graft host interface. The existing anterior chamber air bubble was adjusted to ~30–50 % volume in order to tamponade Descemet's membrane against the DALK graft at a physiologic pressure. The air bubble was reduced to an approximately _*8.0*_ mm size, and the AC was brought to physiologic pressure with BSS on a cannula. Subconjunctival injections of antibiotics and steroid were given. Drapes were removed, an eye patch and shield were placed, and the patient was taken from the operating room in good condition.

Chapter 13
Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK)

Eric Donnenfeld and Alanna S. Nattis

Abstract Patients evaluated and deemed appropriate for such surgical intervention. Endothelial dysfunction, pseudophakic corneal edema, bullous keratopathy, ICE syndrome, or any other pathology needing further surgical intervention. Patients should be educated about the risks and benefits of the procedure, including alternatives.

Keywords Descemet's stripping automated endothelial keratoplasty • DSAEK • Corneal transplant • Endothelium • Endothelial transplant • Endothelial dysfunction

Indications

Endothelial dysfunction, Fuchs' dystrophy, pseudophakic corneal edema, pseudophakic and aphakic bullous keratopathy, repeat or failed corneal graft, and iridocorneal endothelial syndrome.

Essential Steps

1. Scleral tunnel
2. Healon injection into AC
3. Descemetorhexis
4. Preparation of donor tissue
5. Tissue is folded
6. Graft insertion into the AC
7. Slow BSS and air injection to unfold donor tissue
8. Air injection into AC
9. Compression of the cornea
10. BSS exchanged for air in the AC
11. Patient in supine position

E. Donnenfeld (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: ericdonnenfeld@gmail.com

A.S. Nattis
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_13

Complications

– Rejection of graft
– Graft dislocation
– Primary graft failure
– Elevated intraocular pressure
– Infectious keratitis
– Endophthalmitis
– Wound dehiscence
– Peripheral anterior synechia
– Irregular astigmatism

Template Operative Dictation

Preoperative diagnosis: *Fuchs' dystrophy (OD/OS)*

Procedure: Descemet's stripping automated endothelial keratoplasty *(OD/OS) (and cataract extraction with placement of PCIOL).*

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*male/female*) who was previously diagnosed with Fuchs' dystrophy ___ (*months/years*) prior. Medical treatment for corneal decompensation was initiated, and in attempts to continue preserving vision, surgical options were discussed. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The pupil was dilated pharmacologically. Local anesthetic was injected in the standard (*retrobulbar/peribulbar*) fashion using ____ml of lidocaine and Marcaine in a 50:50 mix. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. The eye was prepped and draped in the usual sterile fashion. Steri-Strips were used to retract the eyelashes out of the field. The operating microscope was centered over the eye and an eyelid speculum was placed.

A superior peritomy was created with use of the 0.12 forceps and Westcott scissors. Hemostasis of the underlying scleral bed was achieved with electrocautery. Using a curved crescent blade, a ____mm scleral tunnel was created. A ___mm keratome blade was then used to connect the scleral tunnel into the anterior chamber. A diamond knife was used to make ___ additional mid-peripheral paracentesis incisions.

If cataract extraction was completed—*Viscoelastic was placed in the anterior chamber. A ____mm continuous curvilinear capsulorrhexis was then carried out using capsulorrhexis forceps and a cystotome. Hydrodissection was gently performed with balanced saline solution on a cannula, and a fluid wave was noted.*

Phacoemulsification and phacoaspiration was used to disassemble and remove the nucleus and was followed by coaxial irrigation and aspiration of the cortical material using an irrigation/aspiration (I/A) handpiece. A total _____ absolute phaco time (APT) was used during the procedure. Viscoelastic was injected to inflate the capsular bag and reform the anterior chamber. An intraocular lens, (Alcon/AcrySof/Tecnis) model #_______, serial #______ with a power of _____ diopters, was inspected and found to be defect free and injected into the capsular bag without difficulty. The IOL was well centered and in good position before continuing.

The ___-mm trephine was used to mark the anterior surface of the cornea with methylene blue ink, and a reverse sinskey hook was used to score a ____-mm-diameter circle on Descemet's membrane. Descemet's membrane was then stripped away using a DSAEK rake. The removed tissue was unfurled externally and inspected to ensure complete removal of host Descemet's membrane. Irrigation and aspiration was utilized to remove remaining viscoelastic.

The donor tissue had been previously trephinated with a ____-mm-diameter blade. The anterior corneal button was discarded. The donor endothelium was coated with viscoelastic and folded into a "taco" with the endothelial side interiorly. The donor tissue was then inserted into the anterior chamber and opened with the donor endothelial cells oriented posteriorly.

The donor graft was positioned to cover the area of the previously stripped Descemet's membrane. The incision was closed with ____ interrupted *#10-0 nylon*. An air bubble was placed under the graft in the anterior chamber to hold the transplant tissue in position for ____minutes. A diamond blade was used to tap through host cornea into the donor-host interface. Interface fluid was massaged out using a Lindstrom LASIK roller. After the full ____ minutes, partial fluid-air exchange was performed to relieve pupillary block. Eye pressure was noted to be appropriate, and the eye was leak-free. The conjunctiva was then re-approximated and closed with electrocautery. Solu-Medrol and Ancef subconjunctival injections were placed. Antibiotic drops and Maxitrol ointment were placed in the eye, and the speculum was removed. The eye was then patched and shielded. The patient tolerated the procedure well and was sent to the recovery room in the supine position for 1 h, prior to reexamination by the surgeon.

Chapter 14
Keratoprosthesis

James V. Aquavella

Abstract The concept of a clear device imbedded in the cornea to restore vision was first expressed in the eighteenth century. The modern era began in the 1950s with the work of WM Stone conducted in Boston's Howe Laboratory. The team of Devoe, Castroviejo, and Cardona labored in the mid-twentieth century demonstrating the potential utility of the technique in severely damaged eyes. The current success is attributed to the design changes instituted by Claes Dohlman working at Harvard. The concepts of a fenestrated back plate, the protection of the surface with a bandage contact lens and the use of prophylactic antibiotics, were instrumental. Others contributed multiple changes in operative technique.

For a half-century, keratoprosthesis was perceived by cornea surgeons as an infrequently performed procedure associated with high rate of complication and only indicated in bilateral cases of irreversible cornea blindness. Success was considered as the ability to provide sufficient vision to enable self-care for a year or two. Developments were slow to come by in view of the small number of cases perceived to be candidates for the procedure. The close relationship between a biocompatible material, the specific design of the device, and the surgical technique necessary for successful implantation continues to this day. In the early days of the twenty-first century, the developments in device design, surgical technique, and postoperative management combined to transform the procedure in a very significant positive manner. While the acceptance of the technique has been slow, over the past decade, thousands of procedures utilizing the Boston type 1 device have been performed worldwide.

Keywords Keratoprosthesis • Boston type 1 • KPro • Graft failure • Ocular surface • Glaucoma • Cornea transplant • Aqueous shunt • Pars plana vitrectomy • Retroprosthetic membrane

Indications

While the primary indication continues to be cases in which penetrating keratoplasty is either contraindicated, or unadvisable, such as repeated graft failure, more and

J.V. Aquavella (✉)
Department of Ophthalmology, Flaum Eye Institute, University of Rochester Medical Center, Rochester, NY, USA
e-mail: James_Aquavella@urmc.rochester.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_14

more surgeons are turning to the procedure as an alternative to cornea transplantation as a result of the rapid visual rehabilitation associated with the procedure. Cases with normal ocular surface and good lid motion are preferred, and cases with autoimmune disease should only be contemplated by very experienced KPro surgeons, since they are always complex. These autoimmune cases as well as the infant population require a significant infrastructure and a very experienced team of subspecialists, not only the single cornea surgeon (Figs. 14.1 and 14.2).

Essential Steps

1. Preoperative evaluation of the potential for useful acuity, intraocular pressure status, and control of glaucoma, demonstration of an anatomically attached retina, axial length determination (essential to obtaining an appropriately powered

Fig. 14.1 Keratoprosthesis

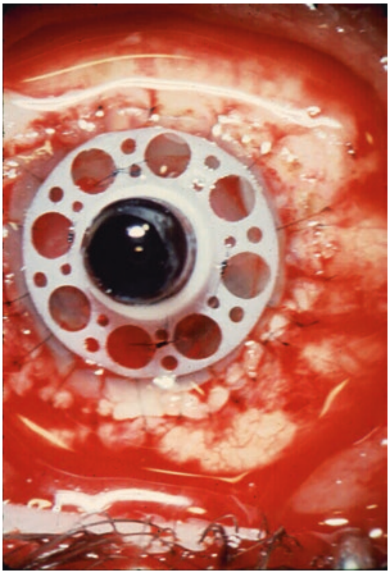

Fig. 14.2 Design changes instituted by Claes Dolman

device), and cataract/intraocular lens status. These components are essential to the routine work up necessary to evaluate potential candidates. Once the determination has been made, an appropriate aphakic or pseudophakic device along with necessary donor tissue must be on hand.

2. Either general anesthesia or retrobulbar injection with sedation is appropriate depending on the specifics of the cases and the desire of the primary surgeon.
3. Standard preparation, draping, and speculum insertion will also depend on the nature of the case. Vitreoretinal surgeons and anterior segment surgeons have differing requirements.
4. Placement of a Flieringa ring for stability is the preferred first step (Fig. 14.3).
5. Creation of 360° conjunctival dissection is performed if indicated.
6. Creation of a central 3 mm trephine opening in the donor tissue can be facilitated by a variety of specialized devices. This is followed by a concentric peripheral cut of appropriate diameter (8–10 mm). The placement of these trephinations must be carefully controlled to enable proper positioning of the keratoprosthesis as well as the subsequent placement of the sutures (Figs. 14.4, 14.5, and 14.6).
7. Assembly of device and placement in balanced salt solution. In order to minimize the "open-sky" time, the device should be ready for speedy implantation (Fig. 14.7).

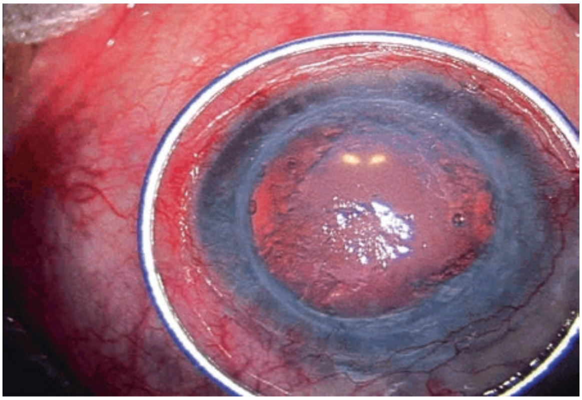

Fig. 14.3 Placement of a Flieringa ring

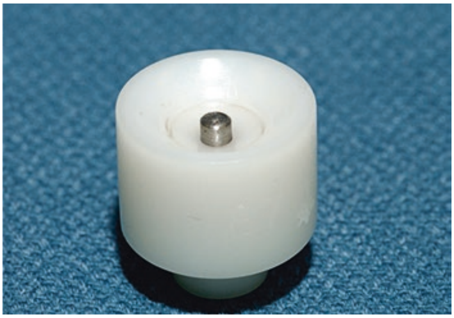

Fig. 14.4 Trephination

Fig. 14.5 Trephination

Fig. 14.6 Trephination

8. Nonpenetrating trephine outline in host cornea is then placed. It should allow for 0.5 mm oversized donor tissue (Fig. 14.8).
9. Cautery in wound to avoid hemorrhage into anterior chamber is wise as blood will require several days to absorb, delaying the process of visual restoration.
10. Guarded entrance into anterior chamber can be made with a diamond blade.
11. The use of a cyclodialysis spatula is useful prior to cutting the pathological tissue, in order to protect the underlying iris tissue and to lyse synechia. In many cases anterior and posterior iris adhesions will need to be severed.
12. Excision of pathological cornea tissue can then be completed.
13. A 360° assurance of open angle and space to accommodate the back plate of prosthesis must be obtained.
14. Viscoelastic is instilled into the angle and over the vitreous face as necessary.
15. Sphincterotomy may be performed if the pupil is miotic and fixed or eccentric.

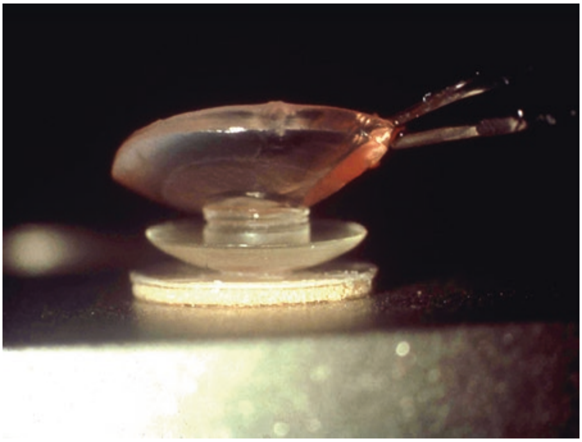

Fig. 14.7 Minimize the "open-sky" time

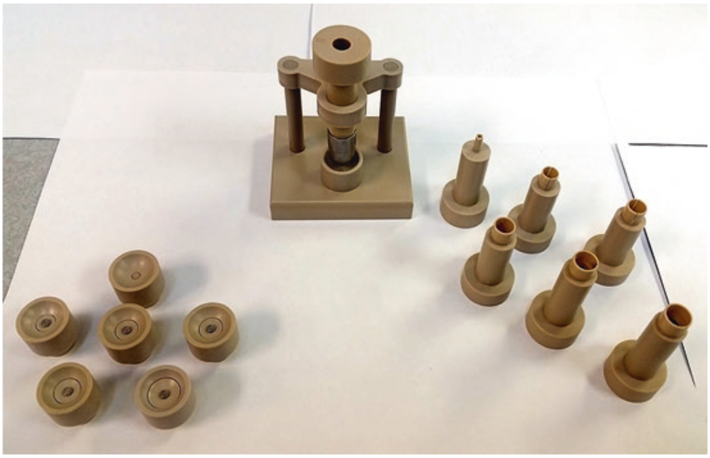

Fig. 14.8 Nonpenetrating trephine outline in host cornea

16. Peripheral iridectomy or a full sector iridectomy is necessary in all cases.
17. Cataract or natural lens extraction or removal of a preexisting IOL is preferred by most surgeons in order to create a single-chamber eye. An aphakic prosthesis device is then mandatory.
18. Limited anterior vitrectomy, if necessary, may be performed at this point.
19. Placement of the assembled device and suturing with 12–16 (9-0 or 10-0) nylon sutures (Fig. 14.9).
20. Trimming suture ends and rotation into recipient cornea.
21. If Ahmed shunt is to be placed, placement of shunt.
22. Consider a pars plana vitrectomy performed by a vitreoretinal surgeon (our preference) in all cases. This enables 360° inspection of the retina and any repairs which may be indicated.

23. Removal of Flieringa ring.
24. Consider advancement of conjunctival flap to the border of the optical cylinder. It may be wise to remove all viable epithelial cells with absolute alcohol and betadine solution prior to closing the conjunctiva in such fashion as to prevent subsequent exposure.
25. Placement of hydrophilic bandage lens (Kontour 16 mm diameter is supplied with the device) (Fig. 14.10).
26. Monocular dressing with antibiotic solution (not ointment).

Complications

- Vitreous loss
- Hemorrhage into anterior chamber
- Vitreous hemorrhage
- Retinal detachment
- Poor centration of optic due to malpositioned trephination
- Glaucoma, often rapidly progressive when associated with KPro, must be treated aggressively to prevent vision loss. Aqueous shunts either pre-prosthesis, concurrent with prosthesis surgery, or at any time if pressure elevation is noted. Intraocular pressure can be monitored with tactile tension if the surgeon is experienced. Scleral depression with a muscle hook during slit lamp examination is often employed. Good visualization of the optic nerve by ophthalmoscopy or in conjunction with OCT measurements is advocated on a periodic basis.
- Endophthalmitis
- Difficulty in maintaining contact lens (lens is essential in early postoperative period; if ocular surface is healthy and the lids functional, the bandage lens may be eliminated after several months if patient is comfortable)
- Retroprosthetic membrane (may be lysed with YAG laser with reduced energy)
- Sterile vitritis (must be differentiated from endophthalmitis and may require topical and peribulbar steroids)
- Cystoid macular edema (usually responds to steroids, but may become chronic)

Template Operative Dictation

Preoperative diagnosis: Cornea opacity (*OD/OS*) secondary to (*describe pathology*) in an (*aphakic/phakic eye*)

Procedure: (1) Keratoprosthesis, (2) cornea transplant utilizing eye bank tissue, (3) cataract/IOL extraction, (4) Ahmed shunt, (5) automated pars plana vitrectomy

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*male/female*) who presented to our clinic with a corneal opacity secondary to (*describe pathology*) where a penetrating keratoplasty was either (*contraindicated/unadvisable*). In attempts to continue preserving

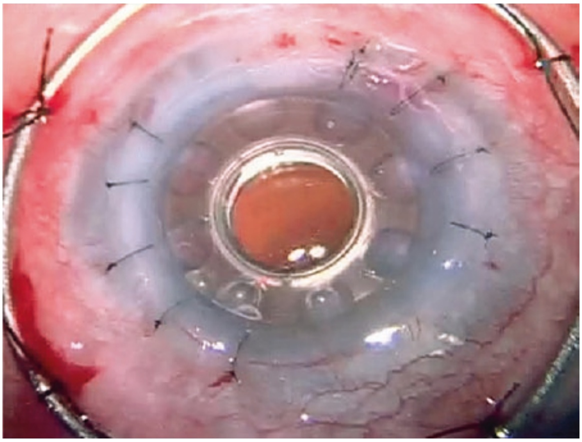

Fig. 14.9 Placement of the assembled device

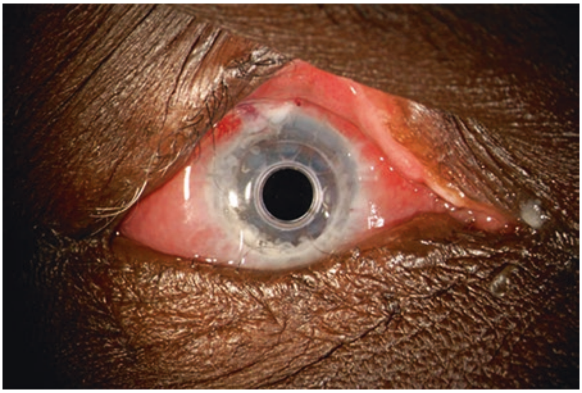

Fig. 14.10 Placement of hydrophilic bandage lens

vision, surgical options were discussed. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: After general anesthesia was obtained, the eye was prepped and draped in standard fashion. A proper time-out was performed, and a speculum was placed between the lids of the (*right/left*) eye where the cornea pathology was examined under the high power of the operating microscope. A Flieringa ring was attached with _#_ interrupted *black silk* sutures. It was decided to remove an (*8.25*, *8.5*, *8.75*) diameter pathological cornea button. An appropriate trephine was selected and a nonpenetrating outline was performed, vessels were coagulated.

Attention was turned to the assembly table where the keratoprosthesis was assembled. A 3 mm central opening was fashioned in the eye bank cornea followed by a ___ diameter concentric peripheral trephination (0.5 mm larger than the removed cornea). The cornea was placed over the optic of the prosthesis, the posterior plate was attached, and the assembled unit was placed in balanced salt solution.

Penetration into the anterior chamber was made with a blade through the deepened nonpenetrating outline, and the pathological button was carefully removed with sharp dissection from the underlying iris. A peripheral iridectomy was performed followed by dissection of the anterior lens capsule and delivery of the lens nucleus (*or removal of the IOL*). Cortical material was removed with irrigation/aspiration. A cyclodialysis spatula was passed through the angle to insure 360° patency and adequate space for the posterior plate of the prosthesis. Viscoelastic material was injected into the angle space, and the assembled prosthesis was inserted into the trephine opening and sutured with _#_ *10-0 nylon* interrupted sutures.

[Choose]

If shunt was placed*—The superior temporal conjunctiva was dissected to enable placement of the Ahmed shunt which was sutured 8 mm posterior to the limbus with _#_ 7-0 sutures. The distal tube was inserted into the anterior chamber via a stab incision made __ mm posterior to the limbus, its position ascertained by direct visualization through the optic. The tube was covered with a half-moon donor tissue and sutured. The conjunctiva flap was sutured to the limbus.*

If pars plana vitrectomy was performed*—The remainder of the procedure was performed by the vitreo/retina surgeon. Prior to the removal of the Flieringa ring and placement of a 16 mm Kontour contact lens.*

The conjunctival flap was advanced to the border of the optical cylinder, and all viable epithelial cells were removed prior to closing. A hydrophilic bandage lens was placed (Kontour 16 mm diameter that was supplied with the device). A monocular patch was applied, and the patient returned to recovery in good condition.

Chapter 15
Simple Limbal Conjunctival Autograft

Marwan Atallah and Guillermo Amescua

Abstract Limbal stem cell deficiency (LSCD) can be due to various causes and leads to corneal scarring and neovascularization as a common phenotypic endpoint. Patients require surgical intervention to manage pain/photophobia and restore vision. Patients should have a healthy donor limbus for an autograft, and the cause of LSCD should be resolved to avoid recurrence. Severe causes leading to LSCD might cause concomitant disease requiring further intervention (like keratoplasty, cataract extraction, pupilloplasty, etc.). Patients should be educated about the risks and benefits of the procedure, including alternatives.

Keywords Limbal stem cell deficiency • Autograft • Simple limbal epithelial transplantation (SLET) • Amniotic membrane transplantation • Simple limbal conjunctival autograft

Indications

Unilateral partial limbal stem cell deficiency not resolving with conservative approaches, patient should have a wet ocular surface and good eyelid function. Best candidates for SLET are patients with unilateral chemical burns or unilateral iatrogenically induced LSCD (i.e., post ocular surface reconstruction after ocular surface neoplasia excision/treatment).

Essential Steps

1. Retrobublar anesthesia for the eye with LSCD.
2. Topical anesthesia for the contralateral/donor eye.
3. Topical brimonidine drops are recommended in both eyes to decrease intraoperative bleeding.
4. Mark a (*2* × *2/3* × *3*) mm area across the superior nasal limbus of the healthy donor eye (Fig. 15.1).

M. Atallah (✉) • G. Amescua
Department of Ophthalmology, Bascom Plamer Eye Institute,
University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: marwan.r.atallah@gmail.com; GAmescua@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_15

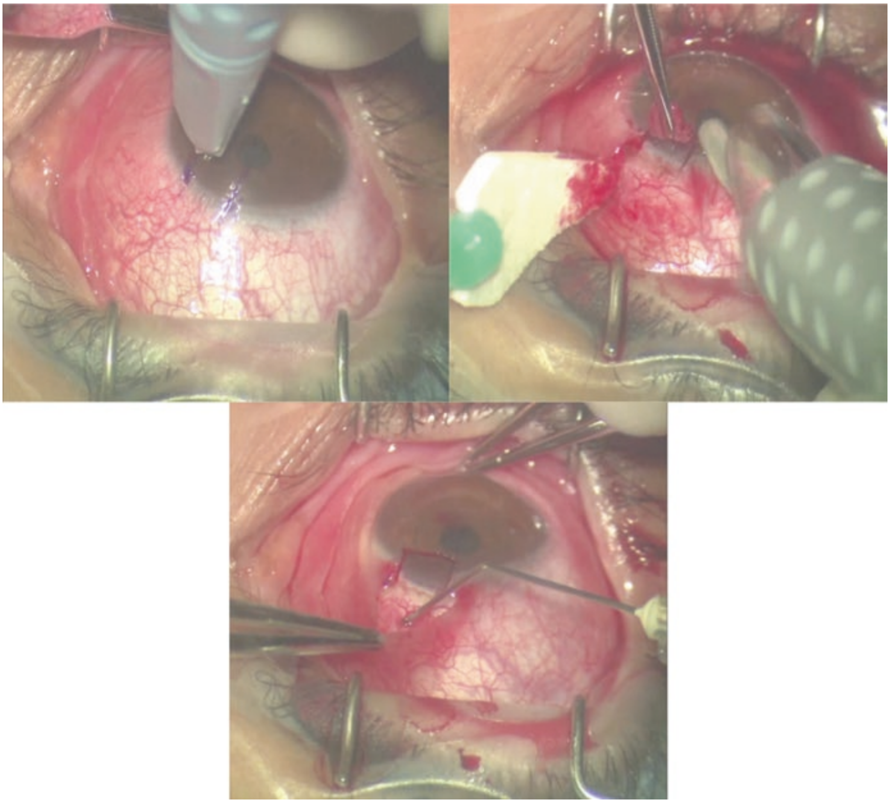

Fig. 15.1 Donor eye (*top left*) marking, (*top right*) explant dissection, and (*bottom*) gluing

5. Dissect subconjunctivally 1 mm into the clear cornea to excise the limbal tissue with a preset depth of approximately 80–100 μm.
6. Try to avoid the use of cautery.
7. Place donor tissue in balanced salt solution.
8. Topical antibiotic/steroid ointment to the donor eye.
9. In the affected eye, perform a 360° conjunctival peritomy and excise any fibrovascular pannus that is extending to the cornea (the pre-op use of corneal OCT can be useful to assess the corneal and pannus thicknesses) (Fig. 15.2).
10. Control bleeding with gentle cauterization, if possible try to avoid cautery.
11. Polish the corneal and limbal surface with a diamond bur.
12. Place an amniotic membrane graft stroma side down on the bare ocular surface and secure it with fibrin glue (Tisseel®, Baxter, USA). (It is important to make sure the edges of the graft are aligned or under the host conjunctiva.)
13. Cut the donor limbal tissue into 12–15 pieces with fine scissors and place the explants spirally on the amniotic membrane overlying the cornea, sparing the visual axis.
14. Secure the tissue again with fibrin glue.

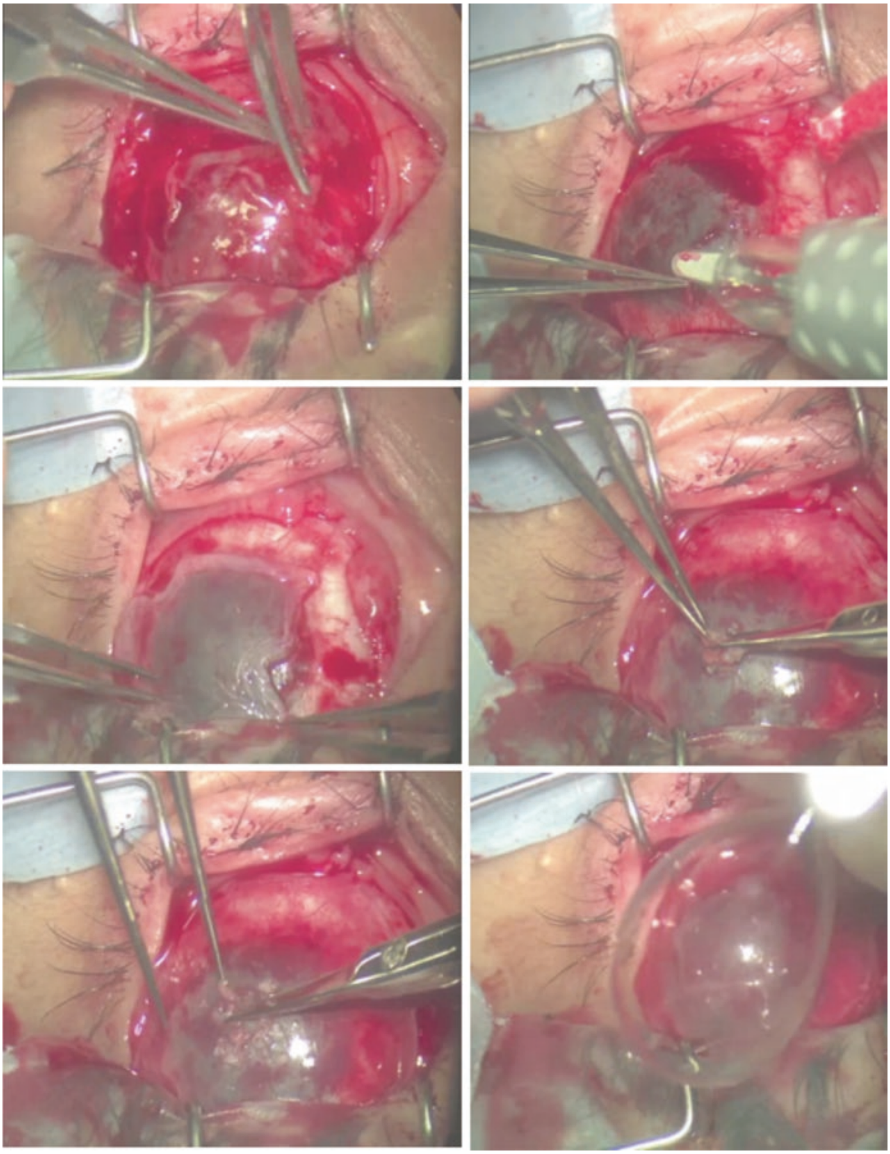

Fig. 15.2 Affected eye (*top left*) 360° peritomy, (*top right*) pannus dissection, (*middle left*) amniotic membrane placement, (*middle right*) explant dissection, (*bottom left*) explant spreading and gluing, and (*bottom right*) contact lens placement

15. *For a modified technique, place a second layer of amniotic membrane such that explanted limbal tissue is sandwiched.*
16. Secure the harvested tissue and amniotic membrane grafts with a 10-0 nylon sutured in a purse-string fashion around the limbal area.
17. Place a bandage contact lens.

Complications

– Corneal perforation on the affected/recipient eye during pannus dissection
– Hematoma under the conjunctiva/amniotic membrane in the recipient eye
– Loss of amniotic membrane with graft explants during the removal of the speculum and drapes
– Inducing limbal stem cell deficiency in healthy eye (so far not reported with SLET)
– Autograft failure/LSCD recurrence
– Amniotic membrane remnant
– Infection

Template Operative Dictation

Preoperative diagnosis: (*Total/__degrees of*) limbal stem cell deficiency (*with concomitant disease if applicable*) in the (*right/left*) eye

Procedure: Simple limbal conjunctival autograft from (*right/left*) to (*left/right*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) with a history of (*cause of LSCD*) in the (*right/left*) eye for (*time*) presented with (*pain/photophobia/vision loss/scarring/symblepharon*) found on (*slit lamp exam/OCT/impression cytology/other*). After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area. The anesthesia team delivered a (*peri/retro*) bulbar injection to the affected (*right/left*) eye. Topical anesthetic, ____, was applied to the donor eye. The patient was brought into the OR on an eye stretcher in the supine position. Patient was prepped and draped in the usual sterile ophthalmic fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

The surgery was started by placing a lid speculum in the healthy (*left/right*) eye. A ___mm × ___mm limbal area at __o'clock was marked, and a limbal conjunctival corneal biopsy was harvested using a (#*15 blade/crescent blade*) and Westcott scissors. The tissue was placed in balanced salt solution for later use. The defect was covered with conjunctiva and glued with fibrin glue. Topical antibiotic and steroid ointment were placed in the eye, and it was closed.

Attention was then turned toward the affected (*right/left*) eye, and a lid speculum was placed. The eye was examined under the microscope and (*findings noted*). A 360° conjunctival peritomy was performed. Hemostasis was achieved using (*cautery/phenylephrine drops/brimonidine drops/pressure with a 4 × 4 gauze*) while trying to minimize the amount of cautery used. (*Corneal pannus excision and dissection was performed.*) A diamond burr was used to smooth the corneal surface. An amniotic membrane graft was glued to the cornea, stromal side down. The stem cells explant harvested from the healthy eye were cut into ___ pieces scattered spirally on top of the amniotic membrane, sparing the visual axis and fixed with fibrin glue.

If two AM's were used in a sandwich technique—Another amniotic membrane was placed to cover the ocular surface and glued.

The resulting stem cell milieu was secured with a *10-0 nylon* suture in a purse-string fashion. At the end of the procedure, a bandage contact lens was placed, and the patient received a subconjunctival injection of antibiotic and corticosteroid. The eye was closed and a patch was applied. The patient was transferred to the post anesthesia care unit in stable condition without any complications.

Chapter 16
Removal of Salzmann's Nodule and Amniotic Membrane Placement

Anny M.S. Cheng and Scheffer C.G. Tseng

Abstract Salzmann's nodular degeneration is a progressive degenerative disease of the cornea that is characterized by the multiple nodular bluish-gray opacities with various number and size (Z Augenheilkd 57:92–99, 1925). The indications for surgery include reduced vision due to encroachment on the visual axis, irregular astigmatism, chronic irritation, and persistent symptoms despite conventional medical therapy (Cornea 29:1469, 2010; Cornea 24:772–777, 2005). Numerous surgical techniques, including superficial keratectomy and superficial keratectomy followed by phototherapeutic keratectomy and keratoplasty depending on the thickness of the involved cornea, have been described (Ocul Surf 14:20–30, 2016). This chapter is focused on the key surgical techniques that are used based on placement of self-retained cryopreserved amniotic membrane (PROKERA®, Bio-Tissue, Miami, FL) following superficial keratectomy to prevent inflammation, scarring and vascularization so as to achieve a favorable surgical outcome without the use of mitomycin C.

Keywords Amniotic membrane • Anti-inflammation • Anti-scarring • Anti-vascularization • Corneal haze • Cryopreserved • PROKERA • Salzmann's nodules • Superficial keratectomy

Indications

Symptomatic Salzmann's nodular degeneration, reduced vision due to encroachment on the visual axis, irregular astigmatism, and failed medical therapy [2, 3] (Figs. 16.1 and 16.2)

A.M.S. Cheng (✉)
Ocular Surface Center, Miami, FL, USA

Florida International University, Herbert Wertheim College of Medicine, FL, USA
e-mail: aCheng@ocularsurface.com

S.C.G. Tseng
Ocular Surface Center, Miami, FL, USA
e-mail: stseng@ocularsurface.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_16

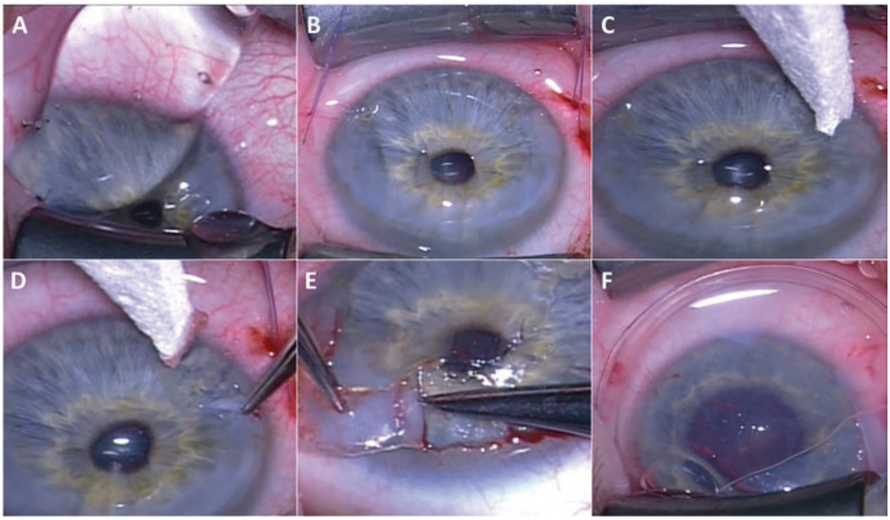

Fig. 16.1 Surgical steps of removal of Salzmann's nodules followed by placement of self-retained amniotic membrane. The surgery is performed under topical anesthesia (**a**), hemostasis, and akinesia achieved by traction sutures (**b**). A dry Weck-Cel (**c**) delineates the border between the Salzmann's nodular lesion and the healthy epithelium to identify the anterior plane. The 0.12 forceps was used to peel off the nodular lesion (**d**) throughout the entire limbal region until all Salzmann's nodules were totally removed. A scissor tip with blunt sweep (**e**) was used to aid such a removal. A self-retained amniotic membrane is placed to accelerate the restoration of corneal surface

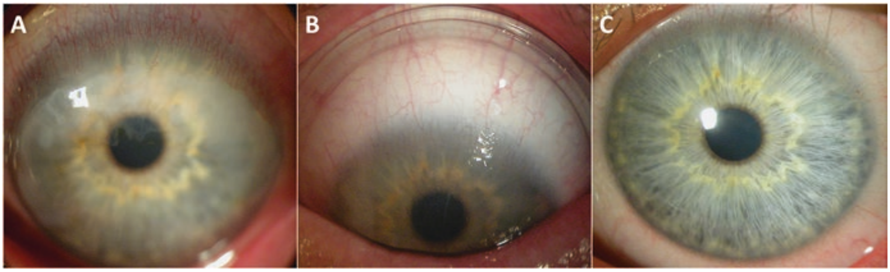

Fig. 16.2 Surgical outcome. Preoperative appearance of Salzmann's nodular lesion distributed the entire upper half of the corneal periphery with superficial vascularization causing irregular astigmatism and photophobia (**a**). After superficial keratectomy and placement of self-retained amniotic membrane (**b**), the eye restored smooth, clear, and avascular corneal surface (**c**)

Essential Steps

1. Identification of boarders of Salzmann's nodules [1]
2. Identification of the anterior plane
3. Peeling off the nodular lesion
4. Smoothening of the corneal surface
5. Application of self-retained cryopreserved amniotic membrane

Complications

- Corneal residual haze and superficial stroma scarring
- Corneal irregularity
- Hyperopic shift
- Astigmatism
- Persistent epithelial defect due to limbal stem cell deficiency
- Recurrence of Salzmann's nodules

Template Operative Dictation

Preoperative diagnosis: *Salzmann's Nodular Degeneration* (*OD/OS*) (CPT code: H18.459)

Procedure: (1) Placement of self-retained amniotic membrane and (2) superficial keratectomy (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ___-year-old (*male/female*) had developed severe (*photophobia/decreased vision/foreign body sensation/recurrent corneal erosion*) due to the above problem over the past ___ months/years despite the conventional maximal medical therapies including _____. After a detailed review of alternatives, risks, and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After intravenous sedation, the *(right/left)* eye was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed in the eye. 1:1000 epinephrine was instilled to create vasoconstriction for subsequent hemostasis control. Topical anesthesia was achieved by 2 % xylocaine gel instilled onto the ocular surface.

A *7-0 Vicryl* suture was placed in the nasal and temporal scleral as tractional sutures. The dry Weck-Cel was used to delineate the border of the gap between Salzmann's nodular tissue and the healthy epithelium. The epithelium overlying or surrounding Salzmann's nodules was rubbed off to identify the anterior plane. The 0.12 forceps was used to peel off the nodular lesion from (___ to ___ -*or*- at ___ and ___) corneal surface until all Salzmann's nodules were totally removed. A (*#64 beaver blade/scissor tip*) with blunt sweep was used to brush off the residual nodule along with 0.12 forceps. The traction sutures were then removed.

The sterile pack of self-retained amniotic membrane was opened. The conformer that was fastened with a cryopreserved amniotic membrane was removed, and first inserted into the upper fornix, followed by the lower edge of the conformer then slid into the lower fornix behind the speculum. After topical application of several drops of antibiotics (*with or without steroid*), the eye was patched over the *(right/left)* eye, and the patient was transferred to the post anesthesia care unit in stable condition.

References

1. Salzmann M. About a variation of nodular dystrophy. Z Augenheilkd. 1925;57:92–9.
2. Lisch W. Salzmann nodular regeneration. Cornea. 2010;29(12):1469.
3. Das S, Link B, Seitz B. Salzmann's nodular degeneration of the cornea: a review and case series. Cornea. 2005;24:772–7.
4. Maharana PK, Sharma N, Das S, Agarwal T, Sen S, Prakash G, Vajpayee RB. Salzmann's nodular degeneration. Ocul Surf. 2016;14(1):20–30.

Chapter 17
Insertion of Intrastromal Corneal Ring Segments (ICRS), Femtosecond Laser Assisted

Jorge L. Alió and Antonio Renna

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention that aims to improve refraction and visual outcomes without halting ectasia progression. It is indicated in corneal ectatic disorders that impair visual acuity and affect activities of daily living. Proper calculation of the intrastromal corneal ring segment (ICRS) thickness, length, and type is required. All ICRS types currently available on the market (Intacs, Addition Technology, Inc., and Keraring, Mediphacos Ltda.) have similar outcomes. It is recommended to use the manufacturer-defined nomogram for the adequate selection based on refraction (sphere and cylinder) and asphericity of 5–7 mm. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Keratoconus • Pellucid marginal degeneration • Post-LASIK ectasia • Corneoplastic surgery • Refractive surgery • Intrastromal corneal ring segments • Femtosecond laser • Corneal ectasia • Contact lens intolerance • Corneal aberration

Indications

Patient with stable corneal ectasia (keratoconus, pellucid marginal degeneration, and post-LASIK ectasia), central corneal thickness >400 μm, astigmatism <7 D, absence of central corneal leukoma, poor motivation to wear contact lenses, and/or contact lens intolerance. Based on preoperative visual limitations, not all patients

J.L. Alió (✉)
Division of Ophthalmology, Vissum Corporation, Universidad Miguel Hernandez, Alicante, Spain
e-mail: jlalio@vissum.com

A. Renna
Division of Ophthalmology, Vissum Corporation, Universidad Miguel Hernandez, Alicante, Spain

Department of Medical and Biological Sciences—Ophthalmology, University of Udine, Udine, Italy
e-mail: antonio.renna11@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_17

benefit from this surgical procedure. Ideal candidates for ICRS insertion have corrected distance visual acuity (CDVA) <0.4 (in decimal scale) and a keratoconus classified grade III or higher on the Red Temática de Investigación Cooperativa en Salud (RETICS) scale.

Essential Steps

1. Topical anesthetic and antibiotic drops are instilled into the eye.
2. Patient positioned under the femtosecond laser system.
3. Eyelid speculum placed (*optional*).
4. Docking of the applanation cone with the suction ring positioned on the eye, centered on the pupil.
5. Suction application.
6. Femtosecond laser-assisted creation of a continuous curvilinear corneal tunnel with a corneal incision at 70–80 % of minimum corneal thickness for 5–7 mm (Fig. 17.1a).
7. Patient transferred to the operating room.
8. Eyelid speculum placed, and patient placed under the operating microscope.

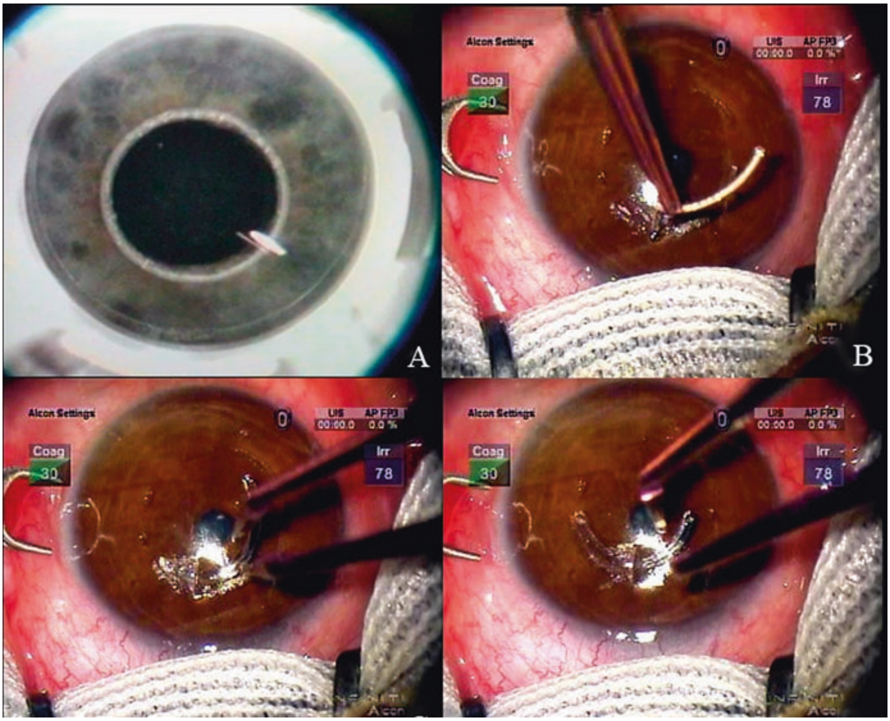

Fig. 17.1 Continuous curvilinear corneal tunnel with a corneal incision created by femtosecond laser (**a**), clockwise segment insertion into the temporal part of the tunnel using the segment holder (**b**–**d**) and then using a sinskey hook (**e**, **f**), clockwise segment fully inserted into the temporal part of the tunnel (**g**)

9. ICRS insertion through the incision into the tunnel with appropriate instruments (Fig. 17.1b–g).
10. Topical antibiotic and steroid drops are instilled.
11. Bandage contact lens placed (*optional*).

Complications

- Corneal microperforation
- Segment decentration
- Inadequate depth of the tunnel
- Asymmetry of the segments
- Superficial tunnel dissection with anterior Bowman layer perforation when inserting the segment
- Corneal macroperforation
- Corneal edema
- Inflammation
- ICRS extrusion
- Corneal neovascularization
- Corneal haze
- ICRS migration
- Corneal melting
- Infectious keratitis
- Mild tunnel deposits around the segments
- Refractive failure

Template Operative Dictation

Preoperative diagnosis: *Corneal ectasia (OD/OS)*

Procedure: Femtosecond laser-assisted insertion of intrastromal corneal ring segment *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This _____-year-old (*male/female)* with a well-known and documented history of (*pellucid marginal degeneration/post-LASIK ectasia/keratoconus*) who complained of decreased vision despite the use of (*spectacles/contact lenses*). The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. Topical anesthesia and antibiotic drops were placed into the *(right/left)* eye. Once in the femtosecond laser room, the patient was placed in the supine position under the laser system. (*An eyelid speculum was placed.*) A proper time-out was performed verifying correct patient, procedure, site, and positioning. The laser cone was applanated onto the center of the cornea and was docked into the circumferential suction ring. Suction was applied evenly across the cornea. Following the docking procedure, the femtosecond laser was then used to create a continuous curvilinear corneal tunnel at 70–80 % of the depth of the cornea with a corneal incision located at __o'clock.

Once the procedure was completed, the patient was brought into the OR on an eye stretcher in the supine position. Topical anesthesia, 0.5 % tetracaine, was instilled into the conjunctival fornices of the *(right/left)* eye. The *(right/left)* eye was prepped and draped in the usual sterile fashion. Another time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed.

The corneal incision and the underlying edges of the tunnel were opened using a sinskey hook. The clockwise segment was fully inserted into the (*temporal/nasal*) part of the tunnel using the segment holders. The counterclockwise segment was then fully inserted into the (*temporal/nasal*) part of the tunnel symmetrically. Topical antibiotic and steroid were applied on the cornea. (*A bandage contact lens was placed on the cornea*.) The eyelid speculum and drape were removed. The patient tolerated the procedure well and left the operating room in good condition.

Chapter 18
Iris Repair (Iridoplasty) Using the Siepser Sliding Knot

Steven B. Siepser

Abstract The patient should be fully informed of the various options available for the repair of iris defects: coloboma, cycloplegia, and traumatic deformation of the iris. A review of the potential for multiple surgeries is to be presented due to the possible need for progressive iris stretch and the alternative of an artificial iris placement. Discussion regarding a detailed history of disability and interference with the activities of daily living is warranted, as is a descriptive comment about any glare disability, visual handicap and light intolerance. Chronicle these conversations along with proper photographic documentation. The patient, any caregivers or decision-makers, and stakeholders in the surgical outcome should participate in the counseling process.

Keywords Iris repair • Iridoplasty • Siepser sliding knot • Iris defects • Iris dialysis • Trauma • Anterior segment

Indications

Iris defects, iris disinsertion, iridectomies, traumatic distortion of the normal iris anatomy, cycloplegia, and ectopic pupil

Essential Steps

1. Careful inspection and iris comparison to normal eye before dilation.
2. Pupil reactivity and position in normal eye.
3. Topical anesthetic, NSAIDS, and antibiotic drops.
4. Decision regarding need for retrobulbar block, dilation.
5. Dilation if combined with more posterior surgery, cataract, exchange of IOL, removal of adhesions, and residual debris.
6. Careful positioning of the head to allow various entrance and exit ports.
7. Care to make sure the proper working distances determined by objective lens on microscope (remove any unneeded attachments (ORA)).

S.B. Siepser (✉)
Wills Eye Surgery Center in Plymouth Meeting, Conshohocken, PA, USA
e-mail: ssiepser@siepservision.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_18

8. Marking of the various meridians for proper approach to defects.
9. Clear corneal 1 mm incisions for introduction and exit of suture needles.
10. Preservative-free intracameral xylocaine.
11. Viscoelastic dissection and visco-positioning of target tissue.
12. Lysis of adhesions, iris grabber, and sinskey hook, hand over hand.
13. *Vitrectomy and luminary probe use as needed.*
14. Identification of the iris collarette and ruff.
15. Needle is introduced and passed down through the proximal edge of the defect, sometimes a cannula can be used to fish mouth the paracentesis to aid passage of the needle into the eye without getting hung up on cornea.
16. Needle passed up through the distal edge of the defect.
17. Needle engaged into the tip of a 25 gauge cannula on viscoelastic and backed out through the distal paracentesis.
18. Condon snare introduced and passed to the distal iris suture and drawn across the defect and out of the eye.
19. Double throw performed.
20. The other side of the incision suture is then placed under tension and used to slip the knot back into the eye over the defect then tightened.
21. Visco-positioning can be repeated to ease needle passage.
22. Two-handed irrigation for removal of blood and pressure tamponade.
23. Step 16–18 repeated to lock the suture knot in position over the defect.
24. Multiple approaches and sutures are needed to close defects and position the iris.
25. Two-handed viscoelastic removal for iris positioning and check.
26. Intracameral Miochol and Miostat to constrict and place tension on the iris.
27. The use of iris traction with iris forceps to center the pupil.
28. The use of iris radial sutures to adjust the pupil centration.
29. The use of a vitrector to remove iris tags and for better sizing and centration.
30. Intracameral Tri-Moxi.
31. Stromal hydration.
32. “Sieps” Betadine test until complete wound closure is assured.
33. Patch and shield if retrobulbar was needed/no patch or shield if topical only.

Complications

- Hyphema
- Iris dialysis
- Residual iris tags
- Anomalous iris positioning
- Miosis
- Endothelial damage
- Corneal edema
- Cystoid macular edema (CME)
- Retinal detachment
- Dysphotopsias
- Anisoconia

– Anisometropia
– Astigmatism
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: Iris coloboma (*OD/OS*), *iridocapsular adhesions*, *iris incarceration*, or *traumatic cycloplegia*

Procedure: Iridoplasty, lysis of adhesions (iridocapsular, wound revision), and repair of dialysis (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*male/female*) who was found to have poor vision and (*glare/disability/anisocoria/pupillary ectopia/light intolerance*) interfering with his/her activities of daily living. Astigmatism (*was/was not*) found to be present. After a fully informed consent covering extensive review of the risks and possible benefits, the patient (and/or caregiver) elected to undergo the procedure.

Description of the procedure: The patient was asked to spell their last name and give their birth date. (*He/she*) pointed to the operative site, and the *(right/left)* eye was marked with the surgeon's initials using an indelible skin marker. Topical anesthesia, NSAID, antibiotic, and mydriatic (as indicated) drops were placed into the *(right/left)* eye. The patient was then brought to the operative theater. The (*Zeiss, Leica, etc.*) operating microscope and microsurgical technique were used throughout the procedure. A thorough review of the procedure steps and needed equipment was done with the OR team.

All OR personnel's attention was directed to the patient, who was asked to spell their last name, state their birth date, verify allergies, and the procedure and site prior to the use of any anesthesia or analgesia. The use of cautery, oxygen, and fire safety procedures was verified. The checklist of needed equipment for the case was reviewed prior to intervening. A modified van Lint block was given with a 1.5 in. *25 gauge* needle. A *23 gauge* blunt retrobulbar needle was used for akinesia and bulbar anesthesia and 5 min of consistent ocular pressure was applied using a "super pinky." Topical anesthesia, 0.5 % tetracaine, was instilled twice into the conjunctival fornices of the *(right/left)* eye. A drop of 5 % Betadine was placed directly on the eye and fornices, and then copiously irrigated. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and the Lieberman rigid speculum was placed.

The various approaches to the iris defect(s) were marked with a skin marker. The needed incisions were made with _*1*_ mm (*15°*) blade. Intracameral *methylparaben-free xylocaine* was injected into the anterior chamber to increase patient comfort. Viscoelastic was injected to position the iris defects for further viscodissection. A sinskey hook and iris spatula were used to perform bondage, define the limits of the adhesions, and position the iris defects. The areas of iris retractions were unfurled and stretched using a sinskey hook and an iris grabber.

If vitrectomy was performed*—An anterior chamber maintainer was placed, the Siepser luminary probe (Escalon-Trek) was introduced to better illuminate residual membranes and vitreous using the Tyndall effect with the microscope light turned off. The vitrectomy handpiece was then introduced to remove all unwanted vitreous and membranes. DORC pediatric silicone-cuffed lenses modified to accommodate the tri-positioned probes to better visualize the anterior segment structures and remove all anterior vitreous.*

Areas of iris retraction were stretched taught and aligned for positional sense. The two-handed I/A handpieces were used to remove any hemorrhage, coagulum, and debris from the anterior chamber. Additional viscoelastic was placed to allow for a clear unobstructed view of the details of the anterior chamber.

A ten polypropylene CIF-4 needle was introduced through the paracentesis using a cannula to fish mouth the incision for easier passage. An iris grasper held the proximal iris while the needle was passed through the iris collarette on the proximal side. The distal iris was then stabilized, and the needle was passed through the matching area of the distal iris collarette docked into the blunt cannula and withdrawn with a following motion to present outside the eye. The Condon snare was then passed across the anterior chamber to loop out the distal end of the suture and pulled through the paracentesis. A double throw knot was then formed outside the eye using the Siepser sliding knot which was then drawn back into the eye over the defect and using tension from the opposite side, cinched tight into the appropriate position. The distal suture was then snared and brought out of the proximal paracentesis. The knot was squared and slid over the original knot and cinched into position. Viscoelastic was used to position the sutures. An intraocular scissor was introduced from another meridian, and the suture ends were transected and removed.

Additional sutures were then passed through the iris ruff and basal areas to completely close the defect using the same technique. Material anterior and posterior to the iris leaflets, and all viscoelastic, was removed using a two-handed I/A handpiece. The iris position was verified and adjusted using intermittent viscoelastic. The iris grabber then cleared all viscoelastic using the two-handed I/A technique.

Minimal stromal hydration of the corneal incisions was needed. The Sieps Betadine test was used to affirm the corneal incision integrity and, with added hydration and testing, found to be water tight. A *0.25* ml of Tri-Moxi was placed in the posterior chamber. The eyelid speculum and drape were removed. Antibiotic ointment was placed in the inferior fornix, and a shield was placed over the eye. The patient tolerated the procedure well and left the OR in satisfactory, stable condition.

Part II
Refractive and Cataract Surgery

Chapter 19
Cataract Extraction, with Intraocular Lens Implant

Alanna S. Nattis and Richard J. Nattis

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Surgical indications for cataracts include those that impair visual acuity, create visual disability, effect activities of daily living, or deemed medically necessary for monitoring or further surgical procedures. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Cataracts • Cataract extraction • Mature cataract • Intraocular lens • IOL • PCIOL • Phacoemulsification

Indications

Cataract causing impaired visual acuity, in preparation for vitrectomy, in preparation for surgical retinal detachment repair, or intraocular pathology necessitating clear media.

Essential Steps

1. Orbital block or topical anesthetic
2. Placement of speculum
3. Paracentesis incision
4. Preservative-free xylocaine instillation
5. Viscoelastic injection into the AC
6. Clear corneal incision
7. Capsulorhexis
8. Hydrodissection of lens

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

R.J. Nattis
Chief of Ophthalmology and Clinical Professor, Department of Ophthalmology, Good Samaritan Hospital, West Islip, NY, USA
e-mail: rdameye@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_19

9. Phacoemulsification and aspiration
10. Coaxial irrigation and aspiration of cortical material
11. Viscoelastic injection into capsular bag
12. PCIOL insertion
13. Removal of viscoelastic
14. Stromal hydration

Complications

- Hyphema
- Corneal edema
- Cystoid macular edema (CME)
- Retinal detachment
- Lens dislocation
- Dropped lens
- Retained nuclear or cortical material
- Capsular tear
- Zonular dehiscence
- Dysphotopsias
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Mature cataract (OD/OS)*

Procedure: Cataract extraction *(OD/OS)* with intraocular lens implant

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) had developed a cataract over the past ____ (*months/years*) and on workup was found to have a (*nuclear/cortical/posterior sub capsular)* (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. The visual impairment was impacting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, topical anesthesia, 0.5 % tetracaine, was instilled three times into the conjunctival fornices of the *(right/left)* eye. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed.

A ____mm keratome blade was used to make a clear corneal peripheral paracentesis incision in the superior quadrant. Intracameral preservative-free xylocaine was injected into the anterior chamber followed by viscoelastic. After noting that the pupil dilated to ____mm, attention was turned toward the capsulorhexis.

***If trypan blue dye used*:**

Technique 1: *Small amounts of trypan blue were injected over the anterior capsule and painted over the anterior capsule surface until an adequate staining was achieved. Viscoelastic was then injected into the anterior chamber.*

Technique 2: *An air syringe was used to inject an air bubble into the anterior chamber. Following this trypan blue was injected into the anterior chamber and used to stain the lens anterior capsule. Following this, balanced salt solution was injected through the paracentesis wound to clear away excess trypan blue and expose the stained anterior lens capsule. Viscoelastic was then injected into the anterior chamber.*

A biplanar clear corneal incision was then created *temporally* using a ____mm keratome. A ____mm continuous curvilinear capsulorhexis was then carried out using capsulorhexis forceps and a cystotome. Hydrodissection was gently performed with balanced saline solution on a cannula, and a fluid wave was noted. Phacoemulsification and phacoaspiration were used to disassemble and remove the nucleus. This was followed by coaxial irrigation and aspiration of the cortical material using a (*standard/bimanual*) irrigation/aspiration (I/A) handpiece. A total _____ absolute phaco-time (APT) was used in the procedure.

If weakened zonules: *In order to support the weakened zonules and stabilize the dislocated cataract, a type 10/11/12 ReFORM capsular tension ring was injected into the capsular bag.*

Viscoelastic was injected to inflate the capsular bag and reform the anterior chamber. An intraocular lens, (*Alcon/AcrySof/Tecnis)* model #_______, serial #______ with a power of _____ diopters, was inspected and found to be defect-free and injected into the capsular bag.

If toric IOL used: *The trailing haptics were dialed into the correct position.*

Viscoelastic was removed from the eye using coaxial irrigation and aspiration. Stromal hydration of the corneal incisions was performed, and the incisions were noted to be watertight. The IOL was found to be centered in position. The pupil was round, and the chamber was formed. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix, and a shield was placed over the eye. The patient was transferred to the post anesthesia care unit in stable condition.

Chapter 20
Cataract Extraction, Extracapsular (ECCE)

Marwan Atallah and Guillermo Amescua

Abstract Cataracts can impair visual acuity and affect activities of daily living. They are the leading cause of blindness worldwide. Cataracts can also impede monitoring of other diseases. In all the above cases, surgical intervention is deemed appropriate. In cases where phacoemulsification is not available or with increased lens opacity (requiring high energy phacoemulsification), extracapsular cataract extraction can be considered. Patients should have been evaluated and appropriate biometric measurements taken. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Cataract • Phacoemulsification • Intraocular lens • Capsulorhexis • Extracapsular cataract extraction (ECCE)

Indications

No access to phacoemulsification technology, significant density of lens, visually significant cataract impairing vision and affecting daily activities, and intraocular pathology necessitating monitoring and clear media.

Essential Steps

1. Retrobulbar anesthesia is recommended, and the use of Honan balloon is also recommended to decrease positive intraocular pressure.
2. Maximize pupil dilation.
3. Prepping, draping, and adequate exposure with speculum, minimizing pressure to the scleral tissue.
4. Corneal paracentesis
5. If no red reflex, trypan blue vital dye injection followed by viscoelastic injection.
6. Using fine forceps and conjunctival scissors, perform a sectoral conjunctival peritomy and expose the clear corneal/limbal/scleral area.

M. Atallah (✉) • G. Amescua
Department of Ophthalmology, Bascom Plamer Eye Institute,
University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: marwan.r.atallah@gmail.com; GAmescua@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_20

7. Good scleral tunnel wound construction (superior/superotemporally) which provides lid protection of wound versus a temporal approach which offers less astigmatism.
8. Entering the anterior chamber using the scleral tunnel with a keratome blade.
9. Capsulorhexis/capsulotomy using a can-opener technique (recommend a large capsulorhexis for ECCE).
10. Hydrodissection.
11. Nucleus delivery into anterior chamber with hydrostatic (irrigation behind the nucleus) and mechanical pressure (special care taken to not compromise the zonules).
12. Enlargement of the scleral tunnel wound to about 7–8 mm using a crescent blade.
13. Nucleus extraction using the lens loupe under the nuclear piece and applying gentle down pressure on the wound.
14. At the same time, gentle pressure is applied at 180° and 2–3 mm away from the limbs until the lens is delivered.
15. Nuclear piece should come out smoothly, if this is not the case, the scleral/corneal wound should be enlarged.
16. Removal of remnant cortical material using simcoe cannula or the coaxial irrigation/aspiration device.
17. Air injection into anterior chamber, or viscoelastic expansion of AC and capsular bag.
18. Posterior chamber intraocular lens placement inside the capsular bag or in the sulcus if there is enough sulcus support.
19. Irrigation and aspiration of air or viscoelastic.
20. Place corneal-scleral sutures to close the wound.
21. Leave anterior chamber under physiologic intraocular pressure using balance salt solution.
22. Closure of the superior or superotemporal conjunctival defect using cautery or sutures.
23. Antibiotic and steroid conjunctival injection or applied topically.
24. Removal of drapes, antibiotic ointment placement, patching, and shielding.

Complications

- Local anesthesia-related complications (hemorrhage, perforation)
- Endothelial damage (Descemet stripping)
- Iris trauma, iris prolapse
- Capsule rupture
- Dislocated lens fragment
- Malposition of intraocular lens
- Zonular dialysis
- Vitreous loss
- Choroidal expulsive hemorrhage
- Wound leak
- Postoperative inflammation (more compared to phaco)

– Posterior capsular opacification (more compared to phaco)
– Astigmatism (more compared to phaco)
– Infection
– Wound dehiscence
– Retinal detachment
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: Visually significant cataract of the (*right/left*) eye

Procedure: Extracapsular extraction of cataract with implantation of intraocular lens in the (*right/left*) eye

Postoperative diagnosis: *Same*

Implant: *MA60 acrylic lens, 14.5 diopter in the capsular bag, aiming for distance vision; serial # 0123456789*

Indication: This ____-year-old (*male/female*) had developed a cataract over the past ____ and on workup was found to have a (*nuclear/cortical/posterior sub capsular*) (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. (*Significant astigmatism was also noted to be present.*) The visual impairment was significant and affecting daily activities. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area. (*The anesthesia team delivered a retrobulbar injection/a peribulbar injection/topical anesthesia*) to the (*right/left*) eye. The patient was brought into the OR on an ophthalmic stretcher in the supine position. Patient was prepped and draped in the usual sterile ophthalmic fashion. Proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

The surgery was started by placing a lid speculum in the (*right/left*) eye to ensure a good exposure of the operative site. A paracentesis incision was made at the __o'clock position followed by injection of viscoelastic.

If trypan blue dye used:

Technique 1: *Small amounts of trypan blue were injected over the anterior capsule and painted over the anterior capsule surface until an adequate staining was achieved. Viscoelastic was then injected into the anterior chamber.*

Technique 2: *An air syringe was used to inject an air bubble into the anterior chamber. Following this trypan blue was injected into the anterior chamber and used to stain the lens anterior capsule. Following this, balanced salt solution was injected through the* *paracentesis wound to clear away excess trypan blue and expose the stained anterior lens capsule. Viscoelastic was then injected into the anterior chamber.*

A sectoral conjunctival peritomy was performed superiorly, and the limbal area exposed. A scleral tunnel wound was made using a crescent blade in the exposed area and used to enter the anterior chamber with a keratome blade. Using a (*27 gauge needle/a cystotome*), a continuous curvilinear capsulorhexis was performed through a separate puncture site adjacent to the wound. Irrigation with balance salt solution under the flap was performed until the lens was mobilized. The nucleus was then delivered into anterior chamber. Extraction was performed with irrigation posterior to the nucleus, then between the iris and the nucleus as it was delivered. Simultaneously, gentle mechanical pressure was applied 2–3 mm away from the limbus inferiorly with care not to compromise the zonules.

Nuclear and cortical debris was then removed with (*coaxial irrigation/aspiration device*). Viscoelastic was injected into the AC and the capsular bag for expansion. A (*lens info*) was carefully loaded into an injector and injected into the (*capsular bag/sulcus using angle forceps*). The lens was verified to be in correct position before the viscoelastic was irrigated and aspirated. The tunnel wound was checked for leakage (*and found to be watertight/a suture was placed*). *Antibiotics and steroids were injected superior to the wound.*

Lid speculum and drapes were removed, antibiotic ointment was applied. (*Steroid/antibiotic*) drops were administered, and the eye was then patched and shielded. The patient was transferred to the post anesthesia care unit in stable condition without any complications.

Chapter 21
Cataract Extraction, the Use of Iris Hooks for Intraoperative Floppy Iris Syndrome (IFIS)

Reginald Camillo and Alanna S. Nattis

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Surgical indications for cataracts include those that impair visual acuity, create visual disability, affect activities of daily living, or deemed medically necessary for monitoring or further surgical procedures. Additionally, intraoperative floppy iris syndrome can occur in any individual with a current or past history of alpha-1 antagonist use. All patients should be screened regarding past and current medication use, as well as all medical conditions. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Cataracts • Cataract extraction • Mature cataract • Intraocular lens • IOL • PCIOL • Phacoemulsification • Floppy iris syndrome • IFIS • Iris hooks • Mydriatic assist device • Visualization • Flomax

Indications

In patients with floppy iris syndrome and mature cataract, cataract causing impaired visual acuity, cataract with diabetic retinopathy, in preparation for vitrectomy, in preparation for surgical retinal detachment repair, or intraocular pathology necessitating clear media.

Essential Steps

1. Sideport incision
2. Additional paracentesis incisions
3. Insertion of iris hooks

R. Camillo (✉)
Department of Ophthalmology, Metropolitan Hospital, New York, NY, USA
e-mail: isurg@me.com

A.S. Nattis
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_21

4. Injection of air and trypan blue if hypermature or white
5. Viscoelastic injection into the AC
6. Clear corneal incision
7. Curvilinear capsulorrhexis
8. Hydrodissection of lens
9. Phacoemulsification and aspiration
10. Coaxial irrigation and aspiration of cortical material
11. Viscoelastic injection into capsular bag
12. PCIOL insertion
13. Removal of iris hooks
14. Removal of viscoelastic
15. Stromal hydration

Complications

– Hyphema
– Corneal edema
– Cystoid macular edema (CME)
– Retinal detachment
– Lens dislocation
– Zonular dehiscence
– Dysphotopsias
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Mature cataract (OD/OS)*

Procedure: Cataract extraction *(OD/OS)* with the use of iris hooks for intraoperative floppy iris syndrome

Postoperative diagnosis: *Mature cataract (OD/OS) and poorly dilating pupil with intraoperative floppy iris syndrome*

Indication: This ____-year-old (*male/female*) had developed a cataract over the past ____ (*months/years*) and on workup was found to have a (*nuclear/cortical/posterior subcapsular)* (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, topical anesthesia, 0.5 % tetracaine, was instilled three times into the conjunctival fornices of the *(right/left)* eye. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed.

A sideport incision was created using a _____mm keratome blade. Intracameral preservative-free xylocaine was injected into the anterior chamber followed by viscoelastic. After noting that the pupil only dilated to less than 4 mm, four additional sideport incisions were created at the *12 o'clock*, *3 o'clock*, *6 o'clock*, *and 9 o'clock* meridians. An iris hook was then inserted through each of the paracentesis ports. The iris and the pupil were secured using the hooks in order to dilate and maintain a _____mm diameter pupil.

If blue dye used: Air was injected into the anterior chamber, and trypan blue dye was used to stain the anterior capsule.

The anterior chamber was then filled with viscoelastic. A uniplanar clear corneal incision was then created *temporally* using a ____mm keratome. A ____mm continuous curvilinear capsulorrhexis was then carried out using capsulorrhexis forceps. Hydrodissection was gently performed, and a fluid wave was noted. Phacoemulsification and phacoaspiration was used to disassemble and remove the nucleus and was followed by irrigation and aspiration of the cortical material using a (*standard/bimanual*) irrigation/aspiration (I/A) handpiece. A total _____ absolute phaco-time (APT) was used in the procedure.

Viscoelastic was injected to inflate the capsular bag and reform the anterior chamber. A ____ diopter posterior chamber intraocular lens was then injected and delivered into the capsular bag.

If toric IOL used: The trailing haptics were dialed into the correct position.

The pupil was then freed from the iris hooks, and the hooks were then removed from the eye. Viscoelastic was removed from the eye using irrigation and aspiration. Stromal hydration of the corneal incisions was performed, and the incisions were noted to be watertight. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix, and a shield was placed over the eye. The patient was transferred to the post anesthesia care unit in stable condition.

Chapter 22
Cataract Extraction, Malyugin Ring

Marguerite McDonald

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Surgical indication for cataracts includes those that impair visual acuity, create visual disability, affect activities of daily living, or deemed medically necessary for monitoring or further surgical procedures. Additionally, intraoperative floppy iris syndrome can occur in any individual with a current or past history of alpha-1 antagonist use. All patients should be screened regarding past and current medication use, as well as all medical conditions. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Cataracts • Cataract extraction • Mature cataract • Intraocular lens • IOL • PCIOL • Phacoemulsification • Floppy iris syndrome • IFIS • Malyugin Ring • Mydriatic assist device • Visualization • Flomax

Indications

Patients with a mature cataract, cataract causing impaired visual acuity, cataract with diabetic retinopathy, in preparation for vitrectomy, in preparation for surgical retinal detachment repair, or intraocular pathology necessitating clear media and a poorly dilating pupil secondary to (*pseudo-exfoliation syndrome/floppy iris syndrome/other*).

Essential Steps

1. Orbital block or topical anesthetic
2. Placement of speculum
3. Paracentesis incision
4. Preservative-free xylocaine instillation
5. Viscoelastic injection into the AC
6. Scleral tunnel incision

M. McDonald (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: margueritemcdmd@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_22

7. Malyugin Ring loaded into injector
8. Malyugin Ring engaged in the pupillary margin
9. Malyugin Ring injected into the AC
10. Remaining three loops engaged
11. Capsulorhexis
12. Hydrodissection of lens
13. Phacoemulsification and aspiration
14. Coaxial irrigation and aspiration of cortical material
15. Viscoelastic injection into capsular bag
16. PCIOL insertion
17. Removal of ring
18. Removal of viscoelastic
19. Stromal hydration

Complications

- Hyphema
- Atonic pupil
- Corneal edema
- Cystoid macular edema (CME)
- Retinal detachment
- Lens dislocation
- Dropped lens
- Retained nuclear or cortical material
- Capsular tear
- Zonular dehiscence
- Dysphotopsias
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Mature senile cataract (OD/OS)*

Procedure: Cataract extraction *(OD/OS)* with the use of Malyugin Ring for an intraoperatively poorly dilating pupil

Postoperative diagnosis: *Mature senile cataract (OD/OS) with poorly dilating pupil*

Indication: This ____-year-old (*male/female*) had developed a cataract over the past ____ (*months/years*) and on work-up was found to have a (*nuclear/cortical/posterior subcapsular)* (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, local anesthetic was injected in the standard *(retrobulbar/peribulbar)* fashion. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and an eyelid speculum was placed.

A half-thickness scleral groove was then made, approximately _*1*_ mm posterior to the surgical limbus, and dissected forward into clear cornea for a distance of _*2*_ mm. A stab incision was then made 90° away, and then the anterior chamber entered via tunnel incision with a _*2.4*_mm keratome blade. The pupil dilated to ___mm and was insufficient to allow a safe phacoemulsification; therefore, decision was made to use a Malyugin Ring. Viscoelastic was injected into the anterior chamber with care to lift the iris away from the anterior capsule. The Malyugin Ring was loaded into the injector. The injector was placed into the anterior chamber. The distal loop was sufficiently engaged at the pupillary margin, and then the two lateral loops were engaged at the pupillary margin. Then, the ring was injected into the eye while the injector was removed. A Malyugin hook was then used to engage the remaining loop in the subincisional location.

If trypan blue dye used: (*If trypan blue is used, it is best to use a cohesive viscoelastic to insert the ring, so that it can be removed quickly and easily before dye instillation.*) *An air syringe was used to inject an air bubble into the anterior chamber. Following this trypan blue was injected into the anterior chamber through a sideport incision and used to stain the lens anterior capsule. Following approximately _15_s, balanced salt solution was injected through the main incision to clear away excess trypan blue and expose the stained anterior lens capsule. Viscoelastic was then injected into the anterior chamber.*

A _*5.2*_mm continuous curvilinear capsulorhexis was then carried out using a cystotome and Utrata Capsulorhexis Forceps. Hydrodissection was gently performed with balanced saline solution on a cannula, and a fluid wave was noted. Phacoemulsification and phacoaspiration was used to disassemble and remove the nucleus and was followed by coaxial irrigation and aspiration of the cortical material using a (*standard/bimanual*) irrigation/aspiration (I/A) handpiece. Viscoelastic was injected to inflate the capsular bag and reform the anterior chamber. An intraocular lens, (*insert brand name here*) model #_______, serial #______ with a power of _____ diopters, was inspected and found to be defect-free and injected into the capsular bag.

If toric IOL used: *The trailing haptics were dialed into the correct position.*

The Malyugin hook was then placed in the anterior chamber, and the furthest loop was disengaged from the iris, followed by the subincisional loop. The subincisional loop was then engaged by the injector, and the ring was then withdrawn into the injector, while carefully monitoring the two lateral loops, ensuring they detached atraumatically from the iris. When both lateral loops were about to enter the injector, the injector was then removed from the eye. Residual viscoelastic and cortical fibers were removed from the eye using coaxial irrigation and aspiration. All incisions were noted to be watertight. The conjunctiva was then reflected back over the surgical wound and closed with bipolar cautery.

The IOL was found to be centered in position. The pupil was round, and the chamber was formed. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix, as well as steroid and antibiotic drops, followed by a shield placed over the *(right/left)* eye. The patient was transferred to the post anesthesia care unit in stable condition.

Chapter 23
Cataract Extraction Requiring Vitrectomy due to Violation of the Posterior Capsule with Lens Implantation (Optic Capture, in the Bag, Sulcus, and ACIOL)

Shakeel Shareef and Lisa B. Arbisser

Abstract In performing routine or complex phacoemulsification (i.e., pupil-dilating devices, capsular staining, zonulopathy requiring capsular tension rings/segments with suturing, iris/scleral sutured IOL), the reader is advised to refer to the appropriate chapters in this textbook. One of the challenges during cataract surgery is dealing with the vitreous gel when it presents itself intraoperatively. Given that the scope of vitreous and lens management cannot be covered in any great detail within one single operative template, this chapter focuses on essential surgical steps one needs to take in managing intraoperative complications when the posterior capsule (PC) is violated (Table 23.1). The farther vitreous travels from the vitreal cavity (categories 1–3, Table 23.1), the greater the traction on the vitreous base with increased risk for a retinal tear or detachment (Arbisser et al., Ophthalmol Clin N Am 19:495-506, 2006; Arbisser, Suppl Cataract Refract Surg Today, 2012). The concepts have been simplified to familiarize the reader in dealing with vitreous. A number of references are provided for further in-depth reading to surgically build upon the basic outline provided in this chapter (Arbisser et al., Ophthalmol Clin N Am 19:495-506, 2006; Arbisser, Suppl Cataract Refract Surg Today 2012; Oetting, http://www.eyerounds.org/tutorials/anterior-vitrectomy/index.htm; Kent, Rev Ophthalmol, 2009).

Keywords Posterior capsule (PC) • Vitreous loss • Vitreous prolapse • Bimanual vitrectomy • Dispersive ophthalmic viscosurgical device (OVD) • Triesence • Anterior chamber • Optic capture • Sulcus IOL • ACIOL

S. Shareef (✉)
Department of Ophthalmology, University of Rochester Medical Center, Rochester, NY, USA
e-mail: Shakeel_Shareef@urmc.rochester.edu

L.B. Arbisser
Department of Ophthalmology, John A. Moran Eye Center, University of Utah, Salt Lake City, UT, USA
e-mail: drlisa@arbisser.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_23

Table 23.1 Classification

Intra-operative complication	Intervention	IOL options
1. Intact anterior hyaloid + broken PC	Dispersive OVD over PC tear; cohesive OVD into Berger space; posterior Capsulorrhexis	One piece in bag or optic capture in Berger's space with three piece
2. Vitreous prolapse – vitreous confined to the anterior chamber	Keep phaco probe in AC; inject dispersive OVD via side-port to create barrier between vitreous and lens: remove phaco probe; biaxial vitrectomy	If anterior capsulorrhexis intact: Sulcus IOL with optic capture. If not, Sulcus IOL
3. Vitreous loss – vitreous has traveled beyond the AC out of the incision	Same as (2); avoid sweeping or Wek Cel vitrectomy; use vitrector to sever vitreous from wound; inject Triesence to stain vitreous; perform biaxial vitrectomy	If poor visibility; inadequate capsule support or significant zonular dialysis, then AC IOL with PI

PC posterior capsule; *PI* peripheral iridectomy
Adapted from Arbisser LB et al. Management of Vitreous Loss and Dropped Nucleus During Cataract Surgery [1, 2]

Table 23.2 Pre-op diagnoses with potential for complications

Pre-op diagnosis—potential for complications
Dense cataracts
Transillumination iris defects
Phacodonesis
Complicated cataract surgery in fellow eye
Marked Ammetropia
Floppy iris syndrome
Pseudoexfoliation
Prior vitrectomy
Advanced age
Posterior polar cataract

Adapted from Arbisser LB et al. Management of Vitreous Loss and Dropped Nucleus During Cataract Surgery [1]

Vision-threatening sequelae (See section heading "Complications" below) are not directly result from vitreous loss but due to its inappropriate management. It is important to recognize the potential for complications preoperatively based upon diagnosis and history (Table 23.2). The type and location of intraocular lens implanted and option for optic capture is a function of the integrity of the capsule and zonular status (Table 23.1). It is important to make a watertight wound construction to maintain a stable anterior chamber and PC integrity at all times during surgery (a normotensive globe) [1] in order to minimize zonular stress, iris prolapse, or sudden surge. Signs of PC tear need to be recognized (Table 23.3). If vitreous is suspected, it is paramount not to withdraw the phaco handpiece out of the AC as this will create a drop in IOP to further vitreous

Table 23.3 Signs of PC tear

Signs of a posterior capsular tear
Sudden deepening of the AC
Sudden pupillary bounce or change in pupil size (pupil widening); peaked pupil
Inability of lens particles to migrate to phaco needle during phacoemulsification
Lens material sinking to the back of the eye
Spidering of the posterior capsule
Tilting of nucleus equator
Inability to rotate a previously mobile nucleus

Adapted from Arbisser LB et al. Management of Vitreous Loss and Dropped Nucleus During Cataract Surgery [1]

prolapse anteriorly and vitreous loss through the path of least resistance via the keratome incision. Through the sideport incision, dispersive OVD should be injected under any lens fragments if present to displace them anterior to the iris plane, and in front of the presumed PC tear. This will displace and compartmentalize the vitreous posteriorly and create a barrier between the vitreal cavity and the lens fragments. Second, barricade the dispersive OVD with a cohesive OVD [1]. This will also serve to pressurize the AC. Only then, should the phaco handpiece be carefully withdrawn. It is prudent not to chase after any lens fragments that have become displaced posterior to the PC with the phaco probe beyond the PC tear, as this can lead to retinal tears [2, 3]. Inform the patient of the possibility of subsequent need for a three-port pars plana vitrectomy and lensectomy by a retina specialist. There should be a backup emergency plan in place for operating room personnel to assist the surgeon in transitioning to set up for vitrectomy in a timely and smooth manner. The essential steps during vitrectomy are to maintain a stable AC and to use biaxial instrumentation [4]. In order to achieve this, abandon and suture the main keratome incision closed and create a new sideport incision < 180° from the original sideport incision that will accommodate the vitrector needle [1].

In biaxial pars plana vitrectomy where the vitrector is introduced via the pars plana and the irrigation cannula is introduced anteriorly via a limbal corneal incision is ideal in removing vitreous from the anterior chamber. This approach enables the prolapsed vitreous to be drawn back into the vitreal cavity posterior to the PC tear and avoids further prolapse into the AC given the resultant lower pressure posteriorly [1]. However since most cataract surgeons do not have the required retinal training to undertake this approach with associated inherent retinal risks (retinal tear or detachment) and lack of familiarity in performing indirect ophthalmoscopy with scleral depression [3], a limbal approach for anterior vitrectomy will be discussed here. Those interested in the pars plana approach are referred to an excellent write-up of this procedure [1, 2].

The goal of vitrectomy is to remove all prolapsed vitreous from the AC back to posterior aspect of the PC. When performing bimanual vitrectomy, one needs to be familiar with the vitrectomy settings and the corresponding foot positions for a given phaco machine. With the infusion line in place, introduce the vitrector in the cut IA setting (cutting precedes aspiration) where vitrectors can cut as high as 5000 cuts per minute [1]. Unlike phacoemulsification where the vitreous can clog the phaco tip during aspiration with risk for tractional retinal detachment (RD), the rapid cut rate, the lowest effective vacuum depending on gauge (150–350) with low flow (around 15–20 cc/min) and the bottle height balanced to provide a normotensive eye [1], prevents such clogging and allows for efficient vitreous lysis and safe removal of the prolapsed vitreous reducing vitreous traction. Irrigation encourages the vitreous to remain posterior by maintaining higher pressure in front of the eye. The vitrector can be entered beyond the PC tear to encourage the vitreous back posteriorly. Care should be taken to focus in the vicinity of the corneal incisions to sever any vitreous strands entrapped within the wounds that may have a posterior connection [2].

Once the vitreous is cleared, any remaining lens fragments or cortex can then be removed in the IA cut mode (aspiration precedes cutting) that enables high suction with a lower cut rate to draw the remaining fragments toward the cutter. Commercially available Triesence (non-preserved triamcinolone) [1] can be used to stain any residual vitreous to facilitate its proper identification and removal once enough OVD is removed which will block adherence of the particles to vitreous. One should avoid sweeping the AC with any instrument such as a cyclodialysis spatula or perform surgical Wek-Cel (Beaver-Visitec, Waltham, MA) vitrectomy [1, 2] as both maneuvers can result in vitreous strands tugging on the retina with risk for RD. Once the vitreous has been amputated from the posterior segment, cellulose sponges can be then used to remove the anterior vitreal fragments via the corneal incisions without fear of traction on the retina [1].

It is important to maintain the AC by leaving the infusion cannula in place, but the infusion must be off (foot position zero), while the cutter is removed to prevent pushing vitreous out the incision on exit and causing incarceration of vitreous in the wound site. The appropriate cohesive OVD should then be placed to prevent collapse of chamber and vitreous representation. In the presence of a posterior continuous curvilinear capsulorrhexis (CCC), one can place a single-piece IOL into the capsular bag. Alternatively, if the posterior CCC is centered and of a smaller diameter (4–5 mm) than the optic diameter, consider placing a three-piece IOL with optic capture via the posterior CCC into Berger's space [1].

If IOL placement in the bag is not viable, in the presence of an intact anterior CCC, a three-piece sulcus IOL can be introduced with the haptics final resting place within the sulcus and the optic displaced through the anterior capsulorrhexis to achieve optic capture. Optic capture will ensure proper centration and lens stability [1] when conducted either via an anterior or posterior CCC. If the capsulorrhexis is too large or there is presence of an anterior radial tear, one can still place an appropriate three-piece IOL of at least 13 mm length (haptic-optic-haptic) within the sulcus provided there is zonular support 180° apart [1, 2]. As there is no measuring of the sulcus and many haptics lose memory, consideration may be given to placing a single iris suture to prevent late lens subluxation. Single-piece IOLs are inappropriate in the ciliary sulcus and can lead to posterior iris chaffing and pigmentary glaucoma [5]. Finally, if there is significant zonular dialysis, inadequate capsular support, or poor visibility due to corneal edema, placement of an ACIOL is appropriate provided that a surgical iridectomy is conducted to prevent pseudophakic pupillary block. It is also not unreasonable to leave the patient aphakic if it is not safe to place an IOL at the time of surgery and plan for a staged procedure.

Drawback to the anterior approach is that following vitrectomy, the pressure will be lower in the anterior segment encouraging more vitreous prolapse, and any vitreous encouraged forward will enlarge the capsular or zonular tear. Therefore, throughout the procedure and after the posterior capsule is breached, it is paramount to keep the AC pressurized with watertight wound closure to prevent any further vitreous prolapse anteriorly [3]. Injection of acetylcholine not only constricts the pupil in order to identify any residual vitreous strands as noted by peaking of the pupillary sphincter but it also helps to further compartmentalize any residual vitreous within the posterior chamber and vitreal cavity. Given the increased risk for endophthalmitis when the anterior hyaloid is violated, appropriate intracameral and subconjunctival antibiotics should be given, and the patient should be placed on nonsteroidal anti-inflammatory drops for several weeks to prevent cystoid macular edema [3]. Postoperatively, consideration should also be given to refer the patient for a careful retina evaluation to rule out retinal tears or impending RD [3]. Additionally, consider placing patients on ocular hypotensive medications to control IOP spikes that may arise from the presence of residual OVD in the AC and taper appropriately over time.

Indications

Vitreous management is something that is surgically unplanned. Those at intraoperative risk for a PC rupture (Table 23.2) should be informed of this potential complication as a part of their informed consent and that appropriate measures will be taken to contain the vitreous with the possible need for additional surgery including pars plana vitrectomy and lensectomy.

Essential Steps

The surgeon should have a high degree of suspicion during cataract surgery for signs of a PC tear (Table 23.3) and be equipped to deal with the associated intraocular complication (Table 23.1). If PC tear is suspected during phacoemulsification or aspiration of cortical material, do the following:

1. Maintain handpiece within the eye in irrigation mode.
2. Inject dispersive OVD via sideport incision to compartmentalize the PC tear and stabilize the AC.
3. Remove handpiece.
4. If PC tear occurs with an intact hyaloid, inject cohesive OVD into Berger's space through the PC tear. Create a posterior capsulorrhexis [1].
5. If PC tear is accompanied by vitreous prolapse into the AC, compartmentalize the vitreous posteriorly, viscoelevate the lens fragments anterior to the iris plane, and remove with phacoemulsification using a slow-motion technique [6].

6. Inject Triesence (triamcinolone acetonide injectable suspension, Alcon Laboratories Inc., Dallas TX) to stain the vitreous via the sideport incision. (Note: This is only possible once the OVD is removed with initial vitrectomy since OVD will block vitreous identification.)
7. Abandon main keratome incision.
8. Create a new sideport incision <180° away from initial sideport incision to fit the gauge of the vitrector needle.
9. Introduce infusion line and vitrector into the AC for biaxial vitrectomy.
10. Use a high-cut I/A setting with low aspiration and vacuum to lyse and aspirate vitreous keeping the eye normotensive with appropriate bottle height.
11. If vitreous loss is present with peaking of the pupil margin, lyse any vitreous strands from the corneal incisions to sever any extension beyond the PC tear.
12. Use I/A cut setting to remove cortex and residual lens material.
13. Maintain the AC by injecting with a viscocohesive OVD in preparation for IOL implantation.
14. If a posterior CCC is present, place a single-piece IOL into the bag or optic capture it with a three-piece IOL into the CCC.
15. If anterior CCC is present, place a three-piece IOL in the sulcus with optic capture or entirely within the sulcus (if uncaptured consider an iris suture to prevent late subluxation).
16. If significant zonulopathy, inadequate capsular support, or corneal edema is present, place ACIOL and perform a surgical iridectomy.
17. If poor view, consider leaving aphakic at the time of surgery.
18. Use IA cut to aspirate viscoelastic and to cut any residual vitreous strands.
19. Pressurize AC to prevent any further vitreous prolapse making certain all incisions are watertight.
20. Inject intracameral antibiotic of choice for endophthalmitis prophylaxis. Administer IV Diamox (if no sulfa allergy) to prevent post-op IOP spike if residual OVD is present in the AC.

Complications

- Choroidal detachment
- Corneal edema
- Cystoid macular edema (CME)
- Endophthalmitis
- Intraocular pressure elevation
- Lens dislocation
- Dropped lens
- Retinal detachment
- Suprachoroidal hemorrhage
- Retained nuclear or cortical material
- Zonular dehiscence

Template Operative Dictation

Note: *The template has been simplified and does not focus on the use of capsular staining or the use of pupil-dilating devices. Please refer to the appropriate chapters in this book dealing with complex cataract surgery. Three distinct scenarios are presented here to simplify concepts to guide the reader on how to surgically handle intraoperative complications in the setting of a PC tear for each category outlined in Table* 23.1*. One should give consideration for converting to an extracapsular cataract extraction if profound zonular dialysis or phacodonesis is present. Complications related to zonulopathy such as suturing of the capsule to the sclera or sutured IOLs will not be addressed here and are covered in accompanying chapters in this textbook. It is beyond the scope of this template to cover all possibilities that may arise in between. The hope is that this will serve as a base by which additional surgical skill sets can be built upon.*

Preoperative diagnosis: *Mature senile cataract (OD/OS)*

Procedure: Cataract extraction *(OD/OS)* with anterior vitrectomy and placement of (*PCIOL* [single piece or three piece]*/ACIOL*) *(OD/OS)*

Postoperative diagnosis: Complicated cataract extraction with violation of posterior capsule (*with vitreous prolapse/loss*)

Indication: A (*nuclear/cortical/posterior subcapsular*) cataract was noted affecting daily activities of living. The patient was motivated to improve vision aiming for (*distance/near*) correction. The patient was informed of the risks inherent with cataract surgery that include but are not limited to loss of vision, infection, need for additional surgery, vitreous loss, vitreous hemorrhage, retinal detachment, and retinal tear.

Description of the procedure: After discussing risks, benefits, alternatives and obtaining consent, the (right/left) eye was marked with a marking pen in the pre-op holding area, and the appropriate (*ASC/hospital based)* approved ophthalmic drops to the (*right/left)* eye were administered for the procedure followed by placement of 2 % lidocaine jelly for topical anesthesia. Following initiation of intravenous sedation, patient was taken to the operating room and placed in a supine position and connected to the monitoring apparatus. The operative eye was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A ___ mm sideport incision was made at ____ clock hours and non-preserved lidocaine was injected followed by a soft-shell technique of a dispersive OVD to coat the endothelium followed by a deeper second layer of cohesive OVD to create space and flatten the anterior capsule. A ____ mm keratome incision was made *temporally*. A standard anterior capsulorrhexis was conducted, followed by hydrodissection (*and hydrodelineation*). Sculpting was initiated with the phaco handpiece. A *divide and conquer technique* was employed to remove the endonucleus.

If the PC ruptured at this stage, with some lens fragments dislocating into the posterior segment, follow template below (otherwise proceed to *)—*During this maneuver, a sudden deepening of the AC was noted with some fragments becoming displaced into the posterior segment. At this juncture, the phaco handpiece was maintained within the eye in irrigation mode. Via the sideport incision, a dispersive OVD was injected into the AC in front of the PC tear to compartmentalize and displace the vitreous posteriorly. The remaining fragments were viscoelevated anterior to the iris plane. No attempt was made to phacoemulsify the fragments beyond the PC tear. A slow-motion phaco technique (flow 25 cm*^{3}*/min; vacuum 250 mmHg; short bursts of phaco to facilitate lens followability)* [1] *was employed to remove the lens fragments within the AC.*

The OR personnel were advised to prepare for biaxial anterior vitrectomy, and the patient was informed of the complication and reassured that all measures are being taken to stabilize the eye. The handpiece was carefully removed, and the keratome incision was sutured closed to maintain a closed chamber. A second sideport corneal incision was created (supero/inferotemporal) to the keratome incision approximately _180_ *° from the first sideport incision to accommodate the vitrector needle.*

Triesence was injected to bind to the vitreous and provide guidance during vitrectomy whenever OVD was not blocking uptake. The irrigation line and a __ gauge disposable vitrectomy probe were introduced via the respective sideport incisions into the AC. The vitrector needle was advanced into the eye while in foot position 2 (irrigation and cutting). Using cut I/A setting with a high cut rate of ___ cuts per minute, anterior vitrectomy was initiated in cut mode (foot position 3) with the infusion line held anteriorly to maintain a positive pressure and to displace the vitreous posteriorly. The lysed vitreous was removed with a low aspiration rate of ____ cc/min in foot position 3 (irrigation, cutting, and aspiration). This cycle was continued with the vitrector tilted down and advanced through the PC tear to facilitate additional removal of vitreous back posteriorly. The bottle height was adjusted to ___ cm in order to maintain a normotensive state. Once there was no clinical evidence of vitreous prolapse noted, the irrigation cannula was removed holding the vitrector in place while simultaneously keeping foot position zero. Additional Triesence was injected followed by reintroducing irrigation to disperse the Triesence in order to confirm complete removal of prolapsed vitreous from the AC. The AC was always maintained thereafter.

If vitreous strands are extending to the corneal incisions—*Using cut I/A mode, the vitrector was used to engage and amputate the vitreous strands entrapped within the corneal wounds from their posterior origin in order to avoid traction on the retina. Care was taken to avoid sweeping the AC with any secondary instruments. As appropriate, the irrigation cannula and vitrector needle lines were interchanged to lyse vitreous strands from the incisions as indicated.*

The cortex was removed from the capsular fornix using the I/A cut setting in foot position 2 (aspiration) at _____ cuts per minute and a flow rate of _____ cc/min. If residual vitreous was encountered, foot position 3 was utilized to lyse the residual vitreous.

Prior to removing the (I/A or vitrector) handpiece, a cohesive OVD was injected via the sideport incision into the AC to prevent vitreous prolapse by pressurizing the eye.

(*The cortical/epinuclear material was removed with the I/A handpiece. A PC tear was noted, and a dispersive viscoelastic OVD was injected over the defect followed by gentle injection of a cohesive OVD into Berger's space to displace and stabilize the anterior hyaloid. An edge of the posterior capsule was grasped with capsulorrhexis forceps, and a CCC was created. Prior to removing the (*I/A or vitrector*) handpiece, a cohesive OVD was injected via the sideport incision into the AC to prevent vitreous prolapse by pressurizing the eye.)

[**Choose one for lens placement and capsular integrity**]:

If the posterior capsule was intact—*Additional viscoelastic was injected to deepen the capsular bag and a foldable IOL ____ diopters, serial # _____, was injected and centered in the bag. I/A was then conducted to remove the viscoelastic material.*

If there was an intact central posterior CCC—*Additional viscoelastic was injected to deepen the capsular bag and a three-piece foldable IOL ____ diopters, serial # _____, was injected, and the optic was displaced posteriorly through the posterior CCC into Berger's space to achieve optic capture. I/A was then conducted to remove the viscoelastic material. Acetylcholine was injected into the AC to constrict the pupil. (Microscissors were used to lyse the vitreous strands when peaking of the sphincter was noted.)*

If there was no viable posterior capsule with an intact anterior CCC—*Additional viscoelastic was injected within the ciliary sulcus between the iris plane and the anterior capsule to create a buffer and a foldable three-piece IOL _ diopters, serial # _____, was injected with the leading haptic directed toward the sulcus. The trailing haptic was tucked underneath the iris plane, and the optic was displaced into the capsular bag via the anterior CCC to achieve optic capture. I/A was then conducted to remove the viscoelastic material. Acetylcholine was injected into the AC to constrict the pupil. (Microscissors were used to lyse the vitreous strands when peaking of the sphincter was noted.)*

If there was no viable PC and an anterior CCC with a radial tear—*Additional viscoelastic was injected within the ciliary sulcus between the iris plane and the anterior capsule to create a buffer, and a foldable three-piece IOL ____ diopters, serial # _____, was injected with the leading haptic directed toward the sulcus. The trailing haptic was tucked underneath the iris plane placing the entire IOL within the sulcus. I/A was then conducted to remove the viscoelastic material. Acetylcholine* *was injected into the AC to constrict the pupil. (Microscissors were used to lyse the vitreous strands when peaking of the sphincter was noted.)*

If there was marked zonulopathy, absence of capsular support or corneal edema obscuring view—*Acetylcholine was injected into the AC to constrict the pupil. (Microscissors were used to lyse the vitreous strands when peaking of the sphincter was noted.) The original keratome incision was then opened by cutting the suture and enlarged appropriately to accommodate a sheets glide and additional viscoelastic. An ACIOL ____ diopters, serial # _____, was introduced along the slide scaffold with the leading haptic secured in the angle. The training haptic was then tucked in the subincision space and adjusted as appropriate for proper placement. I/A was then conducted to remove the viscoelastic material. The keratome incision was re-sutured with a 10-0 nylon mattress suture, and stromal hydration of the corneal wounds ensured a watertight closure.*

Appropriate subconjunctival and intracameral antibiotics were administered for endophthalmitis prophylaxis, and IV Diamox 500 mg was given to counter any residual OVD within the AC to prevent post-op IOP spikes. The IOL was found to be centered in position. The pupil was round and the chamber was formed. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix, as well as steroid and antibiotic drops, followed by a shield placed over the *(right/left)* eye. The patient was transferred to the post anesthesia care unit in stable condition.

References

1. Arbisser LB. When the room gets quiet. Comprehensive strategies for unplanned vitrectomy for the anterior segment surgeon. Suppl Cataract Refract Surg Today. 2012.
2. Arbisser LB, Charles S, Howcroft M, Werner L. Management of vitreous loss and dropped nucleus during cataract surgery. Ophthalmol Clin N Am. 2006;19:495–506.
3. Kent C. When the capsule breaks: strategies for success. Rev Ophthalmol. 2009. http://www.reviewofophthalmology.com/content/i/1217/c/22934/dnnprintmode/true/?skinsrc=[l]skins/rp2010/pageprint&containersrc=[l]containers/rp2010/blank . Accessed 3 June 2016.
4. Oetting T. Anterior vitrectomy. University of Iowa Health Care Ophthalmology and Visual Sciences. http://www.eyerounds.org/tutorials/anterior-vitrectomy/index.htm. Accessed 3 June 2016.
5. Chang DF, Masket, Miller KM, et al. ASCRS Cataract Clinical Committee. Complications of sulcus placement of single-piece acrylic intraocular lenses: recommendations for backup IOL implantation following posterior capsular rupture. J Cataract Refract Surg. 2009;35(8):1445–58.
6. Osher RH. Slow motion phacoemulsification approach. J Cataract Refract Surg. 1993;19(5):667.

Chapter 24
Cataract Extraction, Femtosecond Laser Assisted

Eric Donnenfeld and Eric D. Rosenberg

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Surgical indication for cataracts includes those that impair visual acuity, create visual disability, and affect activities of daily living or deemed medically necessary for monitoring or further surgical procedures. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Cataracts • Cataract extraction • Mature cataract • Intraocular lens • IOL • PCIOL • Phacoemulsification • Femtosecond laser • Limbal relaxing incisions • Capsulorhexis • Laser pretreatment

Indications

Cataract causing impaired visual acuity, in preparation for vitrectomy, in preparation for surgical retinal detachment repair, or intraocular pathology necessitating clear media.

Essential Steps

1. Administration of topical anesthetic and antibiotic drops
2. Patient positioned under Femtosecond laser system
3. Applantation of laser cone
4. Suction applied
5. Capsulorhexis, LRI, lens fragmentation, and clear corneal incisions created
6. Patient transferred to operating room
7. Paracentesis incision
8. Preservative-free Xylocaine instillation

E. Donnenfeld (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: ericdonnenfeld@gmail.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_24

9. Viscoelastic injection into the AC
10. Clear corneal incision
11. Removal of the premade capsulorhexis
12. Hydrodissection of lens
13. Phacoemulsification and aspiration
14. Coaxial irrigation and aspiration of cortical material
15. Viscoelastic injection into capsular bag
16. PCIOL insertion
17. Removal of viscoelastic
18. Stromal hydration

Complications

- Hyperemia
- Capsular tags or bridges
- Miosis
- Endothelial damage
- Hyphema
- Corneal edema
- Cystoid macular edema (CME)
- Retinal detachment
- Lens dislocation
- Zonular dehiscence
- Dysphotopsias
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Mature cataract (OD/OS)*

Procedure: Femtosecond laser assisted cataract extraction *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* had developed a cataract over the past ____ *months/years* and on workup was found to have a (*nuclear/cortical/posterior subcapsular)* (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. Visually significant astigmatism was also noted to be present. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. Topical anesthesia and mydriatic drops were placed into the operative eye. Once in the femtosecond laser room, the patient was placed in the supine position under the laser system. The laser cone was applanated onto the center of the cornea using a circumferential suction skirt, and the suction was applied evenly across the cornea. Following the docking procedure, the anterior segment was imaged using OCT, and the system appropriately identified all critical landmarks. The femtosecond laser was then used to create the capsulorhexis, arcuate limbal relaxing incisions at the steepest axis, primary and secondary phacoemulsification incisions, and fragmentation of the lens.

Once the procedure was completed, the patient was brought into the OR on an eye stretcher in the supine position. Before a proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, topical anesthesia, 0.5 % tetracaine, was instilled three times into the conjunctival fornices of the *operative* eye. The eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the operative eye and an eyelid speculum was placed.

The primary incisions were opened with a blunt spatula. Intracameral *methylparaben-free Xylocaine* was injected into the anterior chamber followed by viscoelastic. Using Utrata forceps, the anterior capsulorhexis was removed in toto. BSS hydrodissection was gently performed, and a fluid wave was noted. Using the phacoemulsification handpiece, the nucleus was emulsified in its entirety. Residual cortical material was then aspirated using the irrigation/aspiration (I/A) handpiece. A total _____ absolute phaco-time (APT) was used in the procedure.

Viscoelastic was injected to inflate the capsular bag and reform the anterior chamber. A ____ diopter posterior chamber intraocular lens was then injected and delivered into the capsular bag.

If toric IOL used: The trailing haptics were dialed into the correct position

Viscoelastic was aspirated from the eye using coaxial irrigation and aspiration. Stromal hydration of the corneal incisions was performed, and the incisions were noted to be watertight. At the conclusion of the case, the anterior chamber was deep and within normal limits to palpation of the cornea. Eyelid speculum and drape were removed. Antibiotic ointment was placed in the inferior fornix and a shield was placed over the eye. The patient tolerated the procedure well and was transferred to the post anesthesia care unit in stable condition.

Chapter 25
Cataract Extraction, Endocyclophotocoagulation, and Goniosynechialysis

Ike K. Ahmed and Matthew B. Schlenker

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Surgical indication for cataracts includes those that impair visual acuity, create visual disability, affect activities of daily living and closed angles secondary to lens rise, or deemed medically necessary for monitoring or further surgical procedures. Endocyclophotocoagulation is often combined with cataract surgery to help reduce intraocular pressure. ECP works by inducing thermal damage to the ciliary processes under endoscopic visualization in order to decrease the amount of aqueous produced or to shrink large ciliary processes posteriorly. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Cataracts • Cataract extraction • Mature cataract • Intraocular lens • IOL • PCIOL • Phacoemulsification • Endocyclophotocoagulation • ECP • Glaucoma • Plateau iris • Closed angle • Goniosynechialysis • Peripheral anterior synechia • PAS

Indications

Goniosynechialysis: peripheral anterior synechia

Endocyclophotocoagulation: closed angles secondary to plateau iris or uncontrolled intraocular pressure

Cataract extraction: closed angles secondary to lens rise, cataract causing impaired visual acuity, and cataract obscuring view to the posterior pole

Essential Steps

1. Topical anesthetic
2. Placement of speculum
3. Paracentesis incision

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ikeahmed@mac.com; Matt.schlenker@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_25

4. Preservative-free Xylocaine instillation
5. Viscoelastic injection into the AC
6. Clear corneal incision
7. Capsulorhexis
8. Hydrodissection of lens
9. Phacoemulsification and aspiration
10. Irrigation and aspiration of cortical material
11. Viscoelastic injection into capsular bag
12. PCIOL insertion
13. Inflation of ciliary sulcus space
14. 210° of endocyclophotocoagulation
15. Pupillary miosis
16. Viscoelastic injection into the angle
17. Gonioscopic evaluation of the angle
18. Lysis of iridocorneal adhesions
19. Removal of viscoelastic
20. Stromal hydration
21. Sutures as necessary

Complications

- Hyphema
- Corneal edema
- Elevated IOP
- Hypotony
- Peripheral anterior synechia
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to the iris
- Capsular tear
- Lens dislocation/zonular dehiscence
- Dropped lens
- Retained nuclear or cortical material
- Dysphotopsias
- Ptosis
- Suprachoroidal hemorrhage

Template Operative Dictation

Preoperative diagnosis: C*ataract and glaucoma (OD/OS)*

Procedure: Cataract extraction by phacoemulsification, intraocular lens implantation, endocyclophotocoagulation, and goniosynechialysis *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* has a history of angle closure glaucoma despite conservative treatment measures ± a visually significant cataract. On workup *he/she* was found to have a closed angle with posterior anterior synechia. *He/she* also had a (*nuclear/cortical/posterior sub capsular)* (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient was elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. 0.5 % tetracaine was instilled into the conjunctival fornices of the *(right/left)* eye. The *(right/left)* eye was prepped and draped in the usual sterile fashion and operating microscope centered over the *(right/left)* eye. The eyelid speculum was placed. A proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A 15 degree paracentesis blade was used to make a side port incision followed by injection of Xylocaine, dispersive viscoelastic, and cohesive viscoelastic (soft-shell technique) into the anterior chamber. Using a 2.2 mm keratome blade, a 2.2 mm temporal clear corneal incision was made.

If trypan blue dye used: *Small amounts of trypan blue were injected over the anterior capsule and painted over the anterior capsule surface until an adequate staining was achieved. Viscoelastic was then injected into the anterior chamber.*

Attention was then turned toward the capsulorhexis. The capsulorhexis was completed using Utrata forceps followed by hydrodissection with balanced saline solution on a Chang cannula. Phacoemulsification was then performed using a phaco-chop technique. Irrigation and aspiration were used to remove remaining cortical material, and the capsular bag was reinflated with cohesive viscoelastic. A total _____ absolute phaco-time (APT) was used in the procedure. An intraocular lens, *Alcon/AcrySof/Tecnis* model #_______, serial #______, with a power of _____ diopters, was inspected and found to be defect-free. The IOL was injected into the capsular bag using a Monarch injector and dialed into proper position using a Kuglen hook.

The nasal ciliary sulcus space was then inflated with cohesive viscoelastic, and the endocyclophotocoagulation probe was placed in the anterior chamber. The ciliary processes were visualized and treated for (*180–210*) degrees on a power setting of 0.2 variable W, continuous-wave mode. Miochol-E was then instilled into the anterior chamber and pupillary miosis was induced. Cohesive viscoelastic was injected into the angle. A *gonio-pole lens* was then used to examine the angle, and lysis of iris-to-cornea adhesions was performed using iris micro forceps.

Viscoelastic was removed from the eye using coaxial irrigation and aspiration. Stromal hydration of the corneal incisions was performed, and the incisions were noted to be watertight (*and if necessary: 10-0 Nylon simple interrupted sutures were placed*). The IOL was found to be centered in position. The pupil was round and the anterior chamber was formed. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix and a shield was placed over the eye. The patient was transferred to the post anesthesia care unit in stable condition.

Chapter 26
Cataract Extraction with Gold Metal Shunt (GMS) Implant

Ike K. Ahmed and Matthew B. Schlenker

Abstract Surgical management of cataract patients with uncontrolled glaucoma poses several challenges to the ophthalmologist. With the goal of improving visual acuity and optimizing intraocular pressure, the ophthalmologist may choose to combine cataract extraction with glaucoma surgery in one operative encounter. Suprachoroidal procedures obviate the need to utilize the conjunctiva to create filtering blebs (i.e., trabeculectomies) and reduce the risk of failure of bleb-related surgery secondary to bleb-related fibrosis, scarring, infection, or overfiltration. The gold metal shunt implant takes advantage of the natural negative pressure gradient from the anterior chamber into the suprachoroidal space, while still providing natural counterpressure to prevent hypotony.

Keywords Cataract extraction • IOL • Uncontrolled glaucoma • Gold metal shunt implant • SOLX gold microshunt

Indications

Glaucoma uncontrolled by medical or laser therapy, refractory glaucoma, or failure of previous glaucoma surgical intervention
Cataract extraction: attempt to further reduce IOP, cataract-causing impaired visual acuity, cataract obscuring view to the posterior pole, and desire to prevent a second surgery in the future which may lead to glaucoma surgery failure

Essential Steps

1. Sideport incision
2. Clear corneal incision
3. Capsulorhexis
4. Hydrodissection
5. Phacoemulsification

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ikeahmed@mac.com; Matt.schlenker@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_26

6. Aspiration and irrigation of the cortical material
7. Capsular bag inflation with viscoelastic
8. Insertion of the IOL
9. Superior fornix-based conjunctival flap
10. 95 % depth scleral incision
11. Scleral pocket
12. Paracentesis incision
13. Injection of viscoelastic
14. Scleral incision made full thickness until choroid visualized
15. Lidocaine and viscoelastic injection into the suprachoroidal space
16. Anterior chamber entered at the level of the scleral spur
17. Insertion of suprachoroidal shunt
18. Confirmation of placement with intraoperative gonioscopy
19. Closure of scleral wound
20. Closure of conjunctiva

Complications

- Hyphema
- Vitreous hemorrhage
- Suprachoroidal hemorrhage
- Thin fibrotic membrane obstructing proximal and distal holes
- Corneal edema
- Elevated IOP
- Hypotony
- Small bleb formation
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to the iris
- Choroidal detachment
- Lens dislocation
- Dropped lens
- Retained nuclear or cortical material
- Capsular tear
- Zonular dehiscence
- Dysphotopsias
- Ptosis

Template Operative Dictation

Preoperative diagnosis: *Uncontrolled glaucoma and cataract (OD/OS)*

Procedure: Gold metal suprachoroidal shunt implant and cataract extraction (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* with a well-known and documented history of glaucoma has had elevated IOP despite maximal tolerated medical ± laser therapy ± failed surgical therapy. The patient's IOP has been as high as ____ mmHg, ± and the patient has had glaucoma progression. *He/she* also had a (*nuclear/cortical/posterior sub capsular)* (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. (*If no cataract present, a clear lens extraction was elected.*) After a detailed review of risks and benefits, the patient was elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine drops were instilled into the eye. Mild analgesia and sedation were induced using MAC. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

Attention was first turned to the cataract. An Ahmed SuperPentiAhm trifaceted mini-diamond knife or 15 degree blade (actually lots of options) was used to make a side port incision followed by injection of Xylocaine, Viscoat, and Provisc (soft-shell technique) into the anterior chamber. Using a ___mm keratome blade, a ___ mm temporal clear corneal incision was made.

If trypan blue dye used:

Technique 1: *Small amounts of trypan blue were injected over the anterior capsule, and painted over the anterior capsule surface until an adequate staining was achieved after the Viscoelastic had been injected into the anterior chamber.*

Technique 2: *Trypan blue was injected into the anterior chamber through a side port incision and used to stain the lens anterior capsule. Following this an air syringe was used to inject an air bubble into the anterior chamber. Following approximately ____seconds, balanced salt solution was injected through the paracentesis wound to clear away excess Trypan blue and expose the stained anterior lens capsule.*

The capsulorhexis was completed using Utrata forceps followed by hydrodissection with balanced saline solution on a Chang cannula. Phacoemulsification was then performed using a phaco-chop technique. Irrigation and aspiration were used to remove remaining cortical material, and the capsular bag was reinflated with Provisc. A total _____ absolute phaco-time (APT) was used in the procedure. An intraocular lens (*Alcon/AcrySof/Tecnis)* model #_______, serial #______, with a power of _____ diopters, was inspected and found to be defect-free. The IOL was injected into the capsular bag using a Monarch injector and dialed into proper position using a Kuglen hook.

The operating microscope was then rotated superiorly into position, and a superior fornix-based conjunctival flap was created by making an initial ____mm peritomy, approximately ____mm from the limbus. Subconjunctival Xylocaine was then infiltrated in the subconjunctival space to augment topical anesthesia. Blunt dissection to mobilize the conjunctiva was then carried out using Westcott scissors. Hemostasis was achieved with bipolar electrocautery. A mini-diamond blade was used to create a 95 % depth scleral incision approximately ____mm from the limbus and ___mm in length. A scleral pocket was then dissected anteriorly toward the clear cornea.

A paracentesis incision was used to lower the intraocular pressure, and additional Provisc was injected into the anticipated entry site of the suprachoroidal shunt. The previously created vertical scleral incision was then extended full thickness until choroid was visualized. 1 % non-preserved lidocaine and Provisc were then injected into the suprachoroidal space. The Zaldivar anterior procedure (ZAP) diamond knife was used to enter the anterior chamber at the level of the scleral spur. The anterior aspect of the SOLX gold suprachoroidal microshunt was inserted into the scleral tunnel using curved tying forceps. The shunt was advanced into the anterior chamber, while a 27-gauge needle was used to place the posterior edge into the suprachoroidal space. A Sinskey hook was used in the anterior chamber to ensure that the shunt was placed sufficiently posterior to ensure that the posterior orifices of the shunt rested in the suprachoroidal space. An intraoperative gonioscopy lens was used to assess and ensure proper positioning of the shunt in the anterior chamber.

The scleral wound was then reapproximated using _#_ interrupted *10-0 nylon* sutures. The conjunctiva was then closed using *10-0 Vicryl* in a running horizontal mattress fashion. At the conclusion of the case, the patient received Maxitrol ointment. The patient was then transferred to the recovery room in stable condition and (he/she) tolerated the procedure well.

Chapter 27
Glued Intrascleral Haptic Fixation of an Intraocular Lens

Eric Donnenfeld and Alanna S. Nattis

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patient was noted to have a dislocated lens, intraoperative posterior capsular rupture, Marfan syndrome, traumatic dislocation of lens, or aphakia that was creating visual disability and/or affecting activities of daily living that necessitated further surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Glued intrascleral haptic fixation • Intraocular lens • Posterior capsular rupture • Unstable bag • Scleral tunnels • Aphakia • Fibrin glue

Indications

Dislocated lens, intraoperative posterior capsular rupture, Marfan syndrome, traumatic dislocation of the lens, and aphakia

Essential Steps for Dislocated Lens (*For Aphakia*)

1. Conjunctival peritomies
2. Cauterization of sclera
3. Creation of scleral flaps, 180° apart
4. Sclerotomy
5. Additional paracentesis incisions
6. Posterior vitrectomy
7. Displaced lens brought into the anterior chamber (*IOL introduced into AC*)
8. Old capsular bag and cortical remnants removed from the IOL (*leading haptic externalized*)

E. Donnenfeld (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: ericdonnenfeld@gmail.com

A.S. Nattis
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_27

9. Injection of viscoelastic (*trailing haptic placed into AC, then externalized*)
10. Creation of scleral tunnels
11. Haptics tucked into scleral tunnels
12. Fibrin glue application

Complications

- Corneal edema
- Decentration of IOL
- Haptic extrusion
- Giant papillary conjunctivitis
- Vitritis
- Hypotony
- Choroidal detachment
- Vitreous hemorrhage
- Cystoid macular edema
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Dislocated intraocular lens/aphakia (OD/OS)*

Procedure: Glued intrascleral haptic fixation of an intraocular lens (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old *male/female* who was diagnosed with a dislocated three-piece posterior chamber intraocular lens. After a detailed review of the risks, benefits, and alternatives, the patient was elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The eye was pharmacologically dilated. Local anesthetic was injected in the standard (*retrobulbar/peribulbar*) fashion to the operative eye using ____ml of lidocaine and marcaine in a 50:50 mix. A Honan balloon was placed. The patient was brought into the OR on an eye stretcher in the supine position. Before a proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, the operative eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the operative eye and an eyelid speculum was placed.

Radial corneal markings with a marker were performed to ensure proper alignment. Two conjunctival peritomies were created 180° apart, and the underlying blood vessels were cauterized using electrocautery. Two partial thickness limbus-based scleral flaps, 180° apart, were created, and a ___mm sclerotomy was made with a MVR blade ____mm from the limbus. In addition, two superior paracentesis incisions with a ___mm keratome blade were created approximately ___ clock hours apart, and viscoelastic was injected into the anterior chamber. An infusion port incision was then made inferiorly and used to maintain the anterior chamber. A posterior vitrectomy was then performed through the sclerotomy beneath the scleral flap.

[Choose one]:

If lens displaced*: The displaced lens was then grasped with two microforceps through the posterior sclerotomy, and brought into the anterior chamber. Any fibrotic tissue was then removed from the lens using forceps and the anterior vitrector. Viscoelastic was placed behind the IOL to reduce movement of the IOL. Two 25-gauge microforceps placed through the limbal incisions were used to grasp the haptics using the handshake technique. Through the sclerotomy incision, the second microforcep externalized the first haptic. This procedure was then repeated on the opposite side of the eye with care taken not to dislocate the haptic that had first been externalized.*

If aphakic*: A* ____ *diopter intraocular lens was then slowly introduced into the anterior chamber through the superior keratome incision. As the leading haptic unfolded, it was grasped using a 25-gauge forcep and externalized into the scleral tunnel. The trailing haptic was intentionally left out of the anterior chamber upon injection of the lens. Next, the trailing haptic was introduced into the anterior chamber, and similarly externalized.*

Using a 26-gauge needle, a scleral tunnel was created along the limbal curvature, with the haptics gently tucked into the scleral tunnel. The intraocular lens was well centered. The anterior chamber was noted to be deep and maintained, and the infusion port was removed. Scleral flaps were sealed with fibrin glue. All wounds were free of any leaks. Antibiotics drops and Maxitrol ointment were placed into the eye. The eyelid speculum was removed and the eye was patched and shielded. The patient tolerated the procedure well and was transferred to the postanesthesia care unit in stable condition.

Chapter 28
Intraocular Lens Exchange

Eric Donnenfeld and David Alevi

Abstract In the case of anisometropia, optic opacification, optical dissatisfaction, or a dislocated IOL, the surgeon is faced with choosing the appropriate strategy for visual rehabilitation. One of the techniques to improve visual acuity is IOL explantation or exchange. This technique relies on the surgeon's ability to maintain a stabilized capsule while safely explanting the previous IOL. When performed correctly, patients may experience excellent visual rehabilitation. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Intraocular lens exchange • IOL • IOL explantation • IOL exchange • Dislocated IOL • Anisometropia • Dissatisfaction with previous lens • Lens opacification

Indications

Dislocated lens, anisometropia, optic opacification, and optical dissatisfaction with previous lens (lens dissatisfaction).

Essential Steps

1. Orbital block or topical anesthetic
2. Placement of speculum
3. Paracentesis incision
4. Preservative-free Xylocaine instillation
5. Paracentesis incision
6. Viscoelastic injection into the AC
7. Clear corneal incision
8. Viscoelastic injection into capsular bag

E. Donnenfeld (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: ericdonnenfeld@gmail.com

D. Alevi
Department of Ophthalmology, Ophthalmic Consultants of Long Island, Rockville Center, NY, USA
e-mail: David.alevi@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_28

9. IOL dialed out of capsular bag
10. IOL cut in two pieces
11. PCIOL insertion
12. Removal of viscoelastic
13. Stromal hydration

Complications

- Hyperemia
- Capsular tags or bridges
- Endothelial damage
- Hyphema
- Corneal edema
- Cystoid macular edema (CME)
- Vitreous loss
- Retinal detachment
- Subsequent lens dislocation
- Zonular dehiscence
- Dysphotopsias
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Anisometropia/lens dysfunction (OD/OS).*

Procedure: Intraocular lens exchange *(OD/OS).*

Postoperative diagnosis: *Same.*

Indication: This is a ____-year-old *male/female* who subsequently developed anisometropia/lens dysfunction following previous cataract surgery. Despite spectacle therapy, the patient failed to improve over the past ___ (*months/years*). After a detailed review of the risks, benefits, and alternatives, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position and placed under appropriate cardiopulmonary monitoring. Local anesthetic was injected in the standard *(retrobulbar/peribulbar)* fashion using ____ml of lidocaine, ____ml of marcaine, and ____ml of hyaluronidase and massaged into place with gentle manual pressure. The *(right/left)* eye was prepped and draped in the usual sterile ophthalmic fashion including placement of half-strength Betadine in the conjunctival fornix. The operating microscope was centered over the *(right/left)* eye and a wire eyelid speculum was placed. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A paracentesis site was created at the ____o’clock position with the use of a diamond blade, and viscoelastic was injected into the anterior chamber. A ____mm keratome blade was used to make a clear corneal incision into the anterior chamber. A 30-gauge needle was then introduced into the anterior chamber and placed underneath the anterior capsule. The viscoelastic was then injected between the posterior surface of the anterior capsule and previously placed intraocular lens. The 30-gauge needle was also utilized to mechanically lyse adhesions between the IOL and the anterior capsule. The intraocular lens was then peaked out of the capsular bag and the haptics were slowly dialed out.

[Choose]

If difficulty was noted in dialing out a haptic*—a micro-scissor was used to cut the haptic, and careful attention was paid to removing the haptic after the lens was removed.*

If Acrylic or Silicon lens*—90 % of the optic of the lens was then cut centrally to allow for easy removal through the clear corneal incision.*

If PMMA lens*—the lens was removed through a ___mm clear corneal incision which was then closed with _#_ interrupted 10-0 Nylon suture.*

The capsular bag was again filled with viscoelastic, and the new intraocular lens (*Alcon/AcrySof/Tecnis)* model #_______, serial #______, with a power of _____ diopters, was injected and rotated into the bag. The residual viscoelastic was then removed using coaxial irrigation and aspiration. At the conclusion of the case, the anterior chamber was noted to be deep, and the pupil was round. The newly placed intraocular lens was well centered in the capsular bag, and the wound was free of any leaks. Antibiotic drops and Maxitrol ointment were placed on the eye. The eye was patched and shielded. The patient tolerated the procedure well and was transferred to the postanesthesia care unit in stable condition.

Chapter 29
Iris-Enclavated Intraocular Lens Implantation

Ike K. Ahmed and Matthew B. Schlenker

Abstract In cases requiring primary or secondary IOL implantation in eyes lacking capsular support, ACIOL, scleral-fixated PCIOL, or iris-sutured PCIOL are all viable options. A scleral-fixated PCIOL and iris-sutured PCIOL have the advantage of keeping the IOL away from the corneal endothelium and avoiding a 6 mm wound, though require longer operating time, significant technical expertise, and can tilt causing iris chaffing, inflammation, hyphema, and elevated intraocular pressure. There are also instances where the sutures break requiring reoperation. An iris enclavated ACIOL is similar to a traditional ACIOL, though does not require sizing, and does not have angle supported haptics that can cause damage to the corneal endothlium, inflammation, or posterior syneciae formation. The newer iris-enclavated IOLs are fixated to the mid-peripheral iris and centered over the pupil. In this position, mydriasis, iris vasculature, and the angle are not affected.

Keywords Iris-enclavated IOL • Iris-fixed IOL • Aphakia • Secondary IOL implantation • Peripheral iridectomy

Indications

Phakic correction in moderate to high myopia or secondary implantation for aphakia.

Essential Steps

1. Topical anesthetic
2. Placement of speculum
3. Paracentesis incisions
4. Miochol-E instillation
5. Viscoelastic injection into the AC
6. Partial thickness limbal groove
7. Clear corneal incision

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto,
Toronto, ON, Canada
e-mail: ikeahmed@mac.com; Matt.schlenker@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_29

8. Insertion of the Artisan lens
9. Closure of the clear cornea incision
10. "Enclavation" of the iris with the lens haptics
11. Creation of a peripheral iridectomy
12. Removal of viscoelastic
13. Stromal hydration

Complications

- Traumatic injury to the iris
- Lens dislocation
- Hyphema
- Endothelial damage
- Corneal edema
- Elevated IOP
- Pupillary block
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Dysphotopsias
- Suprachoroidal hemorrhage
- Retinal detachment

Template Operative Dictation

Preoperative diagnosis: *Aphakia/phakic correction in moderate or high myopia (OS/OD)*

Procedure: Iris-enclavated intraocular lens implantation (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This is a____-year-old aphakic *male/female* some may have not had cataract surgery so perhaps make this optional ____ (*weeks/months/years*) previously or has a dislocated IOL...or has developed uveitis-glaucoma-hyphema syndrome. Patient cannot tolerate contact lenses, and after a thorough discussion of options, risks, and benefits, the patient was elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. 0.5 % tetracaine was instilled into the conjunctival fornices of the *(right/left)* eye. The *(right/left)* eye was prepped and draped in the usual sterile fashion and operating microscope centered over the *(right/left)* eye. The eyelid speculum was placed. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A diamond paracentesis blade was used to make two side port incisions, one superiorly and one inferiorly. Miochol-E was injected into the anterior chamber to successfully achieve intraoperative miosis. The anterior chamber was then inflated with Viscoat and Provisc. The guarded diamond blade was then used to create a _*6*_ mm by _*300*_ μm depth temporal groove at the limbus. A temporal clear corneal incision was made with a 2.2 mm diamond keratome, which was then extended laterally to the full extent of the groove. The Artisan lens was then placed into the anterior chamber using the curved tying forceps and a Sinskey hook used to center over the pupil. A *10-0 nylon suture* using the *triple cross-stitch method* was then placed into the main corneal incision to create a watertight wound. Iris micrograspers were then used to enclave the iris into each of the claw haptics while using micro tying forceps to secure the optic of the Artisan lens. The vitreous cutter was advanced into the side port incision and used to create a peripheral iridectomy.

If anterior vitrectomy was performed: *The vitreous cutter was placed into the (superior/inferior) paracentesis incision while the irrigation cannula was placed into the (inferior/superior) incision. An anterior vitrectomy was performed until all vitreous was cleared from the anterior chamber and wounds.*

Viscoelastic was removed from the eye using coaxial irrigation and aspiration or using a BSS syringe on a 27 gauge cannula. Stromal hydration of the paracentesis incisions was performed, the triple cross-stitch was locked and the knot was buried. and the incisions were noted to be watertight (*and if necessary, 10-0 nylon simple interrupted sutures were placed*). The Artisan lens was found to be centered in position. The pupil was round and the anterior chamber was formed. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix and a shield was placed over the eye. The patient was transferred to the post anesthesia care unit in stable condition.

Chapter 30
IOL Explantation with Iris-Enclavated Intraocular Lens Implantation

Ike K. Ahmed and Matthew B. Schlenker

Abstract In patients requiring IOL explantation/exchange in eyes lacking capsular support, ACIOL, scleral-fixated PCIOL, or iris-sutured PCIOL are all viable options. Although technically easier to implant an ACIOL, a larger (6 mm) corneal/scleral incision is required, and the surgeon may face challenges as to appropriate sizing (angle-to-angle/white-to-white dimensions vary between patients), leading to complications such as corneal endothelial decompensation, chronic iritis, and new/worsening glaucoma. Although technically easier to implant an ACIOL, a larger (6 mm) corneal/scleral incision is required, and the surgeon may face challenges as to appropriate sizing (angle-to-angle/white-to-white dimensions vary between patients), leading to complications such as corneal endothelial decompensation, chronic iritis, and new/worsening glaucoma. Iris-enclavated IOLs (such as the Artisan lens (Ophtec, Boca Raton, FL)) do not require iris suturing (which may be technically challenging) and alleviate the problem of sizing variables from patient to patient. The newer iris-enclavated IOLs are fixated to the mid-peripheral iris and centered over the pupil. In this position, mydriasis, iris vasculature, and the angle are not affected.

Keywords Dislocated IOL • IOL subluxation • IOL exchange • Pseudoexfoliation • Traumatic IOL dislocation • Secondary IOL implantation • Iris-enclavated IOL implantation • Peripheral iridectomy

Indications

Primary implantation in patients with poor capsulo-zonular support, IOL explanation due to uveitis-glaucoma-hyphema syndrome, dislocated IOL, optic opacification, or dissatisfaction with IOL.

Essential Steps

1. Topical anesthetic
2. Placement of speculum

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ikeahmed@mac.com; Matt.schlenker@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_30

3. Paracentesis incisions
4. Viscoelastic injection into the AC
5. Partial thickness limbal groove
6. Clear corneal incision
7. Lens capture with micrograspers and prolapse into AC
8. Injection of Miochol
9. Extension of the clear corneal incision
10. Explanation of whole lens
11. Implantation of Artisan lens
12. Closure of the clear corneal incision
13. "Enclavation" of the iris with the lens haptics
14. Creation of a peripheral iridectomy
15. Removal of viscoelastic
16. Stromal hydration

Complications

- Traumatic injury to the iris
- Subsequent lens dislocation
- Endothelial damage
- Dropped lens
- Vitreous loss
- Zonular dehiscence
- Hyphema
- Corneal edema
- Pupillary block
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Dysphotopsias
- Suprachoroidal hemorrhage
- Retinal detachment

Template Operative Dictation

Preoperative diagnosis: *Dislocated Artisan lens (OD/OS).*

Procedure: Artisan lens explantation, secondary Artisan lens implantation, and anterior vitrectomy (*OD/OS*).

Postoperative diagnosis: *Same.*

Indication: This is a ____-year-old (*male/female)* who subsequently developed decreased vision following previous cataract surgery. The condition has worsened over the past ___ (*months/years*). On workup, he/she was discovered to have a dislocated intraocular lens and poor capsulo-zonular support. After a detailed review of the risks, benefits, and alternatives, the patient was elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. 0.5 % tetracaine was instilled into the conjunctival fornices of the *(right/left)* eye. The *(right/left)* eye was prepped and draped in the usual sterile fashion and operating microscope centered over the *(right/left)* eye. The eyelid speculum was placed. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A diamond paracentesis blade was used to make two side port incisions, one superiorly and one inferiorly. The anterior chamber was then inflated with Viscoat and Provisc. The guarded diamond blade was then used to create a _*6*_ mm by _*300*_ μm depth temporal groove at the limbus. A temporal clear corneal incision was made with a *2.2* mm diamond keratome. The dislocated intraocular lens was then secured with micrograspers and prolapsed into the anterior chamber with the assistance of the Kuglen and Sinskey hooks. Iris retractors were used as needed. Miochol-E was injected into the anterior chamber to successfully achieve intraoperative miosis. Using the keratome blade, the clear corneal incision was then extended laterally to the full extent of the groove. The intraocular lens was then explanted whole from the main corneal incision using micrograspers.

The Artisan lens was then placed into the anterior chamber using the curved tying forceps and centered using a Sinksey hook. A *10-0 nylon suture* using the *triple cross-stitch method* was then placed into the main corneal incision to create a watertight wound. Iris micrograspers were then used to enclave the iris into each of the claw haptics while using micro tying forceps to secure the optic of the Artisan lens. The vitreous cutter was advanced into the side port incision and used to create a peripheral iridectomy.

If anterior vitrectomy was performed: *The vitreous cutter was placed into the superior/inferior paracentesis incision while the irrigation cannula was placed into the inferior/superior incision. An anterior vitrectomy was performed until all vitreous was cleared from the anterior chamber and wounds.*

Viscoelastic was removed from the eye using coaxial irrigation and aspiration or a BSS syringe on a 27 gauge cannula. Stromal hydration of the paracentesis incisions was performed, the triple cross-stitch was locked and the knot was buried, and the incisions were noted to be watertight (*and, if necessary, 10-0 nylon simple interrupted sutures were placed*). The Artisan lens was found to be centered in position. The pupil was round and the anterior chamber was formed. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix and a shield was placed over the eye. The patient was transferred to the postanesthesia care unit in stable condition.

Chapter 31
Repair and Centration of Dislocated IOL Using McCannel Suture Technique

Alanna S. Nattis, Jennifer Yong, and Gerald Zaidman

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patient was noted to have a dislocated lens, intraoperative posterior capsular rupture, or traumatic dislocation of lens that was creating visual disturbance and/or affecting activities of daily living that necessitated further surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords McCannel suture repair • Dislocated IOL • Decentration of IOL • Advanced technique • Securing IOL

Indications

Dislocated or unstable IOL out of visual axis (secondary to pseudoexfoliation, posterior capsular rupture, Marfan's syndrome, trauma, idiopathic).

Essential Steps

1. Orbital block or topical anesthetic
2. Placement of speculum
3. Paracentesis incision
4. Viscoelastic instillation into the AC
5. Pupillary optic capture
6. Placement of first McCannel suture
7. Placement of second McCannel suture
8. Placement of additional paracentesis incision
9. Retrieval of suture from the AC
10. Tying of sutures and securing of haptic

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

J. Yong • G. Zaidman
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Jennifer.Yong@wmchealth.org; pedkera@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_31

11. Anterior vitrectomy
12. Prolapse of optic behind iris
13. Stromal hydration

Complications

- Loss of IOL to vitreous cavity
- Dislocation of IOL postoperatively
- Vitreous incarceration
- Damage to IOL
- Damage to iris
- Hyphema
- Iridodialysis
- Zonular dehiscence
- Cystoid macular edema
- Corneal edema
- Retinal detachment
- Endophthalmitis

Template Operative Dictation

Preoperative Diagnosis: *Dislocated intraocular lens implant (OD/OS).*

Procedure: Repair, centration, and iris fixation of dislocated intraocular lens with anterior vitrectomy (OD/OS).

Postoperative Diagnosis: *Same.*

Indication: This is a ______-year old *male/female* who subsequently developed dislocation of *his/her* intraocular lens implant following previous cataract surgery. Despite spectacle therapy, the patient's refractive error could not be adequately managed without surgical intervention. After a detailed review of the risks, benefits, and alternatives, the patient was elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area and informed consent was obtained. The proper side and site was marked, indicating the operation was to be performed on the (*right/left)* eye. The patient was then brought into the OR on an eye stretcher in supine position and placed under appropriate cardiopulmonary monitoring. Local anesthetic was injected in the standard (*retrobulbar/peribulbar)* fashion using ___ml of lidocaine, _____ml of Marcaine, and ______ml of hyaluronidase, and massaged into place with gentle manual pressure. The *(right/left)* eye was prepped and draped in the usual sterile fashion, including placement of half-strength Betadine in the conjunctival fornix. The operating microscope was then centered and focused over the (*right/left)* eye and a wire eyelid speculum was placed. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A 1 mm microsharp blade was then used to make a clear corneal peripheral paracentesis incision at _10_ and _2_ o'clock hours. Following this, viscoelastic was injected both into the anterior chamber and behind the dislocated IOL. The viscoelastic and a cyclodialysis spatula were used to elevate the IOL out from behind the iris and provide anterior optic capture above the pupil. At this point, the outlines of the haptics were visible underneath the iris nasally and temporally. A *10-0 prolene double-armed* suture with long needles on each end was first passed on the (*temporal/nasal)* side through the clear cornea and iris, then underneath the (*temporal/nasal)* haptic and back through the iris and clear cornea on the other side of the haptic. The (*temporal/nasal)* haptic was secured into place with the suture. This method was then repeated for the haptic on the (*nasal/temporal)* side, securing the (*nasal/temporal)* haptic to the iris. Following suture placement, a microsharp blade was used to create additional paracentesis incisions at _3_ and _9_ o'clock hours. A cyclodialysis spatula and a curved McPherson forceps were then used to retrieve the two loops of the previously placed *10-0 prolene* suture on the (*nasal/temporal)* side and pull them from the anterior chamber through the paracentesis wound at _9_ o'clock. The double-armed needles were cut and removed from the field. The remainder of the suture was then pulled entirely through the clear cornea and back out through the paracentesis wound, so that each cut end of the suture rested outside of the eye though the paracentesis wound (*nasal/temporal)*. The sutures were then tied in a square knot fashion, creating a secure knot on the anterior iris surface and securing the (*nasal/temporal)* IOL haptic in place (McCannel suture technique). The (*temporal/nasal)* haptic was secured similarly.

Once the IOL was secured to the iris, attention was turned to the dislocated capsular bag, behind the IOL. A microsharp blade was used to create a ___mm peripheral paracentesis wound at ___ o'clock. A bimanual anterior vitrectomy was performed to remove the majority of the dislocated and membranous capsular bag, and an anterior vitrectomy was continued to ensure that no vitreous was present in the anterior chamber. The wounds were swept with a cyclodialysis spatula to ensure there was no vitreous present. The IOL optic was then replaced behind the iris by applying gentle pressure with the cyclodialysis spatula.Irrigation/aspiration was carefully performed to remove any remaining viscoelastic from the eye. Balanced saline solution was injected into the eye to reform the anterior chamber. Miochol was instilled into the eye to induce pupillary miosis, and all wounds were tested and noted to be watertight.

Subconjunctival injections of (*antibiotic/steroid)* were given. *Antibiotic ointment* was then placed on the eye. The eyelid speculum was removed and the eye was patched and shielded. The patient tolerated the procedure well and left the OR in good condition with instructions to follow up the following day.

Chapter 32
Scleral Suturing and Fixation of a Dislocated Intraocular Lens

Ike K. Ahmed and Matthew B. Schlenker

Abstract In the case of a symptomatic dislocated IOL secondary to trauma, poor capsule-zonular support, or zonulopathy, the surgeon is faced with choosing the appropriate strategy for visual rehabilitation. One of the techniques to improve visual acuity without the need for IOL explantation or exchange is scleral fixation of the dislocated IOL. This technique relies on the surgeon's ability to stabilize the IOL within the eye and provide a new fixation plane in lieu of the capsular support. When performed correctly, patients may experience excellent visual rehabilitation without the added risk of IOL explantation, large corneal incisions, or extended surgical time.

Keywords Dislocated IOL • Traumatic IOL dislocation • Scleral fixation of IOL • IOL subluxation • Zonulopathy • Pseudoexfoliation

Indications

Patients with poor capsulo-zonular support, corneal decompensation due to ACIOL, and IOL subluxation.

Essential Steps

1. Topical anesthetic
2. Placement of speculum
3. Paracentesis incisions
4. Viscoelastic injection into the AC
5. Iris retraction and visualization of IOL
6. Conjunctival peritomy at appropriate fixation sites
7. Scleral scratch incision
8. Docking needle entry in scleral scratch incision

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ikeahmed@mac.com; Matt.schlenker@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_32

9. Passage of double-armed needle above and below haptic, docked and brought through sclera
10. Ab externo suture tying
11. Suture trimming and rotation into scleral groove
12. Miochol-E injection into the AC
13. Anterior vitrectomy
14. Stromal hydration

Complications

- Lens dislocation or decentration
- Hyphema
- Vitreous hemorrhage
- Corneal edema
- Elevated IOP
- Hypotony
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Suture exposure
- Retinal detachment
- Ptosis
- Choroidal detachment
- Scleral perforation
- Conjunctival/bleb fibrosis
- Suprachoroidal hemorrhage
- Dysphotopsias

Template Operative Dictation

Preoperative diagnosis: *Dislocated intraocular lens (OS/OD).*

Procedure: Scleral suturing and fixation of a dislocated intraocular lens (*OD/OS*).

Postoperative diagnosis: *Same.*

Indication: This is a____-year-old *male/female* who had previously undergone cataract surgery approximately ____ (*weeks/months/years*) previously. Secondary to poor capsulo-zonular support and subsequent IOL subluxation, the patient was elected to undergo the procedure after a thorough discussion of options, risks, and benefits.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. 0.5 % tetracaine was instilled into the conjunctival fornices of the *(right/left)* eye. The *(right/left)* eye was prepped and draped in the usual sterile fashion and operating microscope centered over the *(right/left)* eye. The eyelid speculum was placed. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A 15° paracentesis blade was used to make two side port incisions, one superiorly temporally and one inferiorly temporally. The anterior chamber was then inflated with Viscoat and Provisc. A Kuglen hook was used to retract the iris and visualize the full extent of dislocation. The sites for fixation are then determined based on the location of the IOL and haptics. A conjunctival peritomy was then performed using Westcott scissors and Colibri forceps overlying the area(s) of anticipated suturing of the intraocular lens. Hemostasis was achieved using bipolar electrocautery. A __4__mm scleral scratch incision was then made using a guarded mini-diamond blade, approximately __1__ mm posterior to the scleral spur in a circumferential fashion in the areas of anticipated suturing.

A bent 26-gauge hypodermic needle was used to enter the eye perpendicularly on one side of the scleral scratch incision and subsequently passed straight through the capsular bag and under the haptic. One end of a *double-armed 9-0 polypropylene* suture on two long needles was placed through the (*superior/inferior*) paracentesis wound and into the barrel of the hypodermic (docking) needle. The needle with suture was then retracted from the eye. A second pass __2__mm adjacent to the previous entry site was made, with care taken to pass the needle anterior to the haptic, guided using a Kuglen hook as necessary. The second arm of the suture was placed into the docking needle and removed from the eye, thus creating a loop around the haptic.

If IOL support needed*: (An intraocular microforceps was used to grasp the IOL/ Modified flexible iris retractors were placed at the haptic-optic junction or capsulorhexis edge) in order to support the severely dislocated IOL during suture passage.*

If multi-point fixations was needed*: The second haptic was fixated in an identical manner 180° from the first one, except that the suture pass under the haptic is passed on the opposite side of the scratch incision of the initial one. The externalized suture was then tied using a slipknot to adjust tension and centration within the eye.*
The sutures were tied externally once the tension and centration of the IOL were deemed appropriate. The knot was trimmed and rotated into the scleral groove. Miochol-E was injected into the anterior chamber to successfully achieve intraoperative miosis.

If anterior vitrectomy was performed*: The vitreous cutter was placed into the superior/inferior paracentesis incision while the irrigation cannula was placed into the inferior/superior incision. An anterior vitrectomy was performed until all vitreous was cleared from the anterior chamber and wounds. Intracameral triamcinolone was injected as necessary to stain any remaining vitreous.*

Stromal hydration of the paracentesis incisions was performed, and the incisions were noted to be watertight (*and, if necessary, 10-0 nylon simple interrupted sutures were placed*). Conjunctiva was then reapproximated using _#_ interrupted *10-0 Vicryl* (*This is what we use; others use 9-0, 8-0 or 7-0 sutures*). The intraocular lens was found to be centered in position. The pupil was round and the anterior chamber was formed. Eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix and a shield was placed over the eye. The patient was transferred to the post anesthesia care unit in stable condition.

Chapter 33
Phakic IOL Removal and Cataract Extraction

David Alevi and Eric Donnenfeld

Abstract Patient should be evaluated and deemed appropriate for such a surgical procedure. Patients with significant cataract and prior phakic lens implantation due to high myopia are candidates. In addition, a phakic intraocular lens may rarely need removal secondary to elevated intraocular pressure or hyphema in the eye. Patients with any of these indications in addition to a visually significant cataract are candidates. Patient should be educated about the risks and benefits of the procedure, including alternatives.

Keywords Phakic lens • High myopia • Glaucoma • Hyphema • Phacoemulsification

Indications

Patient with prior phakic implantation requiring cataract surgery.

Essential Steps

1. Bring patient to the operating room
2. Peribulbar/retrobulbar block
3. Primary incision with a 2.65 mm blade
4. Cannula with viscoelastic to separate phakic IOL from capsule
5. Forceps to remove phakic IOL through the primary incision
6. A round capsulorhexis
7. Phacoemulsification
8. Lens insertion

Complications

– Hyphema
– Endophthalmitis

D. Alevi (✉)
Department of Ophthalmology, Ophthalmic Consultants of Long Island, Rockville Center, NY, USA
e-mail: David.alevi@gmail.com

E. Donnenfeld
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: ericdonnenfeld@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_33

– Tear in phakic IOL leading to difficulty in removing lens
– Elevated pressure
– Dropped lens
– Globe injury
– Hyperemia
– Capsular tags or bridges
– Endothelial damage
– Corneal edema
– Cystoid macular edema (CME)

Template Operative Dictation

Preoperative diagnosis: Phakic IOL with cataract *(OD/OS)*.

Procedure: (1) Removal of phakic IOL and (2) phacoemulsification with PCIOL implant (*OD/OS*).

Postoperative diagnosis: *Same*.

Indication*:* This ____-year-old (*male/female*) has a (*right/left*) phakic intraocular lens with cataract formation. The risks, benefits, and alternatives to the procedure were discussed with the (*patient/next of kin*) including the risk for infection, bleeding, pain, loss of vision, need for further surgery, dropped lens, and globe injury. Afterward, the patient requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position and placed under appropriate cardiopulmonary monitoring. Local anesthetic was injected in the standard (*retrobulbar/peribulbar*) fashion using ____ml of lidocaine, ____ml of marcaine, and ____ml of hyaluronidase, massaged into place with gentle manual pressure. The *(right/left)* eye was prepped and draped in the usual sterile ophthalmic fashion including placement of half-strength Betadine in the conjunctival fornix. The operating microscope was centered over the *(right/left)* eye and a wire eyelid speculum was placed. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A diamond blade was then used to create a paracentesis site ___’ clock hours away from the 12 o’ clock position. A superior limbal incision was then made with a 2.65 mm keratome blade. Viscoelastic was then injected using an air cannula underneath the phakic lens in order to lift the lens above the anterior capsule. Viscoelastic was also injected above the lens. Forceps were then used to grasp the optical edge of the lens and slowly removed through the incision. Care was taken to avoid any tears in the lens during removal.

A continuous curvilinear capsulorhexis was completed with the use of the bent cystotome and the Utrata forceps. Hydrodissection and hydrodelineation were then performed with a good fluid wave noted. The nucleus of the cataract was removed with phacoemulsification. Residual cortical fibers were removed by irrigation-aspiration. The wound was then slightly widened with a keratome. The capsular bag was filled with viscoelastic, and the new intraocular lens (*Alcon/AcrySof/Tecnis)* model #_______, serial #______, with a power of _____ diopters, was injected and rotated into the bag. Residual viscoelastic was then removed using coaxial irrigation and aspiration. The superior limbal incision was then hydrated and found to be free of any leaks.

At the conclusion of the case, the anterior chamber was noted to be deep, and the pupil was round. The newly placed intraocular lens was well centered in the capsular bag. Antibiotic and pilocarpine drops as well as Maxitrol ointment were placed on the eye. The eye was patched and shielded. The patient tolerated the procedure well and was transferred to the postanesthesia care unit in stable condition.

Chapter 34
Astigmatic Keratotomy

Marguerite McDonald

Abstract Astigmatic keratotomy (AK) is performed for correction of corneal astigmatism and may be performed during cataract surgery, post-cataract extraction, or post-PKP. AK corneal incisions are performed more centrally in the cornea as opposed to limbal relaxing incisions (LRI). In this technique, a coupling phenomenon is seen in which there is a flattening of the incised steep meridian, accompanied by steepening of the unincised meridian 90° away. Prior to AK, confirmation of corneal astigmatism with manual keratometry, evaluation of corneal topography to identify irregular astigmatism, and pachymetry at sites of planned incision(s) to avoid corneal perforation should be performed. AK has been proven to be a convenient, practical, and cost-effective way of managing astigmatism.

Keywords Astigmatism • Corneal astigmatism • LRI • Limbus • Keratotomy

Indications

Astigmatism, congenital astigmatism, corneal astigmatism at the time of cataract surgery, posttraumatic astigmatism, and post-corneal transplant astigmatism.

Essential Steps

1. LRI calculator printout
2. Corneal marking
3. Orbital block or topical anesthetic
4. Arc shaped corneal/limbal incisions

Complications

- Over- or under-correction of astigmatism
- Irregular astigmatism
- Perforation of the cornea
- Foreign body sensation

M. McDonald (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: margueritemcdmd@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_34

Template Operative Dictation

Preoperative diagnosis: *Astigmatism (OD/OS).*

Procedure: Astigmatic keratotomy (*OD/OS*).

Postoperative diagnosis: *Same*.

Indication: This ____-year-old *male/female* was found to have a ____diopter (*with-the-rule/against-the-rule/oblique*) astigmatism at ___degrees on (*manual keratometry/corneal topography/Scheimpflug*) while having a best-corrected visual acuity of ___. After a detailed review of the risks, benefits, and alternatives, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the minor procedure room and placed in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, topical anesthetic was instilled ×2. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed.

While referencing the nomogram printout, ____ corneal incisions of ___mm length were made at the steep axis of astigmatism (____*o'clock, and* _____*o'clock*) with a diamond blade set at 75–80 % of the depth in the peripheral cornea at the _*9*_ mm optical zone, as noted on the Pentacam. The incision(s) were then made out at the _*9*_ mm optical zone, according to the nomogram. Topical antibiotics and steroid were instilled. A plastic shield was placed over the eye. The patient tolerated the procedure well and was carefully monitored for any adverse reactions.

Chapter 35
Limbal Relaxing Incision

Alanna S. Nattis and Eric D. Rosenberg

Abstract Limbal relaxing incisions (LRIs) are corneal incisions placed adjacent to the limbus, just anterior to the vascular arcade. They are used to relax the steep axis of corneal astigmatism, while steepening the flat axis (coupling effect). LRIs must be as accurate as possible to yield the best result. LRI is performed for correction of corneal astigmatism and may be performed during cataract surgery, post-cataract extraction, or post-PKP. Prior to LRI, confirmation of corneal astigmatism with manual keratometry, evaluation of corneal topography to identify irregular astigmatism, and pachymetry at sites of planned incision(s) to avoid corneal perforation should be performed. LRI has been proven to be a convenient, practical, and cost-effective way of managing astigmatism.

Keywords Astigmatism • Corneal astigmatism • LRI • Limbus • Keratotomy • Peripheral corneal relaxing incision

Indications

Astigmatism, congenital astigmatism, corneal astigmatism at the time of cataract surgery, post-traumatic astigmatism, and post-corneal transplant astigmatism.

Essential Steps

1. LRI calculator printout
2. Corneal marking
3. Orbital block or topical anesthetic
4. Arc-shaped corneal/limbal incisions

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_35

Complications

- Over- or under-correction of astigmatism
- Irregular astigmatism
- Perforation of the cornea
- Foreign body sensation

Template Operative Dictation

Preoperative diagnosis: *Astigmatism (OD/OS).*

Procedure: Limbal relaxing incision(s) (*OD/OS*).

Postoperative diagnosis: *Same.*

Indication: This ____-year-old *male/female* was found to have a ____diopter (*with-the-rule/against-the-rule/oblique*) astigmatism at ___degrees on (*manual keratometry/corneal topography/Scheimpflug*) while having a best-corrected visual acuity of ___. After a detailed review of the risks, benefits, and alternatives, the patient was elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The axes of 0°, 180°, and 90° were marked with a sterile marker on the corneal limbus, while the patient was upright after receiving one drop of proparacaine. The patient was brought into the minor procedure room and placed in the supine position. After proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, topical anesthetic was instilled ×2. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed.

While referencing the nomogram printout, ____ arcuate corneal incisions concentric to the limbus of ___mm length were made at the steep axis of astigmatism (____*o'clock, and* _____*o'clock*) with a diamond blade set at 75–80 % of the depth in the peripheral cornea at the __ mm optical zone, as noted on the Pentacam. Topical antibiotics and steroid were instilled. A plastic shield was placed over the eye. The patient tolerated the procedure well and was carefully monitored for any adverse reactions.

Part III
Filtering and Glaucoma

Chapter 36
Laser Table

Nathan Radcliffe and Tarika Thareja

N. Radcliffe (✉) • T. Thareja
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: DrRadcliffe@gmail.com; Tarika.Thareja@nyumc.org

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_36

	Iridoplasty	Argon laser suture lysis (tube ligature)	Vicryl laser suture lysis (tube ligature)	ALT	SLT	MLT	Argon iridotomy	YAG iridotomy
Mechanism of action	Contracture of pigmented epithelium of anterior iris facilitating widening of angle	Vaporization of suture	Vaporization of suture	Shrinkage of TM causing stretching of adjacent areas	Selective absorption of energy by pigmented TM cells, sparing adjacent tissue	Thermally effects but does not destroy pigmented TM cells	Production of thermal energy causing vaporization of iris tissue and coagulation	Production of shockwaves causing mechanical breakdown of iris tissue
Pretreatment (not always necessary)	Pilocarpine and a_2-agonist	Phenylephrine 2.5%	Phenylephrine 2.5%	Pilocarpine and a_2-agonist	Pilocarpine and a_2-agonist	Pilocarpine and a_2-agonist	Pilocarpine and a_2-agonist	Pilocarpine and a_2-agonist
Duration (s)	0.5–0.7	0.02	0.5	0.1	N/A	300 ms	0.02	N/A
Power	240 mW and up	1000 mW	500 mW	780 mW	0.8–1.0 mJ	1000 mW	400–1500 mW	1.2 mJ and up
Spot size (μm)	500	50	50	50	N/A	300	50	N/A
# of applications	24	As few as possible	As few as possible	#56 over 180°	#40–60 over 180° or #75–100 over 360°	#100 over 360°	As few as possible	As few as possible
Endpoint	Tissue contraction	Retraction of suture	Retraction of suture	Blanching of TM or production of a tiny bubble	Small champagne bubbles	None	Streams of pigment clumps and aqueous humor into AC	
Post-op treatment	Topical steroid QID × 1 week	None	None	Topical steroid QID × 1 week	Topical steroid QID × 1 week	None	Topical steroid QID × 1 week	Topical steroid QID × 1 week
Repeatable	Yes	N/A	N/A	No	Yes	Yes	Yes	Yes

Chapter 37
Cyclocryotherapy

Thaddeus Wandel and Alanna S. Nattis

Abstract Cyclocryotherapy employs temperatures as low as −112 °F (−80 °C) to destroy the ciliary body, thereby decreasing aqueous production and intraocular pressure. Secondary to the risk of significant intraocular inflammation, loss of vision, and phthisis, cyclocryotherapy may often be used as a last-line treatment option for uncontrolled or refractory glaucoma.

Keywords Cyclocryotherapy • Circumferential • Probe • Glaucoma • Thee quadrants • 270°

Indications

Glaucoma, uncontrolled by medical therapy.

Essential Steps

1. Identification of correct eye
2. Retrobulbar ± van Lint block
3. Identification of treatment areas radially
4. Identification of treatment areas posterior to the limbus
5. Timed application of the cyro-probe in a circumferential manner

Complications

- Change/loss of vision
- Intraocular inflammation
- Phthisis
- Hyphema or bleeding from the site

T. Wandel (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: tad_wandel@nymc.edu

A.S. Nattis
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_37

– Pain
– Hypotony
– Cataract formation

Template Operative Dictation

Preoperative diagnosis: Medically uncontrolled glaucoma *(OD/OS)*.

Procedure: Cyclocryotherapy (*OD/OS*).

Postoperative diagnosis: *Same*.

Indication: This ____-year-old *male/female* with a well-known and documented history of glaucoma had been unsuccessfully managed with medically (±surgically) controlled treatment plans. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, general anesthesia was induced. A *LMA/ETT* was placed, and local anesthetic was injected in the standard *(retrobulbar/peribulbar/van Lint block)* fashion using ____ml of lidocaine and bupivacaine in a 50:50 mix. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed in the eye.

Three quadrants/270° of the eye were identified as treatment areas for the cyclocryotherapy. The cyclocryotherapy probe was turned on, and the locations for therapy were identified _*2*_mm posterior to the corneal limbus. The probe was then applied in a circumferential pattern to three out of four quadrants of the (*right/left*) eye. Special care was taken to apply each treatment exactly _*2*_mm posterior to the corneal limbus, approximately one probe width apart for each treatment location. Each cyclocryotherapy session was conducted for ___ seconds, which was timed on the probe timer. Careful attention was paid so that no conjunctival or corneal involvement was encountered while applying treatment. After 270° *(_#_ applications)* of cyclocryotherapy was performed, the (*right/left*) eye was irrigated with sterile BSS. An (*combination of antibiotic/steroid/others*) ointment was applied to the *(right/left)* eye, and the eyelid speculum was removed. A pressure patch was placed over the left eye, and the patient was transferred to the postanesthesia care unit in stable condition.

Chapter 38
Transscleral Diode Laser Cyclophotocoagulation (CPC)

Shakeel Shareef

Abstract Traditionally cyclodestructive procedures, achieved either by freezing (cryotherapy) or laser CPC, have been used to treat refractory glaucoma with poor visual potential, presence of extensive scarring from prior surgery, immobile conjunctiva precluding an *ab externo* approach, or in those at high risk for intraoperative complications (Glaucoma: the requisites in ophthalmology, St. Louis, MO, 2000). Even in eyes with no light perception, the procedure can provide relief from chronic pain, conjunctival injection, and corneal decompensation from elevated IOP. Cyclodestruction is associated with several potential complications including visual loss that may result not necessarily from the procedure itself, but from the underlying disease process including hypotony, macular edema, cataract formation, proliferative diabetic retinopathy, central retinal vein occlusion, neovascular glaucoma and glaucoma progression (Glaucoma: the requisites in ophthalmology, St. Louis, MO, 2000; Curr Opin Ophthalmol 24:102–110, 2013).

The transscleral diode laser delivers a continuous 810 nm beam of energy via a customized delivery tip called the G-Probe (Iridex Corp, CA) (Glaucoma: the requisites in ophthalmology, St. Louis, MO, 2000). The presence of a fiber-optic tip protrusion at the base of the probe is designed to optimally deliver energy to the ciliary body by indenting the sclera 1.2 mm posterior to the limbus. The laser is absorbed by pigment within the ciliary body and coagulates proteins within pigmented epithelial cells reducing aqueous production (Insert to Glaucoma Today, 2012). A clinical judgment needs to be made regarding how much one needs to laser. If the IOP is exceedingly high and needs to be decreased substantially, then more laser applications should be administered. Conversely, if a modest drop in IOP is the goal, then one needs to taper the number of delivered laser applications.

In patients with altered limbal anatomy from prior surgery, pannus formation, megalocornea, or congenital glaucoma, accurate localization of the ciliary body is paramount with transillumination to guide proper placement of the G-Probe (J Ophthalmol 1–16, 2013). Otherwise, there may be no apparent benefit in IOP lowering with laser being delivered to the peripheral cornea. Scleral thinning following standard transscleral diode laser CPC has been reported in a series of patients all

S. Shareef (✉)
Department of Ophthalmology, University of Rochester Medical Center, Rochester, NY, USA
e-mail: Shakeel_Shareef@urmc.rochester.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_38

under 30 years of age using recommended manufacturer settings (Ophthalmic Surg Lasers Imaging 38:301–306, 2007). This may in part be due to an enhanced heat-induced thinning of juvenile collagen vs. adults (Ophthalmic Surg Lasers Imaging 38:301–306, 2007). Conjunctival and scleral burns can occur on the surface either due to accumulation of debris on the fiber-optic tip or the presence of perilimbal conjunctival pigment absorbing the laser energy (Peri-limbal burns in areas of conjunctival melanosis during cyclophotocoagulation, San Francisco, CA, 2013).

Recently, the same company has introduced MicroPulse Technology (http://www.iridex.com/Products/GlaucomaDevices/CYCLOG6-MicroPulseP3.aspxMicropulseG6) with a novel contact probe whereby a continuous-wave laser beam is delivered in a pulsatile manner interspersed with brief rest periods allowing heat to dissipate (see next chapter). This approach is more tissue sparing and potentially enables glaucoma intervention in earlier phases of the disease with functional vision and not just refractory cases. However, based on personal communication of initial experience with several glaucoma colleagues, the success rates to date have been variable with guarded expectations (Personal e-mail communications from the American Glaucoma Society (AGS) membership via agssociety.net). The operative template below outlines the use of the established transscleral diode laser G-Probe delivery system, which can be performed either in the office or OR setting.

Keywords G-Probe • Retrobulbar block • Ciliary body • Cyclodestruction • Transscleral • Diode laser • Scleral indentation • Limbus • Subconjunctival corticosteroids • Fiber-optic tip • Diode laser cyclophotocoagulation

Indications

Glaucoma refractory to medical or surgical interventions or eyes with poor visual potential are good candidates [1]. Patients need to be informed that the goal of transscleral diode laser CPC is to normalize the IOP, reduce the financial and physical burden of dependence upon medication, and in turn improve the quality of life. The procedure is not meant to improve or restore visual loss from glaucoma They also need to be informed of potential risks including a decrease or loss of vision, scleral burns and need to repeat the procedure should the IOP rise post-laser or remain elevated [2].

Essential Steps

1. Lay the patient in supine position (or reclined in examination chair).
2. Retrobulbar block.
3. Lid speculum (can also use Q-tip instead to expose perilimbal area).
4. Inspect fiber-optic G-Probe plate/tip for defects (Fig. 38.1).
5. Wear company-approved protective goggles.

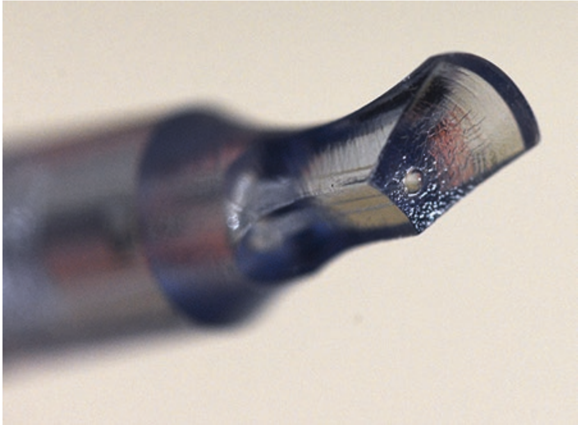

Fig. 38.1 The transscleral diode laser delivers a continuous 810 nm beam of energy via a customized delivery tip called the G-Probe. *Note the fiber-optic tip protrusion at the base of the G-Probe* (IRIDEX Corp, CA)—(Taylor Pannell, CRA, OCT-C) [1]

Fig. 38.2 The presence of a fiber-optic tip protrusion at the base of the probe is designed to optimally deliver energy to the ciliary body by indenting the sclera 1.2 mm posterior to the limbus. *The "heel" of the G-Probe is aligned with the limbus to deliver energy 1.2 mm posteriorly over the ciliary body*—(Taylor Pannell, CRA, OCT-C)

6. Turn machine "on" from "standby" position on zero power setting and project laser beam from probe onto palm of hand and adjust beam brightness and point of focus.
7. Place laser module on "standby" and enter recommended laser settings for power and duration. Place counter on zero.
8. Align "heel" of G-Probe along the limbus (Fig. 38.2) parallel to visual axis to directly treat the ciliary body to reduce aqueous production [3]. If there is alteration of limbal anatomy, place a transilluminator light source onto the scleral surface to identify the anterior edge of the ciliary body 180 degrees away to guide proper placement of the G-probe prior to delivering the energy. Repeat this step over the 360 degree surface until the intended number of treatment spots are delivered [4].
9. Wet corneal surface with balanced saline solution periodically throughout laser procedure to dissipate heat, and clear away any debris to reduce any scleral thinning (Fig. 38.3) or conjunctival/scleral (Fig 38.4) burns [5, 6].
10. Turn machine to "on" position.

Fig. 38.3 Scleral thinning following standard transscleral diode laser CPC. *Note the scleral thinning along the limbus months postoperatively*—(Rachel Hollar, CRA, OCT-C)

Fig. 38.4 Conjunctival and scleral burns can occur on the surface either due to accumulation of debris on the fiber-optic tip or the presence of perilimbal conjunctival pigment absorbing the laser energy. *Note the surface burn involving the conjunctiva and sclera occurred within the pigmented area of perilimbal conjunctival melanosis* (Dorothea Castillo, CRA)

11. Slightly scleral depress G-Probe downward and fully engage footplate for entire duration without moving or lifting probe until accompanying sound of laser delivery stops.
12. Move clockwise or counterclockwise approximately ½ width of probe and proceed with laser application in a similar manner treating six to seven spots per quadrant.
13. Treat 270°–360° of circumference sparing 9 and 3 o'clock.
14. Inject 20 mg Kenalog (0.5 cm^3) in the sub-Tenon or subconjunctival space inferiorly.
15. Remove lid speculum (if one used).
16. Place 1 gtt atropine and choice of antibiotic/steroid ointment.
17. Patch eye.

18. Have patient sit up in upright position, take vitals, and discharge home with post-op instructions.

Complications [1, 7]

- Atonic pupil
- Bleeding
- Chemosis
- Decrease/loss of vision (usually multifactorial)
- Hyphema (common with neovascular glaucoma)
- Hypotony (particularly with multiple treatments)
- Inflammation (acute/chronic)
- IOP spikes
- Pain
- Progressive cataract
- Subconjunctival hemorrhage
- Chronic Flare (due to breakdown of blood aqueous barrier)
- Sympathetic Ophthalmia (rare)

Template Operative Dictation

Preoperative diagnosis: (*Refractory/neovascular/end-stage/uncontrolled/absolute*) glaucoma (*OD/OS*)

Procedure: Transscleral diode laser cyclophotocoagulation (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* was diagnosed with *refractory* glaucoma with uncontrolled IOP despite prior (*medical/surgical*) intervention with poor visual potential.

Description of the procedure: After discussing risks, benefits, and alternatives and obtaining consent, the (*right/left*) eye was marked with a marking pen in the (*office/minor procedure room*), and after placing a drop of anesthetic, the patient was (reclined in the exam chair/placed in a supine position on the table). A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

To decrease the discomfort that may arise from a retrobulbar needle, a 1 cm^3 syringe of 1 % lidocaine on a short (*27/30*) gauge needle was prepared. An alcohol wipe was used to clean the surface along the lower lid margin extending temporal to the lateral canthus. The patient was informed of the discomfort from the administration of anesthetic. The needle tip was then entered in the sub-epidermis temporal to the lateral canthus and the anesthetic injected in a controlled fashion and directed along the inferior lid margin close to its midpoint to create a wheal incorporating the future injection site for the retrobulbar block. A sterile Q-tip was used to massage and spread the raised area.

A retrobulbar block consisting of _____ was prepared and placed on a ___ gauge long needle. The patient was directed to look in primary gaze at a light source with the nonsurgical eye to fixate the surgical eye. By temporally placing the index finger between the inferior orbital bone and the globe to create a pocket of space, the needle was entered gently into the (*right/left*) orbital space initially along the orbital floor and then directed toward the direction of the optic nerve. A total of ___ cc of anesthetic was administered. The eye was massaged for a few minutes until akinesia was confirmed.

A protective paper tape was used to close the lids of the nonoperative eye. Recommended protective eyewear gear was worn. (*A Q-tip/lid speculum*) was used to expose the perilimbal region of the (*right/left*) eye for laser application. The G-Probe was removed from its sterile package and inspected for any defects. Recommended treatment parameters were entered into the laser display module treatment parameters were entered into the laser display module (1750-2000 mW power; 2000-2500 msec duration). The "heel" of the probe was aligned along the limbus at _6_ o'clock hours (Fig. 38.2), the laser was switched to the 'on' position and with firm scleral depression, the footplate was completely depressed for the entire duration without moving the probe. The probe was then moved by ½ width to an adjoining spot along the limbus. Drops of balanced saline solution were placed on the ocular surface prior to initiating each laser application. Each quadrant had a total of (*6/7*) spots placed. The 3 and 9 o'clock positions were spared to avoid damaging the ciliary nerves. If an audible popping sound was heard during laser delivery, the power was decreased in 200–250 mW steps until it was no longer audible. Upon completion, (*if a speculum was used*, *the lid speculum was removed*), the laser system was placed on "standby," and 20 mg of Kenalog in a 1 cm^3 TB syringe on a short needle was injected in the (*sub-Tenon/subconjunctival*) space inferiorly. A drop of 1 % atropine was placed, and a strip of (*steroid/antibiotic*) ointment was placed in the inferior cul-de-sac. The eye was then pressure patched, and the paper tape was removed from the nonoperative eye. The patient was made to sit up, vitals were taken, and the postoperative instructions were reviewed. The patient was advised to remove the patch in the AM and start taking the medications. The patient was then escorted out of the room in satisfactory condition.

References

1. Alward W. Chapter 18: cyclodestructive procedures. In: Krachmer J, editor. Glaucoma: the requisites in ophthalmology. St. Louis, MO: Mosby Inc.; 2000.
2. Ishida K. Updates on results and complications of cyclophotocoagulation. Curr Opin Ophthalmol. 2013;24:102–10.
3. Gaasterland D. Reconsidering transscleral cyclophotocoagulation. Insert to Glaucoma Today. 2012.

4. Morales J, Shahwan S, Odhayb S, et al. Review article: current surgical options for the management of pediatric glaucoma. J Ophthalmol. 2013;2013:1–16.
5. Morales J, Al-Shahwan S, Al-Dawoud A, et al. Scleral thinning after transscleral diode laser cycloablation. Ophthalmic Surg Lasers Imaging. 2007;38:301–6.
6. Shareef S, Wax MB. Peri-limbal burns in areas of conjunctival melanosis during cyclophotocoagulation. Presented as Poster at American Glaucoma Society (AGS), San Francisco, CA; 28 Feb 2013.
7. Kahook M, Noecker R. Transscleral cyclophotocoagulation—technical advice and pearls for clinical practice. Glaucoma Today. 2007:21–4.

Chapter 39
Micropulse Trans-scleral Cyclophotocoagulation (mTSCPC)

Nathan Radcliffe and Tarika Thareja

Abstract Traditional cyclophotocoagulation has typically been reserved for patients with poor vision and end-stage glaucoma, but the use of a safer micropulse technique has allowed the expansion of this treatment option to patients with moderate and/or severe glaucoma. The procedure works by decreasing aqueous production either through ciliary body ablation or through increasing uveoscleral outflow with an 810 nm laser, but does not involve incisions, thus essentially eliminating the risk of bleeding or infection. Micropulse CPC is applicable also to patients with contraindications to incisional glaucoma surgery which may include elderly patients, patients who are at an increased risk of fall, and patients who are unable to make frequent postoperative visits.

Keywords Glaucoma • Trans-scleral cyclophotocoagulation (CPC) • Trans-scleral diode laser CPC • Micropulse • Laser

Indications

Glaucoma that has suboptimal intraocular pressure (IOP) control usually despite the use of the maximum tolerated eye-drop medications. Often patients have failed some other type of laser or incisional glaucoma surgery. Other indications include refractory neovascular glaucoma and aphakic glaucoma.

Essential Steps

1. Administration of anesthesia, which can include monitored anesthesia care (MAC) and a retrobulbar block
2. Patient seated in comfortable position which can include a chair with a headrest or supine on a table
3. Placement of eyelid speculum
4. Surgeon and assistant place laser safety goggles
5. Laser settings (*variable on a case-by-case basis*):

N. Radcliffe (✉) • T. Thareja
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: DrRadcliffe@gmail.com; Tarika.Thareja@nyumc.org

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_39

   - Power, 2000 mW; duty cycle, 31.7 %; time, energy delivered over 50 s with 0.5 ms bursts followed by 1.1 ms rests.
   - Each hemisphere of the eye (superior and inferior) receives a 50-s treatment, sparing the temporal and nasal clock hours.

6. Subconjunctival injection of steroid (*e.g., solumedrol or dexamethasone*)
7. Removal of eyelid speculum
8. Application of steroid antibiotic ointment
9. Patch eye first night
10. Postoperative topical steroid QID × 1 week
11. Follow-up in 1 week

Complications

- Inflammation which can include iritis, fibrinous reaction in the anterior chamber, and cystoid macular edema (although rare)
- Cataract
- Hypotony
- Keratitis
- Reduced accommodation in young phakic patient (can be avoided by sparing the 3-o'clock and 9-o'clock positions where the long ciliary nerves lie)

Template Operative Dictation

Preoperative diagnosis: Glaucoma (*OD/OS/OU*)

Procedure: Micropulse trans-scleral cyclophotocoagulation (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ___-year old (*male/female)* with advanced glaucoma is on maximum medical therapy and requires better IOP control. Micropulse CPC was chosen because (*the patient is prone to heavy bleeding/the patient is unable to make frequent postoperative visits/of the age-related risk of choroidal hemorrhage or hypotony with incisional glaucoma surgery/others).* After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: Informed consent was obtained from the patient at which time the risks, benefits, and alternatives were discussed and all questions were addressed. The patient was identified in the holding area and the (*right/left)* eye was marked. Monitored anesthesia care was initiated. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed. The patient was given a retrobulbar block consisting of a 1:1 mixture of 2 % lidocaine and 0.75 % bupivacaine. A single drop of tetracaine was applied, and the correct eye was prepped and draped in the usual sterile fashion for ophthalmic surgery. A second time-out was again performed verifying correct patient, site, positioning, and all special equipment prior to beginning the case.

A lid speculum was inserted. The laser was set for a _*31.7*_ % duty cycle, creating _*0.5*_ ms bursts followed by _*1.1*_ ms rests, repeated for _*50*_ s. Each hemisphere of the eye received a _*50*_ -s treatment, sparing the temporal and nasal clock hours.

A subconjunctival injection of _____ was administered in the superior subconjunctival space. The lid speculum was removed and ________ ophthalmic ointment was applied. A pressure patch and protective eye shield was placed. The patient was then transferred to the recovery room in stable condition having tolerated the procedure well without any complications. Instructions were given to use (*steroid*) *QID* for 1 week, to remove the patch the following morning, and to follow-up in _*1*_ week.

Chapter 40
Laser Peripheral Iridotomy

Nathan Radcliffe and Tarika Thareja

Abstract Laser iridotomy functions to relieve pupillary block by allowing an equalization of pressure between the anterior and posterior chambers. Patients should have had nonindentation gonioscopy that demonstrated contact between the iris and the trabecular meshwork typically for greater than 180° of the angle, although clinician discretion may be employed on a case-by-case basis. Other indications include aphakic or pseudophakic pupillary block, plateau iris, or phacomorphic angle closure with a component of pupillary block and some cases of pigment dispersion syndrome. The procedure may be performed with an argon laser, Nd:YAG laser, or a combination of the two. This author prefers Nd:YAG for hazel or blue irides and combination argon/YAG for darker irides. Simply put, all patients should be informed of at least a 2 % risk of a linear dysphotopsia from the laser. Recent literature shows that a temporal iridotomy is less likely to result in linear dysphotopsia as compared to a superior iridotomy, although a temporal iridotomy may be more painful, and again clinician discretion may be indicated.

Keywords Anatomical narrow angle • Pupillary block • Angle closure • Argon laser • Nd:YAG laser • Glaucoma • Iridotomy • Occludable angle • Plateau iris

Indications

Primary angle closure and primary angle closure glaucoma, anatomical narrow angle, aphakic or pseudophakic pupillary block, plateau iris or phacomorphic angle closure with a component of pupillary block, and pigment dispersion syndrome with reverse pupillary block

Essential Steps

1. Consideration of pretreatment with pilocarpine 1 h before laser to induce pupil miosis and iris stromal thinning, although not always necessary.
2. Consideration of pretreatment with α_2-agonists like brimonidine or apraclonidine 1 h before laser to help blunt IOP spikes.

N. Radcliffe (✉) • T. Thareja
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: DrRadcliffe@gmail.com; Tarika.Thareja@nyumc.org

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_40

3. Administration of topical anesthetic.
4. Ensure comfort of patient and surgeon with patient head positioning against the headrest.
5. Consideration of the use of the *Abraham iridotomy* lens, although not always necessary.
6. Laser strategy: Nd:YAG laser can typically be used alone to perform the iridotomy, especially in lightly pigmented irides (pretreatment with argon laser should be considered in patients on anticoagulation to prevent significant intraocular bleeding and in those with very thick irides).
7. Laser settings:
   - Argon iridotomy: time, 0.02 s; power, 400–1500 mW; spot size, 50 μm
   - YAG iridotomy: power, 1.2 mJ and up
8. Identification of iris crypt or region of thinned iris (e.g., crypt at 12:00 may be a reason to laser superiorly instead of temporally).
9. Application of a single YAG pulse of 2 mJ aimed temporally in far periphery of iris; more laser energy may be required in dark irides.
10. Penetration is marked by a gush of fluid and pigment into the AC (not always present).
11. A few additional laser pulses may be applied if complete iridotomy is not initially achieved.
12. If penetration is not achieved after ~15 laser pulses at 2 mJ, consider using focusing lens or treating with argon laser.
13. Application of argon laser burns in an overlapping configuration at increasing power as tolerated by patient, keeping in mind that a more pigmented iris will absorb more laser energy and will be more painful per mW of energy.
14. Application of one or two more pulses of YAG laser may be needed to complete a patent iridotomy after argon pretreatment.
15. Check IOP 30–60 min later.
16. Postoperative topical steroid QID × 1 week.
17. Reassess in 2 weeks and perform gonioscopy to ensure angle is open (it will not be in a third of patients and in those a diagnosis of plateau iris is usually made).

Complications

- Linear dysphotopsia/diplopia
- Temporary or persistent iritis
- Corneal burn/scar with argon/YAG laser
- Focal anterior subcapsular lens opacities and cataract progression
- Closure of a patent laser iridotomy
- Hyphema
- Posterior synechiae
- Retinal burns (very rare due to defocusing of light)
- Transient IOP increase

Template Operative Dictation

Preoperative diagnosis: Anatomical narrow angle (*OD/OS/OU*)

Procedure: Laser iridotomy (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This____-year old (*male/female*) was found to have anatomical narrow angle*(s)* (*OD/OS/OU*) with ≥180° of iridotrabecular apposition identified on (*non-indentation gonioscopy/anterior segment optical coherence tomography/ultrasound biomicroscopy*). After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: Informed consent was obtained from the patient at which time the risks, benefits, and alternatives were discussed and all questions were addressed. The patient was identified and the (*right/left)* eye was marked. One drop of pilocarpine 2 % and one drop of brimonidine 0.1 % were instilled into the eye.

60 minutes later, the patient was brought into the procedure room and a proper time-out was performed. Proparacaine was instilled into the eye. Patient was comfortably seated at the laser with forehead touching the guide bar. An *Abraham iridotomy* lens was placed on to the eye with goniosol solution.

[Choose one]:

***If pretreating with argon laser**—Pretreatment with argon laser was used with a duration of 0.02 s and spot size of 50 μm and was aimed at the (3/9) o'clock position in the far periphery of the iris. The initial power was set at 300 mW and was then titrated up as quickly as tolerated by the patient, to a maximum of ____ mW. Burns were applied in an overlapping configuration until contraction of the iris stroma was seen. The patient was then transferred to the Nd:YAG laser and comfort of patient and surgeon were ensured. Pulse(s) of ____mJ was/were applied in the center of the crater to achieve patency.*

***If only Nd:YAG laser used**—The Nd:YAG laser was set at a power of 2 mJ and aimed at the (3/9) o'clock position in the far periphery of the iris. ___ pulse(s) of ____ mJ was/were applied to achieve patency.*

***If Nd:YAG laser used followed by argon laser**—The Nd:YAG laser was set at a power of 2 mJ and aimed at the (3/9) o'clock position in the far periphery of the iris. ___ pulse(s) of ____ mJ was/were applied without achieving patency. The patient was then transferred to the argon laser and comfort of patient and surgeon were ensured. Argon laser was applied at a duration of 0.02 s and spot size of 50 μm and was aimed at the same area in an overlapping configuration. The initial power was set at 300 mW and was then titrated up as quickly as tolerated by the patient, to a maximum of ___ mW.* (*If further YAG laser treatment was needed, the patient was then transferred to the Nd:YAG laser for a final ____ pulse(s) of ____ mJ to complete the iridotomy.*)

Patency was confirmed by visualization of streams of pigment clumps and aqueous humor into the anterior chamber. The patient was monitored in the waiting room for ___ minutes. IOP at ___ minutes following treatment was ____ mmHg. The patient tolerated the procedure well without any IOP spikes observed. The patient was instructed to use topical steroid therapy *1* gtt *QID* (*OD/OS*) for *1* week and to return in _*2*_ weeks at which time gonioscopy will be performed to assess the effect of the iridotomy on angle configuration.

Chapter 41
Laser Peripheral Iridoplasty

Shakeel Shareef

Abstract Argon laser peripheral iridoplasty involves placement of contraction burns within the iris stroma in the far periphery either with or without a laser goniolens to treat appositional angle closure after an laser peripheral iridotomy (LPI) has been performed to rule out relative pupillary block. The key to successful Argon laser peripheral iridoplasty (ALPI) involves laser settings of low energy, long duration, and large spot size causing the peripheral iris to contract toward the "slow" contraction burn, relieving angle closure, thereby facilitating access of aqueous to the irido-corneal angle (Surv Ophthalmol 52:279–288, 2007; Glaucoma – the requisites in ophthalmology, St Louis, 2000). During laser application, the endpoint is visible shrinkage of the peripheral iris. The power setting should be adjusted until visible stromal contraction is noted. The foot pedal should be fully depressed for the entire duration during laser delivery avoiding premature applications. Deepening of the AC should be noted in the vicinity of the laser burn. A common cause for failure of ALPI is to treat the mid-peripheral iris instead of the far periphery. Approximately six spots are applied in each quadrant treating the entire circumference. Given the low-energy setting, ALPI results in minimal inflammation that can be treated with a short course of topical steroids. Familiarity with gonioscopy fundamentals including indentation is important for diagnosis and pre-laser planning (University of Iowa Health Care Ophthalmology and Visual Sciences, www.gonioscopy.org).

Keywords Laser peripheral iridotomy • Argon laser peripheral iridoplasty • Relative pupillary block • Contraction burn • Plateau iris • Argon laser • Appositional angle closure • Relative pupillary block • Indentation gonioscopy • Goldmann 3-mirror lens

Indications

Argon laser peripheral iridoplasty is indicated in patients with appositional angle closure that persists despite a patent iridotomy (Fig. 41.1a, b) due to mechanisms other than relative pupillary block [1]. It can also be used prior to laser peripheral

S. Shareef (✉)
Department of Ophthalmology, University of Rochester Medical Center, Rochester, NY, USA
e-mail: Shakeel_Shareef@urmc.rochester.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_41

a b

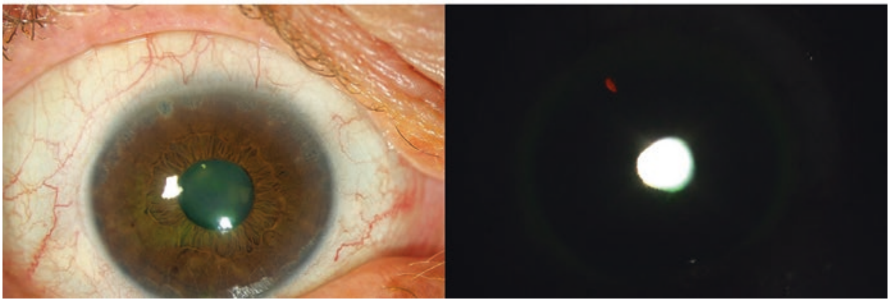

Fig. 41.1 Slit lamp photomicrograph showing an eye treated with ALPI. Note the presence of multiple atrophic laser marks in the far iris periphery (**a**). The patient had plateau iris syndrome with persistence of appositional angle closure despite the presence of a patent LPI noted on retro-illumination (**b**)—iridoplasty and LPI (Taylor Pannell, CRA, OCT)

Table 41.1 Indications for argon laser iridoplasty

Condition	Comment
Plateau iris syndrome	In setting of patent iridotomy
Pretreatment	Improve angle viewing during trabeculoplasty
	With thick irises to facilitate laser iridotomy
	To reduce risk of bleeding during laser iridotomy
Lens induced angle closure	In setting of patent iridotomy
Acute angle closure	To break attack with iridotomy is not possible[a]

[a]After the intraocular pressure is normalized and the cornea clears, laser peripheral iridotomy is warranted as ALPI does not eliminate relative pupillary block

iridotomy (LPI) in the setting of thick irides [4] and increased risk of bleeding due to use of blood thinners [4] or to widen the angle for improved viewing before performing trabeculoplasty [1, 2] (Table 41.1).

Essential Steps

1. Pre-laser treatment with topical anesthetic, IOP lowering, and pupil constricting drops
2. Patient positioning at slit lamp coupled to argon laser
3. Appropriate argon laser settings of low energy, long duration, and large spot size
4. Delivery of energy to far peripheral iris with or without a Goldmann 3-mirror laser contact lens
5. Observation of visible shrinkage of iris stroma at site of application
6. Application of four to six applications per iris quadrant
7. Post-laser instillation of IOP lowering medication
8. IOP check 30–40 min post-laser to check for IOP spike

Complications

1. Post-laser inflammation
2. Acute IOP elevation
3. Minor discomfort during application of burns
4. Corneal endothelial burns [1]
5. Ectopic pupil [4]

Template Operative Dictation

Preoperative diagnosis: Angle closure (*OD/OS*)

Procedure: Argon laser peripheral iridoplasty (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) was diagnosed with appositional angle closure on gonioscopy [3] despite the presence of a patent laser iridotomy.

Description of the procedure: After discussing risks, benefits, alternatives, and obtaining consent, the (*right/left*) eye was marked with a marking pen in the examination room. After placing a drop of anesthetic, one drop of __% pilocarpine was instilled to constrict the pupil, along with one drop of apraclonidine to lower the IOP pre-laser. Approximately *_15_* minutes later, the patient was transferred to the argon laser room suite and placed at the slit lamp. Initial laser settings of 200 μm spot size, 0.5 s duration, and 300 mW power were set using the green wavelength.

[Choose one]:

If Goldmann 3-mirror laser contact lens was used—A drop of anesthetic was applied and the lower lid was pulled and held down. The Goldmann 3-mirror contact lens filled with a coupling gel was gently placed on the eye. The laser beam was directed into the far periphery of the iris through the lens.

If performed without a contact lens—The laser beam was aimed in the far iris periphery.

Approximately *four to six* spots were applied in the far periphery per quadrant treating the entire iris circumference. Contraction of the iris was observed and the power was adjusted to achieve this endpoint.

One drop of apraclonidine was instilled at the end of the procedure, and IOP was checked *_40_* minutes post-laser to detect any spikes. The patient was advised to use a 1 % prednisolone acetate one drop *four* times a day for *_5_* days.

References

1. Ritch R, Tham C, Lam D. Argon laser peripheral iridoplasty (ALPI): an update. Surv Ophthalmol. 2007;52:279–88.
2. Alward W. Laser surgical treatment. In: Krachmer J, editor. Glaucoma - the requisites in ophthalmology. St Louis: Mosby, Inc.; 2000.
3. University of Iowa Health Care Ophthalmology and Visual Sciences. www.gonioscopy.org.
4. Meyer J, Lawrence J. What's new in laser treatment for glaucoma? Curr Opin Ophthalmol. 2012;23(2):111–7.

Chapter 42
Laser Trabeculoplasty

Nathan Radcliffe and Tarika Thareja

Abstract Laser trabeculoplasty may be used as an adjunct to or replacement for medical therapy (oftentimes with reduction in the need for adjunctive therapy) or as the primary therapy in patients with difficulty complying with medical treatment because of side effects, allergies, difficulty instilling drops, forgetfulness, etc. Head-to-head comparison studies of argon laser trabeculoplasty (ALT) and selective laser trabeculoplasty (SLT) demonstrate fairly similar efficacy of the two laser procedures; however, SLT offers the advantage of selectively targeting trabecular pigmented cells and sparing adjacent nonpigmented cells from thermal damage (e.g., no visible scarring). SLT is also much easier to perform because the spot size is larger than ALT. Micropulse laser trabeculoplasty (MLT) is thought to be even lower impact than SLT because it delivers short microbursts of energy followed by a rest period. Recent data suggests that MLT lowers intraocular pressure (IOP) as well as or may be slightly less than SLT. MLT typically does not result in postoperative pressure spikes, and as a result postoperative drops are often unnecessary. MLT is performed with the IQ 532-nm (Iridex), which is this author's preference, but can also be performed with the IQ 577-nm (Iridex) and even less commonly with the IQ 810-nm (Iridex) using a slit-lamp adaptor piece.

Keywords Argon laser trabeculoplasty • Selective laser trabeculoplasty • Micropulse laser trabeculoplasty • Primary open-angle glaucoma • Pigmentary glaucoma • Steroid-induced glaucoma • Exfoliation syndrome • Argon laser • Nd:YAG laser

Indications

Primary open-angle glaucoma (POAG), pigmentary glaucoma, pseudoexfoliation syndrome, steroid-induced glaucoma, and juvenile glaucoma.

N. Radcliffe • T. Thareja (✉)
Department of Ophthalmology, New York University, New York, NY, USA
e-mail: DrRadcliffe@gmail.com; Tarika.Thareja@nyumc.org

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_42

Essential Steps

1. Consideration of pretreatment with pilocarpine or α_2-agonists like brimonidine or apraclonidine up to 1 h before laser to blunt postoperative pressure elevation.
2. Administration of topical anesthetic.
3. Ensure comfort of the patient and surgeon with patient head positioning against the headrest.
4. Place appropriate lens onto the eye with Goniosol solution (*Latina SLT lens*, *Goldmann 3-mirror lens*, *or Ritch trabeculoplasty* lens).
5. Laser settings:
   (a) ALT: time, 0.1 s; power, 780 mW; and spot size, 50 μm
   (b) SLT: power, 0.8–1.0 mJ
   (c) MLT: time, 300 ms; power, 1000 mW; and spot size, 300 μm
6. Laser trabeculoplasty can be done over 90, 180, and 360°. (*The amount of area treated is likely proportional to the probability of success. This author prefers to treat 360° in all eyes except those with heavily pigmented TM. If treating 180°, treat inferior angle first because of increased pigment and higher likelihood of success.*)
7. Application of 100 evenly spaced burns over 360° or 50 evenly spaced burns over 180°.
8. Endpoint:
   (a) ALT: Blanching (mild) with minimal or no bubble formation. If large bubbles form, then decrease energy (*if no tissue reaction, then increase energ*y).
   (b) SLT: Small champagne bubbles or no reaction.
   (c) MLT: No tissue reaction.
9. Site of treatment:
   (a) ALT: Junction of anterior nonpigmented and posterior pigmented edge of TM
   (b) SLT: Straddling entire TM
   (c) MLT: Straddling entire TM
10. Check IOP 30–60 min later.
11. Postoperative topical steroid QID × 1 week (*although typically not given post-MLT and rarely given post-SLT*).
12. Reassess in 1 week.

Complications

- Transient rise in IOP
- Iritis
- Hyphema
- Formation of peripheral anterior synechiae (PAS)
- Very rare corneal burn/scar with refractive error shift (SLT)

Template Operative Dictation

Preoperative diagnosis: Open-angle glaucoma (*OD/OS/OU*)

Procedure: (*ALT/SLT/MLT*) (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) with open-angle glaucoma (*OD/OS/OU*) requires IOP lowering. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: Informed consent was obtained from the patient at which time the risks, benefits, and alternatives were discussed and all questions were addressed. The patient was identified and the (*right/left*) eye was marked. One drop of pilocarpine 2 % and one drop of brimonidine 0.1 % were instilled into the eye. _60_ minutes later the patient was brought into the procedure room. A proper time-out was performed. Proparacaine was instilled into the eye. The patient was comfortably seated at the laser with the forehead touching the guide bar. A (*type of lens*) was inspected and found to be clean and free of defects and then placed onto the eye with Goniosol solution.

[Choose one]:

If argon laser trabeculoplasty (ALT) was used—The argon laser was set at a power of ____mW, spot size of _50_ μm, and duration of _0.1_ s and aimed at the junction of the anterior nonpigmented and posterior pigmented edge of the TM. _#_ evenly spaced burns were applied over ____ degrees of the (inferior/superior/temporal/nasal) angle. (Blanching with minimal or no bubble formation was observed, OR large bubbles formed with the initial power so the energy was decreased to ____ mW, OR no tissue reaction was seen with the initial power so the energy was increased to mW).

If selective laser trabeculoplasty (SLT) was used—The Q-switched frequency-doubled Nd:YAG laser was set at a power of ____mJ and aimed at the TM. _#_ evenly spaced burns were applied over ____ degrees of the (inferior/superior/temporal/nasal) angle. (Small champagne bubbles were observed, OR large bubbles formed with the initial power so the energy was decreased to ____mJ.)

If micropulse laser trabeculoplasty (MLT) was used—The IQ Iridex laser was set at a power of _1000_ mW, spot size of _300_ μm, and duration of _300_ ms and aimed at the TM. _#_ evenly spaced burns were applied over ____degrees of the (inferior/superior/temporal/nasal) angle.

The patient was monitored in the waiting room for ___ minutes. IOP at ___ minutes following treatment was ____ mmHg. The patient tolerated the procedure well without any IOP spikes observed. The patient was instructed (*to use topical steroid therapy 1 gtt QID (OD/OS) for 1 week and*) to return in _2_ weeks for an IOP and AC check.

Chapter 43
Goniosynechialysis

Daniel Lee and Jonathan S. Myers

Abstract Goniosynechialysis is a surgical technique employed to remove peripheral anterior synechiae (PAS) from the trabecular surface in the angle and provide aqueous with renewed access to the trabecular meshwork. Often, goniosynechialysis is combined with cataract extraction, to help address a crowded anterior chamber in phacomorphic or primary angle closure glaucoma. Additionally, goniosynechialysis does not involve surgical manipulation of the conjunctiva, therefore allowing the possibility of subsequent trabeculectomy if necessary.

Keywords Peripheral anterior synechiae • Angle closure glaucoma • Microforceps • Goniosynechialysis • Gonioscopy

Indications

Peripheral anterior synechiae, angle closure glaucoma

Essential Steps

1. Topical anesthesia (*or peri-/retrobulbar anesthesia*)
2. Gonioscopic visualization of angle
3. Side port/paracentesis incisions
4. Intracameral anesthesia
5. Cholinergic pupillary constriction
6. (*Anterior chamber filled with viscoelastic OR anterior chamber maintainer placed*)
7. Lysis of peripheral iris adhesions
8. Viscoelastic removal
9. Confirmation of watertight wound closure

Complications

- Hyphema
- Cyclodialysis cleft

D. Lee (✉) • J.S. Myers
Glaucoma Service, Wills Eye Hospital, Philadelphia, PA, USA
e-mail: daniellee@willseye.org; JMyers@willseye.org

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_43

– Iridodialysis
– Irregular pupil or other iris trauma
– Lens damage or dislocation
– Corneal trauma
– Elevated IOP
– Hypotony
– Inflammation
– Cataract formation
– Corneal edema
– Wound leak
– Endophthalmitis
– Loss of vision
– Loss of eye

Template Operative Dictation

Preoperative diagnosis: *Angle closure glaucoma* (*OD/OS*)

Procedure: *Goniosynechialysis* (OD/OS)

Postoperative diagnosis: *Same*

Indication: This is a ____- year-old (*male/female*) with a history of peripheral anterior synechiae and angle closure glaucoma. After a detailed review of risks, benefits, and alternatives, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought to the OR and positioned on a stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, (*intravenous sedation was induced using MAC and*) topical ocular anesthesia was applied. (*A (retro-/peribulbar) block was administered.*) The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye, and an eyelid speculum was placed in the eye.

A gonioscopic lens was gently placed over the cornea. The peripheral anterior synechiae were clearly visualized. A paracentesis was made in the peripheral cornea at __o'clock, and 1 % preservative-free lidocaine followed by (*Miostat/Miochol*) was injected into the anterior chamber. The anterior chamber was (*filled with cohesive viscoelastic/maintained with a continuous anterior chamber infusion cannula that was inserted*).

[Choose one]:

If using a cyclodialysis spatula—The cyclodialysis spatula was passed through the paracentesis site and the gonioscopic lens was placed over the cornea. Under (direct/indirect) visualization, the cyclodialysis spatula tip was used to gently push *the peripheral iris posteriorly. A steady pressure was maintained to release the iris adhesions until the angle structures were visible. Care was taken to avoid using excessive force or applying pressure too peripherally at the iris root so as to avoid the formation of iris defects or cyclodialysis clefts.*

If using microsurgical forceps—The microsurgical forceps was passed through the paracentesis site and the gonioscopic lens was placed over the cornea. Under direct/indirect visualization, the forceps was used to gently grasp the peripheral iris. The tissue was pulled centrally toward the pupil. A steady pulling force was maintained to release the iris adhesions until the angle structures were visible. Care was taken not to pull too vigorously as to avoid the formation of iris defects or cyclodialysis clefts.

This maneuver was repeated until all visible synechiae were lysed. Viscoelastic was injected throughout the case to maintain control of anterior chamber depth and to aid in visualization and clear small peripheral hemorrhages.

Care was taken to remove the viscoelastic completely from the eye. The wounds were checked and found to be watertight and secure. At the conclusion of the case, the patient received topical antibiotics (*and steroids*) and a shield was placed over the eye. The patient tolerated the procedure well and was transferred to the recovery room in stable condition.

Chapter 44
Trabectome (Trabeculectomy Ab Interno)

Nisha Chadha

Abstract Trabectome is a microinvasive surgical procedure which can offer intraocular pressure reduction in eyes with ocular hypertension or glaucoma. It is an angle-based surgery which increases aqueous humor outflow through removal of the outer trabecular meshwork, a site of major resistance to outflow. While similar to goniotomy and trabeculotomy, trabectome is distinct in its use of electroablation of the trabecular meshwork tissue. It is a conjunctival sparing glaucoma procedure with a better safety profile and faster recovery compared to traditional glaucoma surgeries.

Keywords Trabectome • Trabeculectomy ab interno • Angle surgery • Microinvasive glaucoma surgery • Glaucoma surgery • Electroablation • Trabecular meshwork ablation • MIGS

Indications

Uncontrolled intraocular pressure, progression on visual field, need to reduce topical glaucoma medications, visually significant cataract in glaucoma patient on topical glaucoma medications, visually significant cataract, and need for intraocular pressure reduction.

Essential Steps

1. Apply topical anesthesia.
2. If combining with cataract surgery, create side port incision.
3. Inject 1 % preservative-free lidocaine intracamerally.
4. Create clear corneal incision (1.6–1.7 mm), and flare internal lip of wound to facilitate movement of trabectome handpiece across angle.
5. Rotate microscope approximately 30–45° toward surgeon and rotate patient head in nasal direction approximately 30–45°.

N. Chadha (✉)
Department of Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY, USA
e-mail: nisha.chadha@mssm.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_44

6. Place gonioscopy lens (Swan-Jacobs lens) on the cornea and visualize nasal angle.
7. Activate irrigation/aspiration with foot pedal and enter incision with trabectome handpiece (ensure anterior chamber depth is maintained).
8. Hook trabecular meshwork at 45° angle with footplate of handpiece, and gently pull forward to avoid posterior pressure on the wall of Schlemm's canal.
9. Gently sweep across angle with handpiece while depressing foot pedal to apply electrocautery (power 0.8–1.0) (aim for 90–120° of treatment depending on visibility).
10. Remove handpiece and discontinue irrigation/aspiration.
11. Consider injecting viscoelastic to tamponade any reflux bleeding from Schlemm's canal.
12. Reposition head and microscope to primary position.
13. *If combining with cataract surgery—Enlarge corneal wound to desired width for phacoemulsification and proceed with cataract extraction.*
14. Hydrate wounds and consider placing suture through the main wound (leave the eye slightly pressured to prevent reflux bleeding).
15. Start pilocarpine, topical antibiotic, and topical steroid postoperatively.

Complications

– Hyphema
– Cyclodialysis cleft
– Inflammation
– Intraocular pressure elevation
– Peripheral anterior synechiae
– Cataract or lens trauma (if not combined with phacoemulsification)

Template Operative Dictation

Preoperative diagnosis: Glaucoma (OD/OS)

Procedure: Trabectome (trabeculectomy ab interno) (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____- year-old (*male/female*) with glaucoma and uncontrolled intraocular pressure or need for topical glaucoma drop reduction in combination with cataract extraction for visually significant cataract. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, topical anesthesia (0.5 % tetracaine) was instilled. After

Fig. 44.1 Nasal angle visible through gonioscopy lens and trabectome handpiece in position to engage trabecular meshwork. Trabecular meshwork has been dyed with trypan blue for ease of identification. (Photo courtesy of Nisha Chadha, MD)

adequate anesthesia, the patient was prepped and draped in the usual sterile ophthalmic fashion. A lid speculum was inserted and the microscope was positioned.

A temporal paracentesis was created. Preservative-free lidocaine 1 % was instilled into the anterior chamber. A temporal clear corneal incision was created using a *1.6* mm keratome blade. The patient's head was tilted away from the microscope, approximately 30–45°. The microscope was tilted toward the surgeon approximately 30–45°. A Swan-Jacobs gonioscopy lens was placed on the cornea to visualize the nasal angle. Irrigation/aspiration was activated, and the trabectome handpiece was introduced into the anterior chamber. The trabectome tip engaged the nasal trabecular meshwork, and electroablation was activated while sweeping across the nasal angle. *90–120* degrees of trabecular meshwork was ablated at a power setting of *0.8 mJ*. Blood reflux was noted from the ablated area. The handpiece was removed. Viscoelastic was injected to the anterior chamber. The head was repositioned to supine. The microscope was placed level (Fig. 44.1).

The wounds were hydrated. There was noted to be no leakage. *1* drop of pilocarpine was instilled. Topical antibiotic and steroid drops were placed onto the eye. The eyelid speculum was removed. Topical antibiotic and steroid ointment was placed onto the eye. The eye was shielded, and the patient was wheeled to the recovery room in stable condition.

Chapter 45
Goniotomy and Exam Under Anesthesia (EUA)

Shani S. Reich and Janet B. Serle

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Typically an exam under anesthesia is performed to completely evaluate the eyes prior to beginning surgery. Uncontrolled eye pressure in patients with corneas sufficiently clear to visualize the anterior chamber angle details on gonioscopy can be considered for this procedure. Patients and/or appropriate family members should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Glaucoma • Childhood glaucoma • Uveitic glaucoma • Goniotomy • Gonioscopy • Anterior chamber angle

Indications

Uncontrolled intraocular pressure requiring surgical intervention in childhood glaucomas including congenital, juvenile open-angle glaucoma, Sturge-Weber syndrome, aphakic glaucoma, Axenfeld-Rieger syndrome, and uveitic glaucoma. For patients with uveitic glaucoma, it is advised that the eye be non-inflamed for 3 months preoperatively.

Essential Steps

1. Examination of the anterior segment to determine the presence of ocular abnormalities and to determine if on gonioscopic examination the angle is sufficiently open (Fig. 45.1).
2. Topical application of pilocarpine and apraclonidine.
3. Tilt patient's head 30–45° away from surgeon and tilt the microscope 30–45° toward surgeon.
4. Place locking forceps on the Tenon's insertion superiorly and inferiorly at the limbus, and have the assistant hold forceps.

S.S. Reich • J.B. Serle (✉)
Department of Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY, USA
e-mail: janet.serle@mssm.edu; shani.reich@mssm.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_45

Fig. 45.1 Angle seen through Swan Jacob gonioscopy lens

Fig. 45.2 MVR blade creating cleft through trabecular meshwork. *Image courtesy of Cellso Tello, MD and Matthew Hosler, MD*

5. View nasal angle with gonioscopy lens.
6. Enter anterior chamber with 27-gauge sterile needle on viscoelastic-filled syringe and instill viscoelastic.
7. With gonioscopy lens in place, create cleft perpendicular to anterior trabecular meshwork (Fig. 45.2).
8. The assistant carefully rotates the eye clockwise and counterclockwise to extend cleft.
9. Replace viscoelastic syringe with syringe containing filtered air to fill chamber.
10. Close entry site with interrupted 10-0 nylon or Vicryl suture.

Complications

– Hyphema
– Hyperemia
– Capsular disruption
– Cataract formation

– Lens subluxation
– Miosis
– Endothelial damage
– Corneal scarring
– Epithelial ingrowth
– Corneal edema
– Hypotony
– Iridodialysis
– Cyclodialysis
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: Childhood glaucoma (*OS/OD/OU*)

Procedure: Examination under anesthesia and goniotomy (*OD/OS/OU*)

Postoperative diagnosis: *Same*

Indication: This ____- year-old (*male/female*) has findings of glaucoma. Procedure is indicated to lower the eye pressure. A detailed review of risks and benefits was conducted with the parents (*and the patient—if age appropriate*).

Description of the procedure: The patient was identified in the holding area, and the (*right/left/both*) eye(s) was/were marked with a marking pen. The patient was brought into the operating room and placed on the operating table in the supine position. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

Light anesthesia by mask was given, and topical anesthesia was instilled into the conjunctival fornix of the (*right/left/both*) eye(s). IOP measured with a (*pneumotonometer/Tono-Pen/Perkins tonometer*) was ___ mm Hg OD ____standard deviation ___ mm Hg OS ____standard deviation. Dilating drops (*Mydriacyl _%, Neo-Synephrine _%, Cyclogyl _%*) were instilled to (*right/left/both*) eye.

The patient was then intubated and an intravenous line was placed per anesthesia. Central cornea thickness was OD ___microns and OS ___microns. The operating microscope was used for subsequent examination. Corneal diameters measured with a caliper were ___ mm horizontally and ___ mm vertically OD and ___ mm horizontally by ___mm vertically OS. Anterior segment cornea exam OU revealed (*Haab's striae, clear, cloudy, hazy, opacities, etc.*). The iris was (*normal, thin, etc.*) and the anterior chamber was moderately (*deep, shallow, formed, etc.*). (*No*) vitreous was observed in the anterior chamber. On (*4-mirror, Swan Jacob, etc.*) gonioscopy, the angle OD was (*wide open with CB band and iris processes, poorly visualized, etc.*), and the angle OS was (*wide open with CB band and iris processes, poorly visualized, etc.*). (*Each quadrant [superior, nasal, inferior temporal] should be described and clarified in the note.*)

A dilated exam was then performed. With the microscope and a flat retina lens, the cup-to-disk ratio measured ___horizontal, ___vertical OD and ___horizontal, ___vertical OS. OD optic nerve rim was (*intact, thin, notched*), and OS optic nerve rim was (*intact, thin, notched*). OD optic cup was (*shallow, deep, elongated*), and OS optic cup was (*shallow, deep, elongated*). Macula OD was (*unremarkable, absent foveal reflex, thin, etc.*), and macula OS was (*unremarkable, absent foveal reflex, thin, etc.*). Indirect ophthalmoscopy was performed with a 20 diopter lens. OD central and peripheral retina was (*describe*), and OS central and peripheral retina was (*describe*).

Based on the above findings including a clear cornea and well-visualized angle structures on gonioscopy, it was decided to proceed with glaucoma surgery in the (*right/left/both*) eye(s). A waterproof adhesive transparent dressing was used to cover the contralateral (*left/right*) eye.

The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye and an eyelid speculum was placed. Pilocarpine 2 % and apraclonidine 0.5 % drops were placed onto the cornea of the (*right/left*) eye and viscoelastic placed onto the central cornea. The surgeon was seated temporally and the microscope was tipped 30–45° toward the surgeon. The patient's head was tilted 30–45° away from the surgeon. Locking forceps were placed on the Tenon's insertion superiorly and inferiorly at the limbus. The assistant held the locking forceps, and adjustments were made until an excellent detailed view of the nasal angle was obtained through the (*Swan Jacob,4-mirror, etc.*) gonioscopy lens. The gonioscopy lens was removed from the eye.

The anterior chamber was entered through the peripheral clear cornea temporally with a sharp 27-gauge sterile needle on a viscoelastic-filled syringe (*Miochol was injected*). The needle was carefully passed across the anterior chamber, avoiding contact with the iris or lens, toward the nasal anterior chamber angle. Viscoelastic was instilled into the anterior chamber as needed. The gonioscopy lens was again placed onto the eye. The (*needle/MVR blade*) was placed perpendicular to the anterior trabecular meshwork, and a cleft was created. The assistant carefully rotated the eye clockwise and counterclockwise to extend the cleft in the anterior trabecular meshwork for a total of ___ clock hours. Viscoelastic syringe was removed and replaced by a syringe with filtered air to fill the chamber. The 27-gauge needle was removed from the eye, and the site was closed with an interrupted (*10-0 Vicryl/10-0 nylon*) suture.

The wound was tested and did not leak. The knot was rotated into the cornea. Subconjunctival injections of (*antibiotics and steroids*) were administered inferiorly. A patch and a shield were placed over the eye.

If procedure was performed bilaterally—The patient was then prepped and draped in the usual sterile fashion for the (*left/right*) eye. The surgeons rescrubbed for this eye. *The same procedure was then performed for the contralateral eye*.

The patient was awakened from anesthesia without complications and transported to the postoperative care unit. Follow-up was scheduled for the next day.

Chapter 46
Trabeculotomy and Exam Under Anesthesia (EUA)

Janet B. Serle and Shani S. Reich

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Typically an exam under anesthesia is performed to completely evaluate the eyes prior to beginning surgery. Patients with uncontrolled eye pressure, with or without clear corneas, in which it is anticipated that Schlemm's canal is present, can be considered for this procedure. Patients and or appropriate family members should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Glaucoma • Childhood glaucoma • Uveitic glaucoma • Trabeculotomy • Gonioscopy • Anterior chamber angle

Indications

Uncontrolled intraocular pressure requiring surgical intervention in childhood glaucomas includes congenital, juvenile open angle, Sturge-Weber syndrome, aphakic, Axenfeld-Rieger, and uveitic. For patients with uveitic glaucoma, it is advised that the eye be non-inflamed for 3 months preoperatively.

Essential Steps

1. Examination of the anterior segment (Fig. 46.1) to determine the presence of ocular abnormalities and assess if Schlemm's canal will be present and identified upon surgical dissection
2. Placement of traction suture
3. Careful dissection of conjunctiva
4. Careful dissection of scleral flap
5. Careful dissection to Schlemm's canal
6. Paracentesis
7. Miotic and viscoelastic injection into the anterior chamber

J.B. Serle (✉) • S.S. Reich
Department of Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY, USA
e-mail: janet.serle@mssm.edu; shani.reich@mssm.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_46

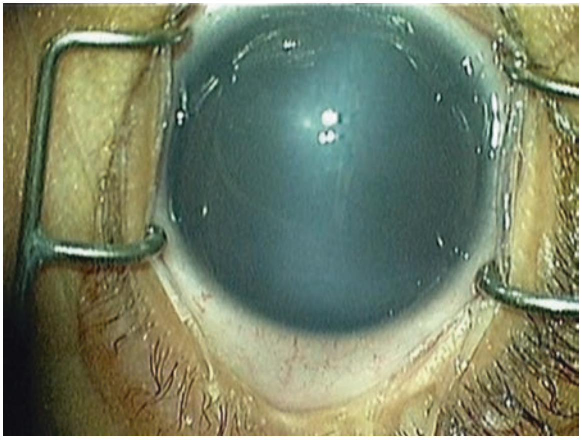

Fig. 46.1 Cloudy cornea with enlarged corneal diameter

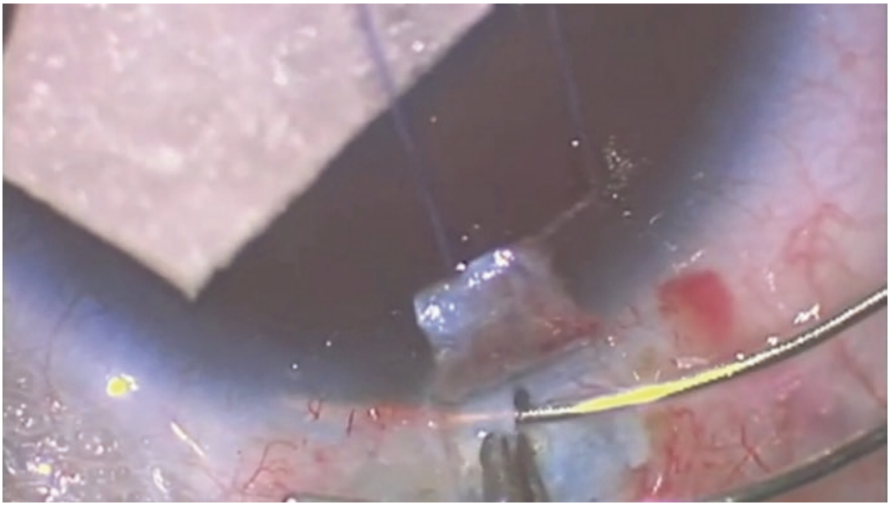

Fig. 46.2 Insertion of catheter into Schlemm's canal

8. Unroofing of Schlemm's canal
9. Cannulation of Schlemm's canal (Figs. 46.2, 46.3, 46.4, and 46.5)
10. Closure of scleral flap (Fig. 46.6)
11. Closure of conjunctiva

Complications

– Hyphema
– Descemet's tear
– Iridodialysis
– Cyclodialysis
– Flat chamber

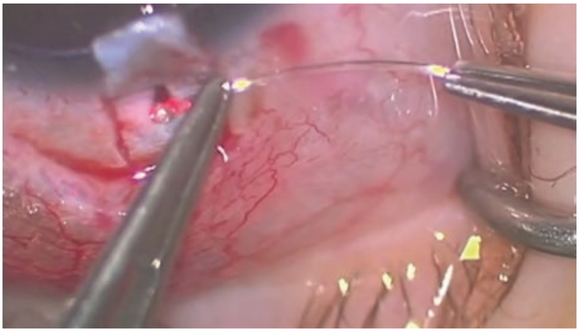

Fig. 46.3 Insertion of I Science illuminated microcatheter

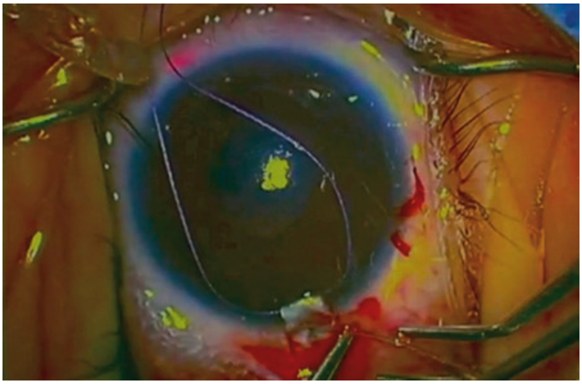

Fig. 46.4 I Science catheter visible in Schlemm's canal 180° from insertion

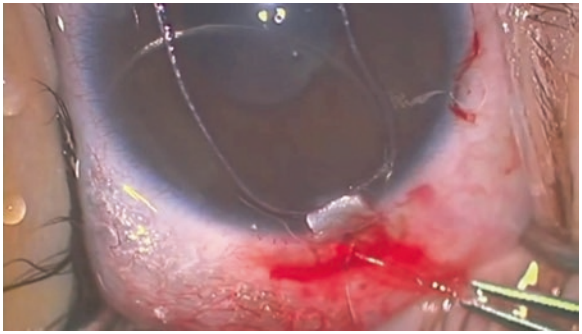

Fig. 46.5 Creation of trabeculotomy by simultaneous pulling of both catheter ends from eye

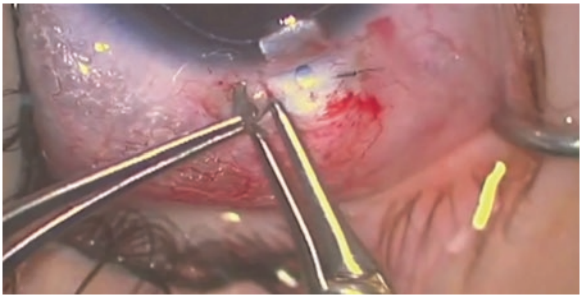

Fig. 46.6 Closure of scleral incision

– Shallow chamber
– Endothelial damage
– Corneal edema
– Cataract formation
– Serous choroidal detachment
– Hemorrhagic choroidal detachment
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Glaucoma* (*OS/OD/OU*)

Procedure: Examination under anesthesia and trabeculotomy (*OD/OS/OU*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) has findings of glaucoma. A procedure is indicated to lower the eye pressure. A detailed review of risks and benefits was conducted with the parents (*and the patient—if age appropriate*).

Description of the procedure: The patient was identified in the holding area, and the *(right/left/both)* eye(s) was/were marked with a marking pen. The patient was brought into the operating room and placed on the operating table in the supine position. A proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

Light anesthesia by mask was given and topical anesthesia was instilled into the conjunctival fornix of the *(right/left/both)* eye(s). IOP measured with a (*pneumotonometer/Tono-Pen/Perkins tonometer*) was ___ mm Hg OD ____standard deviation ___ mm Hg OS ____standard deviation. Dilating drops *(Mydriacyl _%*, *Neosynephrine _%*, *Cyclogyl _%*) were instilled to *(right/left/both)* eye.

The patient was then intubated and an intravenous line was placed per anesthesia.

If ultrasound biomicroscopy was used, (*ultrasound biomicroscopy was used to assess the angles secondary to an (opacified/cloudy) cornea.) On ultrasound biomicroscopy, the angles were (wide open, narrow, closed, etc.) OD at __ clock hours (wide open, narrow, closed, etc.) OS at __ clock hours. A-scan measured axial lengths of __ mm OD and __ mm OS. Central cornea thickness was OD ___microns, OS ___microns.*

The operating microscope was used for subsequent examination. Corneal diameters measured with a caliper were ___ mm horizontally and ___ mm vertically OD and ___ mm horizontally by ___mm vertically OS. Anterior segment cornea exam OU revealed (*Haab's striae and clear, cloudy, hazy, opacities*). The iris was (*normal, thin, not visible, etc.*,) and the anterior chamber was moderately (*deep, shallow, formed, etc.*). (*No*) vitreous was observed in the anterior chamber. On (*four-mirror, Swan Jacob, etc.*) gonioscopy, the angle OD was (*wide open with CB band, iris* *processes, thin peripheral iris, synechiae, poorly visualized, etc.*) and the angle OS was *(wide open with CB band, iris processes, thin peripheral iris, synechiae, poorly visualized, etc.)*. (*Each quadrant [superior, nasal, inferior, temporal] should be described and clarified in the note*.)

A dilated exam was then performed. With the microscope and a (*flat retina lens/gonioscopy lens/indirect lens*) cup to disk ratio measured ___horizontal, ___vertical OD and ___horizontal, ___vertical OS. OD optic nerve rim was (*intact, thin, notched*), and OS optic nerve rim was (*intact, thin, notched).* OD the optic cup was (*shallow, deep, elongated*) and OS the optic cup was (*shallow, deep, elongated*). Macula OD was (*unremarkable, present, absent foveal reflex, thin, etc.)*. Macula OS was (*unremarkable, present, absent foveal reflex, thin, etc.).* Indirect ophthalmoscopy was performed with a 20 diopter lens. OD central and peripheral retina was (*describe*) and OS central and peripheral retina was (*describe*). Retinoscopy OD was ____. Retinoscopy OS was ____. Net refraction was OD____ and OS _____. (*If there was no view for dilated exam, dilated exam was not possible due to poor visualization.*)

Based on the above findings, it was decided to proceed with glaucoma surgery in the *(right/left/both)* eye(s). A waterproof adhesive transparent dressing was used to cover the contralateral (*left/right*) eye.

The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed. A *7-0 Vicryl* traction suture was placed through the peripheral cornea (*inferiorly/superiorly/temporally*) and the globe was rotated. A fornix-based peritomy was then performed *(superiorly/inferiorly/temporally/nasally)* for about _*5*_ clock hours at the limbus. Vannas and blunt Westcott scissors were used to dissect to bare sclera in this area. Using a *#57 blade* (*or other blade as per surgeon's preference*) a half-thickness, trapezoidal scleral flap was dissected. The flap was extended anteriorly until clear cornea was exposed. A _*1.5–2.0*_ mm long radial incision was made at the limbus posterior to clear cornea through the blue gray zone to expose Schlemm's canal. A paracentesis was made temporally. Viscoelastic and miochol were then instilled into the anterior chamber through the paracentesis.

Schlemm's canal was unroofed using a *(#69, #15, or other*) blade. Schlemm's canal was then entered using a (*Harms trabeculotome or viscoelastic on a cannula*).

[Choose one]:

Technique 1: traditional trabeculotomy*—The Harms trabectome was used to cannulate Schlemm's canal without resistance. The right trabectome was then completely advanced, rotated gently into the anterior chamber, and removed. Additional viscoelastic was instilled through the paracentesis. The left trabectome was then completely advanced, rotated gently into the anterior chamber, and removed.*

Technique 2: 360 degree trabeculotomy*—An illuminated microcatheter (I Science) (REF #, Lot #) was then primed for use as per the manufacturer's instructions. The catheter was then placed into Schlemm's canal and advanced (completely or from _ o'clock to _ o'clock) around the eye. Both ends of the catheter were held and pulled* *out of the eye to create the trabeculotomy. A small bridge of tissue was not incised by the catheter at the entrance to Schlemm's canal, to avoid iris prolapse into the wound. A___degree trabeculotomy was created and the catheter was removed from the eye.*

The opening into Schlemm's was closed using interrupted (*10-0/9-0*) *nylon* sutures. The scleral flap was closed using interrupted (*10-0/9-0) nylon* sutures. The conjunctiva was then closed using *8-0 Vicryl* sutures. Balanced salt solution was instilled into the anterior chamber to test for wound leaks. No leaks were observed. Filtered air was injected into the eye through the paracentesis. The lid speculum was then removed from the eye. Topical or subconjunctival injections of (*antibiotics and steroids*) were administered. A waterproof adhesive transparent dressing was placed, and the eye was patched and shielded.

If procedure was performed bilaterally*—The patient was then prepped and draped in the usual sterile fashion for the (left/right) eye. The surgeons rescrubbed for this eye. The same procedure was then performed for the contralateral eye.*

The patient was awakened from anesthesia without complications and transported to the postoperative care unit. Follow-up was scheduled for the next day.

Chapter 47
Trabeculectomy

Thaddeus Wandel and Alanna S. Nattis

Abstract Treatments for glaucoma may be focused on decreasing formation of aqueous or increasing the outflow of fluid from the eye (as in the case of glaucoma filtration surgery). Trabeculectomy is a filtration surgery where an opening is created in the anterior chamber to allow for aqueous flow out of the eye through a partial-thickness scleral flap. The aqueous then flows into the subconjunctival space, creating a filtering bleb. The aqueous may then be filtered through the conjunctiva into the tear film, be absorbed by vascular/perivascular conjunctival tissues, flow through lymphatic vessels, and/or drain through the aqueous veins. Often, antifibrotic medications, such as mitomycin C or 5-fluorouracil, may be employed to prevent excessive scarring of the filtration bleb and allow for more efficacious lowering of IOP.

Keywords Uncontrolled glaucoma • Filtration • Trabeculectomy • Conjunctiva • Unsuccessful laser therapy

Indications

Medically uncontrolled glaucoma, unsuccessful laser therapy, and significantly elevated intraocular pressure with high risk for visual disability

Essential Steps

1. Superior quadrant fornix-based conjunctival incision
2. Access to bare sclera
3. Sub-tenon mitomycin C or antimetabolite application
4. Triangular half-thickness scleral incision and flap creation
5. Paracentesis

T. Wandel (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: tad_wandel@nymc.edu

A.S. Nattis
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_47

6. Rectangular full-thickness scleral/trabecular block excision
7. Peripheral iridectomy
8. Anchor triangular flap
9. Check flow
10. Reapproximation of the conjunctiva

Complications

– Over filtering
– Shallow anterior chamber
– Wound leakage
– Hypotony
– Hyphema
– Choroidal effusion
– Dellen
– Increased IOP
– Hemorrhage
– Cystoid macular edema

Template Operative Dictation

Preoperative diagnosis: *Medically uncontrolled glaucoma (OD/OS)*

Procedure: Trabeculectomy *(OD/OS)* with mitomycin C

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* with a well-known and documented history of glaucoma had been unsuccessful with medically controlled treatment plans. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, general anesthesia was induced. A *(LMA/ETT)* was placed and local anesthetic was injected in the standard *(retrobulbar/peribulbar)* fashion using ____mls of equal parts ___% lidocaine and ___% bupivacaine. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed in the eye. Tetracaine eye drops were instilled onto the surface of the (*right/left*) eye.

Smooth forceps and Westcott scissors were used to dissect the conjunctiva and Tenon's capsule in the superior quadrant in order to create a fornix-based conjunctival flap (FBCF) incision. Using Westcott scissors, blunt dissection was carried out to the bare sclera. Electrocautery provided hemostasis on the scleral bed. Sponges soaked in mitomycin C were then placed in the sub-tenon pocket for ___minutes. Three bottles of BSS were then used to copiously irrigate the ocular surface following mitomycin C application. A *#64 blade* was then used to make a triangular half-thickness scleral incision ___mm in length carried out approximately ____mm from the limbus. The triangular flap was then retracted inferiorly over the cornea. A paracentesis was then created temporally using a micro sharp blade. A micro sharp blade was then used to create a rectangular full-thickness scleral block beneath the retracted triangular partial-thickness scleral flap. The scleral block excision was then completed using Vannas scissors. A peripheral iridectomy was then created by grasping the iris with 0.12 forceps and sheering with Westcott scissors. A cohesive viscoelastic was then injected over the peripheral iridectomy into the anterior chamber, and the scleral flap was laid flat. _#_ interrupted *10-0 nylon* sutures was then used to anchor the apex of the triangular flap to the sclera. Flow through the trabeculectomy site was checked by injecting BSS through the paracentesis wound into the anterior chamber. At this point adequate and appropriate flow was noted. Miochol was then injected into the anterior chamber. The FBCF was reapproximated using _#_ interrupted *10-0 nylon* sutures running from limbus to the base of the incision. Atropine eyedrops were placed onto the surface of the left eye followed by Maxitrol ointment. The eyelid speculum was removed and the eye was patched and shielded. The patient tolerated the procedure well and was transferred to the postanesthesia care unit in stable condition.

Chapter 48
Target Placement of Multiple iStents

Shakeel Shareef and Sansar Sharma

Abstract Preoperative office-based gonioscopy is essential in determining a patient's surgical candidacy for microinvasive glaucoma surgery (MIGS) (University of Iowa Health Care Ophthalmology and Visual Sciences, www.gonioscopy.org). Is the angle open or closed? In the latter, is there appositional or synechial closure? Consideration for placement of multiple micro-bypass stents should be given to those intolerant or unable to take glaucoma medications (i.e., drug-induced systemic or ocular side effects, unable to self-administer medications due to a physical disability), unable to undergo an *ab externo* surgical procedure (i.e., trabeculectomy, tube shunt surgery) due to immobile bulbar conjunctiva from either prior scarring or systemic disease, or unacceptable risk versus benefit associated with invasive surgery. When two or three micro-bypass stents were combined with phacoemulsification (PE), 77 % achieved a mean IOP <15 mmHg with >80 % taking less medications at 1 year (J Cataract Refract Surg 38:1911–1917, 2012). This reduction may reflect enhanced circumferential flow with increased access to collector channels (CC) draining aqueous into the episcleral venous system (J Cataract Refract Surg 38:1911–1917, 2012). Titratability of multiple stents ($n = 1$–3) as a stand-alone procedure in lowering IOP further with each additional iStent was demonstrated in a prospective study. Reduction in IOP ≥20 % with unmedicated IOP ≤18 mmHg versus baseline unmedicated IOP was achieved by 89.2 %, 90.2 %, and 92.1 % for one, two, and three stents, respectively, at 1-year post-op (Clin Ophthalmol 9:2313–2320, 2015). Targeted placement of micro-stents should be directed in areas of greater trabecular meshwork (TM) pigmentation associated with close proximity to collector channels (CC) optimizing aqueous outflow via the aqueous veins (AV) to the episcleral vein (EV) (Invest Ophthalmol Vis Sci 50(4):1692–1697, 2009). Identification of initial blood reflux in Schlemm's Canal (SC) may also serve to target CC (see Chap. 49). For novices, in angles with minimal to no pigment, injection of trypan blue has been shown to selectively stain the TM landmark for visual identification during implantation (Glaukos user meeting, Fort Lauderdale, 2016).

S. Shareef (✉)
Department of Ophthalmology, University of Rochester Medical Center, Rochester, NY, USA
e-mail: Shakeel_Shareef@urmc.rochester.edu

S. Sharma
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: sansar_sharma@nymc.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_48

However, this latter approach does not provide cues for targeting CC. If the target IOP reduction is not achieved or there is evidence of visual field progression or increased cupping, patients may need to be restarted on medical therapy. Risks, benefits, alternatives, and appropriate educational material should have been provided to the patient regarding angle surgery.

Keywords Microinvasive glaucoma surgery (MIGS) • Angle surgery • Intraocular pressure (IOP) • Trabecular meshwork (TM) • Schlemm's canal (SC) • iStent • Blood reflux • Surgical goniolens • Collector channels (CC) • Aqueous veins (AV) • Episcleral veins (EV) • Trypan blue • Ophthalmic viscosurgical device (OVD)

Indications

Patients need to be informed that placement of an iStent is FDA approved when combined with PE to reduce IOP in adult patients with mild to moderate open-angle glaucoma currently treated with ocular hypotensive medications [6]. In stand-alone procedures or placement of additional iStents with PE, the financial burden will be the patient's responsibility.

Note: Surgical placement of multiple iStents can be performed as a stand-alone procedure, combined with PE or pseudophakia [2, 3]. The template in this chapter outlines steps for micro-stent implantation as a stand-alone procedure (Fig. 48.1). The surgeon can modify the template when combining with cataract surgery (see Chap. 49).

Essential Steps

For pre-op planning, each patient needs to be examined in the office with slit lamp based gonioscopy to determine if the angle is open or not [1]. The surgeon needs to be familiar with the essential steps necessary to perform intraoperative gonioscopy to successfully perform MIGS [7, 8].

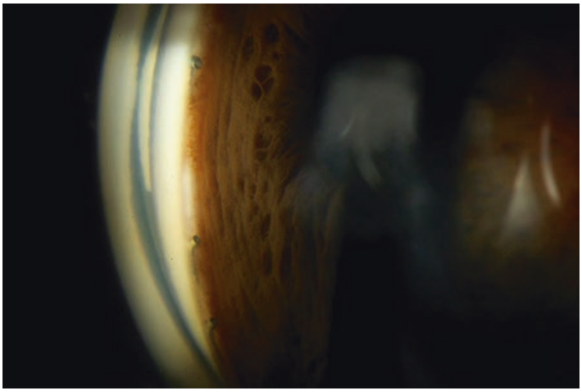

Fig. 48.1 Note the presence of three nasal micro-stents anatomically well positioned within Schlemm's canal. The bottom two iStents are approximately 1 o'clock hour apart (Brittany Richardson, CRA, OCT-C)

1. Administration of ASC or hospital-approved preop medical regimen including but not limited to topical anesthetic, Betadine, antibiotic, and dilating drops followed by lidocaine jelly.
2. Initiation of intravenous sedation and transfer to operating room in supine position.
3. If akinesia is desired, one can administer a retro- or peribulbar block.
4. Fixation ring-assisted temporal access to clear cornea for wound construction based upon eccentricity and location.
5. Injection of non-preserved lidocaine into anterior chamber (AC).
6. *For novices, consider injection of trypan blue into the AC to stain the TM for identification purposes to facilitate micro-stent implantation in the correct anatomic position. Irrigate the dye out after 30 seconds with balanced saline solution before proceeding to step 7* [5].
7. Stabilize AC with soft-shell technique using a layer of viscodispersive and viscocohesive ophthalmic viscosurgical device (OVD) without overfill [9].
8. Head rotation 30° away from surgeon.
9. Surgical microscope rotation 30° toward surgeon.
10. (*If the TM has been pre-stained with trypan blue, can proceed to step 16.*)
11. *Only in patients identified preop on gonioscopy with sparse or mildly pigmented TM where blood reflux can be visualized unimpeded within SC—gently depress posterior lip of corneal wound to cause egress of small quantity of OVD to induce relative hypotony. (In presence of a diffuse or heavily pigmented TM band, leave AC filled as in step 6 and proceed to step 16.)*
12. Dock surgical goniolens onto cornea using lidocaine gel as a coupling medium.
13. Identification, magnification, and illumination of angle structures/TM.
14. Identification of initial clock hours of patchy blood reflux in SC.
15. Entrapment of blood reflux in SC by injection of additional viscocohesive OVD to pressurize AC without overfilling (i.e., posterior iris bowing).
16. Inspection of iStent (comes either as right or left handed) and accompanying injector.
17. Introduction of iStent into AC via keratome incision “heel down” to avoid blunting tip of micro-stent needed for piercing TM and cannulating SC. Advance injector/stent parallel to iris plane to center of pupillary aperture.
18. With nondominant hand, dock goniolens onto cornea using lidocaine jelly as a coupling medium.
19. Under gonioscopic view, advance micro-stent injector nasally to desired clock hour of blood reflux [or pigmented area of TM] [4].
20. Using sharp tip of micro-stent, pierce TM at 15° angle approach introducing first one-third of iStent into SC.
21. Drop heel of micro-stent parallel and onto the TM landmark and advance remaining two-thirds into SC by gentle flexion of wrist.
22. Relax hand to avoid dragging and damaging TM tissue and inner wall of SC; gently disinsert the iStent from the injector.
23. Remove injector from AC and inject additional cohesive OVD over area of insertion site to tamponade any bleed and inspect proper placement of iStent.

24. Tap snorkel posteriorly to ensure complete insertion into SC.
25. Strum snorkel in vertical axis as an internal memory check and observe recoil.
26. Repeat steps 16–25 for each additional micro-stent implanted. Place each additional stent approximately 1–2 o'clock hours away from the other stents(s) [2, 3].
27. Rotate head and microscope back to primary position.
28. Aspirate viscoelastic with I/A handpiece without removing the latter from the AC (keep continuous irrigation in "on" position to maintain AC).
29. Introduce blunt cannula on syringe containing trypan blue via side port.
30. Shut off continuous irrigation while keeping I/A handpiece in the AC. Slowly inject trypan blue toward snorkel and fill AC without over pressurization.
31. Restart continuous irrigation and inspect nasal bulbar conjunctiva to confirm dye filling of episcleral vasculature as it exits the AC followed by blanching as an internal check for aqueous outflow.
32. Aspirate dye and stromal hydrate wounds and pressurize eye to tamponade any potential post-op bleeding from iStent surgical site.

Complications

- Obscuration of gonioscopic view by heme if keratome incision made outside limbus
- Microhyphema
- Blood reflux into AC at insertion site
- Iridodialysis if poor globe control especially under topical anesthesia
- Endothelial damage
- Improper iStent placement into ciliary body band or other nontarget ocular tissue
- Poor visibility to insert iStent in setting of prior complex PE due to altered clarity of keratome incision or diffuse corneal edema [10]
- Obstruction of snorkel
- Potential for intraocular loss of iStent

Template Operative Dictation

Preoperative diagnosis: Glaucoma *(OD/OS)*

Procedure: Placement of multiple iStents *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ______-year-old (*male/female*) was diagnosed with (*mild/moderate*) glaucoma, currently treated with (*1/2/3*) glaucoma medications. The patient was motivated to reduce dependence upon glaucoma medications. If the desired IOP goal was not achieved postoperatively, patient was informed of the need to restart glaucoma medications. Consideration for other surgical interventions to further control IOP would also be considered.

Description of the procedure: After discussing risks, benefits, and alternatives and obtaining consent, the (*right/left*) eye was marked with a marking pen in the preop holding area and the appropriate (*ASC/hospital based)* approved ophthalmic drops to the (*right/left*) eye were administered for the procedure followed by placement of 2% lidocaine jelly for topical anesthesia. Following initiation of intravenous sedation, patient was taken to the operating room and placed in a supine position and connected to the monitoring apparatus.

[Choose one]:

If akinesia was desired, *a peri- or retrobulbar block consisting of* ___________ *was administered.*

If topical anesthesia was desired, *topical anesthetic consisting of* ___________ *was administered*

The patient was prepped and draped in a sterile fashion and a lid speculum was placed. A timeout was taken to identify the patient and the operative eye. The microscope was brought into position. A temporal approach was taken.

With assistance of a fixation ring, the globe was rotated nasally and a ___ mm keratome incision was initiated at the (*9/3*) o'clock position followed by injection with non-preserved lidocaine. A viscodispersive OVD was then injected to coat and protect the corneal endothelium. A deeper layer of a viscocohesive OVD was then injected and advanced into the angle to create and maintain space without overfill. The head was then rotated away 30 degrees and the microscope was similarly rotated toward the surgeon approximately 30° with an endpoint to align the coaxial light along the iris plane (see Chap. 49). With the nondominant hand, surgical goniolens was then docked onto the corneal surface using 2% lidocaine as a coupling medium to view the angle structures with appropriate magnification and illumination.

[Choose one]:

If sparse or no TM pigment was noted preoperatively on gonioscopy, *the posterior lip of the keratome was depressed with a second instrument to cause egress of a small amount of viscoelastic to create relative hypotony to induce blood reflux into SC. Once initial focal pooling of heme was identified, additional viscocohesive was injected into the AC without overfill to entrap the heme in SC and to serve as a targeted site for placement of the micro-stent in vicinity of a CC.*

If diffuse, *a TM-pigmented band was noted throughout the angle preoperatively on gonioscopy.*

The inserter was inspected with the iStent noted to be grossly intact. The micro-stent was introduced via the keratome incision heel down to avoid blunting the tip upon entry into the AC. The inserter/iStent complex was then advanced nasally to the center of the pupil. Under gonioscopic guidance, the inserter was advanced to the (*pigmented TM band/__o'clock hour of heme*). The upper one-third of the TM was approached at a 15° angle, and the tip was used to pierce the TM into SC up to one-third of the length of the micro-stent. The heel of the stent was then gently placed parallel onto the TM landmark. With gentle flexion of the wrist, the stent was advanced to cannulate SC up to the snorkel. The wrist was then recoiled back slightly to relieve any pushing tension on the stent to avoid damaging the TM tissue. The release button on the inserter was pushed to detach the snorkel from the inserter. The snorkel was tapped on its back end to ensure complete insertion into SC. The snorkel was then strummed vertically en face for memory check and was noted to recoil to its parallel position indicating proper insertion. Additional viscocohesive was injected to tamponade any microbleed, an indication that that stent was placed in the correct anatomic and final resting position in SC.

If multiple iStents are placed, *the exact same procedure was then repeated for iStent insertions at __o'clock position(s).*

The head and microscope were returned back to their primary position. Viscoelastic was aspirated with the I/A handpiece, and prior to removal of the latter from the AC, continuous irrigation was turned to the "off" position and trypan blue was injected via the paracentesis site toward the location of the micro-stents without over pressurizing the eye. Attention was then directed to the nasal bulbar conjunctiva and the continuous irrigation was turned to the "on" position. Dye (was/was not) noted to fill the episcleral vasculature in the vicinity of the iStent. Following additional I/A and removal of the handpiece, stromal hydration of the corneal wounds ensured a watertight closure with enough intraocular pressure to tamponade any potential bleed from the iStent implantation site. The lid speculum was removed and the periocular site was washed, cleaned, and dried.

[Choose one]:

If topical anesthesia is used, *a drop of Iopidine and Vigamox was placed on the surface of the eye and an eye shield was affixed on the (right/left) eye.*

If peri-/retrobulbar block is used, *a drop of Iopidine was instilled followed by an ointment of ___________ and the eye was patched with an eyepad and eye shield.*

The patient tolerated the procedure without event and was taken to the recovery room for further observation. The patient was given postoperative instructions and advised to follow up with Dr. ______ in the eye clinic tomorrow morning.

References

1. University of Iowa Health Care Ophthalmology and Visual Sciences. www.gonioscopy.org.
2. Belovay G, Naqi A, Chan B, et al. Using multiple trabecular micro-bypass stents in cataract patients to treat open-angle glaucoma. J Cataract Refract Surg. 2012;38:1911–7.
3. Katz J, Erb C, Guillamet A, et al. Prospective, randomized study of one, two, or three trabecular bypass stents in open-angle glaucoma subjects on topical hypotensive medication. Clin Ophthalmol. 2015;9:2313–20.
4. Hann CR, Fautsch MP. Preferential fluid flow in the human trabecular meshwork near collector channels. Invest Ophthalmol Vis Sci. 2009;50(4):1692–7.

5. Brown RH. Glaukos user meeting. Harbor Beach Marriott Resort & Spa, Fort Lauderdale, Fl. Thursday, 3 March 2016.
6. http://www.glaukos.com/istent/surgical-procedure.
7. Shareef, S. The critical skill of intraoperative gonioscopy for MIGS surgeons. Journal Glaucoma Today 2016; Sept/October issue; pp. 42–46.
8. University of Rochester School of Medicine and Dentistry, Department of Ophthalmology. Intraoperative gonioscopy instructional video. www.anglesurgery.org.
9. Arshinoff SA. Dispersive-cohesive viscoelastic soft shell technique. J Cataract Refract Surg. 1999;25:167–73.
10. Shareef S. Optimizing angle surgery with ACT. Glaucoma Today. 2015;13:48–50.

Chapter 49
Target Placement of iStent Combined with Phacoemulsification

Shakeel Shareef and Sansar Sharma

Abstract A patient's surgical candidacy for microinvasive glaucoma surgery (MIGS) should have been assessed preoperatively by evaluating the angle anatomy with slit lamp-based gonioscopy to ensure adequate visualization to safely perform surgery (University of Iowa Health Care Ophthalmology and Visual Sciences, www.gonioscopy.org). The scleral spur serves as a surgical landmark separating the pigmented trabecular meshwork (TM) anteriorly from the ciliary body band posteriorly. The Schlemm's Canal (SC) located deep to the pigmented TM is the final resting place for the micro-stent. The rate-limiting step in performing angle surgery is visualization of the angle with intraoperative gonioscopy (Exp Rev Ophthalmol 9(6):515–527, 2014; University of Rochester School of Medicine and Dentistry). Target placement of the iStent (Glaukos Corp.) includes areas of greater TM pigmentation (Invest Ophthalmol Vis Sci 50(4):1692–1697, 2009) believed to be in close proximity to collector channels (CC) for optimal aqueous outflow via the aqueous veins (AV) to the episcleral veins (EV) (Surgical innovations in glaucoma, New York, 2014). The authors propose that following induction of relative ocular hypotony, areas of initial focal blood reflux into SC adjoin CC and serve as intraoperative surgical targeting for iStent implantation in optimizing aqueous outflow. One can anticipate a reduction in IOP and/or reduction in medication burden post-op (J Cataract Refract Surg 41(12):2664–2671, 2015). Should the desired pressure reduction not be achieved or there is evidence of glaucoma progression, the patient may need to be restarted on glaucoma medical therapy. Additionally, angle surgery does not preclude traditional ab externo filtration or tube shunt surgery and forms part of a continuum in glaucoma surgical management. Risks, benefits and alternatives, and appropriate educational material should have been provided to the patient regarding angle surgery and need for cataract surgery based upon visual impairment as outlined in chapters addressing cataract extraction in this textbook.

S. Shareef (✉)
Department of Ophthalmology, University of Rochester Medical Center, Rochester, NY, USA
e-mail: Shakeel_Shareef@urmc.rochester.edu

S. Sharma
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: sansar_sharma@nymc.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_49

Keywords Microinvasive glaucoma surgery (MIGS) • Angle surgery • Intraocular pressure (IOP) • Trabecular meshwork (TM) • Schlemm's canal (SC) • iStent • Blood reflux • Intraoperative gonioscopy • Surgical goniolens • Collector channels (CC) • Aqueous veins (AV) • Episcleral veins (EV) • Trypan blue • Phacoemulsification (PE)

Indications

Patient should be informed that placement of an iStent is FDA approved when combined with PE to reduce IOP in adult patients with mild to moderate open-angle glaucoma currently treated with glaucoma medications [7]. It serves to reestablish aqueous outflow into SC by serving as a conduit to bypass diseased TM.

Essential Steps

Pre-operatively, the patient should have undergone a complete office based slit lamp exam with gonioscopy [1] to determine if the angle is open or closed in order to determine the feasibility of angle surgery. The surgeon should be familiar with performing intraoperative gonioscopy [2–4] to successfully perform MIGS.

1. Administration of ASC or hospital-approved pre-op medical regimen including but not limited to topical anesthetic, Betadine, and antibiotic and dilating drops followed by lidocaine jelly.
2. Initiation of intravenous sedation and transfer to operating room in supine position.
3. If akinesia is desired, one can administer a retro- or peribulbar block.
4. Fixation ring assisted temporal access to clear cornea for wound construction based upon eccentricity and location [3, 4] (Figs. 49.1, 49.2 and 49.3).

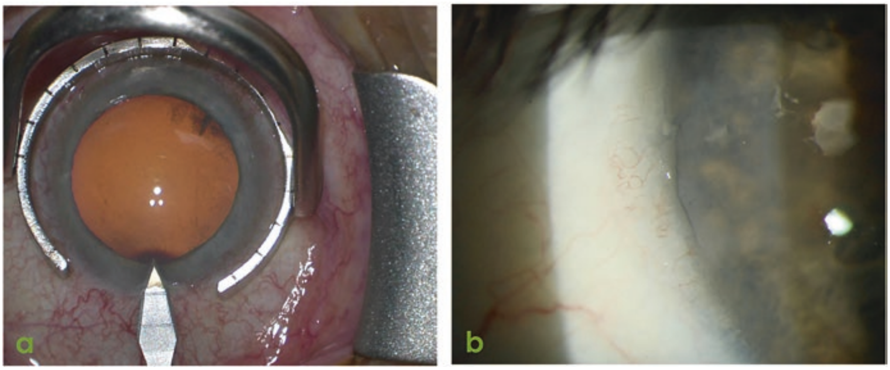

Fig. 49.1 Eccentricity. (**a**) With assistance of a fixation ring, rotate globe nasally to access the peripheral cornea. Create incision inside the limbus (S Shareef). (**b**) Note wound construction. Avoid nicking conjunctival blood vessels as heme will obscure angle viewing when surgical goniolens is placed on cornea (Brittany Richardson, CRA, OCT-C)

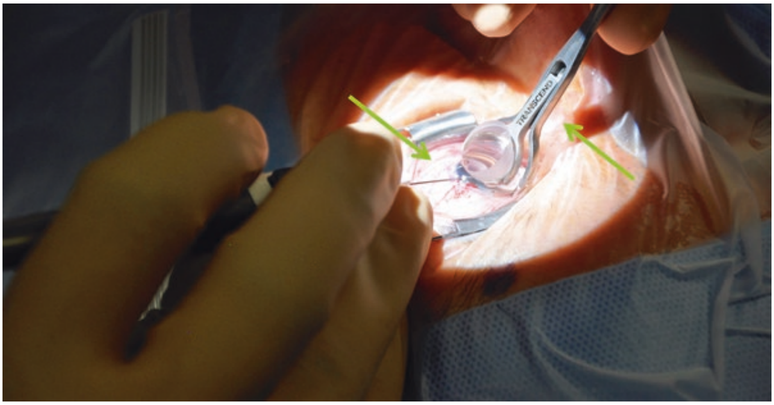

Fig. 49.2 Eccentricity enables entry of surgical instruments via the peripheral cornea for intraocular manipulation and avoids interference from the overlying surgical goniolens (Rachel Hollar, CRA, OCT-C)

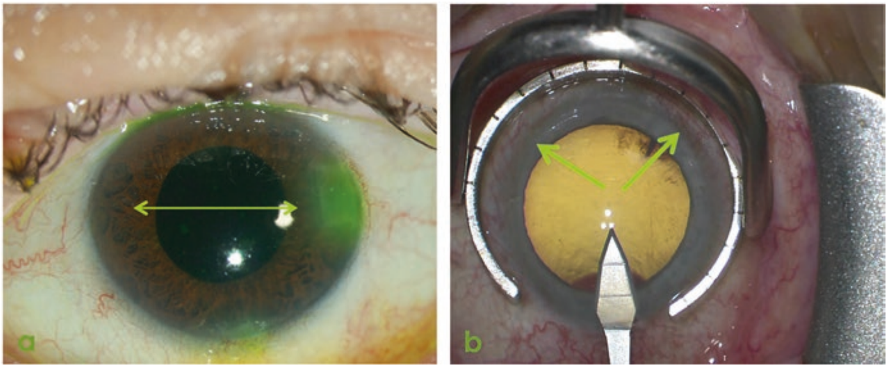

Fig. 49.3 Location. (**a**) Create incision along 3–9 o'clock plane—fluorescein-stained anterior segment photo (Rachel Hollar, CRA, OCT-C). This provides (**b**) equidistant access to the superior and inferior nasal angle. Additionally, this axis serves as an anchor and pivot point for surgical instruments during intra-op surgical manipulation (S Shareef)

5. Injection of non-preserved lidocaine into anterior chamber (AC).
6. Stabilize AC with soft-shell technique using a layer of viscodispersive and viscocohesive ophthalmic viscosurgical device (OVD) without overfill [9].
7. Head rotation 30° away from surgeon.
8. Surgical microscope rotation 30° toward surgeon (Fig. 49.4).
9. Gentle depression on posterior lip of corneal wound to cause egress of small quantity of OVD to induce relative hypotony. [This step should be conducted only in patients identified pre-op on gonioscopy with sparse or mildly pigmented TM where blood reflux can be visualized unimpeded within SC. In the presence of a diffuse or heavily pigmented TM band, leave AC filled as in step 6 and proceed to step 14.]

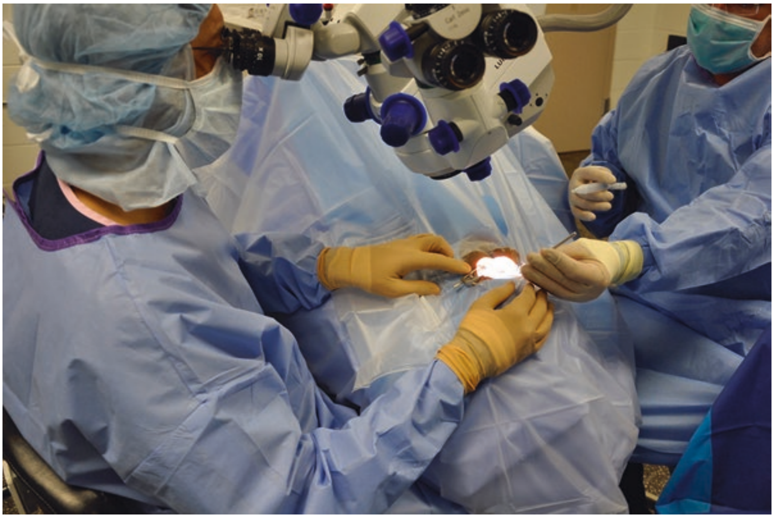

Fig. 49.4 Head and microscope are rotated in opposite directions approximately 30°. End point is to align the coaxial light along the iris plane to surgically access the angle structures. Note increased working distance between the oculars and surgical field (Rachel Hollar, CRA, OCT-C)

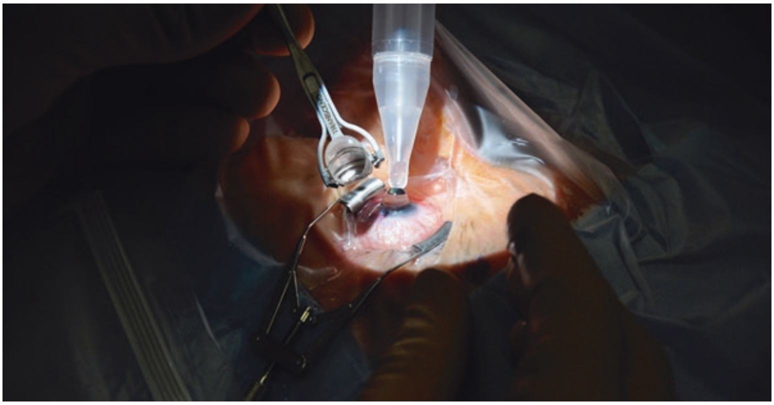

Fig. 49.5 Docking of surgical goniolens of choice using lidocaine gel. This serves two purposes: (1) coupling medium, (2) topical analgesia-increased patient tolerability with decreased pain and sensation of intraocular tissue manipulation during angle surgery—goniolens and gel application on cornea (Rachel Hollar, CRA, OCT-C)

10. Dock surgical goniolens onto cornea using lidocaine gel as coupling medium (Fig. 49.5).
11. Identification, magnification, and illumination of angle structures/TM (Fig. 49.6).
12. Identification of initial clock hours of patchy blood reflux in SC.

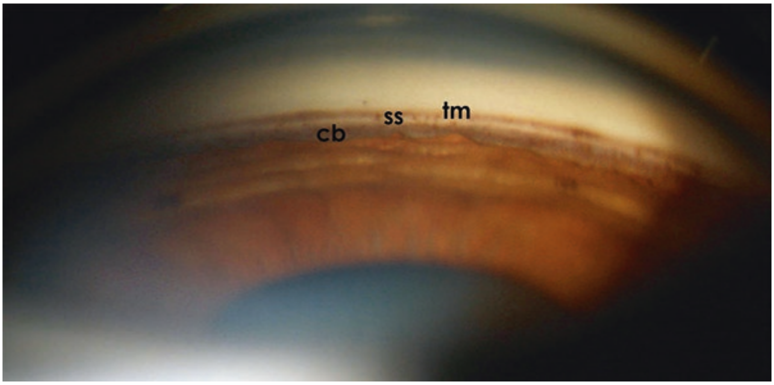

Fig. 49.6 Coaxial light should be parallel to the iris plane. This will facilitate introduction and surgical manipulation of angle structures en face. Note the white band of the scleral spur (ss) separating the trabecular meshwork (TM) pigment band anteriorly from the ciliary body (cb) band posteriorly (Taylor Pannell, CRA, OCT-C)

13. Entrapment of blood reflux in SC by injection of additional viscocohesive OVD to pressurize AC without overfilling (i.e., posterior iris bowing).
14. Inspection of iStent (comes either as right or left handed) and accompanying injector.
15. Introduction of iStent into AC via keratome incision "heel down" to avoid blunting tip of micro-stent needed for piercing TM and cannulating SC. Advance injector/stent parallel to iris plane to center of pupillary aperture.
16. With nondominant hand, dock goniolens onto cornea using lidocaine jelly as a coupling medium.
17. Under gonioscopic view, advance micro-stent injector nasally to desired clock hour of blood reflux [or pigmented area of TM] [5, 6].
18. Using sharp tip of micro-stent, pierce TM at 15° angle approach introducing first one third of iStent into SC (Fig. 49.7).
19. Drop heel of micro-stent parallel and onto the TM landmark, and advance the remaining two third into SC by gentle flexion of the wrist.
20. Relax hand to avoid dragging and damaging TM tissue and inner wall of SC. Gently disinsert the iStent from the injector keeping hand steady.
21. Remove injector from AC, and inject additional cohesive OVD over area of insertion site to tamponade any bleed and inspect proper placement of iStent.
22. Tap snorkel posteriorly to ensure complete insertion into SC (Fig. 49.8).
23. Strum snorkel in vertical axis as an internal memory check and observe recoil.
24. Rotate head and microscope back to primary position.
25. Reset microscope settings in preparation for cataract surgery. [Note: per FDA recommendations, cataract surgery is performed first followed by iStent placement [7, 8]. In this case, steps 1–6 are conducted as outlined above followed by steps 26–32 for PE. This is then followed by step 7–24 for iStent insertion concluding with steps 33–37. I prefer to perform angle surgery at the beginning

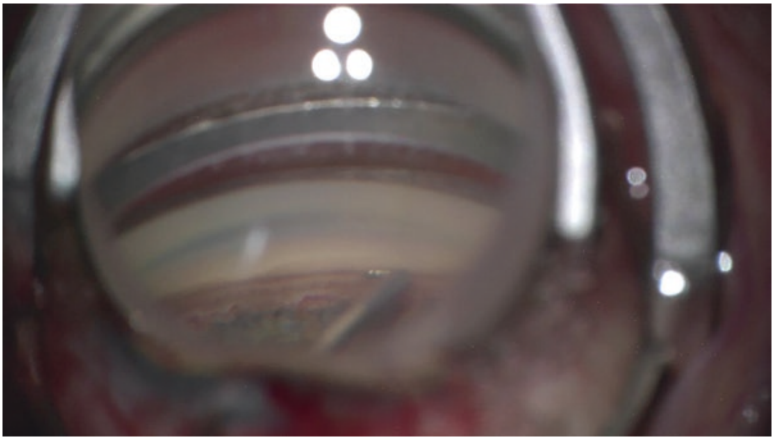

Fig. 49.7 Initial entry of sharp tip of micro-stent into pigmented TM at 15° angle. Note the absence of interference between inserter and goniolens externally at peripheral corneal incision. The latter is used as a pivot point to facilitate entry into the TM (S Shareef)

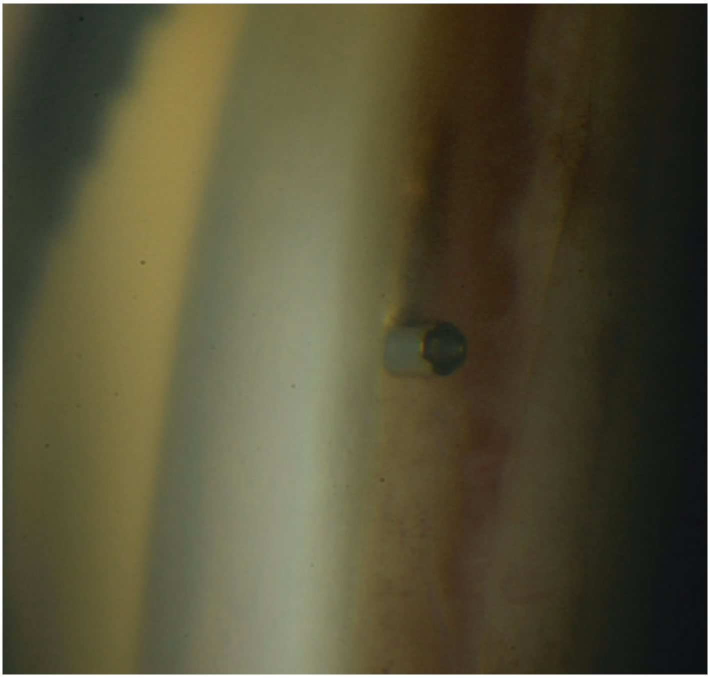

Fig. 49.8 Note anatomically well-positioned and fully inserted iStent into SC with patent snorkel. The arches of the micro-stent are obscured by the overlying mildly pigmented TM tissue indicating proper depth (Brittany Richardson, CRA, OCT-C)

of the case in the presence of an unaltered cornea and ocular integrity providing a pristine, unimpeded view of the angle anatomy with optimization of anesthesia at the beginning of the surgery [10, 11].]
26. Paracentesis/side-port incision.
27. Perform capsulorhexis.
28. Hydrodissect, hydrodelineate, and rotate the lens in the capsular bag.
29. Phacoemulsification and aspiration of endonucleus/epinucleus.
30. Remove cortical material with coaxial irrigation and aspiration (I & A).
31. Deepen capsular bag with viscocohesive OVD.
32. Inject posterior chamber IOL into the bag with proper centration.
33. Remove viscoelastic with I/A hand piece without removing it from the AC. Keep continuous irrigation in "on" position to maintain AC.
34. Introduce blunt cannula on syringe containing trypan blue via side port.
35. Shut off continuous irrigation while keeping I/A handpiece in the AC. Slowly inject trypan blue toward snorkel and fill AC without overpressurization.
36. Restart continuous irrigation, and inspect nasal bulbar conjunctiva to confirm dye filling of episcleral vasculature as it exits the AC followed by blanching as an internal check for aqueous outflow.
37. Aspirate dye and stromal hydrate wounds, and pressurize eye to tamponade any potential post-op bleeding from iStent surgical site.

Complications

- Obscuration of gonioscopic view by heme if keratome incision is made outside the limbus
- Microhyphema
- Blood reflux into AC at insertion site
- Iridodialysis if poor globe control especially under topical anesthesia
- Endothelial damage
- Improper iStent placement into ciliary body band or other nontarget ocular tissue
- Poor visibility to insert iStent in setting of prior complex PE due to altered clarity of keratome incision or diffuse corneal edema [10]
- Obstruction of snorkel
- Potential for intraocular loss of iStent

Template Operative Dictation

Preoperative diagnosis: Glaucoma/mature cataract *(OD/OS)*

Procedure: Phacoemulsification with lens implantation combined with placement of an iStent *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ______-year-old (*male/female)* was diagnosed with (*mild/moderate*) glaucoma, currently treated with (*1/2/3*) glaucoma medications. Additionally, a (*nuclear/cortical/posterior subcapsular*) cataract was noted affecting daily activities of living. The patient was motivated to improve vision aiming for (*distance/near*) correction along with a desire to reduce dependence upon glaucoma medications. If the desired IOP was not achieved postoperatively, the patient was informed restarting glaucoma medications would be indicated to achieve that goal. Consideration for other surgical interventions to further control IOP would also be considered.

Description of the procedure: After discussing risks, benefits, and alternatives and obtaining consent, the (*right/left*) eye was marked with a marking pen in the pre-op holding area, and the appropriate (*ASC/hospital based)* approved ophthalmic drops to the (*right/left*) eye were administered for the procedure followed by placement of 2% lidocaine jelly for topical anesthesia. Following initiation of intravenous sedation, patient was taken to the operating room and placed in a supine position and connected to the monitoring apparatus.

[Choose one]:

If akinesia was desired*—a peri- or retrobulbar block consisting of* ___________ *was administered.*

If topical anesthesia was desired*—topical anesthetic consisting of* ___________ *was administered.*

The patient was prepped and draped in a sterile fashion and a lid speculum was placed. A timeout was taken to identify the patient and the operative eye. The microscope was brought into position. A temporal approach was taken.

With assistance of a fixation ring, the globe was rotated nasally and a___ mm keratome incision was initiated at the (*9/3*) o'clock position followed by injection with non-preserved lidocaine. A viscodispersive OVD was then injected to coat and protect the corneal endothelium. A deeper layer of a viscocohesive OVD was then injected and advanced into the angle to create and maintain space without overfill. The head was then rotated approximately 30 degrees away and the microscope was rotated a similar amount toward the surgeon approximately 30° with an end point to align the coaxial light along the iris plane. With the nondominant hand, a surgical goniolens was then docked onto the corneal surface using 2% lidocaine as a coupling medium to view the angle structures with appropriate magnification and illumination.

[Choose one]:

If sparse or no TM pigment was noted preoperatively on gonioscopy*—the posterior lip of the keratome was depressed with a 2nd instrument to cause egress of a small amount of viscoelastic to create relative hypotony to induce blood reflux into SC. Once initial focal pooling of heme was identified, additional viscocohesive was injected into the AC without overfill to entrap the heme in SC and to serve as a targeted site for placement of the micro-stent in vicinity of a CC.*

If diffuse—*a TM pigmented band was noted throughout the angle preoperatively on gonioscopy.*

The inserter was inspected with the iStent noted to be grossly intact at its distal end. The micro-stent was introduced via the keratome incision heel down to avoid blunting the tip upon entry into the AC. The inserter/iStent complex was then advanced nasally to the center of the pupil. Under gonioscopic guidance, the inserter was advanced to the (*pigmented TM band/ clock hour of heme*). The upper one third of the TM landmark was approached at a 15° angle, and the tip was used to pierce the TM into SC up to one third of the length of the micro-stent. The heel of the stent was then gently placed parallel onto the TM landmark. With gentle flexion of the wrist, the stent was advanced to cannulate SC up to the snorkel. The wrist was then recoiled back slightly to relieve any pushing tension on the stent to avoid damaging the TM tissue. The release button on the inserter was pushed to detach the snorkel from the inserter. The snorkel was tapped on its back end to ensure complete insertion into SC. The snorkel was then strummed vertically en face for memory check and was noted to recoil to its parallel position indicating proper insertion. Additional viscocohesive was injected to tamponade any microbleed, an indication that the stent was placed in the correct anatomic and final resting position in SC.

The head and microscope were returned back to their primary position, and the scope was recentered to begin the cataract portion of the surgery. A ____ mm side-port incision was made approximately 90° from the keratome incision, and additional viscocohesive OVD was injected to pressurize the AC. A standard anterior capsulorhexis was conducted, followed by hydrodissection (*and hydrodelineation*). Sculpting was initiated by the phaco handpiece, and a divide and conquer technique was used to phacoemulsify the endonucleus. The cortical/epinuclear material was removed with the I/A handpiece. After confirming an intact capsular bag, this was deepened with a viscocohesive OVD and a foldable IOL ______ diopters; Serial # __________ was injected and centered in the bag. I/A was then conducted to remove the viscoelastic material.

Prior to removal of the I/A handpiece from the AC, continuous irrigation was turned to the "off" position, and trypan blue was injected via the paracentesis site toward the iStent location without overpressurizing the eye. Attention was then directed to the nasal bulbar conjunctiva, and the continuous irrigation was turned to the "on" position. Dye (was/was not) noted to fill the episcleral vasculature in the vicinity of the iStent. Following additional I/A, stromal hydration of the corneal wounds ensured a watertight closure with enough pressure to tamponade any potential bleed from the iStent implantation site. The lid speculum was removed and the periocular site was washed, cleaned, and dried.

[Choose one]:

If topical anesthesia used—*a drop of Iopidine and Vigamox was placed on the surface of the eye, and an eyeshield was affixed on the (right/left) eye.*

If peri-/retrobulbar block—*a drop of Iopidine was instilled followed by an ointment of __________, and the eye was patched with an eyepad and eyeshield.*

The patient tolerated the procedure without event and was taken to the recovery room for further observation. The patient was given postoperative instructions and advised to follow-up with Dr. ______ in the eye clinic tomorrow morning.

References

1. University of Iowa Health Care Ophthalmology and Visual Sciences. www.gonioscopy.org.
2. Shareef S, Alward W, Crandall A, Vold S, Ahmed I. Intraoperative gonioscopy: a key to successful angle surgery. Exp Rev Ophthalmol. 2014;9(6):515–27.
3. University of Rochester School of Medicine and Dentistry, Department of Ophthalmology. Intraoperative gonioscopy instructional video. www.anglesurgery.org.
4. Shareef, S. The critical skill of intraoperative gonioscopy for MIGS surgeons. Journal Glaucoma Today 2016; Sept/October issue; pp. 42–46.
5. Hann CR, Fautsch MP. Preferential fluid flow in the human trabecular meshwork near collector channels. Invest Ophthalmol Vis Sci. 2009;50(4):1692–7.
6. Fellman R. Intraoperative assessment of the conventional collector outflow system as therapeutic target. In: Samples JR, Ahmed IIK, editors. Surgical innovations in glaucoma. New York: Springer; 2014.
7. Neuhann TH. Trabecular micro-bypass stent implantation during small-incision cataract surgery for open-angle glaucoma or ocular hypertension: long-term results. J Cataract Refract Surg. 2015;41(12):2664–71.
8. http://www.glaukos.com/istent/surgical-procedure.
9. Arshinoff SA. Dispersive-cohesive viscoelastic soft shell technique. J Cataract Refract Surg. 1999;25:167–73.
10. Shareef S. Optimizing angle surgery with ACT. Glaucoma Today. 2015;13:48–50.
11. Shareef S. Get in on the ACT - optimization of angle surgery. EyeTube 2015: http://eyetube.net/video/get-in-on-the-act-optimization-of-angle-surgery--ufohe/.

Chapter 50
Baerveldt Drainage Shunt with Scleral Patch Graft

Ike K. Ahmed and Matthew B. Schlenker

Abstract Patients with scarred, friable, or otherwise compromised conjunctival tissue may benefit from the use of a glaucoma shunt device, as their conjunctiva may not be viable for creation of a trabeculectomy bleb. Also, the use of shunt devices as a primary glaucoma procedure is on the rise. The use of a non-valved implant such as the Baerveldt has been shown to offer better long-term IOP control, but the choice of valve often falls into the preference of the surgeon and the ability of the patient to tolerate suboptimal IOP over the first 6 postoperative weeks and a higher complication rate compared with a valved implant (i.e., Ahmed glaucoma valve drainage device).

Keywords Uncontrolled glaucoma • Shunt • Scleral patch graft • Baerveldt drainage • Drainage

Indications

Glaucoma with IOP not adequately controlled by maximum tolerated medical therapy, laser therapy, or previous glaucoma surgery, especially in patients who have failed previous glaucoma surgery and patients with a high likelihood of trabeculectomy failure, neovascular glaucoma, uveitic glaucoma, congenital glaucoma, aphakic glaucoma, or post-keratoplasty glaucoma. Favor Baerveldt over Ahmed drainage shunt for better long-term IOP control in patients able to accept slightly higher risk of complications and able to tolerate suboptimal IOP over the first 6 postoperative weeks.

Essential Steps

1. Traction suture placed and globe secured at the infraduction position (for superotemporal placement)

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_50

2. Creation of a fornix-based conjunctival flap
3. Creation of a subconjunctival pocket
4. Isolation of superior and lateral rectus muscles (for superotemporal placement)
5. Rip cord placement inside Baerveldt tube
6. Insertion of Baerveldt shunt under superior and lateral rectus (for superotemporal placement)
7. Ligature around the tube
8. Trimming of the tube to appropriate length
9. Paracentesis incision
10. Sclerostomy
11. Insertion of the Baerveldt tube into anterior chamber
12. Scleral patch graft
13. Reapproximation of the conjunctival flap
14. Removal of the traction suture

Complications

- Hyphema
- Corneal edema
- Elevated IOP
- Hypertensive phase
- Hypotony
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to the iris
- Ptosis
- Diplopia
- Choroidal detachment
- Scleral perforation
- Conjunctival/bleb fibrosis
- Bleb dysesthesia
- Suprachoroidal hemorrhage
- Tube blockage, retraction, or erosion
- Migration or expulsion of the plate

Template Operative Dictation

Preoperative diagnosis: *Uncontrolled glaucoma (and failure of previous surgery (OD/OS))*

Procedure: Insertion of Baerveldt drainage shunt *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____- year-old male/female, with a well-known and documented history of glaucoma, has had elevated IOP despite maximal tolerated medical ± laser therapy ± previous glaucoma surgery. On work-up the patient was noted to have uncontrolled glaucoma with an IOP ranging from ____ to ____ mmHg. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine was instilled into the eye. Mild analgesia and sedation were induced using MAC. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and a wire eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A traction suture using *7-0 Vicryl* was placed at the corneal limbus at the 12 o'clock meridian, and a corneal light shield was placed over the eye. A superotemporal fornix-based conjunctival peritomy was created at the limbus for usually 3 mm using ring forceps and Westcott scissors. ____mls of xylocaine was then infiltrated in the subconjunctival space to augment topical anesthesia. The conjunctival flap was extended radially approximately ____mms at each edge of the peritomy to allow access to the posterior scleral surface for placement of the plate. Blunt dissection to mobilize conjunctiva was then carried out using Westcott scissors. Hemostasis was achieved with bipolar electrocautery.

The Baerveldt drainage device was then opened and a *4-0 nylon* ripcord placed into the lumen of the tube. The superior rectus and lateral rectus muscles were identified and isolated with two separate muscle hooks, while the plate of the drainage device was placed under each rectus muscle. The plate was then secured to the sclera usually 9 mm posterior to the limbus, as measured by calipers, with _#_ interrupted *6-0 prolene* sutures. The *4-0 nylon* ripcord tail was placed securely under the conjunctiva inferotemporally away from the limbus.

The tube was allowed to lie in its natural position on the cornea and trimmed to the judged appropriate length using Westcott scissors and Colibri forceps *7-0 Vicryl* suture was then used to ligate the tube near the plate around the 4-0 nylon with careful attention paid to placing the knot on the underside of the tube. BSS on a 27-gauge syringe was injected into the tube to ensure the ligature was tight. A sideport incision was created using an Ahmed SuperPentiahm trifaceted mini-diamond blade. A 22-gauge sharp needle was then used to enter the eye at the scleral spur at an angle parallel to the iris plane for entry of the tube. On removal of the needle, the wound was slightly enlarged with lateral motion of the sharp needle tip. The tube was then held with curved tying forceps and inserted into the wound. Next ____ venting incisions were made just distal to the Vicryl ligature using the 7-0 needle. A scleral patch graft was placed over the tube entry point and secured at the limbus with _#_ interrupted *7-0 Vicryl* sutures. Conjunctiva was then reapproximated using _#_

interrupted *7-0 Vicryl* sutures. The corneal light shield and traction suture were then cut and removed with Westcott scissors. A total of ___ccs of methylprednisolone was then injected into the posterior sub-Tenon's space inferotemporally using a 27-gauge needle.

Maxitrol ointment was placed into the eye at the conclusion of the case, and the eyelid speculum and surgical drapes removed. The patient was then transferred to the recovery room in stable condition, and (he/she) tolerated the procedure well.

Chapter 51
Baerveldt Drainage Shunt with Scleral Patch Graft and Cataract Extraction

Ike K. Ahmed and Matthew B. Schlenker

Abstract In patients with both cataract and uncontrolled glaucoma, the ophthalmologist may choose to treat both conditions in the same operative encounter. Combined cataract extraction, IOL implantation, and glaucoma shunt surgery offer the patient visual rehabilitation, better control of glaucoma, and the benefit of not having to return to the OR for a second procedure. Additionally, patients with scarred, friable, or otherwise compromised conjunctival tissue may benefit from the use of a glaucoma shunt device, as their conjunctiva may not be viable for creation of a trabeculectomy bleb. Also, the use of shunt devices as a primary glaucoma procedure is on the rise. The use of a non-valved implant such as the Baerveldt has been shown to offer better long-term IOP control, but the choice of valve often falls into the preference of the surgeon and the ability of the patient to tolerate suboptimal IOP over the first 6 postoperative weeks and a higher complication rate with a valved implant (i.e., Ahmed glaucoma valve drainage device).

Keywords Uncontrolled glaucoma • Shunt • Scleral patch graft • Cataract extraction • IOL

Indications

Favor Baerveldt over Ahmed drainage shunt for better long-term IOP control in patients able to accept slightly higher risk of complications and able to tolerate suboptimal IOP over the first 6 postoperative weeks. Glaucoma with IOP not adequately controlled by maximum tolerated medical therapy, laser therapy, or previous glaucoma surgery, especially in patients who have failed previous glaucoma surgery, patients with a high likelihood of trabeculectomy failure, neovascular glaucoma, uveitic glaucoma, congenital glaucoma, aphakic glaucoma, or post-keratoplasty glaucoma.

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_51

Cataract extraction: the attempt to further reduce IOP, cataract causing impaired visual acuity, cataract obscuring view to posterior pole, and desire to prevent a second surgery in the future which may lead to glaucoma surgery failure.

Essential Steps

1. Traction suture placed and globe secured at the infraduction position (for superotemporal placement)
2. Creation of a fornix-based conjunctival flap
3. Creation of a subconjunctival pocket
4. Isolation of superior and lateral rectus muscles (for superotemporal placement)
5. Rip cord placement inside Baerveldt tube
6. Insertion of Baerveldt shunt under superior and lateral rectus (for superotemporal placement)
7. Trimming of tube
8. Sideport incision
9. Injection of viscoelastic
10. Clear corneal incision
11. Capsulorrhexis
12. Hydrodissection
13. Phacoemulsification
14. Aspiration and irrigation of the cortical material
15. Capsular bag inflation with viscoelastic
16. Insertion of the IOL
17. Suturing of the clear corneal incision
18. Ligature around tube
19. Sclerostomy
20. Insertion of the Baerveldt tube into anterior chamber
21. Venting slit creation proximal to ligature
22. Scleral patch graft
23. Reapproximation of the conjunctival flap
24. Removal of most of the viscoelastic
25. Removal of the traction suture

Complications

- Hyphema
- Corneal edema
- Elevated IOP
- Hypertensive phase
- Hypotony
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment

– Traumatic injury to the iris
– Ptosis
– Diplopia
– Choroidal detachment
– Scleral perforation
– Conjunctival/bleb fibrosis
– Conjunctival dehiscence
– Bleb dysesthesia
– Suprachoroidal hemorrhage
– Tube blockage, retraction, or erosion
– Migration or expulsion of the plate
– Lens dislocation
– Dropped lens
– Retained nuclear or cortical material
– Capsular tear
– Zonular dehiscence
– Dysphotopsias

Template Operative Dictation

Preoperative diagnosis: *Uncontrolled glaucoma (OD/OS)*

Procedure: Insertion of Baerveldt drainage shunt *with scleral patch graft and cataract extraction (OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____- year-old *male/female*, with a well-known and documented history of glaucoma, has had elevated IOP despite maximal tolerated medical ± laser therapy. The patient's IOP has been as high as ___mmHg, ±, and the patient has had glaucoma progression. *He/she* also had a (*nuclear/cortical/posterior subcapsular)* (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. (*If no cataract present, a clear lens extraction was elected*). After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine and dilating drops were instilled into the eye. Mild analgesia and sedation were induced using MAC. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye, and a wire eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A traction suture using *7-0 Vicryl* was placed at the corneal limbus at the _12_ o'clock meridian, and a corneal light shield was placed over the eye. A superotemporal fornix-based conjunctival peritomy was created at the limbus for __ clock hours using ring forceps and Westcott scissors. ____mls of xylocaine was then infiltrated in the subconjunctival space to augment topical anesthesia. The conjunctival flap was extended approximately ____mm posteriorly at one edge of the peritomy to allow access to the posterior scleral surface for placement of the plate. Blunt dissection to mobilize conjunctiva was then carried out using Westcott scissors. Hemostasis was achieved with bipolar electrocautery.

The Baerveldt drainage device was then opened and a *4-0 nylon* ripcord placed into the lumen of the tube. The superior rectus and lateral rectus muscles were identified and isolated with two separate muscle hooks, while the plate of the drainage device was placed under each rectus muscle. The plate was then secured to the sclera ___mm posterior to the limbus, as measured by calipers, with _#_ interrupted *7-0 Vicryl* sutures. The *4-0 nylon* ripcord tail was placed securely under the conjunctiva inferotemporally away from the limbus.

The tube was allowed to lie in its natural position on the cornea and trimmed to the judged appropriate length using Westcott scissors and Colibri forceps.

Attention was then turned to the cataract. An Ahmed SuperPentiAhm trifaceted mini-diamond knife was used to make a sideport incision followed by injection of Xylocaine, Viscoat, and Provisc (soft-shell technique) into the anterior chamber. Using a ___mm keratome blade, a ___mm temporal clear corneal incision was made.

If trypan blue dye used:

Technique 1: *Small amounts of trypan blue were injected over the anterior capsule and painted over the anterior capsule surface until an adequate staining was achieved after the viscoelastic had been injected into the anterior chamber.*

Technique 2: *Trypan blue was injected into the anterior chamber through a sideport incision and used to stain the lens anterior capsule. Following this an air syringe was used to inject an air bubble into the anterior chamber. Following approximately ____seconds, balanced salt solution was injected through the paracentesis wound to clear away excess trypan blue and expose the stained anterior lens capsule.*

The capsulorhexis was completed using Utrata forceps followed by hydrodissection with balanced saline solution on a Chang cannula. Phacoemulsification was then performed using a phaco-chop technique. Irrigation and aspiration were used to remove remaining cortical material, and the capsular bag was reinflated with Provisc. A total _____ absolute phaco time (APT) was used in the procedure. An intraocular lens, (*Alcon/AcrySof/Tecnis)* model #_______, serial #______ with a power of _____ diopters, was inspected and found to be defect-free. The IOL was injected into the capsular bag using a Monarch injector and dialed into proper position using a Kuglen hook. A single radial interrupted *10-0 nylon* suture was then used to close the clear cornea incision.

Attention was then redirected to completing the glaucoma procedure. *7-0 Vicryl* suture was then used to ligate the tube with careful attention paid to placing the knot on the underside of the tube. BSS on a 27-gauge syringe was injected into the tube to ensure the ligature was tight. A 22-gauge sharp needle was used to enter the eye at the scleral spur at an angle parallel to the iris plane for entry of the tube. On removal of the needle, the wound was slightly enlarged with lateral motion of the sharp needle tip. The tube was then held with curved tying forceps and inserted into the wound. Next ____ venting incisions were made just distal to the Vicryl ligature using the 7-0 needle. A scleral patch graft was placed over the tube entry point and secured at the limbus with _#_ interrupted *7-0 Vicryl* sutures. Conjunctiva was then reapproximated using _#_ interrupted *7-0 Vicryl* sutures. Most/some of the OVD was removed from the anterior chamber manually through the clear corneal incision using a BSS syringe on a cannula. The corneal light shield and traction suture were then cut and removed with Westcott scissors.

If steroid used: *A total of ___ccs of methylprednisolone was then injected into the posterior sub-Tenon's space inferotemporally using a 27-gauge needle.*

Maxitrol ointment was placed into the eye at the conclusion of the case and the eyelid speculum and surgical drapes removed. The patient was then transferred to the recovery room in stable condition, and (he/she) tolerated the procedure well.

Chapter 52
Glaucoma Drainage Device (Ahmed Valve FP-7)

Reginald Camillo and Eric D. Rosenberg

Abstract Patients with scarred, friable, or otherwise compromised conjunctival tissue may benefit from use of a glaucoma drainage device, as their conjunctiva may not be viable for creation of a trabeculectomy bleb. The use of a glaucoma drainage device such as the Ahmed glaucoma valve (AGV) has been shown to offer immediate IOP control with low risk of complications.

Keywords Uncontrolled glaucoma • Ahmed glaucoma valve • Glaucoma shunt • Drainage • Shunt

Indications

Uncontrolled glaucoma in patients who have failed previous glaucoma surgery and patients with a high likelihood of trabeculectomy failure, neovascular glaucoma, uveitic glaucoma, congenital glaucoma, developmental glaucoma, traumatic glaucoma, aphakic glaucoma, pseudophakic glaucoma, or post-keratoplasty glaucoma.

Essential Steps

1. Traction suture placed and globe secured at the infraduction position
2. Creation of a fornix-based conjunctival flap
3. Creation of a subconjunctival pocket
4. Insertion of Ahmed valve
5. Paracentesis incision
6. Sclerostomy
7. Insertion of the AGV tube
8. Scleral patch graft
9. Reapproximation of the conjunctival flap
10. Removal of the traction suture

R. Camillo (✉)
Department of Ophthalmology, Metropolitan Hospital, New York, NY, USA
e-mail: isurg@me.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_52

Complications

- Hypotony
- Valve malfunction
- Hyphema
- Scleral perforation
- Tube blockage, retraction, or conjunctival erosion
- Migration or expulsion of the plate
- Corneal decompensation
- Strabismus
- Hypertensive phase
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Uncontrolled glaucoma and failure of previous glaucoma filtering/drainage device surgery (OD/OS)*

Procedure: Insertion of Ahmed Glaucoma Valve (FP-7) Drainage Device *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____- year-old *male/female* with a well-known and documented history of glaucoma had been unsuccessful with medically controlled treatment plans and has a failed trabeculectomy. After a detailed review of risks and benefits, the patient elected to undergo the procedure. On work-up the patient was noted to have uncontrolled glaucoma with an IOP ranging from ____ to ____ mmHg. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, monitored anesthesia care (MAC) was induced. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed in the eye.

Local anesthetic with 2% lidocaine and epinephrine solution was injected into the subconjunctival space in the superotemporal quadrant. A traction suture using *7-0 Vicryl* was placed at the corneal limbus at the 12 o'clock meridian, and the eye was rotated to and secured in the infraduction position. A superotemporal fornix-based conjunctival flap was made with a conjunctival peritomy, measuring ____ degrees of arc in length and 4 mm from the limbus. Blunt dissection using tying forceps and Westcott scissors was performed to create a superotemporal subconjunctival pocket. Hemostasis was achieved with wet-field cautery.

An Ahmed glaucoma valve, model FP-7, was primed with BSS and placed in the subconjunctival pocket. The anterior edge of the glaucoma drainage device plate was secured to the underlying sclera using _#_ of interrupted *8-0 Vicryl* sutures, 9 mm from the limbus. A paracentesis incision using a ___mm keratome to the anterior chamber was created temporally. Viscoelastic was injected into the anterior chamber. A bent 23-gauge needle was used to create a sclerostomy tunnel and enter the anterior chamber, 2-3 mm from the limbus. The AGV tube was trimmed bevel up to its appropriate length and inserted through the sclerostomy into the anterior chamber. The tube's position in the anterior chamber was noted: with the tip at the midperipheral iris and the tube away from the cornea and the iris. An 8 mm x 11 mm scleral patch graft was placed over the tube and secured to the underlying sclera with _#_ of interrupted *8-0 Vicryl* sutures. The conjunctival flap was approximated using fibrin tissue glue. The traction suture was then removed. Subconjunctival injection of antibiotic and steroid was given in the inferior fornix. The eyelid speculum and drape were removed. Maxitrol eye ointment was placed in the inferior fornix, a patch-shield was placed over the (right/left) eye, and the patient was transferred to the post-anesthesia care unit in stable condition.

Chapter 53
Ahmed Glaucoma Valve with Scleral Patch Graft and Cataract Extraction

Ike K. Ahmed and Matthew B. Schlenker

Abstract In patients with both cataract and uncontrolled glaucoma, the ophthalmologist may choose to treat both conditions in the same operative encounter. Combined cataract extraction, IOL implantation, and glaucoma shunt surgery offers the patient visual rehabilitation, better control of glaucoma, and the benefit of not having to return to the OR for a second procedure. Additionally, patients with scarred, friable, or otherwise compromised conjunctival tissue may benefit from the use of a glaucoma shunt device, as their conjunctiva may not be viable for creation of a trabeculectomy bleb. As well, there has been an increase in the number of glaucoma shunts implanted primarily in patients. The use of a valved implant such as the Ahmed glaucoma valve has been shown to offer more immediate IOP control and lower risk of complications as compared to non-valved implants (i.e., Baerveldt).

Keywords Uncontrolled glaucoma • Cataract extraction • IOL • Ahmed glaucoma valve • Glaucoma shunt

Indications

Glaucoma with IOP not adequately controlled by maximum tolerated medical therapy, laser therapy, or previous glaucoma surgery, especially in patients who have failed previous glaucoma surgery and patients with a high likelihood of trabeculectomy failure, neovascular glaucoma, uveitic glaucoma, congenital glaucoma, aphakic glaucoma, or post-keratoplasty glaucoma. Favor Ahmed over Baerveldt drainage shunt for lower risk of complications and immediately improved IOP control.

Cataract extraction: Attempt to further reduce IOP, cataract causing impaired visual acuity, cataract obscuring view to posterior pole, desire to prevent a second surgery in the future which may lead to glaucoma surgery failure.

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_53

Essential Steps

1. Traction suture placed and globe secured at the infraduction position (for superotemporal placement)
2. Creation of a fornix-based conjunctival flap
3. Creation of a subconjunctival pocket
4. Ahmed valve priming
5. Insertion of Ahmed valve
6. Side port incision
7. Clear corneal incision
8. Capsulorhexis
9. Hydrodissection
10. Phacoemulsification
11. Aspiration and irrigation of the cortical material
12. Capsular bag inflation with viscoelastic
13. Insertion of the IOL
14. Insertion of the tube in AC
15. Scleral patch graft
16. Reapproximation of the conjunctival flap
17. Removal of the traction suture

Complications

- Hyphema
- Corneal edema
- Elevated IOP
- Hypertensive phase
- Hypotony
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to the iris
- Ptosis
- Diplopia
- Choroidal detachment
- Scleral perforation
- Conjunctival/bleb fibrosis
- Bleb dysesthesia
- Suprachoroidal hemorrhage
- Tube blockage, retraction, or erosion
- Migration or expulsion of the plate
- Lens dislocation
- Dropped lens
- Retained nuclear or cortical material
- Capsular tear
- Zonular dehiscence
- Dysphotopsias

Template Operative Dictation

Preoperative diagnosis: *Uncontrolled glaucoma (OD/OS)*

Procedure: Insertion of Ahmed glaucoma valve with scleral patch graft and cataract extraction *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____- year-old *male/female* with a well-known and documented history of open-angle glaucoma has had elevated IOP despite maximal tolerated medical ± laser therapy. The patient's IOP has been as high as ___mmHg, ± and the patient has had glaucoma progression. *He/she* also had a (*nuclear/cortical/posterior subcapsular)* (*Lens Opacity Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. (*If no cataract present, a clear lens extraction was elected*). After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine and dilating drops were instilled into the eye. Mild analgesia and sedation were induced using MAC. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and a wire eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A traction suture using *7-0 Vicryl* was placed at the corneal limbus at the _*12*_ o'clock meridian, and a corneal light shield was placed over the eye. A superotemporal fornix-based conjunctival peritomy was created at the limbus for __ clock hours using ring forceps and Westcott scissors. ____mls of xylocaine was then infiltrated in the subconjunctival space to augment topical anesthesia. The conjunctival flap was extended approximately ____mm posteriorly at each edge of the peritomy to allow access to the posterior scleral surface for placement of the plate. Blunt dissection to mobilize conjunctiva was then carried out using Westcott scissors. Hemostasis was achieved with bipolar electrocautery.

The flexible plate Ahmed glaucoma valve was then opened and primed using balanced saline solution on a 27-gauge Mycroft cannula, and flow was observed through the valve mechanism. The superior rectus and lateral rectus muscles were visualized, and the plate was placed between the two recti. The plate was then secured to the sclera ___mm posterior to the limbus, as measured by calipers, with _#_ interrupted *7-0 Vicryl* sutures. The tube was allowed to lie in its natural position on the cornea and trimmed to the appropriate length with Westcott scissors and Colibri forceps.

Attention was then turned to the cataract. An Ahmed SuperPentiAhm trifaceted mini-diamond knife was used to make a side port incision followed by injection of xylocaine, VISCOAT, and Provisc (soft-shell technique) into the anterior chamber. Using a ___mm keratome blade, a ___mm temporal clear corneal incision was made.

If trypan blue dye is used:

Technique 1: *Small amounts of trypan blue were injected over the anterior capsule and painted over the anterior capsule surface until an adequate staining was achieved after the viscoelastic had been injected into the anterior chamber.*

Technique 2: *Trypan blue was injected into the anterior chamber through a side port incision and used to stain the lens anterior capsule. Following this, an air syringe was used to inject an air bubble into the anterior chamber. Following approximately ____seconds, balanced salt solution was injected through the paracentesis wound to clear away excess trypan blue and expose the stained anterior lens capsule.*

The capsulorhexis was completed using Utrata forceps followed by hydrodissection with balanced saline solution on a Chang cannula. Phacoemulsification was then performed using a phaco-chop technique. Irrigation and aspiration was used to remove remaining cortical material and the capsular bag was reinflated with Provisc. A total _____ absolute phaco-time (APT) was used in the procedure. An intraocular lens, (*Alcon/AcrySof/Tecnis)* model #________, serial #______ with a power of _____ diopters, was inspected and found to be defect free. The IOL was injected into the capsular bag using a Monarch injector and dialed into proper position using a Kuglen hook. A single radial interrupted *10-0 nylon* suture was then used to close the clear cornea incision.

Attention was then redirected to completing the glaucoma procedure. A 22-gauge sharp needle was then used to enter the eye at the scleral spur at an angle parallel to the iris plane for entry of the tube. On removal of the needle, the wound was slightly enlarged with lateral motion of the sharp needle tip. The tube was then held with curved tying forceps and inserted into the wound. A scleral patch graft was placed over the tube entry point and secured at the limbus with _#_ interrupted *7-0 Vicryl* sutures. Conjunctiva was then reapproximated using _#_ interrupted *7-0 Vicryl* sutures. The corneal light shield and traction suture were then cut and removed with Westcott scissors.

If steroid is used: *A total of ___cc's of methylprednisolone was then injected into the posterior sub-Tenon's space inferotemporally using a 27-gauge needle.*

Maxitrol ointment was placed into the eye at the conclusion of the case and the eyelid speculum and surgical drapes removed. The patient was then transferred to the recovery room in stable condition and (he/she) tolerated the procedure well.

Chapter 54
Viscocanalostomy

Ike K. Ahmed and Matthew B. Schlenker

Abstract Viscocanalostomy is a non-perforating filtration surgery used for patients with uncontrolled glaucoma, as an alternative to trabeculectomy. Bypassing the creation of a full thickness sclerostomy (as is created in traditional trabeculectomy) avoids the complications of blebitis, bleb-related endophthalmitis, as well as complications from exposure to use of anti-metabolites (i.e. mitomycin C and 5-FU). Viscocanalostomy is performed to relieve outflow obstruction by dilating Schlemm's canal and b y exicing the inner wall of Schlemm's canal/juxtacanalicular tissue to create a trabecular-Descemet opening.

Keywords Canalostomy • Schlemm's canal • Glaucoma • Viscoelastic • Uncontrolled glaucoma • Conjunctiva • Cannulation

Indications

Open-angle glaucoma uncontrolled by medical or laser therapy.

Essential Steps

1. Superior fornix-based conjunctival flap
2. Superficial parabolic scleral flap
3. Antimetabolite soaked sponge placed under the flap (*if used*) followed by copious irrigation
4. Deep scleral flap
5. Unroofing Schlemm's canal
6. Creation of Descemet's window
7. Deep scleral flap cut and removed
8. Schlemm's canal inner wall stripping
9. Cannulation of Schlemm's canal
10. Injection of viscoelastic
11. Closure of superficial scleral flap
12. Closure of conjunctiva

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_54

Complications

- Hyphema
- Corneal edema
- Elevated IOP
- Hypotony
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to the iris
- Ptosis
- Choroidal detachment
- Scleral perforation
- Conjunctival fibrosis
- Suprachoroidal hemorrhage

Template Operative Dictation

Preoperative diagnosis: *Uncontrolled glaucoma (OD/OS)*

Procedure: Viscocanalostomy with mitomycin C *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____- year-old *male/female* with a well-known and documented history of open-angle glaucoma has had elevated IOP despite maximal tolerated medical ± laser therapy. The patient's IOP has been as high as ___mmHg, ± and the patient has had glaucoma progression. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine drops were instilled into the eye. Mild analgesia and sedation were induced using MAC. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A superior fornix-based conjunctival flap was created by making an initial ___ mm peritomy followed by blunt dissection. A total of ___mls of 2 % lidocaine with 1:100,000 epinephrine was injected into the sub-Tenon's space for additional anesthesia, while ___mls of topical epinephrine was used for hemostasis. A __ x ___mm superficial *parabolic/square* scleral flap was made with a 20 mini-diamond blade. Using a diamond crescent blade, a dissection plane at approximately 33 % depth was fashioned throughout until clear cornea was encountered. A Merocel sponge soaked with 0.2 mg/cc mitomycin C was then placed under the scleral flap for ___ seconds followed by copious irrigation with balanced saline solution. The deep scleral flap was then outlined 1 mm inside the superficial flap edge with a diamond crescent blade, this flap was dissected at 90 % thickness and carried anteriorly to unroof Schlemm's canal. Using gentle pressure with a Weck-Cel sponge, corneal stroma was detached from Descemet's membrane in order to create a Descemet's window 2 mm anterior to Schlemm's canal. At this point, aqueous flow was observed percolating through the intact Descemet's window.

The deep scleral flap was then cut with Vannas scissors at the flap's most anterior hinge point. The inner wall of Schlemm's canal was then stripped using Mermoud forceps. Using a viscocanalostomy cannula, both cut ends of Schlemm's canal were intubated and injected with high molecular weight cohesive viscoelastic. The superficial scleral flap was then repositioned and tightly sutured with _#_ of interrupted *11-0 Mersilene* sutures. High molecular weight cohesive viscoelastic was injected under the superficial scleral flap to fill the scleral reservoir. The conjunctiva was then closed using *10-0 Vicryl* on a vascular spatula needle in a running horizontal mattress fashion.

At the conclusion of the case, the patient received Maxitrol ointment. The patient was then transferred to the recovery room in stable condition and (he/she) tolerated the procedure well.

Chapter 55
Canaloplasty

Ike K. Ahmed and Matthew B. Schlenker

Abstract Traditional glaucoma filtration surgeries (i.e., trabeculectomy) and shunt procedures (i.e., Baerveldt, Ahmed glaucoma valve) are highly successful in lowering IOP but also can have complications. While these surgeries create fistula that enables aqueous to be diverted from the anterior chamber into subconjunctival space by bypassing the natural outflow system, canaloplasty is a technique that promotes outflow of aqueous via the natural outflow pathways via the trabecular meshwork and into Schlemm's canal.

Keywords Uncontrolled glaucoma • Schlemm's canal • Canaloplasty • iScience microcatheter • Trabecular meshwork

Indications

Glaucoma with IOP not adequately controlled by maximum tolerated medical therapy, especially in patients at risk for postoperative hypotony or patients with a high likelihood of trabeculectomy or glaucoma drainage implant failure.

Essential Steps

1. Superior fornix-based conjunctival flap
2. Subconjunctival anesthesia
3. Sideport incision
4. Superficial parabolic scleral flap
5. Deep scleral flap and unroofing of Schlemm's canal
6. Creation of Descemet's window
7. Deep scleral flap cut and removed
8. Stripping outer wall of Schlemm's canal
9. Cannulation of Schlemm's canal
10. Injection of viscoelastic
11. Insertion of iScience microcatheter device passed 360°

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_55

12. Threading of sutures
13. Sutures tied while adjusting for tension
14. (*If Aqua-Flow device used, secured into place*)
15. Closure of superficial scleral flap
16. Closure of conjunctiva

Complications

- Hyphema
- Corneal edema
- Descemet's detachment
- Elevated IOP
- Hypotony
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to the iris
- Ptosis
- Choroidal detachment
- Scleral perforation
- Conjunctival fibrosis
- Suprachoroidal hemorrhage
- Retinal detachment

Template Operative Dictation

Preoperative diagnosis: *Medically uncontrolled glaucoma (OD/OS)*

Procedure: Canaloplasty (*with Aqua-Flow device) (OD/OS)*

Postoperative diagnosis: *Same*

Indication: This ____- year-old *male/female* with a well-known and documented history of open-angle glaucoma has had elevated IOP despite maximal tolerated medical ± laser therapy. The patient's IOP has been as high as ___mmHg, ±, and the patient has had glaucoma progression. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine drops were instilled into the eye. Mild analgesia and sedation were induced using MAC. The *(right/left)* eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the *(right/left)* eye and an eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A superior fornix-based conjunctival flap was created approximately ___mm from the limbus by making an initial ___mm peritomy followed by blunt dissection. A total of ___mls of 2 % lidocaine with 1:100,000 epinephrine was injected into the sub-tenons space for additional anesthesia, while ___mls of topical epinephrine was used for hemostasis.

A side port incision was created with an *Ahmed SuperPentiahm trifaceted mini-blade,* and the eye was inflated with viscoelastic. The mini-diamond blade was then used to outline a parabolic ___x___mm superficial *parabolic/square* scleral flap onto the peripheral clear cornea. Using a diamond crescent blade, a dissection plane at approximately one-third depth was fashioned throughout until clear cornea was encountered. Viscoelastic was then burped out of the side port incision to prevent external bulging of Schlemm's canal during deep dissection. A rectangular deep scleral flap _1_mm inside the superficial flap edge was outlined. The deep flap was dissected at 90 % thickness and carried forward into the peripheral clear cornea in order to unroof Schlemm's canal. Using gentle pressure with a Weck-cel sponge, corneal stroma was detached from Descemet's membrane in order to create a Descemet's window _2_ mm anterior to Schlemm's canal. At this point, aqueous flow was observed percolating through the intact Descemet's window. The deep scleral flap was then excised using the Ahmed SuperCrescent knife and Vannas scissors. The outer wall of Schlemm's canal was gently stripped away using Mermoud forceps. Using a viscocanalostomy cannula, both cut ends of Schlemm's canal were intubated and injected with Healon GV.

The iScience microcatheter device was then inserted into one of the open ends of Schlemm's canal, and the blinking LED was observed to pass 360° around the canal, eventually exiting the opposite open end of Schlemm's canal. During the passage of the microcatheter, trypan blue was injected to observe outflow in the venous collector channels and assess the amount of reflux into the anterior chamber from the canal. The middle of a *10-0 Prolene* suture was then tied around the microcatheter and the device removed from Schlemm's canal in the reverse direction of the placement. To facilitate removal, Healon GV was injected through the microcatheter to inflate the canal. Upon complete removal of the microcatheter, the suture had been successfully threaded through the canal, and the suture was cut from the microcatheter, thereby creating two independent *10-0 Prolene* sutures within the canal. Each suture was tied to itself after having flossed the suture into position, and adjusting the tension appropriately using a slip knot.

If Aqua-Flow device was utilized—A 10-0 nylon suture was then placed into the scleral bed, and the collagen wick implant (Aqua-Flow device) was placed into the scleral bed. The 10-0 nylon suture was then tied around it to secure its position.

The superficial scleral flap was then repositioned and tightly sutured with _#_ of interrupted *11-0 Mersilene* sutures. Healon GV was injected under the superficial scleral flap to fill the scleral reservoir. The conjunctiva was then closed using *10-0 Vicryl* on a spatula-vascular needle in a running horizontal mattress fashion.

At the conclusion of the case, the patient received Maxitrol ointment. The patient was then transferred to the recovery room in stable condition, and he/she tolerated the procedure well.

Chapter 56
Canaloplasty and Cataract Extraction

Ike K. Ahmed and Matthew B. Schlenker

Abstract In patients with both cataract and uncontrolled glaucoma, the ophthalmologist may choose to treat both conditions in the same operative encounter. The combination of cataract extraction, IOL implantation, and canaloplasty offers the patient visual rehabilitation, better glaucoma control, and the benefit of not having to return to the OR for a second procedure. Additionally, patients with scarred, friable, or otherwise compromised conjunctival tissue may benefit from canaloplasty versus trabeculectomy or shunt device. While traditional glaucoma filtration surgeries (i.e., trabeculectomy) and shunt procedures (i.e., Baerveldt, Ahmed glaucoma valve) are highly successful in lowering IOP, they can also have complications. These surgeries create fistulas that enable aqueous to be diverted from the anterior chamber into subconjunctival space by bypassing the natural outflow system. Contrary to this, canaloplasty is a technique that promotes outflow of aqueous via the natural outflow pathways via the trabecular meshwork and into Schlemm's canal.

Keywords Uncontrolled glaucoma • Cataract extraction • Schlemm's canal • Canaloplasty • iScience microcatheter • IOL • Cataract

Indications

Glaucoma with IOP not adequately controlled by maximum tolerated medical therapy, especially in patients at risk for postoperative hypotony or patients with a high likelihood of trabeculectomy or glaucoma drainage implant failure

Cataract extraction: Attempt to further reduce IOP, cataract causing impaired visual acuity, cataract obscuring view to posterior pole, desire to prevent a second surgery in the future which may lead to glaucoma surgery failure.

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_56

Essential Steps

1. Sideport incision
2. Clear corneal incision
3. Capsulorhexis
4. Hydrodissection
5. Phacoemulsification
6. Aspiration and irrigation of the cortical material
7. Capsular bag inflation with viscoelastic
8. Insertion of the IOL
9. Superior fornix-based conjunctival flap
10. Subconjunctival anesthesia
11. Superficial parabolic scleral flap
12. Deep scleral flap and unroofing of Schlemm's canal
13. Creation of Descemet's window
14. Deep scleral flap cut and removed
15. Stripping outer wall of Schlemm's canal
16. Cannulation of Schlemm's canal
17. Injection of viscoelastic
18. Insertion of iScience microcatheter device passed 360°
19. Threading of sutures
20. Sutures tied while adjusting for tension
21. (*If Aqua-Flow device used, secured into place*)
22. Closure of superficial scleral flap
23. Closure of conjunctiva

Complications

– Hyphema
– Corneal edema
– Descemet's detachment
– Elevated IOP
– Hypotony
– Uveitis
– Endophthalmitis
– Cystoid macular edema (CME)
– Retinal detachment
– Traumatic injury to the iris
– Ptosis
– Choroidal detachment
– Scleral perforation
– Conjunctival fibrosis
– Suprachoroidal hemorrhage
– Lens disslocation
– Dropped lens
– Retained nuclear or cortical material

– Capsular tear
– Zonular dehiscence
– Dysphotopsias

Template Operative Dictation

Preoperative diagnosis: *Medically uncontrolled glaucoma (OD/OS)*

Procedure: Canaloplasty (*with Aqua-Flow device*) and cataract extraction (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* with a well-known and documented history of open-angle glaucoma has had elevated IOP despite maximal tolerated medical ± laser therapy. The patient's IOP has been as high as ___mmHg, ±, and the patient has had glaucoma progression. *He/she* also had a (*nuclear/cortical/posterior sub capsular*) (*Lens Opacities Classification System III/Wisconsin Grading/Oxford Clinical Cataract Classification*) grade ___ cataract. (*If no cataract present—A clear lens extraction was elected.*) After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine drops were instilled into the eye. Mild analgesia and sedation were induced using MAC. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye and an eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

An Ahmed SuperPentiahm trifaceted mini-diamond knife was used to make a side port incision followed by injection of Xylocaine, Viscoat, and Provisc (soft-shell technique) into the anterior chamber. Using a ___ mm keratome blade, a ___ mm temporal clear corneal incision was made.

If trypan blue dye used:

Technique 1: *Small amounts of trypan blue were injected over the anterior capsule and painted over the anterior capsule surface until an adequate staining was achieved after the Viscoelastic had been injected into the anterior chamber.*

Technique 2: *Trypan blue was injected into the anterior chamber through a side port incision and used to stain the lens anterior capsule. Following this an air syringe was used to inject an air bubble into the anterior chamber. Following approximately ____seconds, balanced salt solution was injected through the paracentesis wound to clear away excess trypan blue and expose the stained anterior lens capsule.*

The capsulorhexis was completed using Utrata forceps followed by hydrodissection with balanced saline solution on a Chang cannula. Phacoemulsification was then performed using a phaco-chop technique. Irrigation and aspiration were used to remove remaining cortical material and the capsular bag was reinflated with Provisc. A total _____ absolute phaco-time (APT) was used in the procedure. An intraocular lens, (*Alcon/AcrySof/Tecnis)* model #_______, serial #______ with a power of _____ diopters, was inspected and found to be defect-free. The IOL was injected into the capsular bag using a Monarch injector and dialed into proper position using a Kuglen hook. (*If needed: a single radial interrupted 10-0 nylon suture was then used to close the clear cornea incision.*)

Attention was then directed to the glaucoma procedure. A superior fornix-based conjunctival flap was created approximately ___mm from the limbus by making an initial ___ mm peritomy followed by blunt dissection. A total of ___ mL of 2% lidocaine with 1:100,000 epinephrine was injected into the sub-tenons space for additional anesthesia, while ___ mL of topical epinephrine was used for hemostasis.

The mini-diamond blade was then used to outline a parabolic ___×___ mm superficial *parabolic/square* scleral flap onto the peripheral clear cornea. Using a diamond crescent blade, a dissection plane at approximately one-third depth was fashioned throughout until clear cornea was encountered. Viscoelastic was then burped out of the side port incision to prevent external bulging of Schlemm's canal during deep dissection. A rectangular deep scleral flap _1_ mm inside the superficial flap edge was outlined. The deep flap was dissected at 90% thickness and carried forward into the peripheral clear cornea in order to unroof Schlemm's canal. Using gentle pressure with a Weck-cel sponge, corneal stroma was detached from Descemet's membrane in order to create a Descemet's window _2_ mm anterior to Schlemm's canal. At this point, aqueous flow was observed percolating through the intact Descemet's window. The deep scleral flap was then excised using the Ahmed SuperCrescent knife and Vannas scissors. The outer wall of Schlemm's canal was gently stripped away using Mermoud forceps. Using a viscocanalostomy cannula, both cut ends of Schlemm's canal were intubated and injected with Healon GV.

The iScience microcatheter device was then inserted into one of the open ends of Schlemm's canal, and the blinking LED was observed to pass 360° around the canal, eventually exiting the opposite open end of Schlemm's canal. During the passage of the microcatheter, trypan blue was injected to observe outflow in the venous collector channels and assess the amount of reflux into the anterior chamber from the canal. The middle of a *10-0 Prolene* suture was then tied around the microcatheter and the device removed from Schlemm's canal in the reverse direction of the placement. To facilitate removal, Healon GV was injected through the microcatheter to inflate the canal. Upon complete removal of the microcatheter, the suture had been successfully threaded through the canal, and the suture was cut from the microcatheter, thereby creating two independent *10-0 Prolene* sutures within the canal. Each suture was tied to itself after having flossed the suture into position and adjusting the tension appropriately using a slip knot.

If Aqua-Flow device was utilized*—A 10-0 nylon suture was then placed into the scleral bed, and the collagen wick implant (Aqua-Flow device) was placed into the scleral bed. The 10-0 nylon suture was then tied around it to secure its position.*

The superficial scleral flap was then repositioned and tightly sutured with _#_ of interrupted *11-0 Mersilene* sutures. Healon GV was injected under the superficial scleral flap to fill the scleral reservoir. The conjunctiva was then closed using *10-0 Vicryl* on a spatula-vascular needle in a running horizontal mattress fashion. Most/some of the viscoelastic was removed using a BSS syringe on a cannula

At the conclusion of the case, the patient received Maxitrol ointment. The patient was then transferred to the recovery room in stable condition, and he/she tolerated the procedure well.

Chapter 57
Deep Sclerectomy with Collagen Implant

Ike K. Ahmed and Matthew B. Schlenker

Abstract Deep sclerectomy with collagen implant is a non-perforating filtration surgery for treatment of uncontrolled open-angle glaucoma. Glaucoma with IOP not adequately controlled by maximum tolerated medical therapy, especially in patients at risk for post-operative hypotony or patients with a high likelihood of trabeculectomy or glaucoma drainage implant failure. In this procedure, a collagen implant is used at the end of the deep sclerectomy dissection in order to augment the flow of aqueous from the anterior chamber to the subconjunctival space.

Keywords Collagen • Sclerectomy • Sclera • Uncontrolled glaucoma • Conjunctiva • Schlemm's canal

Indications

Glaucoma with IOP not adequately controlled by maximum tolerated medical therapy, especially in patients at risk for postoperative hypotony or patients with a high likelihood of trabeculectomy or glaucoma drainage implant failure

Essential Steps

1. Superior fornix-based conjunctival flap
2. Superficial parabolic scleral flap
3. Antimetabolite-soaked sponge placed under the flap (if used) followed by copious irrigation
4. Deep scleral flap
5. Unroofing Schlemm's canal
6. Creation of Descemet's window
7. Deep scleral flap cut and removed
8. Schlemm's canal inner wall stripping
9. Insertion of collagen implant

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto,
Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_57

10. Closure of superficial scleral flap
11. Closure of conjunctiva

Complications

- Hyphema
- Corneal edema
- Elevated IOP
- Hypotony
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Ptosis
- Choroidal detachment
- Scleral perforation
- Conjunctival/bleb fibrosis
- Suprachoroidal hemorrhage

Template Operative Dictation

Preoperative diagnosis: *Medically uncontrolled glaucoma (OD/OS)*

Procedure: Deep sclerectomy with collagen implant (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old male/female with a well-known and documented history of glaucoma has had elevated IOP despite maximal tolerated medical ± laser therapy. The patient's IOP has been as high as ___mmHg, ±, and the patient has had glaucoma progression. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine drops were instilled into the eye. Mild analgesia and sedation were induced using MAC. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye and an eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A superior fornix-based conjunctival flap was created by making an initial ___ mm peritomy followed by blunt dissection. A total of ___ mL of 2 % lidocaine with 1:100,000 epinephrine was injected into the sub-tenons space for additional anesthesia, while ___mL of topical epinephrine was used for hemostasis. A __×___ mm superficial *parabolic/square* scleral flap was made with a 20 mini-diamond blade. Using a diamond crescent blade, a dissection plane at approximately 33 % depth was fashioned until clear cornea was encountered. A Merocel sponge soaked with 0.2 mg/cm^3 Mitomycin-C was then placed under the scleral flap for ____ s followed by copious irrigation with balanced-salt solution. The deep scleral flap was then outlined 1 mm inside the superficial flap edge with a 20 mini-diamond blade. Utilizing a diamond crescent blade, this flap was dissected at 90 % thickness and carried anteriorly to unroof Schlemm's canal. Using gentle pressure with a Weck-cel sponge, corneal stroma was detached from Descemet's membrane in order to create a Descemet's window 2 mm anterior to Schlemm's canal. At this point, aqueous flow was observed percolating through the intact Descemet's window.

The deep scleral flap was then cut with Vannas scissors at the flap's most anterior hinge point. The inner wall of Schlemm's canal was then stripped using Mermoud forceps. A *10-0 nylon suture* was placed in the scleral bed, and the AquaFlow collagen implant device was then placed into the scleral reservoir and sutured into place. The superficial scleral flap was then repositioned and loosely sutured into place with _#_ of interrupted *10-0 nylon* sutures. High molecular weight cohesive viscoelastic was injected under the superficial scleral flap to fill the scleral reservoir. The conjunctiva was then closed using *10-0 Vicryl* on a spatula-vascular needle in a running horizontal mattress fashion.

At the conclusion of the case, the patient received Maxitrol ointment. The patient was then transferred to the recovery room in stable condition, and he/she tolerated the procedure well.

Chapter 58
Gold Metal Shunt (GMS) Implant

Ike K. Ahmed and Matthew B. Schlenker

Abstract Surgical management of uncontrolled glaucoma poses several challenges to the ophthalmologist. Suprachoroidal procedures obviate the need to utilize conjunctiva to create filtering blebs (i.e., trabeculectomies) and reduce the risk of failure of bleb-related surgery secondary to bleb-related fibrosis, scarring, infection, or overfiltration. The gold metal shunt implant takes advantage of the natural negative pressure gradient from the anterior chamber into the suprachoroidal space while still providing natural counterpressure to prevent hypotony.

Keywords Uncontrolled glaucoma • Metal shunt • Gold implant • Shunt • Gonioscopy • SOLX gold suprachoroidal microshunt

Indications

Glaucoma uncontrolled by medical or laser therapy or failure of previous glaucoma surgical intervention

Essential Steps

1. Superior fornix-based conjunctival flap
2. 95 % depth scleral incision
3. Scleral pocket
4. Paracentesis incision
5. Injection of viscoelastic
6. Scleral incision made full thickness until choroid visualized
7. Lidocaine and viscoelastic injection into the suprachoroidal space
8. Anterior chamber entered at the level of the scleral spur
9. Insertion of suprachoroidal shunt
10. Confirmation of placement with intraoperative gonioscopy
11. Closure of scleral wound
12. Closure of conjunctiva

I.K. Ahmed (✉) • M.B. Schlenker
Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, ON, Canada
e-mail: ike.ahmed@utoronto.ca; Matt.schlenker@utoronto.ca

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_58

Complications

- Hyphema
- Vitreous hemorrhage
- Suprachoroidal hemorrhage
- Thin fibrotic membrane obstructing proximal and distal holes
- Corneal edema
- Elevated IOP
- Hypotony
- Small bleb formation
- Uveitis
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to the iris
- Choroidal detachment
- Ptosis

Template Operative Dictation

Preoperative diagnosis: *Uncontrolled glaucoma (OD/OS)*

Procedure: Gold metal suprachoroidal shunt implant (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female*, with a well-known and documented history of glaucoma, has had elevated IOP despite maximal tolerated medical ± laser therapy ± failed surgical therapy. The patient's IOP has been as high as ____mmHg, ± and the patient has had glaucoma progression. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Tetracaine drops were instilled into the eye. Mild analgesia and sedation was induced using MAC. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye and an eyelid speculum was placed in the eye. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A superior fornix-based conjunctival flap was created by making an initial ____ mm peritomy, approximately ____ mm from the limbus. Subconjunctival xylocaine was then infiltrated in the subconjunctival space to augment topical anesthesia. Blunt dissection to mobilize the conjunctiva was then carried out using Westcott scissors. Hemostasis was achieved with bipolar electrocautery. A mini-diamond blade was used to create a 95% depth scleral incision approximately ____ mm from the limbus and ___ mm in length. A scleral pocket was then dissected anteriorly toward the clear cornea.

A paracentesis incision was made to lower the intraocular pressure, and Provisc was injected into the anticipated entry site of the suprachoroidal shunt. The previously created vertical scleral incision was then extended full thickness until choroid was visualized. One percent non-preserved lidocaine and Provisc were then injected into the suprachoroidal space. The Zaldivar anterior procedure (ZAP) diamond knife was used to enter the anterior chamber at the level of the scleral spur. The anterior aspect of the SOLX gold suprachoroidal microshunt was inserted into the scleral tunnel using curved tying forceps. The shunt was advanced into the anterior chamber while a 27-gauge needle was used to place the posterior edge into the suprachoroidal space. A Sinskey hook was used in the anterior chamber to ensure that the shunt was placed sufficiently posterior to ensure that the posterior orifices of the shunt rested in the suprachoroidal space. An intraoperative gonioscopy lens was used to assess and ensure proper positioning of the shunt in the anterior chamber.

The scleral wound was then reapproximated using _#_ interrupted *10-0 nylon* sutures. The conjunctiva was then closed using *10-0 Vicryl* in a running horizontal mattress fashion. At the conclusion of the case, the patient received Maxitrol ointment. The patient was then transferred to the recovery room in stable condition, and (he/she) tolerated the procedure well.

Part IV
Retina and Vitreous

Chapter 59
Panretinal Photocoagulation (PRP)

Jessica Lee and Richard Rosen

Abstract Panretinal photocoagulation (PRP) uses light energy to create thermal injury to the retinal tissue. When PRP is applied to areas of poorly perfused retina, pathologic levels of vascular endothelial growth factor (VEGF) are suppressed. PRP is an effective method of treating ischemic retinal vascular disease such as proliferative diabetic retinopathy (PDR). Fluorescein angiography should be performed to identify areas of neovascularization and retinal ischemia to guide application of PRP. A clear view of the fundus facilitates delivery of PRP. Effective delivery of PRP may be limited or delayed if the ocular media is obscured by corneal edema, cataract, and/or vitreous hemorrhage.

Keywords Diabetic retinopathy • Venous occlusive disease • Central retinal vein occlusion • Ischemic retina • Threshold retinopathy of prematurity • Photocoagulation

Indications

Diabetic retinopathy, central retinal vein occlusion, ischemic retina, sickle cell retinopathy, and neovascularization

Essential Steps

1. Topical anesthetic and dilating drops.
2. (*Optional—Anesthetic injection (retrobulbar, peribulbar, or sub-Tenon's space) is given if the patient cannot tolerate discomfort of laser burns.)*
3. With slit-lamp delivery system:
   (a) Place additional topical anesthetic drops.
   (b) Special contact lens is coupled with ophthalmic gel (i.e., topical glycerin).
   (c) Position patient comfortably in front of slit lamp.
   (d) Ensure proper slit-lamp laser equipment and laser settings.
4. With indirect laser system:

J. Lee (✉) • R. Rosen
Department of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, New York, NY, USA
e-mail: jlee@nyee.edu; RRosen@nyee.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_59

(a) Position patient comfortably
(b) Ensure proper setup of laser indirect ophthalmoscope with appropriate laser settings

5. Apply laser and adjust exposure settings to appropriate retinal response.
6. Adjust anesthesia following initiation of treatment as necessary.

Complications

- Transient vision loss
- Photocoagulation of the fovea
- Macular edema
- Hemorrhage
- Choroidal effusions
- Visual field defects
- Night vision problems

Template Operative Dictation

Preoperative diagnosis: *Proliferative diabetic retinopathy* (*OD/OS*)

Procedure: (1) Panretinal photocoagulation (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old (*male/female*) who has proliferative diabetic retinopathy. The risks, benefits, and alternatives and purpose of laser treatment were discussed with the patient. The patient expressed understanding that the laser treatment is performed not to improve vision but to stabilize vision and prevent further vision loss. The patient understood (*his/her*) clinical diagnosis, including the risks of the procedure and anesthesia risks including vision loss, need for further laser treatments, and need for future surgery. After detailed informed consent process, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: A time-out procedure was carried out in the standard fashion verifying operative eye and procedures to be performed.

[Choose one]:

If topical anesthesia*—Proparacaine was placed into the (right/left) eye, followed by pupillary dilation with tropicamide 1 % and phenylephrine 2.5 %.*

If retrobulbar/peribulbar anesthesia*—__ cm^3 of 2 % lidocaine/0.75 % Marcaine was injected into the (right/left) (retrobulbar/peribulbar) space, using a retrobulbar needle on a 10 cm^3 syringe.*

Adequate anesthesia was obtained. Using the (*green or yellow diode)* laser, laser burns were applied one spot width apart, remaining one disk diameter from the disk and two disk diameters from the fovea to the retinal periphery. Laser treatment was performed without complication. The following settings and parameters were used:

Laser: ___________
Lens: ____________
Settings:
Duration: ______ ms
Spot size: ______ μm
Power: _________ mW
Number of spots: _________

The patient tolerated the procedure well and left the laser suite in good condition.

Chapter 60
Focal Macular Laser

Jessica Lee and Richard Rosen

Abstract Focal laser photocoagulation was the first treatment proven effective for reducing diabetic macular edema established by the Early Treatment Diabetic Retinopathy Study (ETDRS). The purpose of focal laser photocoagulation is to reduce the progression of diabetic macular edema and to stabilize visual function. Focal laser treatment is targeted at leaking microaneurysms identified by fluorescein angiography or by fundoscopic exam over areas of retinal thickening. Grid pattern photocoagulation can be applied over areas of diffuse leakage. Since the early 2000s, intravitreal injections of anti-vascular endothelial growth factor (VEGF) have revolutionized the management of diabetic macular edema. The treatment of diabetic macular edema often involves a multimodal approach combining the use of intravitreal anti-VEGF injections, with or without focal laser treatment, with or without intravitreal steroid injections.

Keywords Macular edema • Microaneurysms • Diabetic retinopathy • Nonproliferative diabetic retinopathy • Severe diabetic retinopathy

Indications

Diabetic macular edema

Essential Steps

1. Topical anesthetic and dilating drops.
2. Special contact lens is coupled with ophthalmic gel (i.e., topical methylcellulose).
3. Focal laser treatment is applied over areas of leaking microaneurysms.

Complications

– Photocoagulation of the fovea
– Traction on the central fovea

J. Lee (✉) • R. Rosen
Department of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, New York, NY, USA
e-mail: jlee@nyee.edu; RRosen@nyee.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_60

– Increased macular edema
– Vitreous hemorrhage
– Iatrogenic choroidal neovascularization

Template Operative Dictation

Preoperative diagnosis: Diabetic macular edema (*OD/OS*)

Procedure: (1) Focal macular laser (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old (*male/female*) who has diabetic macular edema on the (*right/left*). The risks, benefits, and alternatives and purpose of laser treatment were discussed with the patient. The patient expressed understanding that the laser treatment is performed not to improve vision but to stabilize vision and prevent further vision loss. The patient understood (*his/her*) clinical diagnosis, including the risks of the procedure and anesthesia risks including vision loss, need for further laser treatments, and need for future surgery. After detailed informed consent process, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: A time-out procedure was carried out in the standard fashion verifying operative eye and procedures to be performed. Proparacaine was placed into the (right/left) eye, followed by pupillary dilation with tropicamide 1 % and phenylephrine 2.5 %.

Using the (*green or yellow*) laser, the leaking microaneurysms were targeted. Laser treatment was performed without complication. The following settings and parameters were used:

Laser: ____________
Lens: _____________
Settings:
Duration: ______ ms
Spot Size: ______ µm
Power: __________ mW
Number of spots: __________

The patient tolerated the procedure well and left the laser suite in good condition.

Chapter 61
Pneumatic Retinopexy 1

Stephen Huddleston and Steve Charles

Abstract The decision to proceed with pneumatic retinopexy for retinal detachment repair is dependent on a variety of factors. All tears must be identified via indirect ophthalmoscopy and carefully drawn with relation to the retinal vessels to aid in relocating and applying laser retinopexy. Failure to identify all tears will lead to a much lower chance of success and perhaps the wrong decision by delaying surgery. The vast majority of successful pneumatic retinopexies, as primary repair of retinal detachments, are performed on patients with tears in the superior half of the retina between 3 and 9 o'clock. Rarely tears below the horizontal meridian are treated as a temporizing measure prior to taking the patient to surgery for vitrectomy. Patients should undergo a thorough informed consent process including the reduced success rate of pneumatic retinopexy compared to primary vitrectomy for retinal detachment repair.

Keywords Rhegmatogenous retinal detachment • Retinal tear • Pneumatic retinopexy • Laser indirect ophthalmoscopy • Cryotherapy

Indication

Rhegmatogenous retinal detachment with superior break(s)

Essential Steps

1. Topical anesthetic and 5 % Betadine drops.
2. Mask worn by the patient, assistant, and surgeon.
3. 1 cm^3 of pure filtered C3F8 drawn into a TB syringe.
4. Capped 30-gauge needle placed on syringe.
5. Sterile glove usage by the assistant and surgeon.
6. Sterile bladed speculum placement.
7. Placing patient on their side either nasal sclera straight up or temporal sclera up depending on location of detachment.
8. Entry at the highest point possible into eye marked with TB syringe.

S. Huddleston (✉) • S. Charles
Charles Retina Institute, University of Tennessee, Memphis, TN, USA
e-mail: stevehudd@gmail.com; Scharles@att.net

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_61

9. 5 % Betadine applied again.
10. Syringe pushed out until 0.6–0.8 cm^3 (depends on size of bubble needed to successfully cover all breaks) of C_3F_8 remains.
11. Eye entered 4 mm posterior to limbus leaving the needle tip barely inside the vitreous cavity.
12. Syringe plunger advanced slowly with needle at the highest point of the vitreous cavity resulting in a single bubble without "fish eggs."
13. Patient brought to slit lamp in seated position.
14. AC tap performed with fresh 30-gauge needle on open ended TB syringe until eye at physiologic intraocular pressure.
15. Testing for light perception by the surgeon.
16. If the patient has light perception or better procedure is complete.
17. Patient commences positioning based on tear(s) location.
18. If single bubble is achieved, laser may be performed on the same day after several hours. If multiple bubbles, have patient position for two days at home and then return to clinic.
19. Follow closely, after good laser is achieved, for development of new tears, especially inferiorly.

Complications

- Ocular hypertension
- Endophthalmitis
- Proliferative vitreoretinopathy
- Suprachoroidal hemorrhage
- Sympathetic ophthalmia
- Iatrogenic lens damage
- Hyphema
- New retinal tears
- Vitreous hemorrhage

Template Operative Dictation

Preoperative diagnosis: (1) Retinal detachment (*OD/OS*)

Procedure: (1) Pneumatic retinopexy (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *male/female* who has new retinal detachment (*OD/OS*) with break(s) at ___ o'clock.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: The (*right/left*) eye was prepped in the usual fashion for intravitreal injection with 2 % lidocaine solution administration, followed by 5 %

Betadine application, and an additional 2 % lidocaine solution. The periocular tissues were then sterilized with 5 % Betadine swabs. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. A bladed speculum was placed in the eye. The patient was rotated to the (*left/right*) and the (*nasal/temporal*) eye was positioned at the highest possible point. The eye was entered perpendicularly 4 mm posterior to the limbus with a 30-gauge needle on a tuberculin syringe filled with (*0.4–0.8*) cm^3 of pure C3F8. The needle was advanced until just inside the vitreous cavity. Slow advancement of the plunger was then commenced while the needle position was carefully maintained in order to achieve a single bubble. Once gas injection was complete, the needle was withdrawn from the eye. The patient was sat up and positioned at the slit lamp. A fresh 30-gauge needle on an open ended tuberculin syringe was directed into the anterior chamber on a track parallel to the iris plane and positioned over the iris. Flow into the syringe was carefully monitored by the assistant, as the surgeon maintained needle position. Once adequate aqueous was obtained, the needle was withdrawn and the speculum was removed. Light perception or better was (*present/absent*).

If light perception was not present*—the anterior chamber was again entered with a new 30-gauge needle on another open ended tuberculin syringe and additional aqueous was removed from the anterior chamber. Subsequent testing revealed light perception or better.*

The eye was again treated with 5 % Betadine and then irrigated with sterile BSS solution. Required positioning was confirmed with the patient and (*he/she)* exited the procedure suite.

Chapter 62
Pneumatic Retinopexy 2

Paymohn Mahdavi and Paul E. Tornambe

Abstract Pneumatic retinopexy is a noninvasive, outpatient procedure that can be done in office for the treatment of retinal detachment and tears. There is no need for MAC or general anesthesia, and therefore it is also an ideal treatment for patients unable to tolerate anesthesia. The procedure has a lower risk of infection when compared to PPV, leads to no change in refractive error when compared to scleral buckle, and has faster recovery time when compared to PPV and SB. In addition, it is a lower-cost procedure. Note: phakic patients do better than aphakic patients.

Keywords Retinopexy • Pneumatic • Retinal detachment • Retinal tear • Transscleral cryopexy

Indications

Rhegmatogenous retinal detachment with no proliferative vitreoretinopathy, retinal break(s) located in superior 240° of periphery no larger than 1 clock hour in size, or multiple breaks within 1–2 clock hours

Contraindications

Significant media opacity, advanced glaucoma, sickle cell disease, extensive lattice degeneration, patient unable to maintain posturing position, and patient intends to fly or travel to areas of high altitude (will expand the gas bubble inside the eye).

Essential Steps

1. Dilate eye.
2. Anesthesia (topical).
3. Identify retinal tears/breaks and perform transscleral cryopexy.

P. Mahdavi (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Paymohn@gmail.com

P.E. Tornambe
San Diego Retina Research Foundation, San Diego, CA, USA

Retina Consultants San Diego, San Diego, CA, USA
e-mail: tornambepe@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_62

4. Sterilize the eye with Betadine with attention to lashes and lash line.
5. Draw up the exact amount of intraocular gas (C_3F_8 or SF_6) into a TB syringe with #30 needle.
6. Perform a paracentesis BEFORE injection of gas.
7. Inject gas rapidly to avoid bubble formation (*aphakic patients, 3 mm posterior to limbus for pseudophakic/aphakic patients; phakic patients, 4 mm posterior to limbus*).
8. Tamponade the injection site to prevent gas escape.
9. Position the patient's head appropriately.
10. Perform indirect ophthalmoscopy to verify central retinal artery patency.
11. If small bubbles are seen, gently tap the globe with a cotton-tip applicator.
12. Check visual acuity; if NLP, then check IOP and perform repeat paracentesis.
13. Apply topical antibiotic drops into the eye.

Complications

– Secondary retinal break formation
– Endophthalmitis
– Extension of retinal break
– Vitreous hemorrhage
– Cataract
– Subretinal gas
– Lack of retinal attachment

Template Operative Dictation

Preoperative diagnosis: (1) Retinal detachment (*OD/OS*)

Procedure: (1) Pneumatic retinopexy (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *male/female* who has new retinal detachment (*OD/OS*) with break(s) at ___ o'clock.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: The risks, alternatives, benefits, and complications were explained and understood, all questions were answered, and the patient gave consent to proceed. The operation was performed on the (*right/left*) eye. The pupil was dilated with 1 % Cyclogyl and 2.5 % Neo-Synephrine. A subconjunctival injection of 1 % Xylocaine with epinephrine with 0.5 % Marcaine was given. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. After adequate anesthesia was obtained, the patient was placed in a supine position.

A lid speculum was inserted between the lids of the (*right/left*) eye. Cryopexy was applied before the gas was injected. Betadine solution was placed on the cornea and conjunctiva, left in place for three minutes, and then dried. A __ cm^3 paracentesis was done at 3 o'clock limbus. __ cm^3 SF6 was injected with a *#30* needle into the vitreous through the pars plana at _*3*_ o'clock. The steamroller maneuver was performed.

If light perception was not present*—the anterior chamber was again entered with a new 30-gauge needle on another open ended tuberculin syringe and additional aqueous was removed from the anterior chamber. Subsequent testing revealed light perception or better.*

Indirect ophthalmoscopy showed that the central retinal artery was patent. The lid speculum was removed; a subconjunctival injection of Gentamicin 20 mg was given. The eye was patched. At the time of discharge, the patient had ______ vision and the IOP was ___. The patient was asked to lie on left side. A follow-up visit was scheduled in one day.

Chapter 63
Laser Retinopexy

Jessica Lee and Richard Rosen

Abstract The purpose of laser retinopexy is to create firm chorioretinal adhesions around areas of retinal holes or breaks to prevent liquefied vitreous from entering into the subretinal space and causing a retinal detachment. Three rows of interlocking confluent laser spots should be applied to completely surround the retinal break. The factors that determine the effectiveness of laser retinopexy include the wavelength of laser used, the power of the laser, duration of treatment, and the spot size. Laser retinopexy frequently uses argon or diode laser (green, yellow, or infrared light) as it is well absorbed by melanin and hemoglobin with poor absorption by xanthophyll pigments. The laser spots should be gray to moderately white burns, and the power of the laser can be titrated to produce such results, usually requiring several hundred (200–300) mW. The duration of treatment can be adjusted with shorter duration treatments requiring more power and longer treatment times being more effective when applying treatment through poor media clarity or shallow subretinal fluid. Spot sizes of 100–500 µm are standard for laser retinopexy. Smaller spot sizes can yield higher power per unit of area than larger spot sizes, and caution should be used when small spot sizes are used not to rupture Bruch's membrane.

Keywords Retinal breaks • Horseshoe retinal tears • Operculated retinal holes • Atrophic retinal holes • Lattice degeneration • Retinal detachments • Photocoagulation • Pneumatic retinopexy

Indications

Retinal breaks, horseshoe retinal tears, operculated retinal holes, atrophic retinal holes, lattice degeneration, retinal detachments, photocoagulation, and pneumatic retinopexy

J. Lee (✉) • R. Rosen
Department of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, New York, NY, USA
e-mail: jlee@nyee.edu; RRosen@nyee.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_63

Essential Steps

1. Topical anesthetic and dilating drops.
2. *Optional—anesthetic injection (retrobulbar, peribulbar, or sub-Tenon's space) is given if the patient cannot tolerate discomfort of laser burns*.
3. With slit lamp delivery system.
   (a) Place additional topical anesthetic drops.
   (b) Special contact lens is coupled with ophthalmic gel (i.e., topical glycerin).
   (c) Position patient comfortably in front of slit lamp.
   (d) Ensure proper of slit lamp laser equipment and laser settings.
4. With indirect laser system.
   (a) Position patient comfortably.
   (b) Ensure proper setup of laser indirect ophthalmoscope and laser settings.
   (c) Scleral depression can facilitate appearance of retinal tear and may effectively displace any surrounding subretinal fluid.
5. Apply laser in three interlocking confluent rows around retinal tears/hole.

Complications

– Transient vision loss
– Photocoagulation of the fovea
– Macular edema
– Retinal or vitreous hemorrhage
– Choroidal effusions
– Visual field defects
– Night vision problems
– Subsequent epiretinal membrane
– Anterior segment laser burns

Template Operative Dictation

Preoperative diagnosis: *Retinal break* (*OD/OS*)

Procedure: (1) Laser retinopexy (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old (*male/female*) who has a (*retinal break/hole/lattice degeneration*) in the (*right/left*) eye. The risks, benefits and alternatives, and purpose of laser treatment were discussed with the patient. The patient expressed understanding that the laser treatment is performed not to improve vision but to stabilize vision and prevent further vision loss. The patient understood (*his/her*) clinical diagnosis, including the risks of the procedure and anesthesia risks including vision loss, need for further laser treatments, and need for future surgery. After detailed informed consent process, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise none)

Description of the procedure: A time out procedure was carried out in the standard fashion verifying operative eye and procedures to be performed.

[Choose one]:

If topical anesthesia—*Proparacaine was placed into the (right/left) eye, followed by pupillary dilation with tropicamide 1 % and phenylephrine 2.5 %.*

If retrobulbar/peribulbar anesthesia—__*cm*^{3} *of 2 % lidocaine/0.75 % Marcaine was injected into the (right/left) (retrobulbar/peribulbar) space, using a retrobulbar needle on a 10 cm*^{3} *syringe.*

Using the (*green/yellow/infrared*) laser, laser burns were applied as three confluent rows surrounding the (*retinal break/hole/lattice degeneration*). Laser treatment was performed without complication. The following settings and parameters were used:

Laser: ____________
Lens: _____________
Settings:
Duration: ______ ms
Spot Size: ______ µm
Power: _________ mW
Number of spots: _________

The patient tolerated the procedure well and left the laser suite in good condition.

Chapter 64
Repair of Macular Hole

Stephen Huddleston and Steve Charles

Abstract A confirmation of a macular hole should be made with optical coherence tomography imaging in clinic. The patient should then undergo a thorough informed consent process including the need for an expedient repair and the risks involved with vitrectomy-based surgery.

Keywords Full-thickness macular hole • Lamellar macular hole • Pars plana vitrectomy • Fluid-air exchange • Air-gas exchange • Posterior vitreous detachment creation • Brilliant blue stain • Internal limiting membrane peel

Indications

Full-thickness or lamellar macular hole

Essential Steps

1. Topical anesthetic and dilating drops
2. Retrobulbar anesthesia
3. Sterilization of periocular and ocular surface
4. Sterile draping of microscope and patient
5. Opening of sterile drape with Westcott scissors, bisecting lid opening so drape can fold under and cover lid margins and lashes
6. Placement of sterile wire speculum
7. Placement of all trocars posterior to the limbus with anterior conjunctival displacement with cotton tip and 30° insertion angle
8. Posterior vitreous detachment creation using suction-only mode on vitreous cutter and pulling from posterior to anterior at disk margins avoiding lateral motion
9. Vitrectomy (highest cut rate and vacuum settings)
10. Brilliant blue (off-label) use to stain the internal limiting membrane
11. Internal limiting membrane peel using DSP ILM forceps (pinch peeling, avoid scrapers, and pics)

S. Huddleston (✉) • S. Charles
Charles Retina Institute, University of Tennessee, Memphis, TN, USA
e-mail: stevehudd@gmail.com; Scharles@att.net

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_64

12. Fluid-air exchange
13. Air-gas exchange using isoexpansive surface tension agent (*SF6*)
14. Removal of cannulae while forcing scleral tunnel closed with smooth metal instrument
15. Broad-spectrum antibiotic and steroid subconjunctival injections
16. Speculum removal with patch and shield placement
17. Patient positioning if phakic, not needed if pseudophakic

Complications

- Ocular hypotony
- Ocular hypertension
- Endophthalmitis
- Proliferative vitreoretinopathy
- Suprachoroidal hemorrhage
- Sympathetic ophthalmia
- Iatrogenic lens damage
- Hyphema
- Retinal detachment
- Failure of hole closure
- Recurrence of macular hole

Template Operative Dictation

Preoperative diagnosis: Macular hole (*OS/OD*)

Procedure: (1) Pars plana vitrectomy, (2) fluid-air exchange, (3) air-gas exchange, and (4) internal limiting membrane peel

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *male/female* who has a (*lamellar or full-thickness*) macular hole. After detailed informed consent process, including risks and benefits of the procedure, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise none)

Description of the procedure: After verifying the correct surgical site, the patient was placed in supine position and taken to the operating room on an ophthalmologic gurney. The patient received a retrobulbar injection with a 1 ¼ in., 27 gauge needle consisting of *2 % lidocaine* through the infratemporal periocular tissues on a straight path into the muscle cone. This produced adequate akinesia and analgesia.

The eye was prepped and draped in the usual sterile fashion for ophthalmic surgery. The lid drape was then incised and a speculum was inserted to further expose the operative eye. A time-out procedure was then carried out in the standard fashion verifying operative eye and procedures to be performed. A measurement was made

(*3.0/3.5/4.0* mm) from the limbus in the inferotemporal quadrant. A Bishops forceps was used to displace the conjunctiva, and a (*25/27*) gauge trocar was used to place a (*25/27)* gauge port in the vitreous cavity. The trocar was inserted at a 30° insertion angle through the sclera with anterior conjunctival displacement using a cotton tip applicator to create a self-sealing scleral wound. The infusion cannula was placed through the inferotemporal port and confirmed to be inside the vitreous cavity by direct visualization using the operating microscope. Ports were also placed in the superotemporal and superonasal quadrants using the same technique.

With all three ports in place, the vitrectomy was begun by placing the endo-illuminator into the (*superonasal/superotemporal*) cannula, and the vitreous cutter into the (*superotemporal/superonasal*) cannula. At this point, the macular hole was identified. A posterior vitreous detachment was created at the optic nerve head using posterior to anterior motion of the vitreous cutter on suction mode. Using the flat lens, all visible vitreous was then removed. With the assistance of brilliant blue stain and a (*25/27*) gauge DSP ILM forceps, the internal limiting membrane was peeled 360° around the fovea without creating iatrogenic retinal breaks. The assistant surgeon then stabilized the wide-angle visualization lens on the eye, and a thorough inspection of the peripheral retina was performed (*if needed: including scleral depression in order to identify any peripheral retinal breaks and other retinal pathology*). After the peripheral retina was inspected and all vitreous removed, a soft tip cannula was then positioned over the optic nerve, and a complete fluid-air exchange was performed. Following this, an air-gas exchange was performed using an isoexpansive mixture of sulfur hexafluoride gas leaving the eye at physiologic eye pressure.

The superotemporal and superonasal ports were removed. The sclerotomy sites were closed using manual pressure with closed forceps overlying the sclerotomy sites while simultaneously removing the cannulae with a second pair of forceps. The port containing the infusion cannula was also removed and closed in the same manner. Subconjunctival injections of *25 mg of vancomycin*, *20 mg of tobramycin*, and *2 mg of Decadron* were given in the inferior fornix. The speculum was removed followed by the drapes. 5 % Betadine was applied to the ocular surface, followed by irrigation with sterile BSS. The periocular surface was then cleaned with a wet followed by dry 4×4s. The eye was then patched and shielded in the usual fashion following ophthalmic surgery. The patient left the operating room in stable condition and was transported to the postoperative holding area. The patient tolerated the procedure well (*with/without*) complications. Attending Dr._____ was present and scrubbed for the entire procedure. Dr. _____ was present and scrubbed for the surgery, assisted in the surgery, and assisted with important medical communications with the operating room staff.

Chapter 65
Internal Limiting Membrane Peel

Paymohn Mahdavi and Paul E. Tornambe

Abstract Risk factors for the development of a membrane are age, posterior vitreous detachment, and a history of a membrane in the fellow eye. Most common cause is idiopathic; however it has been associated with retinal vascular diseases, inflammatory disease, trauma, intraocular tumors, and a history of retinal tear/detachment. No medical therapy currently exists.

Keywords Internal limiting membrane peel • ILM peel • Retina procedure • PPV • Retinal vascular disease

Indications

Visual decline that affects quality of life (e.g., a pilot with 20/20 VA would still be a candidate if metamorphopsia is affecting his vision), marked retinal distortion, metamorphopsia

Essential Steps

1. Anesthesia: General, MAC, peribulbar or retrobulbar block (based on surgeon).
2. Prep and drape with attention to maintain sterility.
3. Lid speculum.
4. Perform vitrectomy with attention to excise the posterior hyaloid face away.
5. Insertion of Brilliant Blue dye to stain the membranes (ERM and ILM).
6. Remove ERM and ILM from posterior pole for approximately a 2DD area centered on the fovea.
7. Examine retinal periphery for tears/pathology and apply endo laser photocoagulation as needed.

P. Mahdavi (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Paymohn@gmail.com

P.E. Tornambe
San Diego Retina Research Foundation, San Diego, CA, USA

Retina Consultants San Diego, San Diego, CA, USA
e-mail: tornambepe@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_65

8. Remove instruments and cannulas and seal sclerotomy wounds with plain gut sutures.
9. Inject subconjunctival Marcaine posterior to the wounds.
10. Inject subtenons Ancef 0.5 cm^3 inferiorly away from the sclerotomy wounds.
11. Maxitrol ointment +/− timolol.
12. Patch and shield the eye.

Complications

– Cataract formation
– Elevation in IOP
– RPE mottling
– Light toxicity
– Central retinal artery occlusion
– Secondary angle closure glaucoma
– Visual field loss
– Vitreous hemorrhage
– Choroidal hemorrhage
– Retinal detachment
– Cystoid macular edema
– Persistent epithelial defect
– Iris neovascularization/neovascular glaucoma
– Anterior chamber shallowing
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: Macular hole (*OS/OD*)

Procedure: (1) Pars plana vitrectomy, (2) fluid-air exchange, (3) air-gas exchange, and (4) internal limiting membrane peel

Postoperative diagnosis: *Same*

Indication: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, general anesthesia (LMA) was induced. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye and an eyelid speculum was placed.

Three trans-conjunctival sclerotomies were made through the pars plana, and three *23#* valved cannulas were simultaneously inserted, above and below the lateral rectus muscle and above the medial rectus muscle. The infusion cannula was placed into the inferotemporal cannula, visualized, and then turned on. The vitrectomy cutter and light pipe were alternated in the superonasal and superotemporal cannula sites. Initially, an anterior vitrectomy was performed which was then carried posteriorly and peripherally. The posterior hyaloid was engaged over the nerve and removed with a soft tip cannula.

Attention was focused on the macular pathology. Brilliant Blue was injected for a few moments and subsequently removed which positively stained the internal limiting membrane and negatively stained epiretinal membrane tissue. Using the Alcon Finesse Scraper and Eckart Forceps, the epiretinal membrane and internal limiting membrane were broadly removed from the posterior pole for an approximate 2DD area centered on the fovea. The retinal periphery was examined and pathology was (*noted/not noted*) (*note type of pathology found here)* and (*if pathology was found, dictate type of repair performed*). A 100 % fluid/air/25 % SF6 gas exchange was performed.

The instruments and cannulas were removed from the eye. _#_ interrupted *7-0 plain gut* sutures were placed to secure and close the sclerotomy wounds. The IOP was measured by __________ tonometry. Subconjunctival ___cm^3 of Marcaine was injected posteriorly to the wounds. A total of ___cm^3 of subtenon's Ancef was injected inferiorly away from the sclerotomy wounds. Maxitrol eye ointment was placed in the inferior fornix and a shield was placed over the eye. The patient tolerated the procedure well and was taken to the holding area.

Chapter 66
Removal of Epiretinal Membrane (ERM Peel)

Jessica Lee and Richard Rosen

Abstract Epiretinal membranes (ERM) are a collection of glial or RPE cells and collagenous cells that can form a contractile fibrocellular scaffold. This contractile scaffold can lead to reduced vision and metamorphopsia. Epiretinal membranes can occur idiopathically or may be associated with uveitis, posterior vitreous detachments, retinal tears, retinal detachments, and vitreous hemorrhage. ERMs have been called by a variety of different names including macular pucker, cellophane maculopathy, preretinal macular fibrosis, epimacular membranes, and preretinal gliosis. Ocular coherence tomography (OCT) can help identify the presence of an ERM and elucidate characteristics of retinal thickening or distortion and the extent of the ERM. Prior to a surgical intervention, it is important to establish that the ERM is in fact the cause of the patient's visual disturbance.

Keywords Epiretinal membrane • Macular pucker • Pars plana vitrectomy • Membrane peel • ERM peel

Indications

Epiretinal membrane, macular pucker

Essential Steps

1. Topical anesthetic and dilating drops.
2. Retrobulbar or peribulbar anesthesia.
3. Sterilization of the periocular and ocular surface.
4. Sterile draping of operative field, the patient, and the microscope.
5. Open sterile drape with Westcott scissors, bisecting lid opening so drape can fold under and cover the lid margins and lashes.
6. Place sterile wire speculum.
7. Place trocars through the pars plana 3–4 mm posterior to the limbus with anterior conjunctival displacement with cotton tip and 30° insertion angle.

J. Lee (✉) • R. Rosen
Department of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, New York, NY, USA
e-mail: jlee@nyee.edu; RRosen@nyee.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_66

8. Pars plana vitrectomy.
9. Induce and/or confirm posterior vitreous detachment with injection of dilute triamcinolone (if needed).
10. Examine extent of the epiretinal membrane using flat lens.
11. Peel the membrane by grasping with intraocular forceps or after establishing a surgical plane with a bent needle, diamond-dusted brush, or membrane scraper.
12. (*Optional ILM peel—Stain with dilute ICG; internal limiting membrane peel*).
13. Examine the peripheral retina with scleral depression to check for peripheral retinal pathology such as retinal tears or retinal holes.
14. Remove all trocars, and ensure watertight sclerotomy sites (*or suture sclerotomy sites if necessary*).
15. Broad-spectrum antibiotic and steroid subconjunctival injections.
16. Speculum removal followed by patching and shield placement.

Complications

– Macular injury, hemorrhage, or hole
– Ocular hypotony
– Ocular hypertension
– Endophthalmitis
– Proliferative vitreoretinopathy
– Suprachoroidal hemorrhage
– Sympathetic ophthalmia
– Iatrogenic lens damage
– Hyphema
– Retinal tear
– Retinal detachment

Template Operative Dictation

Preoperative diagnosis: macular pucker (*OD/OS*)

Procedure: (1) Pars plana vitrectomy, (2) membrane peel, *(3) ILM removal, and (4) injection of intravitreal Kenalog* (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *male/female* who has an epiretinal membrane in the (*right/left*) eye. The risks, benefits, alternatives, and purpose of laser treatment were discussed with the patient. After appropriate medical clearance, explanation of the risks, benefits, and alternatives was discussed with the patient and the family. The risk of retinal detachment, infection, bleeding, blindness, glaucoma, corneal decompensation, in addition to other potential complications, was discussed. After detailed informed consent process, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: After verifying the correct surgical site, the patient was brought into the operating room. The patient was given some sedation by the anesthesiologist, and a retrobulbar block of the (*right/left*) eye using 0.75 % Marcaine with 2 % lidocaine in a 50:50 solution was given. Approximately __cm^3 was used. Adequate akinesia and analgesia were achieved. The eye was prepped and draped in the usual sterile fashion for ophthalmic surgery. The lid drape was then placed to outline the lashes and a speculum was inserted to further expose the operative eye. A time-out procedure was then carried out in the standard fashion verifying operative eye and procedures to be performed.

A measurement was made (*3.0/3.5/4.0*) mm from the limbus in the inferotemporal quadrant. A cotton tip applicator was used to displace the conjunctiva toward the limbus, and a (*23/25/27*) gauge trocar was used to place a (*23/25/27)* gauge cannula in the vitreous cavity. The trocar was inserted at a 30° insertion angle through the sclera with anterior conjunctival displacement using a cotton tip applicator to create a self-sealing scleral wound. The infusion cannula was placed through the inferotemporal port and confirmed to be inside the vitreous cavity by direct visualization using the operating microscope. Cannulas were also placed in the superotemporal and superonasal quadrants using the same technique.

With all three ports in place, the vitrectomy was begun by placing the endoilluminator into the (*superonasal/superotemporal*) cannula and the vitreous cutter into the (*superotemporal/superonasal*) cannula.

If dilute Kenalog is used*—Dilute Kenalog was used to stain the vitreous to assist with elevation of the hyaloid.*

The posterior hyaloid was confirmed to be detached. The hyaloid was removed. Vitrectomy was then completed and shaving in the periphery was performed. The flat lens was then used for visualization of the macula. There was a membrane posteriorly, which was engaged using (*MVR blade, ILM forceps)* and the membrane was peeled.

If ILM peel is performed*—Dilute ICG (diluted 50 % concentration with D5W) was used to stain the internal limiting membrane. ILM forceps were used to remove the ILM.*

The peripheral retina was inspected with scleral depression. There was no evidence of any peripheral holes or peripheral tears.

If pathology needing endolaser was found*—The (retinal tear, neovascularization, avulsed vessel) were/was treated using a (straight/flexible tip) (25/27) gauge laser probe. Laser power was titrated to achieve the needed treatment effect.*

The superotemporal and superonasal ports were removed. The sclerotomy sites were closed using manual pressure with closed forceps overlying the sclerotomy sites while simultaneously removing the cannula with a second pair of forceps. The infusion port was also removed and closed in the same manner.

Subconjunctival injections of ___*mg of (antibiotic name) and* __*mg of (steroid name)* were administered into the inferior fornix. The speculum was removed followed by the drapes. Antibiotic and steroid ointment was placed in the eye, and the eye was patched with a Fox Eye Shield. The patient left the operating room in stable condition and was transported to the postoperative holding area. The patient tolerated the procedure well (*with/without*) complications.

Attending Dr._____ was present and scrubbed for the entire procedure. Dr. _____ was present and scrubbed for the surgery, assisted in the surgery, and assisted with important medical communications with the operating room staff.

Chapter 67
Pars Plana Vitrectomy

Paymohn Mahdavi and Paul E. Tornambe

Abstract A PPV is a surgical procedure in which the vitreous gel is removed using ports placed through the pars plana. The port system allows the procedure to be performed in a closed system, opposed to the previous open sky techniques. The advantages of the PPV are decreased operative times, increased patient comfort, decreased conjunctival scarring, decreased rate of infection, and decreased complication rates. It has become the gold standard for retinal surgery.

Keywords PPV • Pars plana vitrectomy • Vitreomacular traction • Vitrectomy • Pars plana

Indications

Vitreomacular traction, removal of opacities, repair of retinal detachment (tractional, rhegmatogenous), removal of intraocular foreign bodies, membrane peel, macular hole repair, submacular surgery, vitreous biopsy, pars plana lensectomy, removal of dropped lens/lens fragment, repositioning of subluxed IOL

Essential Steps

1. Dilate pupil.
2. Anesthesia: General, MAC, peribulbar or retrobulbar block (based on surgeon).
3. Prep and drape with attention to maintain sterility.
4. Lid speculum.
5. Mark site of port entry with caliper.

P. Mahdavi (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Paymohn@gmail.com

P.E. Tornambe
San Diego Retina Research Foundation, San Diego, CA, USA

Retina Consultants San Diego, San Diego, CA, USA
e-mail: tornambepe@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_67

6. Using inserter-cannula system perform trans-conjunctival sclerotomies through the pars plana with 23-gauge valved cannulas inserted above and below the lateral rectus muscle and above the medial rectus muscle.
7. Hold each cannula with forceps to remove the inserter.
8. Connect infusion line to the inferior temporal cannula.
9. Place contact lens on the cornea (lens system per surgeon preference).
10. Remove scleral plugs from ports and insert the vitrectomy probe/cutter and illuminator into remaining cannulas superiorly.
11. Set vitrector settings.
12. Perform vitrectomy with focus on core vitrectomy first.
13. Identify and remove posterior hyaloid face.
14. Perform peripheral vitrectomy with scleral depression to detach vitreous base.
15. Perform thorough exam to identify any pathology and treat as needed.
16. Remove instruments and cannulas and seal sclerotomy wounds with plain gut sutures.
17. Check IOP (tonometer per surgeon preference).
18. Inject subconjunctival Marcaine posterior to the wounds.
19. Inject subtenons Ancef 0.5 cm^3 inferiorly away from the sclerotomy wounds.
20. Maxitrol ointment.
21. Patch and shield the eye.

Complications

- Cataract formation
- Retinal detachment/retinal tears
- Macular pucker
- Elevation in IOP
- Light toxicity
- Central retinal artery occlusion
- Secondary angle-closure glaucoma
- Vitreous hemorrhage
- Choroidal hemorrhage
- Cystoid macular edema
- Persistent epithelial defect
- Iris neovascularization/neovascular glaucoma
- Anterior chamber shallowing
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: (1) Vitreomacular traction (*OD/OS*)

Procedure: (1) Pars plana vitrectomy (*OD/OS*) (2) ILM peel

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *male/female* who has new retinal detachment (*OD/OS*) with break(s) at ___ o'clock.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: The patient was taken to the OR, a time-out was called, the (*right/left*) eye was identified, and the procedure was defined. After MAC and peribulbar Xylocaine/Marcaine injection, the patient was prepped and draped in the normal sterile fashion. A lid speculum was inserted between the lids of the (*right/left*) eye.

Three trans-conjunctival sclerotomies were made through the pars plana and *25#* valved cannulas were simultaneously inserted, above and below the lateral rectus muscle and above the medial rectus muscle. The infusion cannula was placed into the inferior temporal cannula, visualized, and then turned on. The vitrectomy cutter and light pipe were alternated in the superior cannula sites. Initially an anterior vitrectomy was performed which was then carried posteriorly and peripherally. The posterior hyaloid was engaged over the nerve and removed.

Attention was then focused on the macular pathology. Triamcinolone acetate was inserted for a few moments and then removed which positively stained the internal limiting membrane and negatively stained epiretinal membrane tissue. Using the vitrectomy instrument, posterior hyaloid was broadly removed from the posterior pole for approximately a 2DD area centered on the fovea. The retinal periphery was examined where no pathology was identified, and therefore no treatment rendered. A fluid/air exchange was performed. The instruments and cannulas were removed from the eye. _#_ interrupted _–0 *plain gut* suture was placed to secure the sclerotomy wounds. The IOP was normal by palpation. Nothing additional was injected into the vitreous. Subtenons *antibiotic* was injected inferiorly away from the sclerotomy wounds. Maxitrol drops were applied. The eye was patched and a shield placed over the patch. The patient tolerated the procedure well and was taken to the holding area.

Chapter 68
Evacuation of Vitreous Hemorrhage via Pars Plana Vitrectomy

Stephen Huddleston and Steve Charles

Abstract The decision for proceeding to surgery for removal of vitreous hemorrhage is highly dependent on its anticipated cause. Ultrasound imaging should be performed by the surgeon in the clinic prior to scheduling surgery to confirm the presence (or absence) of both traction and rhegmatogenous retinal detachments and choroidal edema or suprachoroidal hemorrhage. If a patient is a diabetic, the presumed cause will be proliferative disease. If the patient is not a diabetic, the most common causes of vitreous hemorrhage would be trauma, retinal tear secondary to PVD, avulsed retinal vessel, macroaneurysm, and neovascularization secondary to retinal vein occlusion. The clinical history and examination of the other eye will often help determine the probable cause. The patient should undergo a detailed informed consent process including the steps needed to correct the suspected cause and the inherent risks associated with vitrectomy-based surgery.

Keywords Vitreous hemorrhage • Pars plana vitrectomy • Endophotocoagulation • Traction retinal detachment • Rhegmatogenous retinal detachment • Avulsed retinal vessel • Retinal vein occlusion • Proliferative diabetic retinopathy • Retinal macroaneurysm • Retinal tear

Indications

Vitreous hemorrhage

Essential Steps

1. Topical anesthetic and dilating drops.
2. Retrobulbar anesthesia.
3. Sterilization of periocular and ocular surface.
4. Sterile draping of the microscope and patient.
5. Opening of sterile drape with Westcott scissors, bisecting lid opening so drape can fold under and cover lid margins and lashes.

S. Huddleston (✉) • S. Charles
Charles Retina Institute, University of Tennessee, Memphis, TN, USA
e-mail: stevehudd@gmail.com; Scharles@att.net

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_68

6. Placement of sterile wire speculum.
7. Placement of all trocars posterior to the limbus with anterior conjunctival displacement with cotton tip and 30° insertion angle.
8. Pars plana vitrectomy.
9. Identify cause of vitreous hemorrhage.
10. Correct pathology (if (a) traction detachment: curved scissors delamination, cutter delamination, endophotocoagulation; if (b) rhegmatogenous detachment: internal drainage of subretinal fluid, fluid-air exchange, endolaser, air-gas exchange; or (c) laser treatment for retinal tear, avulsed vessel, proliferative disease).
11. Removal of cannulas while forcing scleral tunnel closed with smooth metal instrument.
12. Broad-spectrum antibiotic and steroid subconjunctival injections.
13. Speculum removal with patch and shield placement.

Complications

– Ocular hypotony
– Ocular hypertension
– Endophthalmitis
– Proliferative vitreoretinopathy
– Suprachoroidal hemorrhage
– Sympathetic ophthalmia
– Iatrogenic lens damage
– Hyphema
– Retinal detachment
– Recurrence of vitreous hemorrhage

Template Operative Dictation

Preoperative diagnosis: (1) Vitreous hemorrhage

Procedure: (1) Pars plana vitrectomy, (2) endophotocoagulation (if performed), (3) scissors delamination of epiretinal membranes (if performed), (4) cutter delamination of epiretinal membranes (if performed), (5) fluid-air exchange (if performed), (6) air-gas exchange (if performed)

Postoperative diagnosis: *Add found cause(s) of vitreous hemorrhage here.*

Indication: Patient is a ____-year-old *male/female* who has (*new/recurrent*) vitreous hemorrhage from (*list cause if known, "an unknown cause" otherwise*). After detailed informed consent process, including risks and benefits of the procedure, the patient is elected to proceed with the surgery.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: After verifying the correct surgical site, the patient was placed in supine position and taken to the operating room on an ophthalmologic gurney. The patient received a retrobulbar injection with a 1 ¼ in., 27 gauge needle consisting of *2 % lidocaine* through the infratemporal periocular tissues on a straight path into the muscle cone. This produced adequate akinesia and analgesia.

The eye was prepped and draped in the usual sterile fashion for ophthalmic surgery. The lid drape was then incised and a speculum was inserted to further expose the operative eye. A time-out procedure was then carried out in the standard fashion verifying operative eye and procedures to be performed. A measurement was made (*3.0/3.5/4.0*) mm from the limbus in the inferotemporal quadrant. A cotton tip applicator was used to displace the conjunctiva toward the limbus, and a (*25/27*) gauge trocar was used to place a *(25/27)* gauge cannula in the vitreous cavity. The trocar was inserted at a 30° insertion angle through the sclera with anterior conjunctival displacement using a cotton tip applicator to create a self-sealing scleral wound. The infusion cannula was placed through the inferotemporal port and confirmed to be inside the vitreous cavity by direct visualization using the operating microscope. Cannulas were also placed in the superotemporal and superonasal quadrants using the same technique.

With all three ports in place, the vitrectomy was begun by placing the endoilluminator into the (*superonasal/superotemporal*) cannula and the vitreous cutter into the (*superotemporal/superonasal*) cannula. Clearing of the vitreous hemorrhage was carefully performed with the vitreous cutter starting nasal to the presumed location of the optic nerve using a continuous engage and advance strategy. (If a subhyaloid hemorrhage is observed: *An opening into the vitreous was created posteriorly, nasal to the optic nerve head using the vitreous cutter and suction only mode, resulting in removal of all subhyaloid hemorrhage.)* Once all vitreous hemorrhage was cleared, a thorough inspection of the retina was undertaken using both the flat lens and wide-angle visualization lens.

If scleral depression performed*—including scleral depression in order to identify any peripheral retinal breaks and other retinal pathology.*

The cause of the hemorrhage was confirmed as (*an avulsed vessel, retinal tear, retinal detachment, macroaneurysm, etc.*).

If pathology needing endolaser was found*—the (retinal tear, neovascularization, avulsed vessel) were/was treated using a (straight/flexible tip) (25/27) gauge laser probe. Laser power was titrated to achieve the needed treatment effect.*

If traction detachment found*—using (cutter delamination/a combination of cutter delamination and curved scissor delamination), all traction detachments affecting the macula were relieved without creating iatrogenic retinal tears. Then, using a (straight/flexible tip) (25/27) gauge laser probe, endo pan retinal photocoagulation was performed to a level of (1,2,3,4+).*

If rhegmatogenous *detachment—retinal tears were found at ___ o'clock position(s) causing a retinal detachment from ___ to ___ o'clock involving/not involving the macula. (If not able to reattach by draining through existing breaks: a posterior* *drainage retinotomy was created with the vitreous cutter (nasal/temporal/superior temporal/inferior temporal/inferior nasal/superior nasal) to the (nerve/arcades/macula). The soft tip cannula was then positioned over the (surgical drainage retinotomy site/retinal tear), and simultaneous internal drainage of subretinal fluid and fluid-air exchange were performed. At the end of this process, the retina was noted to be completely reattached. Endophotocoagulation was performed using a (25/27) gauge (straight/flexible tip) laser probe in order to sufficiently surround (if retinotomy performed: the posterior drainage retinotomy site as well as) all retinal breaks and other areas needing treatment. Following this, (air-gas exchange/air-silicon oil exchange) was performed using (an isoexpansile mixture of sulfur hexafluoride gas/silicone oil) leaving the eye at physiologic eye pressure.*

The superotemporal and superonasal ports were removed. The sclerotomy sites were closed using manual pressure with closed forceps overlying the sclerotomy sites while simultaneously removing the cannulas with a second pair of forceps. The port containing the infusion cannula was also removed and closed in the same manner. Subconjunctival injections of *25 mg of vancomycin*, *20 mg of tobramycin*, and *2 mg of Decadron* were given in the inferior fornix. The speculum was removed followed by the drapes. 5 % Betadine was applied to the ocular surface, followed by irrigation with sterile BSS. The periocular surface was then cleaned with a wet followed by dry 4×4's. The eye was then patched and shielded in the usual fashion following ophthalmic surgery. The patient left the operating room in stable condition and was transported to the postoperative holding area. The patient tolerated the procedure well (*with/without*) complications. Attending Dr._____ was present and scrubbed for the entire procedure. Dr. _____ was present and scrubbed for the surgery, assisted in the surgery, and assisted with important medical communications with the operating room staff.

Chapter 69
Scleral Buckling for Primary Retinal Detachment 1

Stephen Huddleston and Steve Charles

Abstract The decision to proceed with scleral buckling over primary vitrectomy for primary retinal detachment repair is becoming less common with each passing year, and combining vitrectomy with scleral buckling is never performed by the authors of this chapter secondarily to combining the potential complications of both procedures without creating an additive improvement in outcomes. Primary scleral buckling is indicated for young phakic patients with anterior tears and no proliferative vitreoretinopathy. Patients also need to be counseled on the risk profile of scleral buckling versus vitrectomy before agreeing to surgery.

Keywords Rhegmatogenous retinal detachment • Retinal tear • Scleral buckle • External drainage of subretinal fluid • Cryotherapy

Indications

Young, phakic patient with rhegmatogenous retinal detachment without PVR, patients that must fly

Essential Steps

1. Topical anesthetic and dilating drops
2. Retrobulbar anesthesia or general anesthesia
3. Sterilization of periocular and ocular surface
4. Sterile draping of microscope and patient
5. Opening of sterile drape with Westcott scissors, bisecting lid opening so drape can fold under and cover lid margins and lashes
6. Placement of sterile wire speculum
7. Soaking of hard silicone scleral buckle in gentamicin solution
8. Peritomy corresponding to degree of access needed for muscle isolation
9. Isolation of muscles on silk sutures
10. Indirect ophthalmoscopy with cryotherapy applied to all breaks

S. Huddleston (✉) • S. Charles
Charles Retina Institute, University of Tennessee, Memphis, TN, USA
e-mail: stevehudd@gmail.com; Scharles@att.net

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_69

11. External drainage of subretinal fluid if indicated
12. Trimming of buckle to desired length
13. Placing scleral sutures
14. Placing scleral buckle underneath muscles
15. Tying down knots over buckle with simultaneous pressure being placed by assistant on buckle
16. Paracentesis if needed after tightening buckle sutures
17. Confirmation of appropriate buckling effect with indirect ophthalmoscopy
18. Closing peritomy
19. Broad spectrum antibiotic and steroid subconjunctival injections
20. Speculum removal with patch and shield placement

Complications

– Ocular hypotony
– Ocular hypertension
– Endophthalmitis
– Proliferative vitreoretinopathy
– Suprachoroidal hemorrhage
– Sympathetic ophthalmia
– Iatrogenic lens damage
– Hyphema
– Retinal detachment
– Vitreous hemorrhage

Template Operative Dictation

Preoperative diagnosis: (1) Rhegmatogenous retinal detachment

Procedure: (1) Scleral buckle placement, (2) cryotherapy, (3) external drainage of subretinal fluid (if performed) (*OD*/*OS*)

Postoperative diagnosis: Same

Indication: Patient is a ____-year-old male/female who has a macula on/off rhegmatogenous retinal detachment with break(s) located at ____ o'clock. After detailed informed consent process including risks and benefits of the procedure, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: After verifying the correct surgical site, the patient was placed in supine position and taken to the operating room on an ophthalmologic gurney. The patient received a retrobulbar injection with a 1¼ in., 27-gauge needle consisting of *2 % lidocaine* through the infratemporal periocular tissues on a straight path into the (*right*/*left*) muscle cone. This produced adequate akinesia and analgesia.

The (*right/left*) eye was prepped and draped in the usual sterile fashion for ophthalmic surgery. The lid drape was then incised, and a speculum was inserted to further expose the operative eye. A time-out procedure was then carried out in the standard fashion verifying operative eye and procedures to be performed. A ___-degree (*temporal/nasal*) conjunctival peritomy was then performed. Each of the __ rectus muscles was isolated and carefully imbricated using 0-0 silk sutures. Careful examination with indirect ophthalmoscopy and cryopexy was performed to the regions containing peripheral retinal breaks. A ___ scleral buckle was then trimmed (if required) and passed posterior to the rectus muscles.

If external drainage of subretinal fluid required—*Given the bullous nature of the detachment, a non-drainage procedure was not possible. A drainage site along the (describe quadrant entered here) to the rectus muscle created using a 27-gauge needle on a syringe with the plunger removed was inserted under direct observation with indirect ophthalmoscopy to ensure that the needle tip was underneath the retina bevel down. Very thick viscous subretinal fluid was drained very slowly using gentle pressure on the eye as needed. The needle was withdrawn when no further drainage was noted, and the buckle was placed over the drainage site. The needle track was self-sealing without retinal incarceration.*

5-0 nylon sutures were placed in the quadrants to secure the scleral buckle to the sclera. An anterior chamber paracentesis using a 30-gauge needle was performed in order to facilitate tightening of the scleral buckle. The scleral buckle was then tightened and found to be in appropriate location. The retina was periodically examined throughout the case using binocular indirect ophthalmoscope and a 30-diopter lens. Areas of cryopexy were visualized, and the buckle was found to be covering the retinal breaks. The conjunctiva was then closed using *6-0 plain gut* suture. The eye was found to be at physiologic pressure, and the optic nerve and vessels appeared to be perfused. Subconjunctival injections of *antibiotic* and *steroid* were given in the inferior fornix. The speculum was removed followed by the drapes. 5 % Betadine was applied to the ocular surface, followed by irrigation with sterile BSS. The periocular surface was then cleaned with a wet followed by dry 4 × 4s. The eye was then patched and shielded in the usual fashion following ophthalmic surgery. The patient left the operating room in stable condition and was transported to the postoperative holding area. The patient tolerated the procedure well (*with/without*) complications. Attending Dr._____ was present and scrubbed for the entire procedure. Dr. _____ was present and scrubbed for the surgery, assisted in the surgery, and assisted with important medical communications with the operating room staff.

Chapter 70
Scleral Buckling for Primary Retinal Detachment 2

Edward Marcus

Abstract Scleral buckling surgery has been successfully used to repair rhegmatogenous retinal detachments for more than 60 years. Although procedures such as vitrectomy and pneumatic retinopexy have been added to the ophthalmologist's armamentarium for retinal detachment repair, scleral buckling remains a valuable procedure, whether used alone or in combination with other procedures. Scleral buckling is performed to produce functional closure of retinal breaks responsible for retinal detachment and to reduce changes of recurrent detachment. Various options as far as segmental elements, encircling elements, and buckles made of different materials are available. Essential to all successful retinal detachment repair surgeries, all retinal breaks must be identified, and their extent delineated.

Keywords Rhegmatogenous retinal detachments • Scleral buckle • Retinal detachment • Silicon band • Vitreoretinal degeneration • Vitreoretinal traction

Indications

Rhegmatogenous retinal detachments

Essential Steps

1. Retrobulbar anesthesia
2. Sterilization of periocular and ocular surface
3. Sterile draping of microscope and patient
4. Placement of sterile wire speculum
5. Limbal conjunctival peritomy
6. Rectus muscle isolation
7. Inspection of the sclera
8. Indirect ophthalmoscopy and identification of retinal pathology
9. Cryotherapy treatment
10. Insertion of scleral band

E. Marcus (✉)
Mount Sinai Medical Center, New York, NY, USA
e-mail: edward.i.marcus@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_70

11. Confirmation of treatment and inspection of retina using indirect ophthalmoscopy
12. Reapproximation of the conjunctiva
13. Broad spectrum antibiotic and steroid subconjunctival injections
14. Speculum removal with patch and shield placement

Complications

– Ocular hypertension
– Endophthalmitis
– Scleral abscess
– Proliferative vitreoretinopathy
– Suprachoroidal hemorrhage or detachment
– Cystoid macular edema
– Muscle imbalance
– Retinal re-detachment

Template Operative Dictation

Preoperative diagnosis: Rhegmatogenous retinal detachment

Procedure: Scleral buckle

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *(a) phakic male/female* who had developed a rhegmatogenous retinal detachment secondary to a *vitreoretinal traction/PVD.* After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying the correct patient, procedure, site, position, and special equipment prior to starting the case. The patient received monitored sedation with a retrobulbar injection consisting of *2% lidocaine* through the infratemporal periocular tissues on a straight path into the muscle cone. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye.

A lid speculum was placed. A 360° limbal conjunctival peritomy was made using Westcott scissors, and the four oblique quadrants were bluntly dissected. The four rectus muscles were isolated with *4-0 silk* ties, and the sclera was inspected in the oblique quadrants. No *radial staphylomas/scleral cracks/scleral dehiscences* were noted. The area of retinal pathology was inspected using indirect ophthalmoscopy and a 20 diopter lens, and retinal breaks located at approximately ___o'clock and ___mm from the limbus were treated using cryotherapy. A ____mm (*silicone/other material*) band was then passed underneath the rectus muscles and around the eye and affixed to itself in the *superonasal* quadrant using a *Watzke sleeve/tantalum clip/suture/others*. The band was sutured to the sclera with bites taken parallel to the limbus in the oblique quadrants using *4-0 Mersilene sutures* and tightened.

The retina was inspected again using indirect ophthalmoscopy, and the breaks were found to be on the buckle. The optic nerve was well perfused and the eye was of appropriate pressure. The buckle was washed using an *antibiotic* solution, the silk ties were removed, and the conjunctiva was reapproximated using *6-0 plain gut* sutures. The patient received subconjunctival steroid and antibiotic injections, topical ointment, a patch, and an eye shield. He/she tolerated the procedure well, was sent to the postanesthesia care unit in stable condition, and was told to follow up the next day.

Chapter 71
Scleral Buckling for Rhegmatogenous Retinal Detachment

Quraish Ghadiali and Michael Engelbert

Abstract The principle of rhegmatogenous retinal detachment (RRD) repair is rooted in the concept of closing the retinal break(s) and relieving the vitreous traction on the flap(s). However, the methods by which to repair a RRD vary considerably. While scleral buckles were formerly the mainstay of treatment, small-gauge instrumentation has made pars plana vitrectomy the preferred technique for a majority of retina specialists. Nevertheless, scleral buckle surgery either alone or in combination with pars plana vitrectomy is an essential component of retinal detachment repair and should be in the arsenal of all vitreoretinal surgeons. The principle of accurate identification and localization of retinal breaks is as pertinent to scleral buckling today as it was when first emphasized by Jules Gonin in 1921. Precisely identifying areas of retinal pathology is critical for choosing the appropriate buckling element. Consequently, meticulous preoperative and intraoperative examinations are essential to maximizing surgical success. Silicone rubber is the preferred material used for scleral buckle explants, either in the form of compressible sponges or solid elements. Compared to other materials, silicone rubber has been found to be biologically inactive, chemically inert, and is less prone to bacterial infection (Michels retinal detachment, St. Louis, 1997). Scleral buckles may be applied in a segmental (either circumferential or radial) or encircling fashion. The latter may be used as a solitary treatment or in combination with pars plana vitrectomy repair.

Keywords Retina • Retinal detachment • Rhegmatogenous • Cryotherapy • Scleral buckle • Conjunctiva • Sclera • Drainage

Q. Ghadiali (✉) • M. Engelbert
Department of Ophthalmology, Manhattan Eye, Ear, & Throat Hospital, New York, NY, USA

Department of Ophthalmology, New York University, New York, NY, USA
e-mail: quraish@gmail.com; e-mail: michael.engelbert@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_71

Indications

Rhegmatogenous retinal detachment repair

Essential Steps

1. Conjunctival peritomy
2. Dissection of Tenon's capsule
3. Rectus muscle isolation
4. Identification of retinal break(*s*) using scleral indentation with indirect ophthalmoscope
5. Cryotherapy to retinal break(*s*) (*optional*)
6. Marking of the horns and posterior extent of the tear(*s*) on the scleral surface
7. Intrascleral horizontal mattress sutures
8. Drainage of subretinal fluid (*optional*)
9. Securing of buckle element with temporary knot(*s*)
10. Confirmation of buckle placement and height with indirect ophthalmoscope
11. Finalization of sutures
12. Tenon's and conjunctival closure

Complications

– Scleral perforation and inadvertent drainage
– Bleeding
– Scleral buckle infection
– Rectus muscle avulsion
– Recurrent retinal detachment
– Anterior segment ischemia
– Retinal folds
– Refractive error due to change in axial length
– Diplopia
– Scleral buckle extrusion

Template Operative Dictation

Preoperative diagnosis: Rhegmatogenous retinal detachment (*OD/OS*)

Procedure: (*Segmental/encircling*) scleral buckle (*with cryotherapy*) (*and drainage)* (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) suffers from a retinal detachment of the (*right/left*) eye. After a detailed review of the risks, benefits, and alternatives of the procedure, including but not limited to bleeding, infection, inflammation, retinal detachment, loss of vision, loss of eye, double vision, and need for further surgery, informed consent was obtained, witnessed, and placed in the patient's chart.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: On the day of surgery, the patient was brought to the operating room in stable condition. Intravenous sedation was provided by the anesthesia team. Approximately ___cc of ____ was injected in a retrobulbar fashion behind the operative eye. (*General anesthesia was provided by the anesthesia team.*) The patient was then prepped and draped in the usual sterile ophthalmic fashion. Eyelashes were draped out of the operative field. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. A stainless steel eyelid speculum was placed in the operative eye.

A ____-degree conjunctival peritomy was created using blunt Westcott scissors and 0.12 forceps approximately *2*-mm posterior and parallel to the limbus. (*Radial relaxing incisions were created.*) Curved Steven's tenotomy scissors were then used to enter Tenon's space in each of the exposed quadrants. The intermuscular septa were further dissected using 0.12 forceps and blunt Westcott scissors. Using *2-0 silk* passed through a Gass retinal detachment hook, each of the exposed rectus muscles was isolated and tied.

If cryotherapy was used—The cryoprobe was then brought onto the operative field, and a contiguous area of cryotherapy was applied to the edges of the break(s) under direct visualization using the indirect ophthalmoscope and a ____ lens.

The retinal break(*s*) at ____ o'clock was/were marked using a scleral marker and were then marked with a surgical pen.

[Choose one, scleral buckling technique]:

For segmental element (circumferential or radial with mattress sutures)*—Next, a 5-0 nylon suture on a spatulated needle was used to place one-half thickness intrascleral bites ____ mm apart in a horizontal mattress fashion straddling the previously marked retinal break(s). ____ further 5-0 nylon mattress sutures were placed in a similar fashion to secure the scleral buckle superior and inferior (anterior and posterior) to the retinal break. A ____ silicone buckling element, which had previously been soaking in antibiotic solution, was then brought onto the operative field and threaded through each of the pre-placed nylon mattress sutures (and under the ____ rectus muscle(s)). The mattress sutures were then tightened using temporary knots to secure the element to the globe. (The eye pressure remained physiologic by palpation./An anterior chamber paracentesis was performed using a 30-gauge needle on a tuberculin syringe to bring the eye to acceptable physiologic pressure.)*

For encircling element (circumferential with mattress sutures)*—A ____ silicone band, which had previously been soaking in antibiotic solution, was then brought onto the operative field and threaded under each rectus muscle. Next, a 5-0 nylon suture on a spatulated needle was used to place one-half thickness intrascleral bites ____ mm apart in a horizontal mattress fashion over the scleral buckle at the level of the previously marked retinal break(s). This was repeated in each of the four quadrants. The mattress sutures were then tightened using a temporary knot to secure the element to the globe. A ____ silicone sleeve was brought onto the* *field, cut to an appropriate length, and used to secure the scleral buckle in the superonasal quadrant. The scleral buckle was tightened to achieve an appropriate height. (The eye pressure remained physiologic by palpation./An anterior chamber paracentesis was performed using a 30-gauge needle on a tuberculin syringe to bring the eye to acceptable physiologic pressure.)*

For encircling element (circumferential with scleral tunnels)*—Two radial ____-mm partial thickness scleral incisions were made ____ mm apart. Using a beaver blade, a lamellar dissection was performed creating scleral tunnels. This was performed in each of the four quadrants. A ____ silicone band, which had previously been soaking in antibiotic solution, was then brought onto the operative field and threaded under the scleral tunnels and under each rectus muscle. A ____ silicone sleeve was brought onto the field, cut to an appropriate length, and used to secure the buckle in the superonasal quadrant. (The eye pressure remained physiologic by palpation./An anterior chamber paracentesis was performed using a 30-gauge needle on a tuberculin syringe to bring the eye to acceptable physiologic pressure.)*

If external drainage of subretinal fluid was required*—An appropriate location for drainage was chosen taking care to avoid the long posterior ciliary arteries and nerves as well as the vortex veins. Using a ____ blade, a radial scleral incision was created ____ mm in length. (A 6-0 silk suture was placed in a mattress fashion at the edges of the scleral incision.) Diathermy was applied to the underlying choroid. A ____ blade (____ needle) was used to penetrate the choroid to allow egress of subretinal fluid. (The scleral sutures were then tied.)*

Under direct visualization using the indirect ophthalmoscope and a ____ lens, the central retinal artery was confirmed to be well perfused. The scleral buckle indentation was confirmed to be in the correct position and at an appropriate height. The scleral mattress sutures were then permanently tied and the knots were rotated posteriorly. The edges of the scleral buckle element were trimmed to minimize exposure.

Tenon's capsule was then closed over the scleral buckle element using ____ suture in an interrupted fashion. The conjunctiva was then closed using ____ suture in a running fashion (*using two interrupted sutures at each horizontal meridian, respectively*). Hemostasis was excellent throughout the case. (*Injections of antibiotic and steroid were injected under the conjunctiva in the inferior fornix.*)

The eyelid speculum and drapes were removed. Antibiotic and steroid ointments were applied along with a soft patch and hard shield. The patient tolerated the procedure well and was escorted to the recovery room in stable condition.

Reference

1. Wilkinson CP, Rice RA. Michels retinal detachment. 2nd ed. St. Louis: Mosby; 1997.

Chapter 72
Scleral Buckle with Vitrectomy

Edward Marcus

Abstract The combination of pars plana vitrectomy and scleral buckling surgery has been successfully used to repair rhegmatogenous retinal detachments. While employing both techniques, the ophthalmologist is afforded the ability to treat and drain subretinal fluid via a pars plana approach, perform endolaser, peel fibrous membranes, relieve retinal traction, and close retinal breaks. Scleral buckling provides an external approach to produce functional closure of retinal breaks responsible for retinal detachment and to reduce changes of recurrent detachment. Various options as far as segmental elements, encircling elements, and buckles made of different materials are available. Essential to all successful retinal detachment repair surgeries, all retinal breaks must be identified, and their extent delineated.

Keywords Rhegmatogenous retinal detachments • Scleral buckle • Retinal detachment • Silicon band • Vitreoretinal degeneration • Vitreoretinal traction

Indications

Rhegmatogenous retinal detachments

Essential Steps

1. Retrobulbar anesthesia
2. Sterilization of periocular and ocular surface
3. Sterile draping of microscope and patient
4. Placement of sterile wire speculum
5. Limbal conjunctival peritomy
6. Rectus muscle isolation
7. Inspection of the sclera
8. Indirect ophthalmoscopy and identification of retinal pathology
9. Insertion of scleral band
10. Placement of all trocars posterior to the limbus
11. Pars plana vitrectomy

E. Marcus (✉)
Mount Sinai Medical Center, New York, NY, USA
e-mail: edward.i.marcus@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_72

12. Preretinal membrane dissection to remove traction
13. Endodiathermy marking of retinal breaks
14. Endodiathermy created posterior drainage retinotomy
15. Fluid-air exchange
16. Laser photocoagulation to retinal breaks, edges of scleral buckle, and retinotomy site
17. Air-silicon exchange
18. Closure of the sclerotomy sites
19. Reapproximation of the conjunctiva
20. Broad spectrum antibiotic and steroid subconjunctival injections
21. Speculum removal with patch and shield placement

Complications

- Ocular hypertension
- Endophthalmitis
- Scleral abscess
- Proliferative vitreoretinopathy
- Suprachoroidal hemorrhage or detachment
- Cystoid macular edema
- Muscle imbalance
- Retinal re-detachment
- Extrusion of scleral buckle
- Refractive error

Template Operative Dictation

Preoperative diagnosis: Rhegmatogenous retinal detachment

Procedure: Scleral buckle with pars plana vitrectomy

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *(a) phakic male/female* who had developed a rhegmatogenous retinal detachment secondary to a *vitreoretinal traction/PVD*. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying the correct patient, procedure, site, position, and special equipment prior to starting the case. The patient received monitored sedation with a retrobulbar injection consisting of *2% lidocaine* through the infratemporal periocular tissues on a straight path into the muscle cone. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye.

A lid speculum was placed. A 360° limbal conjunctival peritomy was made using Westcott scissors, and the four oblique quadrants were bluntly dissected. The four rectus muscles were isolated with *4-0 silk* ties, and the sclera was inspected in the oblique quadrants. No *radial staphylomas/scleral cracks/scleral dehiscences* were noted. The area of retinal pathology was inspected using indirect ophthalmoscopy and a 20 diopter lens, and retinal breaks were noted at approximately ___o'clock and ___mm from the limbus. A ____mm (*silicone/other material*) band was then passed underneath the rectus muscles and around the eye and affixed to itself in the *superonasal* quadrant using a *Watzke sleeve/tantalum clip/suture/others*. The band was sutured to the sclera with bites taken parallel to the limbus in the oblique quadrants using *4-0 Mersilene sutures* and tightened.

A measurement was made *3.5/4.0* mm from the limbus in the inferotemporal quadrant and a (*25/27*) gauge trocar was used to place a (*25/27)* gauge port in the vitreous cavity. The trocar was inserted at a 30° insertion angle through the sclera with anterior conjunctival displacement using a cotton tip applicator to create a self-sealing scleral wound. The infusion cannula was placed through the inferotemporal port and confirmed to be inside the vitreous cavity by direct visualization using the operating microscope. Ports were also placed in the superotemporal and superonasal quadrants using the same technique.

With all three ports in place, the vitrectomy was begun by placing the endo-illuminator into the (*superonasal/superotemporal*) cannula and the vitreous cutter into the (*superotemporal/superonasal*) cannula. A careful and complete vitrectomy was carried out using high cutting and low aspiration with careful inspection of the retinal periphery and shaving of the vitreous base. Preretinal membranes were carefully dissected using DSP ILM forceps until all traction was relieved. All retinal breaks were marked with endodiathermy, and a posterior drainage retinotomy was made inferior to the macula using endodiathermy. After the peripheral retina was inspected and all vitreous removed, a soft tip cannula was then positioned over the optic nerve and a complete fluid-air exchange was performed. The retina was found to flatten completely. Following this, laser photocoagulation was applied to all retinal breaks, the edges of the scleral buckle, and the drainage retinotomy site. The air was then exchanged for *1000* centistoke silicone oil. The superotemporal and superonasal ports were removed. The sclerostomy sites were closed using *7-0 Vicryl* sutures.

The buckle was washed using an *antibiotic* solution, the silk ties were removed, and the conjunctiva was reapproximated using *6-0 plain gut* sutures. The patient received subconjunctival steroid and antibiotic injections, topical ointment, a patch, and an eye shield. *He/she* tolerated the procedure well, was sent to the postanesthesia care unit in stable condition, and was told to follow up the next day.

Chapter 73
Repair of Retinal Detachment via Pars Plana Vitrectomy (C3F8/SF6/Oil)

Stephen Huddleston and Steve Charles

Abstract A confirmation of a rhegmatogenous retinal detachment should be made including identification of the causative breaks if possible. The patient should then undergo a thorough informed consent process including the need for an expedient repair and the risks involved with vitrectomy-based surgery.

Keywords Retinal detachment • Pars plana vitrectomy • Endolaser • Fluid-air exchange • Air-gas exchange • Air-silicon oil exchange • Drainage retinotomy • Internal drainage of subretinal fluid

Indications

Rhegmatogenous retinal detachment

Essential Steps

1. Topical anesthetic and dilating drops
2. Retrobulbar anesthesia
3. Sterilization of periocular and ocular surface
4. Sterile draping of microscope and patient
5. Opening of sterile drape with Westcott scissors, bisecting lid opening so drape can fold under and cover lid margins and lashes
6. Placement of sterile wire speculum
7. Placement of inferior temporal gauge trocar posterior to the limbus with anterior conjunctival displacement with cotton tip and 30° insertion angle
8. Vitrectomy
9. Identification of retinal tears
10. Surgical retinotomy
11. Drainage of subretinal fluid
12. Fluid-air exchange
13. Endophotocoagulation

S. Huddleston (✉) • S. Charles
Charles Retina Institute, University of Tennessee, Memphis, TN, USA
e-mail: stevehudd@gmail.com; Scharles@att.net

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_73

14. Placement of surface tension agent (*SF6*, *C3F8*, *silicone oil*)
15. Removal of cannulas while forcing scleral tunnel closed with smooth metal instrument
16. Broad-spectrum antibiotic and steroid subconjunctival injections
17. Speculum removal with patch and shield placement
18. Patient positioning as indicated by location of breaks and agent used in repair

Complications

– Ocular hypotony
– Ocular hypertension
– Endophthalmitis
– Proliferative vitreoretinopathy
– Suprachoroidal hemorrhage
– Sympathetic ophthalmia
– Iatrogenic lens damage
– Hyphema

Template Operative Dictation

Preoperative diagnosis: Rhegmatogenous retinal detachment (OS/OD)

Procedure: (1) Pars plana vitrectomy, (2) fluid-air exchange, (3) *air-gas exchange/air-silicon oil exchange*, and (4) endophotocoagulation

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old *male/female* who has a macula *on/off* rhegmatogenous retinal detachment with break(s) located at ____ o'clock. After detailed informed consent process, including risks and benefits of the procedure, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise: none)

Description of the procedure: After verifying the correct surgical site, the patient was placed in supine position and taken to the operating room on an ophthalmologic gurney. The patient received a retrobulbar injection with a 1 ¼ in., 27 gauge needle consisting of *2 % lidocaine* through the infratemporal periocular tissues on a straight path into the muscle cone. This produced adequate akinesia and analgesia.

The eye was prepped and draped in the usual sterile fashion for ophthalmic surgery. The lid drape was then incised and a speculum was inserted to further expose the operative eye. A time-out procedure was then carried out in the standard fashion verifying operative eye and procedures to be performed. A measurement was made *3/3.5/4.0* millimeters from the limbus in the inferotemporal quadrant. A Bishops forceps was used to displace the conjunctiva, and a (*25/27*) gauge trocar was used to place a (*25/27)* gauge port in the vitreous cavity. The trocar was inserted at a 30°

insertion angle through the sclera with anterior conjunctival displacement using a cotton tip applicator to create a self-sealing scleral wound. The infusion cannula was placed through the inferotemporal port and confirmed to be inside the vitreous cavity by direct visualization using the operating microscope. Ports were also placed in the superotemporal and superonasal quadrants using the same technique.

With all three ports in place, the vitrectomy was begun by placing the endo-illuminator into the superonasal cannula and the vitreous cutter into the superotemporal cannula. A macula (*involved/uninvolved*) (*quadrant or quadrants involved/total*) retinal detachment was noted. After removing all vitreous traction and vitreous and identifying any subretinal or epi-retinal proliferative vitreoretinopathy lesions, a switch to wide-angle visualization was made. The assistant surgeon then stabilized the wide-angle visualization lens on the eye, and a thorough inspection of the peripheral retina was performed (*if needed: including scleral depression in order to identify any peripheral untreated retinal breaks and other retinal pathology*). Retinal tears were found at ___ o'clock position(s), and a posterior drainage retinotomy was created with the vitreous cutter (*nasal/temporal/superior temporal/inferiortemporal/inferiornasal/superiornasal*) to the *nerve/arcades/macula* if the subretinal fluid could not be drained through a preexisting retinal break. The soft tip cannula was then positioned over the surgical drainage retinotomy site, and simultaneous internal drainage of subretinal fluid and fluid-air exchange were performed. Through this process, the retina was noted to be completely reattached. Endophotocoagulation was performed using a (*25/27*) gauge (*straight/flex tip*) laser probe in order to sufficiently surround the posterior drainage retinotomy site, as well as, all retinal breaks and other areas needing treatment. Following this, *air-gas exchange/air-silicon oil exchange* was performed using *an isoexpansile mixture of sulfur hexafluoride gas/silicone oil* leaving the eye at physiologic eye pressure.

The superotemporal and superonasal ports were removed. The sclerotomy sites were closed using manual pressure with closed forceps overlying the sclerotomy sites, while simultaneously removing the cannulae with a second pair of forceps. The port containing the infusion cannula was also removed and closed in the same manner. Subconjunctival injections of *25 mg of vancomycin*, *20 mg of tobramycin*, and *2 mg of Decadron* were given in the inferior fornix. The speculum was removed followed by the drapes. 5 % Betadine was applied to the ocular surface, followed by irrigation with sterile BSS. The periocular surface was then cleaned with a wet followed by dry 4 × 4s. The eye was then patched and shielded in the usual fashion following ophthalmic surgery. The patient left the operating room in stable condition and was transported to the postoperative holding area. The patient tolerated the procedure well (*with/without*) complications. Attending Dr._____ was present and scrubbed for the entire procedure. Dr. _____ was present and scrubbed for the surgery, assisted in the surgery, and assisted with important medical communications with the operating room staff.

Chapter 74
Removal of Silicone Oil Following PPV and Retinal Detachment Repair

Stephen Huddleston and Steve Charles

Abstract The decision for silicone oil removal should be made after indirect ophthalmoscopy confirms retinal attachment and adequate retinopexy. The patient should then undergo a thorough informed consent process including the risk of re-detachment after silicone oil removal and the inherent risks involved with vitrectomy-based surgery.

Keywords Rhegmatogenous retinal detachment • Proliferative vitreoretinopathy • Pars plana vitrectomy • Fluid-air exchange • Viscous fluid extraction • Endophotocoagulation

Indications

Previous retinal detachment repair using silicone oil

Essential Steps

1. Topical anesthetic and dilating drops
2. Retrobulbar anesthesia
3. Sterilization of periocular and ocular surface
4. Sterile draping of microscope and patient
5. Opening of sterile drape with Westcott scissors under the microscope, bisecting lid opening so drape can fold under and cover lid margins and lashes
6. Placement of sterile wire speculum
7. Placement of all trocars posterior to the limbus following anterior conjunctival displacement with cotton tip applicator and 30° insertion angle
8. Insertion of inferotemporal cannula plug prior to engaging nasal cannula with viscous fluid extraction device
9. Rotation of the eye until the nasal cannula is at the highest possible point
10. Extrusion of the silicone oil while continuously monitoring infusion into the eye

S. Huddleston (✉) • S. Charles
Charles Retina Institute, University of Tennessee, Memphis, TN, USA
e-mail: stevehudd@gmail.com; Scharles@att.net

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_74

11. Stoppage of extrusion immediately once all silicone oil has been removed
12. Entrance to the anterior chamber and aspiration of any silicone oil emulsification present with a 30-gauge needle bevel up using console-based extrusion
13. Performing a thorough retinal inspection using wide-angle system and assessing the need for additional laser treatment
14. Performing fluid-air exchange with a soft tip cannula at the interface of air and fluid in order to aspirate remaining silicone oil along with the balanced salt solution
15. Following the interface posteriorly with the soft tip cannula as the fluid level continuously decreases
16. Finishing aspiration of any residual BSS or silicone oil at the nerve
17. Removal of cannulas while forcing scleral tunnel closed with smooth metal instrument
18. Broad-spectrum antibiotic and steroid subconjunctival injections
19. Speculum removal with patch and shield placement

Complications

- Ocular hypotony
- Ocular hypertension
- Endophthalmitis
- Proliferative vitreoretinopathy
- Suprachoroidal hemorrhage
- Sympathetic ophthalmia
- Iatrogenic lens damage
- Hyphema
- Retinal re-detachment

Template Operative Dictation

Preoperative diagnosis: (1) Retinal detachment (*OS/OD*), (2) silicone oil emulsification, (3) ocular hypertension (if present)

Procedure: (1) Pars plana vitrectomy revision, (2) silicone oil removal, (3) fluid-air exchange, (4) air-gas exchange (if performed), (5) endophotocoagulation (if performed)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old (*male/female*) who had previously undergone retinal detachment repair with silicone oil placement secondary to (*proliferative vitreoretinopathy*, *being unable to position*). After a confirmation of retinal attachment, adequate retinopexy, and a detailed informed consent process, including risks and benefits of the procedure, the patient elected to proceed with the surgery.

Complications: (list here if applicable, otherwise none)

Description of the procedure: After verifying the correct surgical site, the patient was placed in supine position and taken into the operating room on an ophthalmologic gurney. The patient received a retrobulbar injection with a 1 ¼ in., 27-gauge needle consisting of *2 % lidocaine* through the infratemporal periocular tissues on a straight path into the muscle cone. This produced adequate akinesia and analgesia.

The eye was prepped and draped in the usual sterile fashion for ophthalmic surgery. The lid drape was then incised and a speculum was inserted to further expose the operative eye. A time-out procedure was then carried out in the standard fashion verifying operative eye and procedures to be performed. A measurement was made 3.5 mm from the limbus in the inferotemporal quadrant. A Bishops forceps was used to displace the conjunctiva, and a (25-/27-) gauge trocar was used to place a (25-/27-*)* gauge port into the vitreous cavity. The trocar was inserted at a 30° insertion angle through the sclera with anterior conjunctival displacement using a cotton tip applicator in order to create a self-sealing scleral wound. The infusion cannula was placed through the inferotemporal port and confirmed to be inside the vitreous cavity by direct visualization using the operating microscope. Ports were also placed in the superotemporal and superonasal quadrants using the same technique.

With all three ports in place, the temporal cannula was plugged and the viscous fluid extruder was secured on the nasal cannula using the Bishops forceps. The eye was then rotated until the nasal cannula was at the most superior location possible. Silicone oil was then extracted in toto from the vitreous cavity using the viscous fluid extractor. Special care was taken to confirm adequate infusion pressure throughout this process. The nasal cannula was then plugged, and the anterior chamber was entered with a 30 gauge needle on extrusion. Using a proportional control system, all silicone emulsification was removed from the anterior chamber. The vitrectomy revision was then accomplished by first placing the endo-illuminator into the (*superonasal/superotemporal*) cannula and the vitreous cutter into the (*superotemporal/superonasal*) cannula. A thorough inspection of the retina was performed using both the flat lens and wide-angle visualization lens.

If scleral depression performed**:** *including scleral depression in order to identify any peripheral retinal breaks and other retinal pathologies* (*describe pathology found if needed here and describe measures taken to address it*, *i.e.*, *endolaser*, *additional drainage of subretinal fluid*, *or forceps membrane peeling*).

Infusion was then switched from BSS+ to filtered room air. A soft tip cannula was positioned at the BSS+/air interface and aspiration of residual silicone oil and BSS+ was commenced. As the residual interface moved posteriorly, the soft tip cannula was consistently maintained in proximity. Once arrived at the optic nerve, any minimal amounts of residual silicone oil and BSS+ were carefully and completely removed.

If air-gas exchange performed**:** *following this*, *an air-gas exchange was performed using an isoexpansive mixture of sulfur hexafluoride gas leaving the eye at physiologic eye pressure*.

The superotemporal and superonasal ports were removed. The sclerotomy sites were closed using manual pressure with closed forceps overlying the sclerotomy sites, while simultaneously removing the cannulas with a second pair of forceps. The port containing the infusion cannula was also removed and closed in the same manner. Subconjunctival injections of *25 mg of vancomycin*, *20 mg of tobramycin*, and *2 mg of Decadron* were given in the inferior fornix. The speculum was removed followed by the drapes. 5 % betadine was applied to the ocular surface, followed by irrigation with sterile BSS. The periocular surface was then cleaned with a wet followed by dry 4×4s. The eye was then patched and shielded in the usual fashion following ophthalmic surgery. The patient left the operating room in stable condition and was transported to the postoperative holding area. The patient tolerated the procedure well (*with/without*) complications. Attending Dr._____ was present and scrubbed for the entire procedure. Dr. _____ was present and scrubbed for the surgery, assisted in the surgery, and assisted with important medical communications by the operating room staff.

Chapter 75
Pars Plana Vitrectomy and Pars Plana Lensectomy for Retained Lens Fragments

Quraish Ghadiali and Michael Engelbert

Abstract While cataract extraction surgery has become increasingly safe and efficient, retained lens material or a "dropped nucleus" continues to be one of the more common complications, typically as a result of posterior capsule compromise or zonular dehiscence. An attempt to remove posteriorly dislocated lens material by the anterior segment surgeon is often attempted via an anterior vitrectomy, but may result in anterior vitreous traction leading to retinal tears and possibly detachment. While small cortical lens fragments may be well tolerated and eventually absorbed, persistent retained lens material places the eye at risk for elevated intraocular pressure, chronic inflammation predisposing to cystoid macular edema and corneal edema, and retinal detachment. Although some authorities advocate for prompt lens removal, the definitive timing to posterior segment intervention is not universally agreed upon. Depending on the hardness of the lens, its removal may be achieved with the vitrectomy handpiece alone or in combination with Fragmatome phacoemulsification. Surgical outcomes are typically favorable with the majority of patients retaining 20/40 vision or better (Pars plana vitrectomy for the management of retained lens material after cataract surgery. Am J Ophthalmol 144(3):364–370, 2007).

Keywords Retina • Cataract surgery • Retained lens • Dropped nucleus • Fragmatome • Pars plana vitrectomy • Pars plana lensectomy • Vitrectomy • Lensectomy • Complication

Indications

Retained lens material after cataract extraction

Q. Ghadiali (✉) • M. Engelbert
Department of Ophthalmology, Manhattan Eye, Ear, & Throat Hospital, New York, NY, USA

Department of Ophthalmology, New York University, New York, NY, USA
e-mail: quraish@gmail.com; michael.engelbert@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_75

Essential Steps

1. Suturing of pre-existing surgical wounds
2. Microcannula placement
3. Core vitrectomy
4. Superotemporal sclerotomy enlargement for 20 gauge Fragmatome
5. Instillation of perfluorocarbon liquid (*optional*)
6. Pars plana lensectomy
7. Assessment for retinal breaks
8. Removal of microcannulas/closure of enlarged sclerotomy

Complications

– Infection
– Bleeding
– Retinal detachment
– Persistent retained lens material
– Glaucoma
– Cystoid macular edema

Template Operative Dictation

Preoperative diagnosis: Retained lens fragment (*OD/OS*)

Procedure: (1) (*25-gauge/23-gauge*) pars plana vitrectomy and (2) pars plana lensectomy (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) suffers from retained lens material after attempted cataract extraction surgery on (*date*). After a detailed review of the risks, benefits, and alternatives of the procedure, including but not limited to bleeding, infection, inflammation, retinal detachment, glaucoma, loss of vision, loss of eye, and need for further surgery, informed consent was obtained, witnessed, and placed in the patient's chart.

Complications: (list here if applicable, otherwise none)

Description of the procedure: On the day of surgery, the patient was brought to the operating room in stable condition. Intravenous sedation was provided by the anesthesia team. Approximately ___cc of ____ was injected in a retrobulbar fashion behind the operative eye. (*General anesthesia was provided by the anesthesia team.*) The patient was then prepped and draped in the usual sterile ophthalmic fashion. Eyelashes were draped out of the operative field. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. A stainless steel eyelid speculum was placed in the operative eye.

A 25-gauge (*23-gauge*) microcannula was placed in the inferotemporal quadrant in a beveled fashion 3.5 mm posterior to the limbus. The associated infusion cannula was inserted, confirmed to be in correct position within the vitreous cavity by direct visualization through the dilated pupil with the light pipe, and then turned on. Two further microcannulas were placed superonasally and superotemporally in a similar fashion 3.5 mm posterior to the limbus, the superotemporal in a limbus-parallel direction. The vitrectomy hand piece and light pipe were inserted into the eye and the anterior vitreous was cleared. Then, under indirect wide field visualization, a core and peripheral vitrectomy was performed.

(A posterior vitreous detachment was then completed over the optic nerve).

(To protect the macula from the retained lens pieces, perfluorocarbon liquid was instilled with a dual-bore cannula.)

Next, the superotemporal microcannula was removed. Using conjunctival forceps and Westcott scissors, the conjunctiva overlying the superotemporal sclerotomy was incised. Using a 20-gauge MVR blade, the superotemporal sclerotomy was enlarged. The fragmatome was then brought onto the operative field and inserted into the superotemporal sclerotomy. The retained lens fragments were cleared using a combination of phacofragmentation and aspiration. The vitrectomy hand piece was then inserted into the vitreous cavity to remove any residual lens material. At the end of the surgery, scleral depression was performed. No retinal breaks or residual lens material was seen. (*Perfluorocarbon liquid was then removed from the eye*.)

The superotemporal sclerotomy wound was closed using *7-0 Vicryl* suture in a horizontal mattress fashion. The overlying conjunctiva was closed using *7-0 Vicryl* suture in an interrupted fashion. The superonasal microcannula was then removed (*and sutured closed using 7-0 Vicryl suture in an interrupted fashion*). Finally, the inferotemporal microcannula and associated infusion cannula was removed (*and sutured closed using 7-0 Vicryl suture in an interrupted fashion*).

The eye remained at appropriate physiologic pressure by palpation. (*Injections of antibiotic and steroid composed of ____ were injected under the conjunctiva in the inferior fornix.*) The eyelid speculum and drapes were removed. Antibiotic and steroid ointment were applied along with a soft patch and hard shield. The patient tolerated the procedure well and was escorted to the recovery room in stable condition.

Reference

1. Merani R, Hunyor AP, Playfair TJ, Chang A, Gregory-Roberts J, Hunyor AB, et al. Pars plana vitrectomy for the management of retained lens material after cataract surgery. Am J Ophthalmol. 2007;144(3):364–70.

Chapter 76
Intravitreal Injection

Jessica Lee and Richard Rosen

Abstract Intravitreal injections allow for direct drug delivery into the vitreous cavity and are used to treat various retinal diseases including macular degeneration, diabetic retinopathy, uveitis, and endophthalmitis.

Keywords Age-related macular degeneration • Choroidal neovascular membrane • Diabetic macular edema • Diabetic retinopathy • Non-proliferative diabetic retinopathy • Severe diabetic retinopathy • Vein occlusion • Ischemic retina • Threshold retinopathy of prematurity • Uveitis • Cystoid macular edema • Endophthalmitis

Indications

Age-related macular degeneration, choroidal neovascular membrane, diabetic macular edema, diabetic retinopathy, non-proliferative diabetic retinopathy, severe diabetic retinopathy, vein occlusion, ischemic retina, threshold retinopathy of prematurity, endophthalmitis

Essential Steps

1. Surgical time-out to confirm correct medication and correct eye.
2. Place patient in near supine position.
3. Topical anesthetic.
4. Povidone-iodine 5 % solution placed prior to placement of anesthesia.
5. Anesthesia: topical (lidocaine jelly), subconjunctival lidocaine injection, pledgets soaked with proparacaine.
6. Sterile lid speculum placement.
7. Povidone-iodine 5 % solution again.
8. Mark the location of the injection: 3.0–3.5 mm for pseudophakic patients and 3.5–4.0 mm for phakic patients. After marking, place Betadine again.
9. Do not talk to patient and ask the patient not to talk during the injection.
10. Insert the needle and aim for the mid-vitreous cavity and inject.

J. Lee (✉) • R. Rosen
Department of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai,
New York, NY, USA
e-mail: jlee@nyee.edu; RRosen@nyee.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_76

11. Cover the injection site with a sterile Q-tip as the needle is being pulled out.
12. Rinse the Betadine.
13. Ensure optic nerve perfusion.
14. Review endophthalmitis and retinal detachment precautions.

Complications

– Pain
– Subconjunctival hemorrhage
– Vitreous hemorrhage
– Increased intraocular pressures
– Corneal abrasion
– Corneal epithelial defect
– Cataract
– Endophthalmitis
– Retinal detachment

Template Operative Dictation

Preoperative diagnosis: *Diabetic macular edema* (*OD/OS*)

Procedure: (1) Intravitreal injection of __cc of (*Avastin*, *Lucentis*, *Eylea*, *Ozurdex*, *vancomycin*, *ceftazidime*, *foscarnet*, *clindamycin*) (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: Patient is a ____-year-old (*male/female*) who has (*exudative wet age-related macular degeneration/diabetic macular edema/endophthalmitis/other).* After a detailed informed consent process, including risks and benefits of the procedure, the patient elected to proceed with the injection.

Complications: (list here if applicable, otherwise none)

Description of the procedure: The patient was brought into the procedure room and placed in the supine position. A time-out for safety was performed to confirm the correct medication and the correct eye. A drop of proparacaine was placed in the surgical eye. Povidone-iodine 5 % solution was placed prior to placement of (*topical lidocaine jelly/subconjunctival lidocaine injection/pledgets soaked with proparacaine*).

A sterile lid speculum was placed. Povidone-iodine 5 % solution was again applied to the eye. The injection site was marked ___mm from the limbus. After marking, povidone-iodine 5 % solution was again applied. Using a 30-gauge needle, ___cc of ______ was injected into the mid-vitreous cavity. The Betadine solution was rinsed from the eye. After the injection, the central retinal artery was confirmed to be patent and optic nerve perfusion was checked. There were no complications. The patient was instructed to call immediately upon any sudden pain, decreased vision, flashing lights, floaters, or other symptoms of retinal tears or detachment.

Part V
Pediatrics and Strabismus

Chapter 77
Nasolacrimal Duct Probing

Dawn Rush and Eric D. Rosenberg

Abstract Congenital nasolacrimal duct obstruction occurs in approximately 5 % of newborns. The blockage occurs most commonly at the valve of Hasner located at the distal end of the nasolacrimal duct. The rate of spontaneous resolution is estimated to be at 90 % within the first year of life. However, if obstruction does not resolve on its own or with massage, probing may be indicated to ensure patency and even manually open the nasolacrimal passage.

Keywords Nasolacrimal duct • Obstruction • Dacryocystocele • Crigler massage • Punctual stenosis • Epiphora

Indications

Chronic dacryocystitis, congenital nasolacrimal duct obstruction, congenital dacryocele, dacryolith, punctual eversion and stenosis, canalicular stenosis secondary to trauma, herpes simplex infection, drugs, or irradiation

Essential Steps

1. Punctal dilatation
2. Insertion of the probe vertically (2 mm)
3. Lateral canthus traction and nasal advancement of probe (8 mm)
4. Probe advanced caudally (10–12 mm)
5. Advancement through the valve of Hasner
6. Metal-to-metal confirmation
7. Fluorescein-saline irrigation

Complications

– Stenosis
– Dacryocystitis
– Nasolacrimal duct perforation

D. Rush (✉) • E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: RushMD@msn.com; Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_77

– Creation of false passage
– Nasal discharge

Template Operative Dictation

Preoperative diagnosis: *Nasolacrimal duct obstruction (OD/OS/OU)*

Procedure: Exam under anesthesia with probing of the (*right/left/bilateral*) nasolacrimal system.

Postoperative diagnosis: *Same*

Indication: This is a____-month-old (*male/female*) who was noted to have epiphora and matting of the lashes for the past ______(*weeks/months*) with chronic, intermittent obstruction of the nasolacrimal duct. Upon gentle pressure over the lacrimal sac, purulent material was expressed from the punctum. After a detailed review of the risks and benefits with the (*mother/father*), the decision was made to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. 1 % cyclopentolate was administered preoperatively. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. (*She/he*) was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A punctal dilator was used to dilate the superior and inferior puncta of the (*right/left*) eye. Using a *0 Bowman* probe, the inferior and superior puncta were probed vertically for 2 mm and then nasally with lateral traction applied to the lateral canthus until a hard stop was appreciated. At this point the probe was rotated caudally and slightly laterally and posteriorly to enter the nasolacrimal duct. The probe was aligned with the supraorbital notch and advanced through the valve of Hasner with a light pop sensation appreciated at approximately ___mm. A nasal speculum was used to first examine the (*right/left*) nasal aperture and secondly to confirm a metal-on-metal probe contact under the inferior turbinate. Fluorescein saline was then irrigated through the canalicular system and recovered from the nose with a cotton tip applicator.

Before the conclusion of the case, a thorough exam under anesthesia was completed. The anterior segment examination revealed normal anterior segment structures. A posterior segment examination revealed a clear lens and vitreous. Cup-to-disc ratio was ___. Peripheral examination was normal. There was minimal blood noted from the nasal aperture. No false tracks were created or noted.

The patient received ___drops of tetracaine and Tobradex ophthalmic solution to the (*right/left/bilateral*) eye(s). (*She/he*) tolerated the procedure well and was transported into the recovery room in stable condition. Postoperative instructions were discussed at length with the family.

Chapter 78
Lacrimal Intubation

Dawn Rush and Alanna S. Nattis

Abstract Nasolacrimal intubation with silicone tubing is an effective method of relieving chronic nasolacrimal duct obstruction in children (success rates reported to be about 90 %). The procedure of nasolacrimal intubation is less invasive than dacryocystorhinostomy (DCR) and is technically easier to perform. In addition to its use in children, silicone intubation has been found to be efficacious in adults with epiphora as well.

Keywords Nasolacrimal duct • Silastic tubing • Silicone • Intubation • Punctal stenosis • Epiphora • Valve of Hasner

Indications

Chronic nasal lacrimal duct obstruction

Essential Steps

1. Punctal dilatation
2. Probing of the nasolacrimal system
3. Metal-to-metal contact
4. Crawford tube insertion
5. Tubing sutured and tied to anterior nasal vestibule

Complications

– Stenosis
– Dacryocystitis
– Epiphora

D. Rush (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: RushMD@msn.com

A.S. Nattis
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_78

- Tube extrusion
- Nasal discharge
- Pyogenic granuloma formation

Template Operative Dictation

Preoperative diagnosis: *Chronic nasal lacrimal duct obstruction (OD/OS/OU)*

Procedure: Exam under anesthesia with probing of the (*right/left/bilateral*) superior and inferior puncta and canalicular system with insertion of temporary Silastic tubes.

Postoperative diagnosis: *Same*

Indication: This is ____-year-old (*male/female*) who required multiple repeat probing and developed chronic nasal lacrimal duct obstruction. After a detailed review of risks and benefits with the (*mother/father*), the decision was made to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. 1 % cyclopentolate was administered preoperatively. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. (*She/he*) was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A punctal dilator was used to dilate the superior and inferior puncta of the (*right/left*) eye. Using a *0 Bowman* probe, the inferior and superior puncta were probed vertically for 2 mm and then nasally with lateral traction applied to the lateral canthus until a hard stop was appreciated. At this point the probe was rotated caudally and slightly laterally and posteriorly to enter the nasolacrimal duct. The probe was aligned with the supraorbital notch and advanced through the valve of Hasner. Patency was assured with metal-to-metal contact made under the inferior turbinate. A Crawford tube on a wire passer was then inserted through the inferior and superior puncta without complication. The tube was tied into place with a *4-0 Silk* tie and sutured to the anterior vestibule using a *5-0 Vicryl* suture.

Before the conclusion of the case, a thorough exam under anesthesia was completed. The anterior segment examination revealed normal anterior segment structures. A posterior segment examination revealed a clear lens and vitreous. Cup-to-disc ratio was ___. Peripheral examination was normal. There was minimal blood noted from the nasal vestibule. No false tracks were created or noted. The patient received ___drops of tetracaine and Tobradex ophthalmic solution to the (*right/left/bilateral*) eye(s). (She/he) tolerated the procedure well and was transported into the recovery room in stable condition. Postoperative instructions were discussed at length with the family.

Chapter 79
Bilateral Lateral Rectus Recession (BLR)

Dawn Rush, Amro Ali, and Eric D. Rosenberg

Abstract Strabismus (abnormal ocular alignment) is a common problem in children. Misalignment may be vertical, horizontal, torsional, or a combination of these. Although strabismus can be treated with conservative therapy such as prisms, patching, glasses, and orthoptic exercises, many cases require surgery for correction. Horizontal eye muscle surgery is the most common strabismus surgery performed and is used for patients with exo- and eso-deviations, dissociated vertical deviations, abnormal head postures, and/or nystagmus. Several techniques are available for treatment of strabismus and may include resection, recession, splitting of muscles, or any combination of these treatments. Bilateral muscle recessions/resections may be performed, or surgery may be done on antagonist muscles of the same eye, depending on diagnosis and surgeon preference.

Keywords Exotropia • Exophoria • Strabismus • Lateral rectus • Medial rectus • BLR

Indications

Intermittent exotropia, sensory exotropia, consecutive exotropia, congenital exotropia

Essential Steps

1. Conjunctival incision (fornix or limbal)
2. Identification and isolation of lateral rectus
3. Suturing of the anterior insertion site of the lateral rectus
4. Disinsertion of the lateral rectus
5. Recession measurement distance
6. Reattachment of the lateral rectus
7. (Hang-back or adjustable sutures if used)
8. Hemostasis
9. Closure of the conjunctiva (occasionally left open if fornix based)
10. Repeat for other eye

D. Rush (✉) • A. Ali • E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: RushMD@msn.com; amro.ali9@icloud.com; Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_79

Complications

- Over-/undercorrection
- Diplopia
- Granuloma formation
- Muscle or conjunctival hematoma
- Chorioretinal scarring
- Slipped muscle
- Orbital cellulitis
- Epithelial inclusion cysts
- Dellen formation
- Refractive changes
- Anterior segment ischemia
- Retinal detachment
- Vitreous hemorrhage
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: Exotropia

Procedure: Recession of lateral rectus muscles OU

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*male/female*) who had developed consecutive exotropia following muscle surgery ____ years prior. The patient was experiencing significant symptoms such as (double vision/eyestrain/headache/squinting/loss of binocular vision) which were not adequately controlled with nonsurgical methods. After a detailed review of risks, benefits, and alternatives with the (*mother/father/guardian*), the decision was made to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and ___ drops of 2.5 % phenylephrine were administered preoperatively. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. (*She/he*) was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

The (*left/right*) eye was taped closed with a Steri-Strip, while an eyelid speculum was placed beneath the lids of the (*right/left*) eye. A ____mm inferotemporal fornix-based conjunctival incision was performed on the (*right/left*) eye using Westcott scissors. A surgical dissection plane was carried out beneath Tenon's capsule to bare the sclera, where the (*right/left*) lateral rectus was identified. A Stevens hook was then passed parallel to the insertion site of the muscle, between the sclera and the muscle to isolate the lateral rectus. A Greene hook was then passed behind the muscle belly to ensure that all the muscle fibers were isolated. The isolated lateral rectus muscle was found to be of (*normal/abnormal*) tone on the insertion site.

The anterior insertion of the muscle was adequately exposed, and the muscle was sutured approximately ____mm from its insertion with a double-armed *6-0 Vicryl* suture on a spatulated needle. A full-thickness locking whipstitch was then placed at the superior and inferior poles of the muscle. Light traction was then placed on the muscle hook, and the muscle was disinserted from the globe using tenotomy scissors. A distance of ____mm was measured and marked from the original insertion site to the planned insertion site using a caliper. The spatulated needles were then used to pass partial thickness bites through the sclera in their anteriorly and posteriorly marked sites. This was performed using the "crossed-swords" technique. Careful attention was made to ensure that no perforation or penetration of the globe occurred. The eye was thoroughly irrigated with BSS, followed by electrocautery for hemostasis. The conjunctival incision was closed with (*_#_ of interrupted 6-0 Vicryl sutures/tissue glue/electrocautery*).

The eyelid speculum was removed from the (*right/left*) eye and placed into the (*left/right*) eye, while the (*right/left*) eye was taped closed with a Steri-Strip. Using the same technique described above, the (*left/right*) lateral rectus was identified, isolated, and noted to be of (*normal/abnormal*) tone. The (*left/right*) lateral rectus muscle was disinserted and reinserted at a distance of ___mm. No perforation or penetration of the globe occurred, and the conjunctival incision was closed in the same fashion as previously described. The speculum was subsequently removed from the (*left/right*) eye, and ___drops of tetracaine ophthalmic solution followed by ___ drops of Tobradex ophthalmic solution were administered to each eye. The patient tolerated the procedure well. There were no complications, and the patient was transferred to the recovery room in stable condition.

Chapter 80
Recession and Resection (R&R)

Dawn Rush and Alanna S. Nattis

Abstract Strabismus (abnormal ocular alignment) is a common problem in children. Misalignment may be vertical, horizontal, torsional, or a combination of these. Although strabismus can be treated with conservative therapy such as prisms, patching, glasses, and orthoptic exercises, many cases require surgery for correction. Horizontal eye muscle surgery is the most common strabismus surgery performed and is used for patients with exo- and eso-deviations, dissociated vertical deviations, abnormal head postures, and/or nystagmus. Several techniques are available for treatment of strabismus and may include resection, recession, splitting of muscles, or any combination of these treatments. Bilateral muscle recessions/resections may be performed, or surgery may be done on antagonist muscles of the same eye, depending on diagnosis and surgeon preference.

Keywords Esotropia • Exotropia • Strabismus • Recession • Resection

Indications

Intermittent, sensory, consecutive, or congenital eso- or exotropia

Essential Steps

1. Inferomedial conjunctival incision (fornix or limbal)
2. Identification and isolation of medial rectus
3. Suturing of the anterior insertion site of the medial rectus
4. Disinsertion of the medial rectus
5. Recession measurement distance
6. Reattachment of the medial rectus
7. (Hang-back or adjustable sutures if used)

D. Rush (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: RushMD@msn.com

A.S. Nattis
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_80

8. Inferolateral conjunctival incision (fornix or limbal)
9. Identification and isolation of lateral rectus
10. Resection zone measurement on the lateral rectus
11. Suturing of the anterior insertion site on the lateral rectus
12. Disinsertion and resection of lateral rectus muscle
13. Reattachment of the lateral rectus
14. Hemostasis
15. Closure of the conjunctiva (occasionally left open if fornix based)

Complications

– Over/undercorrection
– Diplopia
– Granuloma formation
– Muscle or conjunctival hematoma
– Chorioretinal scarring
– Slipped muscle
– Orbital cellulitis
– Epithelial inclusion cysts
– Dellen formation
– Refractive changes
– Anterior segment ischemia
– Retinal detachment
– Vitreous hemorrhage
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Esotropia*

Procedure: Recession of (*right/left*) medial rectus muscle and resection of (*right/left*) lateral rectus muscle

Postoperative diagnosis: *Same*

Indication: This is a ____- year-old (*male/female*) who presented to the office with a diagnosis of *esotropia*. The patient was experiencing significant symptoms such as (double vision/eyestrain/headache/squinting/loss of binocular vision) which were not adequately controlled with nonsurgical methods. After a detailed review of risks, benefits, and alternatives with the (*mother/father/guardian*), the decision was made to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. ____ drops of 2.5 % phenylephrine were administered to the (*right/left*) eye only. (*She/he*) was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

An eyelid speculum was carefully placed beneath the lids of the (*right/left*) eye. A ____mm inferomedial fornix-based conjunctival incision was performed on the (*right/left*) eye using Wescott scissors. A surgical dissection plane was carried out beneath Tenon's capsule to bare sclera, where the (*right/left*) medial rectus was identified. A Stevens hook was then passed parallel to the insertion site of the muscle, between the sclera and the muscle, in order to isolate the lateral rectus. A Greene hook was then passed behind the muscle belly to ensure that all the muscle fibers were isolated. The isolated medial rectus muscle was found to be of (*normal/abnormal*) tone on the insertion site.

The anterior insertion of the muscle was adequately exposed, and the muscle was sutured approximately ____mm from its insertion with a double-armed *6-0 Vicryl* suture on a spatulated needle. A full thickness locking whip stitch was then placed at the superior and inferior poles of the muscle. Light traction was then placed on the muscle hook, and the muscle was disinserted from the globe using tenotomy scissors. A distance of ____mm was measured and marked from the original insertion site to the planned insertion site using a caliper. The spatulated needles were then used to pass partial thickness bites through the sclera in their anteriorly and posteriorly marked sites. This was performed using the "crossed-swords" technique. Careful attention was made to ensure that no perforation or penetration of the globe occurred. The eye was thoroughly irrigated with BSS, followed by electrocautery for hemostasis. The conjunctival incision was closed with (*_#_ of interrupted 6-0 Vicryl sutures/tissue glue/electrocautery*).

Using the same technique described above, a ____mm inferolateral fornix-based conjunctival incision was performed on the (*right/left*) eye where the (*right/left*) lateral rectus was identified, isolated, and noted to be of (*normal/abnormal*) tone. The anterior insertion of the muscle was adequately exposed, and calipers were used to measure and mark the ____mm of the muscle to be resected. The muscle was sutured approximately ____mm from its insertion with a double-armed *6-0 Vicryl* suture on a spatulated needle. Straight clamps were placed anterior and posterior to the previously marked regions. The muscle was disinserted from the globe and the marked portion of muscle resected. The spatulated needles were then used to pass partial thickness bites through the sclera at the original insertion site. The eye was thoroughly irrigated with BSS, followed by electrocautery for hemostasis. The conjunctival incision was closed with (*_#_ of interrupted 6-0 Vicryl sutures/tissue glue/electrocautery*). The speculum was subsequently removed from the (*right/left*) eye, and ___drops of tetracaine ophthalmic solution followed by ___ drops of TobraDex ophthalmic solution were administered to each eye. The patient tolerated the procedure well. There were no complications, and the patient was transferred to the recovery room in stable condition.

Chapter 81
Bilateral Medial Rectus Recession (BMR)

Dawn Rush, Amro Ali, and Eric D. Rosenberg

Abstract Strabismus (abnormal ocular alignment) is a common problem in children. Misalignment may be vertical, horizontal, torsional, or a combination of these. Although strabismus can be treated with conservative therapy such as prisms, patching, glasses, and orthoptic exercises, many cases require surgery for correction. Horizontal eye muscle surgery is the most common strabismus surgery performed and is used for patients with exo- and eso-deviations, dissociated vertical deviations, abnormal head postures, and/or nystagmus. Several techniques are available for treatment of strabismus and may include resection, recession, splitting of muscles, or any combination of these treatments. Bilateral muscle recessions/resections may be performed, or surgery may be done on antagonist muscles of the same eye, depending on diagnosis and surgeon preference.

Keywords Esotropia • Strabismus • Medial rectus • Recession • BMR

Indications

Intermittent esotropia, sensory esotropia, consecutive esotropia, congenital esotropia, nonaccommodative esotropia

Essential Steps

1. Conjunctival incision (fornix or limbal)
2. Identification and isolation of medial rectus
3. Suturing of the anterior insertion site of the medial rectus
4. Disinsertion of the medial rectus
5. Recession measurement distance
6. Reattachment of the medial rectus
7. (Hang-back or adjustable sutures if used)
8. Hemostasis
9. Closure of the conjunctiva (occasionally left open if fornix based)
10. Repeat for other eye

D. Rush (✉) • A. Ali • E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: RushMD@msn.com; amro.ali9@icloud.com; Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_81

Complications

– Over/undercorrection
– Diplopia
– Granuloma formation
– Muscle or conjunctival hematoma
– Chorioretinal scarring
– Slipped muscle
– Orbital cellulitis
– Epithelial inclusion cysts
– Dellen formation
– Refractive changes
– Anterior segment ischemia
– Retinal detachment
– Vitreous hemorrhage
– Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: Esotropia

Procedure: Recession of medial rectus muscles OU

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*male/female*) who presented to the office with a diagnosis of *esotropia*. The patient was experiencing significant symptoms such as (double vision/eyestrain/headache/squinting/loss of binocular vision) which were not adequately controlled with nonsurgical methods. After a detailed review of risks, benefits, and alternatives with the (*mother/father/guardian*), the decision was made to undergo the procedure.

Description of the procedure: The patient was identified in the holding area. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. (*She/he*) was prepped and draped in the usual sterile fashion. ___ drops of 2.5 % phenylephrine was administered intraoperatively in both eyes. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

The (*left/right*) eye was taped closed with a steristrip, while an eyelid speculum was placed beneath the lids of the (*right/left*) eye. A ____mm inferonasal fornix-based conjunctival incision was performed on the (*right/left*) eye using Westcott scissors. A surgical dissection plane was carried out beneath Tenon's capsule to bare sclera, where the (*right/left*) medial rectus was identified. A Stevens hook was then passed parallel to the insertion site of the muscle, between the sclera and the muscle to isolate the medial rectus. A Greene hook was then passed behind the muscle belly to ensure that all the muscle fibers were isolated. The isolated medial rectus muscle was found to be of (*normal/abnormal*) tone on the insertion site.

The anterior insertion of the muscle was adequately exposed, and the muscle was sutured approximately ____mm from its insertion with a double-armed *6-0 Vicryl* suture on a spatulated needle. A full thickness locking whip stitch was then placed at the superior and inferior poles of the muscle. Light traction was then placed on the muscle hook, and the muscle was disinserted from the globe using tenotomy scissors. A distance of ____mm was measured and marked from the original insertion site to the planned insertion site using a caliper. The spatulated needles were then used to pass partial thickness bites through the sclera in their anteriorly and posteriorly marked sites. This was performed using the "crossed-swords" technique. Careful attention was made to ensure that no perforation or penetration of the globe occurred. The eye was thoroughly irrigated with BSS, followed by electrocautery for hemostasis. The conjunctival incision was closed with (*_#_ of interrupted 6-0 Vicryl sutures/tissue glue/electrocautery*).

The eyelid speculum was removed from the (*right/left*) and placed into the (*left/right*) eye while the (*right/left*) eye was taped closed with a Steri-Strip. Using the same technique described above, the (*left/right*) medial rectus was identified, isolated, and noted to be of (*normal/abnormal*) tone. The (*left/right*) medial rectus muscle was disinserted and reinserted at a distance of ___mm. No perforation or penetration of the globe occurred, and the conjunctival incision was closed in the same fashion as previously described. The speculum was subsequently removed from the (*left/right*) eye, and ___ drops of tetracaine ophthalmic solution followed by ___ drops of TobraDex ophthalmic solution were administered to each eye. The patient tolerated the procedure well. There were no complications, and the patient was transferred to the recovery room in stable condition.

Chapter 82
Bilateral Inferior Oblique and Lateral Rectus Recession

Dawn Rush and Alanna S. Nattis

Abstract Strabismus (abnormal ocular alignment) is a common problem in children. Misalignment may be vertical, horizontal, torsional, or a combination of these. Although strabismus can be treated with conservative therapy such as prisms, patching, glasses, and orthoptic exercises, many cases require surgery for correction. Horizontal eye muscle surgery is the most common strabismus surgery performed and is used for patients with exo- and eso-deviations, dissociated vertical deviations, abnormal head postures, and/or nystagmus. Several techniques are available for treatment of strabismus and may include resection, recession, splitting of muscles, or any combination of these treatments. Bilateral muscle recessions/resections may be performed, or surgery may be done on antagonist muscles of the same eye, depending on diagnosis and surgeon preference.

Keywords Exotropia • Hypertropia • Strabismus • Lateral rectus • Inferior rectus • Recession

Indications

Intermittent exotropia with hypertropia, sensory exotropia with hypertropia, consecutive exotropia with hypertropia, congenital exotropia with hypertropia

Essential Steps

1. Conjunctival incision (fornix or limbal)
2. Identification and isolation of lateral rectus
3. Lateral rectus placed on a traction suture
4. Identification and isolation of inferior oblique

D. Rush (✉)
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: RushMD@msn.com

A.S. Nattis
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_82

5. Suturing of the anterior insertion site of the inferior oblique
6. Disinsertion of the inferior oblique
7. Recession measurement distance
8. Reattachment of the inferior oblique
9. (Hang-back or adjustable sutures if used)
10. Suturing of the anterior insertion site of the lateral rectus
11. Disinsertion, recession, and reattachment of the lateral rectus
12. (Hang-back or adjustable sutures if used)
13. Hemostasis
14. Closure of the conjunctiva (occasionally left open if fornix based)
15. Repeat for other eye

Complications

- Over/undercorrection
- Diplopia
- Granuloma formation
- Muscle or conjunctival hematoma
- Chorioretinal scarring
- Slipped muscle
- Orbital cellulitis
- Epithelial inclusion cysts
- Dellen formation
- Refractive changes
- Anterior segment ischemia
- Retinal detachment
- Vitreous hemorrhage
- Endophthalmitis

Template Operative Dictation

Preoperative diagnosis: *Intermittent exotropia with bilateral hypertropia*

Procedure: Inferior oblique and lateral rectus recession OU

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*male/female*) who presented to the office with a diagnosis of *intermittent exotropia with bilateral hypertropia*. The patient was experiencing significant symptoms such as (double vision/eyestrain/headache/squinting/loss of binocular vision) which were not adequately controlled with non-surgical methods. After a detailed review of risks, benefits, and alternatives with the (*mother/father/guardian*), the decision was made to undergo the procedure.

Description of the procedure: The patient was identified in the holding area. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. (*She/he*) was prepped and draped in the usual sterile fashion. ___ drops of 2.5 % phenylephrine was administered intraoperatively in both eyes. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

The (*left/right*) eye was taped closed with a steristrip, while an eyelid speculum was placed beneath the lids of the (*right/left*) eye. A ____ mm inferotemporal fornix-based conjunctival incision was performed on the (*right/left*) eye using Westcott scissors. A surgical dissection plane was carried out beneath Tenon's capsule to bare sclera, where the (*right/left*) lateral rectus was identified. A Stevens hook was then passed parallel to the insertion site of the muscle, between the sclera and the muscle to isolate the lateral rectus. A Greene hook was then passed behind the muscle belly to ensure that all the muscle fibers were isolated. The isolated lateral rectus muscle was found to be of (*normal/abnormal*) tone on the insertion site, and the muscle was placed on a *4-0 silk* traction suture.

Next, the (*right/left*) inferior oblique muscle was identified. A Stevens hook was then passed parallel to the insertion site of the muscle, between the sclera and the muscle. A Greene hook was then passed behind the muscle belly to ensure that all the muscle fibers were isolated. The isolated inferior oblique muscle was found to be of (*normal/abnormal*) tone on the insertion site. The anterior insertion of the inferior oblique muscle was adequately exposed, and the muscle was sutured approximately ____ mm from its insertion with a double-armed *6-0 Vicryl* suture on a spatulated needle. A full thickness locking whip stitch was then placed at the superior and inferior poles of the muscle. Light traction was then placed on the muscle hook, and the muscle was disinserted from the globe using tenotomy scissors. A distance of ____ mm was measured and marked from the original insertion site to the planned insertion site using a caliper. The spatulated needles were then used to pass partial thickness bites through the sclera in their anteriorly and posteriorly marked sites. This was performed using the "crossed-swords" technique.

Attention was directed to the (*right/left*) lateral rectus. Using the same technique dictated above, the anterior insertion of the lateral rectus muscle was adequately exposed. The traction suture was removed, and the lateral rectus muscle was sutured at its insertion site and disinserted and reattached using the "crossed-swords" technique at a measured distance of ___ mm posteriorly. Careful attention was made to ensure that no perforation or penetration of the globe occurred. The eye was thoroughly irrigated with BSS, followed by electrocautery for hemostasis. The conjunctival incision was closed with (*_#_ of interrupted 6-0 Vicryl sutures/tissue glue/electrocautery*).

The eyelid speculum was removed from the (*right/left*) eye and placed into the (*left/right*) eye, while the (*right/left*) eye was taped closed with a Steri-Strip. Using the same technique described above, the (*left/right*) lateral rectus and inferior oblique were identified, isolated, and noted to be of (*normal/abnormal*) tones. The (*left/right*) lateral rectus and inferior oblique muscles were disinserted and reinserted at a distance of ___ mm and ___ mm, respectively. No perforation or penetration of the globe occurred, and the conjunctival incision was closed in the same fashion as previously described. The speculum was subsequently removed from the (*left*/*right*) eye, and ___ drops of tetracaine ophthalmic solution followed by ___ drops of TobraDex ophthalmic solution were administered to each eye. The patient tolerated the procedure well. There were no complications, and the patient was transferred to the recovery room in stable condition.

Chapter 83
Vertical and Horizontal Muscle Recessions With and Without Adjustable Suture

Vivek Patel

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Measurements of ocular misalignment need to be as precise as possible and stable for at least 6 months. If systemic thyroid status remains uncontrolled, surgery should be postponed until stability is achieved. If orbital decompression is considered, this should be performed before strabismus surgery, and orthoptic measurements repeated 2 months after decompression surgery. Clinical activity of the eye disease should also be minimal at the time of surgery.

Keywords Thyroid • Graves • Diplopia • Restrictive strabismus • Vertical • Horizontal • Adjustable suture

Indications

Such patients usually have intractable diplopia with large angle misalignment not readily amenable to prism wear. The possibility of prism wear after surgery and need for more surgery should be discussed with the patient at the time of informed consent. Adjustable suture technique can be considered for any patient that may tolerate the procedure. Muscle resections are very rarely performed, as recessions are preferred in restrictive strabismus cases.

Essential Steps

1. Administration of phenylephrine 2.5 % drops q15 min × 3.
2. Induction of general anesthesia.
3. Eyelid speculum used to retract eyelids.
4. Forced duction testing.
5. Conjunctival incision over the desired muscle (start with the muscle to be recessed).
6. Clearly check ligaments.

V. Patel (✉)
USC Roski Eye Institute, Keck School of Medicine, Los Angeles, CA, USA
e-mail: Vivek.Patel@med.usc.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_83

7. Hook the extraocular muscle (may be very tight).
8. Imbricate the muscle at insertion site (consider nonabsorbable suture for inferior rectus muscles).
9. Detach the muscle from the sclera using Westcott scissors.
10. Reattach the muscle using partial thickness scleral passes.
11. Close conjunctiva.
12. Repeat for other muscles to be recessed.

Complications

- Muscle avulsion or shearing
- Imbricating suture cut or sheared from the muscle
- Lost or slipped muscle
- Scleral perforation
- Vision loss
- Retinal detachment
- Vitreous hemorrhage
- Anterior segment ischemia
- Conjunctival recession with suture exposure
- Pyogenic granuloma
- Corneal abrasion
- Late postoperative overcorrection
- Reactivation of thyroid eye disease

Template Operative Dictation

Preoperative diagnosis: *Restrictive strabismus, severe Graves' orbitopathy with a right hypertropia of _30_ prism diopters and esotropia of _20_ prism diopters*

Procedure: (*Right/Left*) superior rectus recession of _4.5_mm on adjustable suture with a (*left/right*) inferior rectus recession of _9_mm on nonabsorbable Mersilene suture, as well as a (*right/left*) medial rectus recession of _6_mm on adjustable suture

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) had developed significant horizontal and vertical ocular misalignment over the past several months. Following stability of measurements, surgical realignment was considered and detailed measurements were taken. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area and informed consent was signed. Both eyes were marked in the holding area given bilateral surgery. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. (*She/he*) was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A lid speculum was placed to separate the upper and lower lids of the (*left/right*) eye. It was seen that the (*left/right*) eye was considerably hypo-deviated given the expected (*left/right*) inferior rectus restriction. Forced ductions revealed marked restriction in attempted *elevation* and *abduction* of the globe. An inferior conjunctival peritomy was performed, and the inferior rectus muscle was then hooked on a Jameson hook and freed of check ligaments and Tenon's fascia. The inferior rectus was seen to be extremely tight and was not capable of being manually elevated to primary position. A grooved hook was passed underneath the left inferior rectus muscle insertion to facilitate a more safe passage of the imbrication suture of *6-0 nonabsorbable Mersilene* suture. The suture was then weaved through the muscle insertion as well as taking locking bites on either end. The muscle was then carefully detached using Westcott scissors.

The inferior rectus was reattached to the eye using partial thickness scleral bites _*9*_ mm posterior to the original incision site. This position of the muscle was seen to have maximal relaxation, deemed intraoperatively. The muscle was extremely tight, and pulling it up further would not have been possible without sheering the sutures. This appeared to relax the esotropia to some degree given the combined restrictive forces of the inferior and medial rectus muscles. The conjunctiva was then closed overlying the muscle suture and sclera using *6-0 plain gut* suture.

Attention was now directed to the (*right/left*) eye. (*He/She*) was seen again to be extremely tight in the MR territory, namely, when the eye was passively moved into abduction by forced duction testing. There was a vertical restriction as well, *however, not as much as the left eye*. A medial _*120*_-degree limbal conjunctival peritomy was performed and the medial rectus muscle was hooked on a Jameson hook and freed of check ligaments and tenon's fascia. The medial rectus was then imbricated using a *6-0 double-armed Vicryl* suture through its original insertion site and then detached from the eye using Westcott scissors. The muscle was then reattached through the original insertion site using partial thickness scleral bites; however, it allowed to hang back _*6.0*_ mm in the pole sutures. The muscle was secured at this location using another *6-0 undyed Vicryl* suture which was tied in a cinch knot surrounding the pole sutures, permitting adjustment postoperatively. The conjunctiva was closed overlying the muscle suture and sclera.

Attention was now directed to the superior aspect of the (*right/left*) eye. Given that we wanted further control over the final position and vertical alignment it was decided to put the superior rectus muscle of the (*right/left*) eye on an adjustable suture. A superior _*120*_-degree limbal conjunctival peritomy was performed and the superior rectus muscle was then hooked on a Jameson hook. The muscle was freed of check ligaments and tenon's fascia being very careful not to violate the underlying superior oblique muscle. The superior rectus muscle was then imbricated using a *6-0 double-armed Vicryl* suture through its original insertion site, then

Fig. 83.1 Isolated inferior rectus: The inferior rectus muscle is hooked on a Jameson hook, with adjacent Tenon's fascia and check ligaments cleared. At this point, the muscle can be imbricated

detached from the eye using Westcott scissors. It was reattached to the eye through the original insertion site, while being allowed to hang back on the pole sutures _*4.5*_ mm. At this point, it was secured at this location using another *6-0 undyed Vicryl* suture which was tied in a cinch knot surrounding the pole sutures. The conjunctiva was then closed overlying the muscle suture and sclera.

A patch was placed over of the right eye to protect the sutures as well as the eye upon emergence. The patient tolerated the procedure well and was transferred to the postanesthesia care unit in stable condition. The plan was discussed with the patient, and (*he/she*) will be seen later this afternoon for final suture adjustment and tie off as required (Fig. 83.1).

Post-Op Notes for the Reader

The patient was seen back for a final suture adjustment and alignment check 5 h after surgery had been completed. The patch was removed and it was noted that he had a residual ten prism diopter right hypertropia and 6 PD esotropia. Our intention is to leave him somewhat undercorrected given the expectation of late postoperative overcorrection of the recessed inferior rectus and medial rectus muscles. Hence, the medial rectus muscle was left without further manipulation and secured by tying the pole sutures around the adjustable knot and cutting each short. For the right superior rectus muscle, a further recession of 2 mm was performed which reduced his hyperdeviation to five prism diopters on the right side; hence he was left with a five prism diopter right hypertropia intentionally given the expectation that over time he may well achieve an alignment closer to orthophoria. He was able to maintain good alignment and was not noticing double vision with a slight chin-up posture. He noted a marked improvement from his preoperative alignment.

Following the final suture manipulations and tie off, the conjunctiva was closed overlying the muscle suture and sclera using 6-0 plain gut suture. They were given postoperative instructions including the use of polymyxin/dexamethasone ointment 3 times a day in both eyes for 1 week, as well as pain medications to use every 4–6 h as needed. He was instructed to follow up in 3 days, or sooner PRN.

Chapter 84
Hummelsheim Transposition for Complete Paralytic Sixth Nerve Palsy

Vivek Patel

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Measurements of ocular misalignment need to be as precise as possible and stable for at least 6 months. A transposition of the vertical rectus muscles should be considered for patients with a complete or near complete sixth nerve palsy, given that a standard recess and resect procedure would not be sufficient to address the deficit in abduction.

Keywords Transposition • Diplopia • Paralytic strabismus • Vertical • Horizontal • Adjustable suture • Hummelsheim

Indications

Such patients usually have intractable diplopia with large angle misalignment not readily amenable to prism wear. The possibility of prism wear after surgery and need for more surgery should be discussed with the patient at the time of informed consent. Adjustable suture technique can be considered for any patient that may tolerate the procedure, allowing greater precision of alignment. Alternatively, direct, intraoperative injection of botulinum toxin into the ipsilateral medial rectus can be considered for muscles in which contracture is suspected based on forced duction testing. Various intraoperative modifications can be performed to titrate or augment the degree of effect desired.

Essential Steps

1. Administration of phenylephrine 2.5 % drops q15 min × 3.
2. Induction of general anesthesia.
3. Eyelid speculum used to retract eyelids.
4. Forced duction testing.
5. 360° conjunctival incision with relaxing incisions in four quadrants.
6. Begin with isolation of vertical rectus muscles.

V. Patel (✉)
USC Roski Eye Institute, Keck School of Medicine, Los Angeles, CA, USA
e-mail: Vivek.Patel@med.usc.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_84

7. Hook the extraocular muscle.
8. Longitudinally split the vertical rectus muscles (split 12–14 mm in length) into two equal components, in between the anterior ciliary arteries.
9. Imbricate the muscles at lateral component of the split muscle at the insertion site (*small resection here can augment the effect*).
10. Detach the imbricated portion of the vertical rectus muscles from the sclera using Westcott scissors.
11. Isolate the lateral rectus muscle.
12. Reattach the lateral stumps of SR and IR muscles using partial thickness scleral passes, adjacent to the LR insertion.
13. Perform full-thickness muscle union of transposed SR and IR bellies to the LR muscle (*imbricating a small amount sclera in between the muscles can augment the effect*).
14. Isolate the medial rectus muscle.
15. Imbricate the MR muscle.
16. Detach from the eye and reattach 4–6 mm posterior to insertion site (*adjustable suture technique or alternative would be direct injection of two to four units of botulinum toxin into the MR muscle belly, without recessing the muscle*).
17. Close conjunctiva.

Complications

– Muscle avulsion or shearing
– Imbricating suture cut or sheared from the muscle
– Lost or slipped muscle
– Scleral perforation
– Vision loss
– Retinal detachment
– Vitreous hemorrhage
– Anterior segment ischemia
– Conjunctival recession with suture exposure
– Pyogenic granuloma
– Corneal abrasion
– Over or undercorrection
– Consecutive exotropia in opposite field of gaze

Template Operative Dictation

Preoperative diagnosis: Complete paralytic right sixth nerve palsy with no capacity for abduction (*OD*/*OS*)

Procedure: (1) Hummelsheim transposition of the vertical rectus muscles to the lateral rectus muscle with muscle union and (2) ipsilateral medial rectus recession on adjustable suture (*OD*/*OS*)

Postoperative diagnosis: *Same*

Indication: A complete paralysis of the (*right/left*) 6th nerve with no capacity for abduction. In this scenario, the only surgical possibility was a transposition procedure and chose the Hummelsheim-type transposition. Following stability of measurements, surgical realignment was considered and detailed measurements were taken. The visual impairment was affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area and informed consent was signed. The (*right/left*) eye was marked in the holding area. The patient was brought to the operating room, placed in a supine position, and connected to cardiorespiratory monitoring devices. The patient then received general anesthesia with LMA intubation. (*She/he*) was prepped and draped in the usual sterile fashion. A proper time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

Following induction of general anesthesia. A lid speculum was placed to separate the upper and lower lids of the (*right/left*) eye. Forced duction testing revealed a mild amount of restriction within the medial rectus muscle of the (*right/left*) eye evidenced by slight difficulty in abducting the eye. A 360° conjunctival peritomy was performed given that all four rectus muscles would need to be accessed in this case. Relaxing incisions were placed at the four quadrants of the 360° conjunctival peritomy. The inferonasal, inferotemporal, superonasal, and superotemporal quadrants of the conjunctiva and sub-Tenon's space were bluntly dissected to isolate the vertical rectus muscles. The inferior rectus muscle was hooked first, and using a Stevens hook, it was split longitudinally *14* mm posteriorly, beginning at its insertion. Using blunt technique, the capsulopalpebral fascia was pushed posteriorly, and the split was fashioned in between the anterior ciliary arteries.

The superior rectus muscle was isolated next, and it was ensured that the underlying superior oblique muscle was not entrapped in the isolation. Similar to the inferior rectus muscle, the anterior ciliary vessels of the superior rectus were identified, and a Stevens hook was used to separate the muscle fibers longitudinally *14* mm posteriorly, beginning at the insertion site. A *6-0 double-armed Vicryl* suture was passed through the lateral aspect of the insertion of the superior rectus muscle, as well as through the lateral aspect of the insertion of the inferior rectus muscle. The imbricated portions of the muscles were then detached from the eye following imbrication. The medial stump of the inferior rectus muscle, as well as the medial stump of the superior rectus muscle, remained attached at their insertion site without any further manipulation.

The superotemporal and inferotemporal quadrants of the eye were cleared of Tenon's fascia. The lateral rectus muscle was then hooked and isolated. Once the lateral rectus muscle was isolated, the lateral stump of the inferior rectus muscle and the lateral stump of the superior rectus muscle were transposed to the border of the LR insertion. The stumps were then attached to the eye using partial-thickness scleral passes immediately superior and inferior to the lateral rectus muscle insertion.

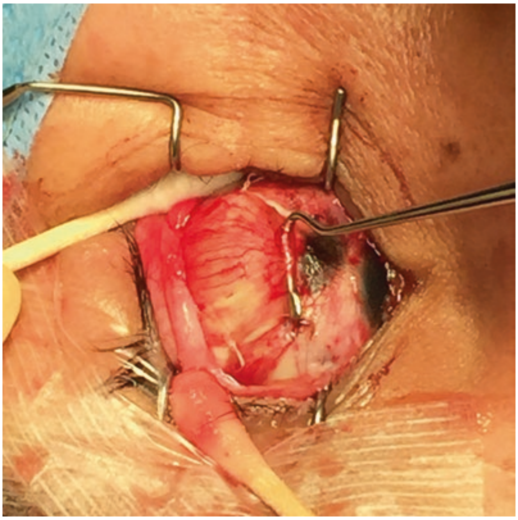

Fig. 84.1 Isolated inferior rectus: the inferior rectus muscle is hooked on a Jameson hook, with adjacent Tenon's fascia and check ligaments cleared. At this point, the muscle can be imbricated

A muscle union suture unifying the muscles _6_mm posteriorly were performed for both rectus stumps. The superior border of the inferior rectus transposed muscle was then fastened to the inferior border of the lateral rectus muscle using a *5-0 Mersilene nonabsorbable* suture. Similarly, the superior border of the lateral rectus muscle was fastened to the inferior border of the transposed superior rectus muscle _6_mm posterior to the insertion.

Following this, the medial rectus muscle was hooked on a Jameson hook and freed of ligaments and Tenon's fascia. It was imbricated through its original insertion site using a *6-0 double-armed Vicryl* suture, then detaching using Westcott scissors. The muscle was reattached to the eye through the original insertion site, while being allowed to hang back on the pole sutures _4.0_mm. The medial rectus was then secured at this location using another *6-0 undyed Vicryl* suture and tied in a cinch knot surrounding the pole sutures, thereby permitting postoperative adjustment if required. The conjunctiva was then closed overlying the muscle suture and sclera using a *6-0 plain gut* suture. The patient tolerated the procedure well, and a patch was placed over the (*right/left*) eye and the sutures for the postoperative recovery period (Fig. 84.1).

Post-Op Notes for the Reader

Five hours after surgery, the patient was seen to be quite awake and ready for the postoperative evaluation. (She/He) had excellent improvement in (her/his) ductions. The (right/left) eye moved considerably better toward abduction, and there was a very minimal compromise in adduction in the same eye. There was an eight prism diopter exotropia at this point, which collapsed his preoperative deviation of 30 *prism diopters of esotropia. The medial rectus muscle was advanced slightly to reduce his exotropia to four prism diopters. This was desired, as we expect over the next few weeks that the transposed tendons will relax to some degree reducing the amount of abducting force present. The muscle was secured at this position and the conjunctiva was then closed overlying the muscle suture and sclera using 6-0 plain gut suture.*

Polymyxin ointment was placed in the eye and given postoperative instructions. The patient was prescribed pain medications and will use Predforte and steroid drops 4 times a day as well as Ocuflox 4 times a day for the next week.

Chapter 85
Surgical Optical Iridectomy

Alanna S. Nattis and Gerald Zaidman

Abstract In cases of obstruction of the visual axis secondary to pupillary and/or iris abnormalities, it may be necessary to perform an optical iridectomy to increase pupil size, provide a larger visual field, and to prevent amblyopia. Surgical optical iridectomy involves creating and/or enlarging the pupil size by physically removing iris obstruction from the visual axis. If there are iridolenticular adhesions, with violation of the lens capsule, the ophthalmologist may consider a combined lensectomy-iridectomy. In cases of aphakia or pseudophakia, where there may be presentation of vitreous, the ophthalmologist should be prepared to perform an anterior vitrectomy, if needed. The patient/guardian(s) should be informed of the need for further surgery, poor cosmesis, corectopia, photopsias, or other visual disturbances postoperatively.

Keywords Optical iridectomy • Iris • Posterior synechiae • Amblyopia • Iris malformation • Visual axis • Corneal opacity

Indications

Posterior synechiae, corneal opacity, scarring, congenital iris malformation blocking visual axis leading to decreased vision, amblyopia

Essential Steps

1. Paracentesis incisions
2. Injection of viscoelastic into anterior chamber
3. Visco-synechiolysis or blunt synechiolysis with instrument, if necessary
4. Incision of the iris for iridectomy
5. Irrigation of viscoelastic from the anterior chamber
6. Closure/hydration of wounds

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

G. Zaidman
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: pedkera@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_85

Complications

– Hyphema
– Corneal edema
– Corectopia
– Elevated IOP
– Damage to lens (crystalline or IOL implant)
– Cataract formation
– Endophthalmitis
– Traumatic injury to the iris

Template Operative Dictation

Preoperative diagnosis: small, irregular pupil (*OD*/*OS*)

Procedure: Surgical optical iridectomy (*OD*/*OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male*/*female*) with a well-known and documented history of (*posterior synechiae*/*congenital pupillary*/*iris malformation*) complained of decreased vision despite the use of mydriatic eye drops and spectacles. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the preoperative area, and the (*right*/*left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying the correct patient, procedure, site, position, and special equipment prior to starting the case. (*General*/*local*) anesthesia was induced. The (*right*/*left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right*/*left*) eye.

Following anesthesia and ophthalmic akinesia, a wire lid speculum was placed into the patient's (*right*/*left*) eye. Two paracentesis incisions were made at *10 and 2 o'clock* with a microsharp #75 blade. Dispersive viscoelastic was injected into the (*right*/*left*) eye (and *if synechiae present*, *while also serving to break the synechiae from the iris to the lens*). The pupillary edge was lifted with care, and viscoelastic injected between the lens and the iris. Vannas scissors were used to create an optical iridectomy by incising the iris radially at the ____-o'clock position for approximately ___mm. The eye was then thoroughly irrigated using balanced saline solution (BSS) in order to remove viscoelastic and ensure hemostasis. The paracentesis wounds were hydrated and noted to be watertight. Cyclopentolate, β-blocker, and phenylephrine drops were administered topically, and injections of *antibiotics* and/or *steroids* were given subconjunctivally. Antibiotic eye ointment was placed in the inferior fornix, the eyelid speculum was removed, and a patch and shield were placed over the eye. The patient was then transferred to the recovery room in stable condition, and (he/she) tolerated the procedure well.

Chapter 86
Surgical Posterior Capsulotomy with Anterior Vitrectomy

Alanna S. Nattis and Gerald Zaidman

Abstract For patients who develop posterior capsular opacification but cannot sit for/tolerate laser Nd: YAG capsulotomy, surgical capsulotomy performed under sedation/general anesthesia is a viable option. In pediatric patients who have undergone cataract extraction/lensectomy and have developed posterior capsular opacification, it is necessary to relieve the visual obstruction to prevent amblyopia. The ophthalmologist should be prepared to perform an anterior vitrectomy, should vitreous prolapse following capsulotomy. Patients and their guardian(s) should be adequately informed of the risks, benefits, and alternatives of the procedure, as well as the possible need for further surgery.

Keywords Posterior capsular opacity • Vitreous • Lens • Pseudophakia • YAG laser

Indications

Opacified posterior capsule, posterior capsular membrane causing decreased vision, and uncooperative patient who would not tolerate a YAG laser

Essential Steps

1. Anterior chamber paracentesis incisions
2. Injection of viscoelastic into anterior chamber
3. Elevation of intraocular lens implant (IOL) with blunt instrument (e.g., cyclodialysis spatula)
4. Injection of viscoelastic into posterior chamber, behind IOL
5. Use of microvitreoretinal blade to create a surgical capsulotomy
6. Insertion of anterior chamber maintainer

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

G. Zaidman
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: pedkera@aol.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_86

7. Anterior vitrectomy
8. Sweeping of wounds and angle with spatula
9. Miochol injection into anterior chamber
10. Hydration/suturing of wounds
11. *Subconjunctival antibiotic/steroid injections*

Complications

- Persistently leaking wound
- Incomplete posterior capsulotomy
- Vitreous incarceration
- Corneal edema
- Loss, subluxation, or dislocation of IOL
- Endophthalmitis
- Cystoid macular edema (CME)
- Retinal detachment
- Traumatic injury to iris

Template Operative Dictation

Preoperative diagnosis: *Post-CE/IOL with secondary opacified posterior capsule* (*OD/OS*)

Procedure: Surgical posterior capsulotomy with anterior vitrectomy (OD/OS)

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) status post cataract extraction with intraocular lens implant subsequently developed posterior capsule opacification, causing significant visual obstruction. The patient was unable to cooperate for a laser capsulotomy secondary to (*mental status/age/disability*). After a detailed review of risks and benefits, the (*patient/guardian*) elected to undergo the procedure.

Description of the procedure: The patient was identified in the preoperative area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. A proper time-out was performed verifying the correct patient, procedure, site, position, and special equipment prior to starting the case. General anesthesia was induced. The (*right/left*) eye was prepped and draped in the usual sterile fashion. The operating microscope was centered over the (*right/left*) eye.

Following anesthesia and ophthalmic akinesia, a wire lid speculum was placed into the patient's (*right/left*) eye. Two paracentesis incisions were made at *10 and 2 o'clock* with a microsharp #75 blade. Dispersive viscoelastic was injected into the (*right/left*) eye. Using a cyclodialysis spatula, the edge of the IOL was then lifted up out of the bag and dispersive viscoelastic injected between the IOL and the posterior capsule. A microvitreoretinal blade was passed under the IOL, and then used to create multiple circumferential stab wounds into the posterior capsule until an opening was created. Additional dispersive viscoelastic was then injected into the space while the MVR blade was removed and the wound enlarged with a 2.4 mm keratome.

An anterior vitrectomy was then performed by first placing an anterior chamber maintainer through the *2 o'clock* incision and the vitrectomy handpiece through the enlarged second incision. The vitrectomy handpiece was placed below the IOL and in the vicinity of the posterior capsular bag opening while a complete anterior vitrectomy was performed. All instruments were removed from the eye once completed. The wounds were checked with Weck-Cel sponges for the presence of vitreous and none was noted. The cyclodialysis spatula was introduced into the anterior chamber to sweep the wounds and angle for the presence of vitreous. After the anterior chamber was noted to be free of vitreous, acetylcholine chloride was instilled and pupillary miosis was induced. The intraocular lens was checked and remained centered. The paracentesis wounds were hydrated and each reinforced with _#_ interrupted *10-0 Vicryl sutures*. All the wounds were noted to be watertight. Cyclopentolate and β-blocker drops were administered topically, and injections of *antibiotics* and *steroid* were given subconjunctivally. The eyelid speculum was removed and antibiotic-steroid eye ointment was placed in the inferior fornix. A patch and shield was placed over the eye. The patient was then transferred to the recovery room in stable condition, and (he/she) tolerated the procedure well.

Part VI
Occuloplastics and Orbit

Chapter 87
Orbit: One-Wall (Medial) Decompression

Cameron B. Nabavi and Craig N. Czyz

Abstract Thyroid eye disease causes orbital congestion and proptosis due to extraocular muscle and orbital fat enlargement with fibrosis. Proptosis, in turn, can lead to compressive optic neuropathy and exposure keratopathy. Treatment of proptosis from thyroid eye disease consists of orbital decompression, taking advantage of the adjacent sinus spaces to expand orbital volume. For cases of mild proptosis, medial wall decompression alone can be done, taking advantage of the adjacent ethmoid sinuses. Patients should be educated about the risks, benefits, and alternatives of the procedure including bleeding, infection, loss of vision, double vision, and need for more surgery.

Keywords Thyroid eye disease • TED • Exophthalmos • Compressive optic neuropathy • Medial • Decompression

Indications

Compressive optic neuropathy, exposure keratopathy, and proptosis are key indications to consider orbital decompression in general. Medial wall decompression can be of benefit in patients with mild symptoms and no compressive optic neuropathy, in which multiple wall decompression is a better approach. Medial wall decompression can be done via a transcaruncular approach, concealing any surgical incisions.

Essential Steps

1. General anesthesia is administered.
2. Local infiltration to the caruncle and inferior conjunctival cul-de-sac is performed.

C.B. Nabavi (✉)
Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA
e-mail: cnabavi@yahoo.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_87

3. A corneal eye shield is placed.
4. Westcott scissors are used to create a surgical plane between the caruncle and plica semilunaris.
5. A four-pronged lacrimal rake is placed for medial traction.
6. Blunt dissection with curved Stevens scissors aiming for the posterior lacrimal crest is performed until periosteum is exposed.
7. A Freer elevator is used to free the periosteum from the underlying medial wall.
8. The anterior and posterior ethmoid arteries are treated with care and are a landmark for the superior extent of decompression.
9. A thin, malleable retractor is used to retract the orbital contents in the subperiosteal plane.
10. The Fraser suction or Freer elevator can be used to fracture the medial wall. Pituitary forceps, upbiting Kerrison rongeurs or Takahashi forceps are used to remove bone of the medial orbital wall and underlying ethmoid sinus air cells.
11. Once adequate medial decompression is performed, oxymetazoline (Afrin) is irrigated through the area for hemostasis.
12. The periorbita is incised with #12 Bard-Parker blade between the medial and inferior rectus muscles, allowing orbital fat to prolapse forward.
13. A malleable retractor is placed as countertraction in the subperiosteal plane, while gentle pressure is placed on the globe allowing orbital contents to prolapse into the decompression sites.
14. The transcaruncular incision is closed with 6-0 plain gut in a buried fashion.
15. The corneal shield is removed.
16. The patient is extubated.

Complications

- Orbital hemorrhage
- Orbital compartment syndrome
- Optic nerve injury
- Infection
- Diplopia
- Restricted motility
- Subconjunctival hemorrhage
- Vision loss
- Globe dystopia
- Globe rupture
- Hypoesthesia
- Eyelid retraction or ptosis
- Vitreous hemorrhage
- Retinal detachment
- Cerebrospinal fluid leak
- Lacrimal drainage system injury
- Keratopathy

Template Operative Dictation

Preoperative diagnosis: *Thyroid eye disease with proptosis (and exposure keratopathy) (left/right) eye*

Procedure: (1) Anterior orbitotomy with removal of bone for decompression and (2) lateral canthoplasty of the (*right/left*) eye

Postoperative diagnosis: Same

Indication: This is a ____-year-old _____ (*race*) (*male/female*) with a history of thyroid eye disease and symptoms of (*exposure keratopathy/proptosis*). These symptoms have not improved with medical management, and the medial wall decompression has been recommended. A detailed review of the risks, benefits, and alternatives to a medial wall decompression were discussed with the patient, including but not limited to bleeding, infection, loss of vision, loss of the eye, globe malposition, double vision, and need for more surgery. The patient understands the risks, benefits and alternatives and wishes to proceed. The informed consent was then signed.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye was marked with a surgical marking pen. The patient was brought into the operating room under anesthesia care and placed supine on the operating room table. General endotracheal anesthesia was administered. The patient was then prepped and draped in a standard sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. 2 % lidocaine with 1:100,000 epinephrine and 0.75 % Marcaine in a 1:1 ratio were injected into the caruncle and inferior conjunctiva via a transconjunctival approach. A corneal shield was placed.

If canthotomy performed: *A lateral canthotomy with an inferior cantholysis was performed to gain improved access to the orbital floor. A #15 Bard-Parker blade was used to make a ___mm incision in the (right/left) lateral canthal angle. The lateral canthal tendon and inferior crus were then disinserted. Hemostasis was maintained with (monopolar/bipolar) cautery*.

Attention was turned to the caruncle where Westcott scissors were used to create a surgical plane between the caruncle and plica semilunaris. Blunt dissection with Stevens scissors was directed to the posterior lacrimal crest, and a Freer elevator was used to open the medial periosteum. A Freer elevator was then used to free the periosteum from the underlying medial wall. A malleable retractor was used to retract the orbital contents and expose the subperiosteal plane. The subperiosteal dissection was continued until the lamina papyracea of the medial wall was visualized and the appropriate amount of medial wall was exposed. A Freer elevator was used to infracture the medial orbital wall. Bone of the medial orbit was removed with a (*pituitary/Takahashi*) forceps. Underlying ethmoid air cells and mucosa were also removed. Once adequate medial bony decompression was performed, the area was irrigated with oxymetazoline for hemostasis.

A #12 Bard-Parker blade was used to incise the periorbita between the medial and inferior rectus muscles allowing the orbital fat to prolapse forward. A malleable retractor was placed for countertraction in the subperiosteal plane, while gentle pressure was placed on the globe allowing the orbital contents to prolapse into the decompressed medial orbit. The transcaruncular incision was closed with *6-0 plain gut* suture in a buried interrupted fashion.

If canthotomy performed: *The lateral lower lid was secured to the common canthus and lateral orbital rim with 5-0 Vicryl suture.*

A 5-0 Vicryl suture was passed in a whipstitch fashion through the anterior and posterior tarsus of the lid. The suture was then passed through the common canthal tendon at the lateral orbital rim. The suture was temporally tightened to assess lid position. Lid position was found to be appropriate. A buried, interrupted 6-0 Vicryl suture was then passed gray line to gray from upper to lower lid to reform the lateral canthal angle. The 5-0 Vicryl suture was then tied down. The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion. The skin incision was then closed using simple, interrupted 6-0 plain gut sutures.

Ophthalmic antibiotic ointment was placed on the ocular surface after the corneal eye shield was removed. The patient was extubated and taken to the recovery area in stable condition. The patient tolerated the procedure well.

Chapter 88
Orbit: Two-Wall (Medial and Floor) Decompression

Cameron B. Nabavi and Craig N. Czyz

Abstract Thyroid eye disease causes orbital congestion and proptosis due to extraocular muscle and orbital fat enlargement with fibrosis. Proptosis, in turn, can lead to compressive optic neuropathy and exposure keratopathy. Treatment of proptosis from thyroid eye disease consists of orbital decompression, taking advantage of the adjacent sinus spaces to expand orbital volume. For cases of moderate proptosis, medial wall and floor decompression can be done, taking advantage of the adjacent ethmoid sinuses and maxillary sinus, respectively. Patients should be educated about the risks, benefits, and alternatives of the procedure including bleeding, infection, loss of vision, double vision, and need for more surgery.

Keywords Thyroid eye disease • TED • Exophthalmos • Compressive optic neuropathy • Medial and floor • Decompression

Indications

Compressive optic neuropathy, exposure keratopathy, and proptosis are key indications to consider orbital decompression in general. Two-wall decompression can be of benefit in patients with moderate to severe symptoms including compressive optic neuropathy. Medial wall decompression can be done via a transcaruncular approach, while a transconjunctival approach with or without a lateral canthotomy can be done for the orbital floor, concealing any surgical incisions.

Essential Steps

1. General anesthesia is administered.
2. Local infiltration to the caruncle and inferior conjunctival cul-de-sac is performed.

C.B. Nabavi (✉)
Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA
e-mail: cnabavi@yahoo.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_88

3. A corneal eye shield is placed.
4. *If needed, a lateral canthotomy with inferior cantholysis is performed.*
5. An incision through the conjunctiva, lid retractors, and periosteum of the inferior orbital rim is performed.
6. A Freer elevator is used to free the periosteum from the underlying orbital floor.
7. An osteotome and mallet create an osteotomy in the medial posterior orbital floor.
8. A judicious amount of bone is removed with a forceps (care is taken to avoid the infraorbital nerve and orbital strut which can lead to V2 hypoesthesia and diplopia, respectively).
9. Once adequate bony decompression of the floor is performed, attention is placed to the medial wall.
10. An incision between the caruncle and plica semilunaris is performed.
11. A four-pronged lacrimal rake is placed for medial traction.
12. Blunt dissection with curved Stevens scissors aiming for the posterior lacrimal crest is performed until periosteum is reached.
13. A Freer elevator is used to free the periosteum from the underlying medial wall.
14. The anterior and posterior ethmoid arteries are treated with care and are a landmark for the superior extent of decompression.
15. A thin malleable retractor is used to retract the orbital contents in the subperiosteal plane.
16. The Fraser suction or Freer elevator can be used to fracture the medial wall. Pituitary or Takahashi forceps are used to remove bone of the medial orbital wall and underlying ethmoid sinus air cells.
17. Once adequate medial decompression is performed, oxymetazoline (Afrin) is irrigated through the area for hemostasis.
18. The periorbita is incised with #12 Bard-Parker up-biting blade between the medial and inferior rectus muscles, allowing orbital fat to prolapse forward.
19. A malleable retractor is placed as countertraction in the subperiosteal plane, while gentle pressure is placed on the globe allowing orbital contents to prolapse into the decompression sites.
20. The transcaruncular incision is closed with *6-0 plain gut* in a buried fashion (the transconjunctival incision is not closed).
21. If a lateral canthotomy had been performed, the lateral lower lid tarsus is reapproximated to the common canthus and lateral orbital rim with 5-0 vicryl suture. The lateral canthal angle is reapproximated with a 6-0 vicryl suture. The skin is closed with 6-0 plain gut suture.
22. The corneal shield is removed.
23. The patient is extubated.

Complications

– Orbital hemorrhage
– Orbital compartment syndrome
– Optic nerve injury
– Infection
– Diplopia
– Restricted motility

- Subconjunctival hemorrhage
- Vision loss
- Globe dystopia
- Globe rupture
- Hypoesthesia (V2)
- Eyelid retraction or ptosis
- Vitreous hemorrhage
- Retinal detachment
- Cerebrospinal fluid leak
- Lacrimal drainage system injury
- Keratopathy

If lateral canthoplasty/cantholysis is employed:

- Scarring
- Lid laxity/malposition
- Canthal angle distortion

Template Operative Dictation

Preoperative diagnosis: *Thyroid eye disease with proptosis, exposure keratopathy (and/or compressive optic neuropathy) (left/right)* eye

Procedure: (1) Two-wall anterior orbitotomy with removal of bone for decompression and (2) lateral canthoplasty (*right/left*) eye

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old _____ (*race*) (*male/female*) with a history of thyroid eye disease and symptoms of *(exposure keratopathy, proptosis, and/or compressive optic neuropathy)*. These symptoms have not improved with medical management, and the medial wall and orbital floor decompression has been recommended. A detailed review of the risks, benefits, and alternatives to a medial wall and floor decompression were discussed with the patient, including but not limited to bleeding, infection, loss of vision, loss of the eye, globe malposition, double vision, and need for more surgery. The patient understands the risks and benefits and wishes to proceed. The informed consent was then signed.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye was marked with a surgical marking pen. The patient was brought into the operating room under anesthesia care and placed supine on the operating room table. General endotracheal anesthesia was administered. The patient was then prepped and draped in a standard sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. 2 % lidocaine with 1:100,000 epinephrine and 0.75 % Marcaine in a 1:1 ratio were injected into the caruncle and inferior conjunctiva via a transconjunctival approach. A corneal shield was placed.

If canthotomy performed*: A lateral canthotomy with an inferior cantholysis was performed to gain improved access to the orbital floor. A #15 Bard-Parker blade was used to make a ___ mm incision in the (right/left) lateral canthal angle. The lateral canthal tendon and inferior crus were then disinserted. Hemostasis was maintained with (monopolar/bipolar) cautery.*

A Desmarres retractor was used to retract the lower lid, while a Jaeger lid plate was used to protect the globe. Cutting electrocautery was used to cut through the conjunctiva, lid retractors, and inferior orbital rim periosteum. A Freer elevator was used to free the orbital floor periosteum from the underlying orbital floor. An osteotome and mallet were used to create a bone window through the posterior medial orbital floor. The bone of the orbital floor was removed with a pituitary forceps and an up-biting Kerrison rongeurs. Care was taken to avoid the infraorbital nerve bundle and anterior orbital strut. Once an adequate orbital floor decompression was performed, attention was placed to the medial wall.

Westcott scissors were used to create a surgical plane between the caruncle and plica semilunaris. Blunt dissection with Stevens scissors was directed to the posterior lacrimal crest, and a Freer elevator was used to open the medial periosteum. A Freer elevator was then used to free the periosteum from the underlying medial wall. A malleable retractor was used to retract the orbital contents and expose the subperiosteal plane. The subperiosteal dissection was continued until the lamina papyracea of the medial wall was visualized and the appropriate amount of medial wall was exposed. A Freer elevator was used to infracture the medial orbital wall. Bone of the medial orbit was removed with a (*pituitary/Takahashi*) forceps. Underlying ethmoid air cells and mucosa were also removed. Once adequate medial bony decompression was performed, the area was irrigated with oxymetazoline for hemostasis.

A #12 Bard-Parker blade was used to incise the periorbita between the medial and inferior rectus muscles allowing the orbital fat to prolapse forward. A malleable retractor was placed for countertraction in the subperiosteal plane, while gentle pressure was placed on the globe allowing the orbital contents to prolapse into the decompressed medial orbit. The transcaruncular incision was closed with *6-0 plain gut* suture in a buried interrupted fashion.

If canthotomy performed: *The lateral lower lid was secured to the common canthus and lateral orbital rim with 5-0 Vicryl suture.*

A 5-0 Vicryl suture was passed in a whipstitch fashion through the anterior and posterior tarsus of the lid. The suture was then passed through the common canthal tendon at the lateral orbital rim. The suture was temporally tightened to assess lid position. Lid position was found to be appropriate. (A buried, interrupted 6-0 Vicryl suture was then passed gray line to gray from upper to lower lid to reform the lateral canthal angle. The 5-0 Vicryl suture was then tied down. The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion.) The skin incision was then closed using simple, interrupted 6-0 plain gut sutures.

Ophthalmic antibiotic ointment was placed on the ocular surface after the corneal eye shield was removed. The patient was extubated and taken to the recovery area in stable condition. The patient tolerated the procedure well.

Chapter 89
Orbit: Three-Wall (Medial, Floor, and Lateral) Decompression

Cameron B. Nabavi and Craig N. Czyz

Abstract Thyroid eye disease causes orbital congestion and proptosis due to extraocular muscle and orbital fat enlargement with fibrosis. Proptosis, in turn, can lead to compressive optic neuropathy and exposure keratopathy. Treatment of proptosis from thyroid eye disease consists of orbital decompression, taking advantage of the adjacent sinus spaces to expand orbital volume. For cases of moderate to severe proptosis, medial wall, lateral wall and orbital floor decompression can be done, taking advantage of the adjacent ethmoid sinuses, maxillary sinus, and orbital trigone, respectively. Patients should be educated about the risks, benefits, and alternatives of the procedure including bleeding, infection, loss of vision, double vision, and need for more surgery.

Keywords Thyroid eye disease • TED • Exophthalmos • Compressive optic neuropathy • Medial • Floor • Lateral • Decompression

Indications

Compressive optic neuropathy, exposure keratopathy, and proptosis are key indications to consider orbital decompression surgery. Three-wall decompression can be of benefit in patients with moderate to severe symptoms including compressive optic neuropathy. Medial wall decompression can be done via a transcaruncular approach, while a transconjunctival approach can be performed for the orbital floor. The lateral wall involves removal of the bone of the deep lateral orbital wall, known as the trigone.

C.B. Nabavi (✉)
Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA
e-mail: cnabavi@yahoo.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_89

Essential Steps

1. General anesthesia is administered.
2. Local infiltration to the caruncle, inferior conjunctival cul-de-sac, lateral canthus, and lateral orbital rim is performed.
3. A corneal eye shield is placed.
4. A lid-splitting incision starting at the lateral canthus is performed.
5. Cutting electrocautery is used to incise the periosteum of the external lateral orbital wall. A Freer elevator is used to free the periosteum from the underlying bone. A similar technique is performed from the intraorbital lateral orbital wall.
6. An incision through the conjunctiva, lid retractors, and periosteum of the inferior orbital rim is performed.
7. A Freer elevator is used to free the periosteum from the underlying orbital floor.
8. For the medial wall, Westcott scissors are used to create a plane between the caruncle and plica semilunaris.
9. Blunt dissection with curved Stevens scissors aiming for the posterior lacrimal crest is performed until periosteum is reached.
10. A Freer elevator is used to free the periosteum from the underlying medial wall.
11. The anterior and posterior ethmoid arteries are treated with care and are a landmark for the superior extent of our decompression.
12. Attention is placed back to the lateral wall where an oscillating saw is used to create an osteotomy at superior and inferior borders of the lateral orbital wall.
13. Kocher clamps secure the lateral orbital rim, and gentle maneuvering allows for removal of the lateral orbital rim for replacement at the end of the case.
14. Kerrison rongeurs and a drill are used to remove bone of the deep lateral wall (care is taken to not be too aggressive due to the possible complication of cerebrospinal fluid (CSF) leak).
15. Attention is placed back to the orbital floor where an osteotome and mallet create an osteotomy in the medial posterior orbital floor.
16. A judicious amount of bone is removed with a pituitary forceps (care is taken to avoid the infraorbital nerve and orbital strut which can lead to V2 hypoesthesia and diplopia, respectively).
17. Once adequate bony decompression of the floor is performed, attention is placed to the medial wall.
18. A thin malleable retractor is used to retract the orbital contents in the subperiosteal plane.
19. While retracting orbital contents, the Fraser suction tubing or Freer elevator can be used to fracture the medial wall. *Pituitary/Takahashi* forceps are used to remove bone of the medial orbital wall and underlying ethmoid sinus air cells.
20. Once adequate medial decompression is performed, oxymetazoline is irrigated through the area for hemostasis.
21. The periorbita is incised with #12 Bard-Parker up-biting blade between the medial and inferior rectus muscles, allowing orbital fat to prolapse forward.

22. A malleable retractor is placed as countertraction in the subperiosteal plane, while gentle pressure is placed on the globe allowing orbital contents to prolapse into the decompression sites.
23. Attention is placed to the lateral decompression where the periosteum is incised inferior to the lateral rectus.
24. The lateral orbital rim bone flap is thinned with a burr.
25. The lateral orbital rim is replaced with a *4-0 Prolene* suture through drilled holes or with a curvilinear low-profile plate and screws.
26. The transcaruncular incision is closed with *6-0 plain gut* in a buried fashion (the transconjunctival incision is not closed).
27. The lateral lower lid is secured to the common canthus with a *5-0 Vicryl* suture.
28. The lateral canthal angle is reformed with *6-0 vicryl* suture, and the skin is closed with the 6-0 plain gut suture.
29. The corneal shield is removed.
30. The patient is extubated.

Complications

– Orbital hemorrhage
– Orbital compartment syndrome
– Optic nerve injury
– Infection
– Diplopia
– Restricted motility
– Subconjunctival hemorrhage
– Vision loss
– Globe dystopia
– Globe rupture
– Hypoesthesia (V2)
– Eyelid retraction or ptosis
– Vitreous hemorrhage
– Retinal detachment
– Cerebrospinal fluid leak
– Lacrimal drainage system injury
– Keratopathy
– Scarring
– Lid laxity/malposition
– Canthal angle distortion

Template Operative Dictation

Preoperative diagnosis: *Thyroid eye disease with proptosis, exposure keratopathy (and/or compressive optic neuropathy) (left/right) eye*

Procedure: (1) Two-wall anterior orbitotomy with removal of bone for decompression, (2) lateral orbitotomy with bone flap and removal of bone for decompression, and (3) lateral canthoplasty of the (*right/left*) eye

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old _____ (*race*) (*male/female*) with a history of thyroid eye disease and symptoms of (*exposure keratopathy, proptosis, and/or compressive optic neuropathy*). These symptoms have not improved with conservative measures, and the three-wall decompression has been recommended. A detailed review of the risks, benefits, and alternatives to a medial wall, lateral wall, and floor decompression were discussed with the patient, including but not limited to bleeding, infection, loss of vision, loss of the eye, globe malposition, double vision, and need for more surgery. The patient understands the risks, benefits and alternatives and wishes to proceed. The informed consent was then signed.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye was marked with a surgical marking pen. The patient was brought into the operating room under anesthesia care and placed supine on the operating room table. General endotracheal anesthesia was administered. The patient was then prepped and draped in a standard sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. 2 % lidocaine with 1:100,000 epinephrine and 0.75 % Marcaine in a 1:1 ratio were injected into the caruncle and inferior conjunctiva via a transconjunctival approach. Similar local anesthetic was injected in the lateral canthus and lateral orbital rim area.

A corneal shield was placed, and a lid-splitting incision starting at the lateral canthus was performed with a #15 Bard-Parker blade. Cutting electrocautery was used to incise the periosteum of the lateral orbital rim. A Freer elevator was used to free the periosteum from the underlying bone of the external lateral orbital rim. The temporalis muscle and fascia were separated from the lateral orbital rim with a #_*9*_ elevator. A similar maneuver was performed to free the periorbita from the intraorbital lateral orbital rim.

Attention was then placed to the orbital floor where a Desmarres retractor was used to retract the lower lid, while a Jaeger lid plate was used to protect the globe. Cutting electrocautery was used to cut through the conjunctiva, lid retractors, and inferior orbital rim periosteum. A Freer elevator was used to free the orbital floor periosteum from the underlying orbital floor. Attention was switched to the medial wall, where a transcaruncular approach was chosen. Westcott scissors were used to create a surgical plane between the caruncle and plica semilunaris. Blunt dissection with Stevens scissors was directed to the posterior lacrimal crest, and a Freer elevator was used to open the medial periosteum. A Freer elevator was then used to free the periosteum from the underlying medial wall. A malleable retractor was used to retract the orbital contents and expose the subperiosteal plane. The subperiosteal dissection was continued until the lamina papyracea of the medial wall was visualized and the appropriate amount of medial wall was exposed. Once exposure of the medial wall and orbital floor was complete, attention was placed back to the lateral wall.

An oscillating saw was used to create an osteotomy at the superior and inferior lateral wall margins. Kocher clamps were then used to carefully remove the lateral orbital wall, while cutting electrocautery was used to separate this wall from the underlying temporalis muscle and fascia. Kerrison rongeurs and a (*piezoelectric bone saw/burr*) were used to remove bone from the deep lateral wall. Care was taken to avoid any CSF leak. Bone wax was used for hemostasis.

An osteotome and mallet were used to create a bone window through the posterior medial orbital floor. The bone of the orbital floor was removed with a pituitary forceps and up-biting Kerrison rongeurs. Care was taken to avoid the infraorbital nerve bundle and orbital strut. Once an adequate orbital floor decompression was performed, oxymetazoline was irrigated through the area for hemostasis.

A Freer elevator was used to infracture the medial orbital wall. Bone of the medial orbit was removed with a (*pituitary/Takahashi*) forceps. Underlying ethmoid air cells and mucosa were also removed. Once adequate medial bony decompression was performed, the area was irrigated with oxymetazoline for hemostasis.

A #12 Bard-Parker blade was used to incise the periorbita allowing orbital fat to prolapse forward. A malleable retractor was placed as countertraction in the subperiosteal plane, while gentle pressure was placed on the globe allowing the orbital contents to prolapse into the decompressed medial orbit.

Attention was placed back to the lateral orbit where the periorbita was incised inferior to the lateral rectus in order to allow orbital fat to spill forward. The bone flap was thinned with a burr and then replaced with a *4-0 Prolene* suture through (*predrilled holes/a low-profile curvilinear plate with screws*).

The transcaruncular incision was closed with *6-0 plain gut* suture in a buried interrupted fashion. The transconjunctival incision was not closed in attempt to prevent postoperative lid retraction. The lateral lower lid was secured to the common canthus and lateral orbital rim with *5-0 Vicryl* suture. The deep subcutaneous tissue of the lid-splitting incision was closed with *5-0 Vicryl* suture in a buried interrupted fashion. The skin was closed with *6-0 plain* sutures in a running fashion.

Ophthalmic antibiotic ointment was placed on the ocular surface after the corneal eye shield was removed. The patient was extubated and taken to the recovery area in stable condition. The patient tolerated the procedure well.

Chapter 90
Orbit: Canthal Advancement and Balanced Orbital Decompression

Jill A. Foster, Craig N. Czyz, and Cameron B. Nabavi

Abstract Thyroid eye disease causes orbital congestion and proptosis due to extraocular muscle and orbital fat enlargement with inflammation, edema, deposition of glycosaminoglycans and fibrosis. The disparity in bony orbital volume and the soft tissue accumulation may lead to compressive optic neuropathy and exposure keratopathy. Surgical treatment of the proptosis from thyroid eye disease consists of removal of the nonessential orbital bone or orbital decompression. Removal of the nonsupporting orbital bone allows the surgeon to take advantage of the adjacent sinus spaces and the temporal fossa to expand orbital volume. For cases of mild to moderate proptosis, medial and lateral wall removal may be performed, acquiring additional space from the adjacent ethmoid sinuses and the temporal fossa behind the lateral orbital rim. Additional volume may be obtained from removal of the medial orbital floor and anterior displacement of the lateral orbital rim. Reset of the lateral canthus on the advanced rim may also provide improvement of lid position and cosmetic appearance. Patients should be educated about the risks, benefits, and alternatives of the procedure including bleeding, infection, scar, paresthesias, loss of vision, double vision, and need for more surgery. A balanced medial and lateral

J.A. Foster, MD, FACS (✉)
Nationwide Children's Hospital, Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Department of Ophthalmoloby, The Ohio State University, Columbus, OH, USA
e-mail: Fosterj@jillfoster.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

C.B. Nabavi
Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA
e-mail: cnabavi@yahoo.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_90

wall decompression may reduce the risk of diplopia by mechanically preventing unilateral horizontal displacement of the orbital contents. Sparing the medial orbital strut diminishes the risk of downward dystopia of the globe.

Keywords Thyroid eye disease • TED • Exophthalmos • Compressive optic neuropathy • Balanced orbital decompression • Canthal

Indications

Compressive optic neuropathy, exposure keratopathy, and proptosis are key features of thyroid eye disease that lead the surgeon to consider orbital decompression. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. General anesthesia is administered.
2. Local infiltration is placed in the area of the supraorbital neurovascular bundle, the infraorbital neurovascular bundle, the medial canthal area, and the inferior conjunctival cul-de-sac. Further local anesthesia is placed at the lateral canthus, lateral orbital rim, and the anterior temporal fossa.
3. Local anesthetic is injected into the lateral nasal mucosa beneath and around the middle turbinate, and the nose is packed with oxymetazoline-soaked neuropatties.
4. The patient is prepped and draped.
5. A corneal eye shield is placed.
6. A lateral canthal incision starting at the lateral canthus and extending 2 cm beyond the lateral orbital rim is performed.
7. Monopolar cautery is used to horizontally incise the periosteum, deep temporalis fascia, and temporalis muscle along the extended lateral canthal skin incision. The cautery is also used to make a curvilinear incision along the edge of the orbital rim to create an opening in the periosteum. A Freer elevator is used reflect the periosteum and temporalis muscle away from the lateral orbital rim and then from the underlying temporal fossa bone. The periosteum/periorbita is also elevated from the inner aspect of the lateral orbital wall.
8. A swinging eyelid flap is created by making a subtarsal transconjunctival incision across the lower eyelid and reflecting the skin and orbicularis away from the underlying orbital septum and fat. This continues down to the inferior orbital rim. The cautery is used to incise the periosteum along the edge of the infraorbital rim, and the periosteum is elevated up from the orbital floor.
9. An oscillating saw is used to create horizontal osteotomies in the lateral orbital rim at the zygomatico-frontal suture line, and a second osteotomy is made at a level just above the zygomatic arch.

10. Two Kocher clamps secure the lateral orbital rim, and a gentle outfracturing maneuver allows for removal of the lateral orbital rim for replacement at the end of the case.
11. Kerrison and front-biting rongeurs and a drill are used to remove bone of the lateral wall.
12. The bone of the orbital floor between the infraorbital nerve and the medial orbital strut is removed by infracturing the thin bone into the maxillary sinus and then the Freer elevator and rongeurs are used to remove the bone fragments.
13. With the lateral wall bone flap left open so that the orbital contents can shift temporally, attention is placed to the medial wall.
14. ***If a transcaruncular approach is used for the medial wall***:

    (a) Westcott scissors are used to create a plane at the posterior third of the caruncle.
    (b) Blunt dissection with curved Stevens scissors aiming for the posterior lacrimal crest is performed until periosteum and bone are exposed.
    (c) A Freer elevator is used to separate the periosteum from the underlying medial wall. Thin ribbon retractors are placed to reflect the periosteum and orbital contents laterally in order to access the medial wall. A skin hook is used to displace the caruncle medially for improved visualization. A headlight is used for illumination.

15. *If a modified Lynch incision is used for the medial wall*:

    (a) An incision 6–8 mm medial to the medial canthus is made with the Bard-Parker #15 blade and then blunt reflection or cutting electrocautery is used to dissect through the subcutaneous tissue down to the periosteum of the nasal bone. Retraction sutures are placed and clamped to the drape.
    (b) A Freer elevator is used to free the periosteum from the anterior edge of the incision toward posterior orbit, and gradually the medial wall bone is exposed. Care is taken to avoid the lacrimal sac and to preserve the bones of the lacrimal sac fossa. Effective bone removal begins at the posterior lacrimal crest. Anterior bone may be removed for visualization but does not assist in volume augmentation.

16. The anterior and posterior ethmoid arteries are treated with care and when visualized may serve as a landmark for the superior extent of the decompression.
17. A thin malleable retractor is used to retract the periosteum and orbital contents.
18. While retracting orbital contents, the Fraser suction tip or Freer elevator can be used to infracture the medial wall into the ethmoid sinus air cells. Pituitary or Takahashi forceps are used to remove bone of the medial orbital wall and underlying ethmoid sinus air cells.
19. The periorbita is radially incised with Bard-Parker #12 blade or a Wescott scissors with the incision placed between the medial and inferior rectus muscles and/or above the medial rectus muscle, allowing orbital fat to prolapse.

20. Once the tissue has been released in the medial decompression, the focus returns to the orbital floor where the inferior periosteum is opened medial to the inferior rectus muscle, and fat is allowed to prolapse into the orbital floor defect.
21. Attention is placed to the lateral decompression where the periosteum is radially incised inferior and/or superior to the lateral rectus.
22. Consideration is given to posteriorly debulking the prolapsed orbital fat if this may be safely accomplished.
23. The orbital fat is also inspected externally in the lower eyelid. Additional local anesthetic is added to the medial and lateral fat pads. These two fat pads are pedicalized with the cautery to tease the deeper fat forward using the cautery, cotton swabs, and gentle pressure on the globe. Capsule is pushed away from the fat with the cotton swabs. When the desired amount of fat is prolapsed anteriorly, the fat is removed with the monopolar cautery tip.
24. The posterior aspect of the lateral orbital rim bone flap is thinned with the rongeurs and a burr leaving the anterior rim intact.
25. The lateral orbital rim is repositioned in the original site, but the rim is anteriorly displaced by half of the anterior to posterior length of the rim bone, usually about 3 mm. The bone is then plated into position with a curvilinear low-profile plate and screw.
26. The transcaruncular incision is closed with 6-0 plain gut in a buried fashion. The transconjunctival incision may be left open to improve lower eyelid retraction or closed with fibrin sealant or buried 6-0 polyglactin suture.
27. The lateral lower lid is secured to the common lateral canthus with a 5-0 Vicryl suture. This suture is not tied until the subsequent step is completed.
28. The lateral canthal angle is reformed with 6-0 suture. The temporalis and deep temporal fascia are closed with a 4-0 polyglactin suture, and the skin is closed with a 6-0 plain gut suture.
29. If a medial Lynch incision was used, it is closed with deep periosteal 4-0 or 5-0 polyglactin suture and then 6-0 plain gut suture in the skin.
30. A temporary tarsorrhaphy is considered to support lower eyelid position.
31. The corneal shield is removed.
32. The patient is extubated.

Complications

- Orbital hemorrhage
- Orbital compartment syndrome
- Optic nerve injury
- Infection
- Diplopia
- Restricted motility
- Subconjunctival hemorrhage
- Vision loss
- Globe dystopia
- Globe rupture
- Hypoesthesia (V2)
- Eyelid retraction or ptosis

– Cerebrospinal fluid leak
– Lacrimal drainage system injury
– Keratopathy
– Scarring
– Lid laxity/malposition
– Canthal angle distortion

Template Operative Dictation

Preoperative diagnosis: *Thyroid eye disease (with proptosis/exposure keratopathy/compressive optic neuropathy/eyelid retraction/lagophthalmos) (left/right) eye*

Procedure: (1) Anterior orbitotomy with removal of bone for decompression, medial wall, (2) lateral orbitotomy with bone flap and removal of bone for decompression, and (3) lateral canthoplasty of the (*right/left*) eye

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old (*race*) (*male/female*) with a history of thyroid eye disease and symptoms of (*exposure keratopathy, proptosis, and/or compressive optic neuropathy*). These symptoms have not improved with conservative measures, and orbital decompression has been recommended. A detailed review of the risks, benefits, and alternatives to a medial and lateral wall decompression were discussed with the patient, including but not limited to bleeding, infection, scar, muscle or nerve weakness, loss of vision, loss of the eye, global malposition, double vision, death, and need for further surgery. The patient understands the risks and benefits and wishes to proceed. The informed consent was then signed.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was brought into the operating room under anesthesia care and placed supine on the operating room table. General endotracheal anesthesia was administered. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. 2 % lidocaine with 1:100,000 epinephrine and 0.75 % Marcaine in a 1:1 mix were injected as a supraorbital nerve block and an infraorbital nerve block, directly into the medial canthus and into the inferior conjunctiva via a transconjunctival approach. Additional local anesthesia was placed in the lateral canthus and into the lateral nasal wall. The nose was packed with oxymetazoline-soaked neuropatties. The patient was prepped and draped in a standard sterile fashion suitable for surgery.

A corneal shield was placed. An extended lateral canthal incision was performed with a #15 Bard-Parker blade. Cutting electrocautery was used to incise the periosteum of the lateral orbital rim and to incise the deep temporal fascia. A Freer elevator was used to free the periosteum from the bone of the external lateral orbital rim. The temporalis muscle and fascia were separated from the lateral orbital rim and temporal fossa with a #9 elevator. A similar maneuver was performed with the Freer elevator to free the periorbita from the intra-orbital lateral orbital rim.

Attention was then directed to the orbital floor. A *4-0 silk* retraction suture was placed in the lower eyelid. The eyelid was everted over a cotton swab, and the monopolar cautery was used to make a transconjunctival incision. A Wescott scissors was used to open the plane between the post-orbicularis fascia and the orbital septum. A *6-0 Vicryl* suture was used to imbricate the conjunctiva and lower eyelid retractors. A protective corneal shield was placed over the cornea, and the *Vicryl* retraction suture in the conjunctiva and lower eyelid retractors was clamped with a hemostat superiorly to the drape. The plane of dissection was continued down to the level of the infraorbital rim where the rim was incised with the monopolar cautery. The periorbita of the orbital floor was elevated with the Freer periosteal elevator. The Freer elevator or an osteotome and hammer were used to create an initial opening in the medial orbital floor into the maxillary sinus. Spinal laminectomy rongeurs were then used to remove the bone between the pathway of the infraorbital nerve and the medial orbital strut.

An oscillating saw was then used to create an osteotomy at both the superior and inferior lateral wall margins. Kocher clamps were used to outfracture the lateral orbital rim, and scissors were used to separate this piece of rim from the attached temporalis muscle and fascia. Rongeurs and a *(piezoelectric bone saw/burr)* were used to remove bone from the lateral orbital wall. Bone wax was used for hemostasis in the bone. Attention was then placed to the medial wall.

[Choose one]:

If a transcaruncular approach was taken*—Attention was then placed to the medial wall via a transcaruncular approach. Westcott scissors were used to create an incision at the posterior third of the caruncle. Blunt spreading dissection with Steven scissors was directed to the posterior lacrimal crest until the bone and periosteum were encountered. A Freer elevator was used to separate the medial periosteum from the underlying medial orbital wall. The orbital contents were retracted with a thin ribbon retractor.*

If a modified Lynch incision approach was taken*—Attention was then placed to modifying the medial orbital wall where an incision along the lateral nasal wall anterior to the medial canthus was marked and incised with a #15 Bard-Parker blade. Cutting electrocautery was then used to dissect through the subcutaneous tissue down to the periosteum. 4-0 silk sutures were placed for retraction and clamped to the drapes. A Freer elevator was then used to free the nasal periosteum from the underlying bone continuing posteriorly past the anterior lacrimal crest and the lacrimal sac fossa to the medial orbital wall behind the posterior lacrimal crest.*

A Freer elevator was then used to infracture the medial orbital wall into the ethmoid sinuses. Bone fragments of the medial orbit were removed with hemostats, suction, and (*pituitary*/*Takahashi*) forceps. The underlying ethmoid air cells and air cell mucosa were also removed.

A (*#12 Bard-Parker blade/Wescott scissors*) was used to incise the periorbita allowing orbital fat to prolapse. Care was taken to avoid the medial rectus muscle. Gentle pressure was placed on the globe allowing orbital contents to prolapse into the decompressed medial space. Similarly, the periorbita medial to the inferior rectus muscle was opened over the floor defect. This allowed orbital fat to prolapse into the maxillary sinus.

Attention was placed back to the lateral orbit where the periorbita was radially incised to allow orbital fat to protrude outward. Care was taken to avoid the pathway of the lateral rectus muscle and the lacrimal gland.

Attention was then directed to debulking orbital fat. This was accomplished by trimming posterior fat protruding from the slit periorbita where fat could be removed without disrupting vital orbital contents. The anterior fat of the inferiomedial and inferiolateral fat pads was then injected with additional local anesthetic. The cautery was used to isolate the fat from the surrounding capsule and to slowly tease the fat anteriorly while avoiding the inferior oblique muscle meanwhile controlling hemostasis. The fat was then transected with the cautery.

The bone flap of the lateral orbital rim was thinned with the rongeurs and then a burr to remove any nonessential bone behind the orbital rim. The bone was then replaced and plated into position with the bone flap advanced approximately _*3*_ mm anterior to its original position. A _*1.0*_ mm sized curved orbital rim plate with _*six*_ _*4*_ mm screws was used to hold the advanced rim in place.

[Choose one]:

If a transcaruncular approach was taken*—The transcaruncular incision was closed with 6-0 plain gut suture in a buried interrupted fashion.*

If a modified Lynch incision approach was taken*—The deep subcutaneous tissue was closed with a 5-0 Vicryl suture in a buried, interrupted fashion. The skin was closed with 6-0 plain gut suture in a running or interrupted fashion.*

The transconjunctival incision (*was left open to improve lower eyelid retraction/was closed with a 6-0 polyglactin buried interrupted suture or fibrin sealant*).

The lateral canthal incision was then closed by resetting the lateral canthus on the anteriorly advanced rim. From lateral to medial, the deep subcutaneous tissue and deep temporalis fascia at the lateral canthal incision were closed with *4-0 Vicryl* suture in a buried interrupted fashion. A lateral canthal gray line suture was placed from the upper to the lower eyelid margin with 6-0 polyglactin and left loose until the lateral lower lid is secured (*to the soft tissue of the upper lateral canthus/to the plate along the lateral orbital rim*) with *5-0 Vicryl* suture. The gray line suture was tied first and then the canthal refixation suture was tied. The skin was closed with *6-0 plain* sutures in a (*running/interrupted*) fashion.

Ophthalmic antibiotic ointment was placed on the ocular surface and the incisions. The corneal eye shield was then removed. Steri-Strips and Mastisol were used to create a temporary splint across the lower eyelid. The patient was extubated and taken to the recovery area in stable condition. The patient tolerated the procedure well.

Chapter 91
Orbit: Dermis Fat Graft (DFG) for Orbital Volume Augmentation

Daniel Straka and Craig N. Czyz

Abstract A dermis fat graft (DFG) is a versatile procedure applicable to a number of conditions in oculofacial plastic surgery, including orbital volume augmentation. For this purpose it is most commonly used in the setting of congenital microphthalmos or in cases of the anophthalmic socket when patients are intolerant of alloplastic implants or have insufficient conjunctiva. Many factors are taken into consideration when performing this surgery including the age of the patient, underlying pathology, factors affecting DFG survival, and the amount of volume desired. DFG is employed in cases of congenital microphthalmos where conformer therapy or scleral shell placement is not adequate. The goal is to place the DFG in the inferior cul-de-sac inferior to the small globe for both support and additional volume to promote symmetric eyelid and periocular soft tissue development. In the anophthalmic orbit, the DFG can be used as a primary implant or used to augment an existing implant. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Dermis fat graft • DFG • Anophthalmos • Microphthalmos • Orbital augmentation • Volume augmentation • Dermis • Fat graft

Indications

Volume augmentation in the anophthalmic or microphthalmic orbit, superior sulcus deformity, and other atrophic facial conditions. Symptoms can include functional and cosmetic concerns.

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_91

Essential Steps

1. Preoperative marking of the site for dermis fat graft harvesting (typically buttock or abdomen)
2. Administration of subcutaneous local anesthetic and retrobulbar block (general or monitored anesthesia care (MAC) could be used)
3. Eyelid speculum placement
4. Incision of the inferior cul-de-sac
5. Blunt dissection anterior to the septum of the orbital rim
6. Harvesting the dermis fat graft
7. Suturing the dermis fat graft into place
8. Closing the dermis fat graft donor site
9. Placement of antibiotic ointment and conformer

Complications

- Hemorrhage
- Infection
- Wound dehiscence
- Overcorrection
- Undercorrection
- Asymmetric eyelid contour

Template Operative Dictation

Preoperative diagnosis: *Microphthalmos* (*OD*/*OS*)

Procedure: Dermis fat graft for orbital augmentation (*OD*/*OS*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male*/*female*) has a history of (*bilateral*/*unilateral*) (*microphthalmos*/*anophthalmos*) with significant orbital volume deficiency necessitating surgical intervention. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient and/or patient's guardians. Following this, the decision was made to proceed with surgery, and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right*/*left*) eye was marked with a surgical marking pen, as well as the (*right*/*left*) (*buttock*/*abdominal wall*) for the dermis fat graft. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia*/*Monitored conscious sedation*) was administered by (*hospital*/*surgery center*) anesthesia department. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery as was the donor site. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ______ was injected into the (*right/left*) lower eyelid and dermis fat graft site.

If DFG is being used as a primary or secondary orbital implant*—see dictation on enucleation, and then proceed with paragraph #3 on graft harvesting.*
Westcott scissors and 0.3 forceps were used to incise the conjunctiva and lower lid retractors in the conjunctival fornix. A lacrimal rake was used to retract the lower eyelid as a blunt dissection was performed using hemostats and a Freer elevator to dissect anterior to the orbital septum until the inferior orbital rim was encountered. Space was created both nasally and temporally for the dermis fat graft. A ruler was used to measure the desired length and width of the dermis fat graft and noted to be approximately ___mm.

Attention was then turned to the donor site. An elliptical dermis fat graft was then measured and marked on the (*right/left*) (*buttock/abdomen*) skin with a surgical marking pen. The measurement was intentionally oversized by approximately __%. A #15 Bard-Parker blade was used to incise through the epidermis, with special care taken to leave the dermis intact in order to make removal of the epidermis easier. Once the epidermal incision was made, Westcott scissors and forceps were used to dissect the epidermis away from the underlying dermis. Once the epidermis was removed, the #15 Bard-Parker blade was used to complete the incision through the dermis. The graft was then harvested using curved iris scissors and forceps being careful to include the appropriate amount of subcutaneous fat along with the dermis. Hemostasis was obtained with (*mono/bi*)polar cautery. The donor site was closed using buried, deep subcutaneous interrupted *4-0 Vicryl* sutures, followed by buried, interrupted *6-0 Vicryl* for the superficial subcutaneous tissue. Lastly, a running 6-0 (*plain/chromic*) gut suture was used for skin closure. Antibiotic ointment was applied to the suture site (*and it was dressed with Telfa/Tegaderm*).

The graft was placed in the recipient bed, and additional trimming was performed for the appropriate volume and fit. The cut conjunctival edges of the lower eyelid were sutured to the edges of the dermis with a combination of running and interrupted *6-0 Vicryl* and *6-0 plain gut* sutures. This secured the dermis fat graft into its appropriate location. The wound was dressed with antibiotic ointment followed by a sterile adhesive dressing.

Ophthalmic antibiotic ointment was instilled into the (*right/left*) eye and across the incision(s). A conjunctival conformer was placed into the operative eye. The patient tolerated the procedure well (*was awoken from general anesthesia*) and was then taken to the recovery area in stable condition.

Chapter 92
Orbit: Lacrimal Gland Biopsy

Daniel Straka and Craig N. Czyz

Abstract The lacrimal gland biopsy is usually performed to diagnose or rule out an underlying condition. Occasionally disorders arising in the lacrimal gland can indicate systemic disease. Patients with a lacrimal gland tumor will often present with proptosis and/or fullness of the superolateral orbit with or without inferonasal globe dystopia. More frequently, patients may have symptoms of idiopathic orbital inflammation or infectious dacryoadenitis, which may necessitate biopsy. It is classically taught that only the orbital portion of the lacrimal gland should be biopsied due to the risk of injury to the secretory ductules passing through the palpebral lobe. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Lacrimal gland • Orbital cellulitis • Orbital inflammation • Wegener's • Sarcoidosis • Lymphoma • Dacryoadenitis

Indications

The most common indication for a lacrimal gland biopsy is for those patients presenting with severe or recurrent inflammatory conditions affecting the lacrimal gland (dacryoadenitis) or in cases of suspected neoplasms. The lacrimal gland is one of the most common sites of involvement in idiopathic orbital inflammation (IOI), and due to its relative surgical accessibility, it is frequently biopsied in cases of recurrent IOI. Preoperative imaging should be assessed prior to performing a lacrimal gland biopsy. Cases suspected of being pleomorphic adenomas should never be biopsied. Instead these tumors must be excised completely due to the risk

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_92

of tumor seeding and malignant degeneration. When a lymphoproliferative disease is suspected, the tissue should be sent for fresh histopathologic analysis.

Essential Steps

1. Preoperative marking of the upper eyelid crease incision with surgical marking pen.
2. Administration of subcutaneous local anesthetic.
3. Eyelid crease incision.
4. Identification of the orbital septum.
5. Preseptal dissection superiorly to the superolateral orbital rim.
6. Opening the orbital septum and identifying the orbital lobe of the lacrimal gland.
7. The portion of the lacrimal gland to be biopsied can be directly excised or clamped with a hemostat and excised.
8. Hemostasis is obtained.
9. The skin wound is closed.
10. Removal of the corneal shield.

Complications

– Hemorrhage
– Infection
– Wound dehiscence
– Scarring
– Ptosis
– Eyelid retraction
– Asymmetric eyelid contour
– Dry eye syndrome

Template Operative Dictation

Preoperative diagnosis: Lacrimal gland enlargement on the (*right/left/bilateral*)

Procedure: Lacrimal gland biopsy (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of (*recurrent episodes of orbital inflammation/dacryoadenitis without a known etiology/mass of the lacrimal gland*) on the (*right/left*). A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site were identified in the preoperative area, and the (*right/left*) eyelid incision was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia*/*Monitored conscious sedation*) was administered by (*hospital*/*surgery center*) anesthesia department. Topical anesthetic proparacaine was placed into the (*right*/*left*) eye. A surgical marking pen was used to mark the planned incision site. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ______ was injected into the (*right*/*left*) upper eyelid. A corneal shield was placed in the (*right*/*left*/*both*) eye(s).

A caliper was used to measure a lid crease incision of ___mm on the (*right*/*left*) upper eyelid. A #15 Bard-Parker blade was used to make an incision through the skin and orbicularis muscle. Westcott scissors and 0.3 forceps were used to dissect a preseptal plane superiorly until the superolateral orbital rim was identified. A Desmarres retractor was used to retract the tissue and expose the superior orbital rim. The orbital septum was then opened revealing the (*inflamed orbital lobe of the lacrimal gland tissue*/*lacrimal gland mass*). A blunt hemostat was used to clamp the portion of the lacrimal gland to be biopsied. Westcott scissors and forceps were used to excise a portion of the lacrimal gland. The tissue was sent to pathology for (*fresh histopathological analysis*/*permanent histopathological analysis*). Hemostasis was obtained with (*mono*/*bi*)polar cautery. The wound was then closed with (*interrupted*/*running*) *6-0 plain gut* sutures.

The corneal shield was then removed from the (*right*/*left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right*/*left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 93
Orbit: Lacrimal Gland Resuspension

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Lacrimal gland prolapse • Orbit • Lacrimal gland resuspension • Anterior orbitotomy • Superior sulcus fullness • Mechanical upper eyelid ptosis

Indications

Lacrimal gland prolapse causing symptomatic complications or cosmetic issues. Symptoms may include superior sulcus fullness and mechanical upper eyelid ptosis. Systemic and neoplastic causes of lacrimal gland enlargement leading to secondary prolapse should be considered.

Essential Steps

1. Administration of topical anesthetic and local anesthetic
2. Corneal shield placement
3. Lid crease incision
4. Dissection through orbicularis and septum toward the superior lateral orbit
5. Identification of lacrimal gland
6. Incision of brow fat pad at the superior lateral orbital rim
7. Blunt preperiosteal dissection to lacrimal gland fossa
8. Sutures placed through lacrimal gland capsule and anchored to periosteum of lacrimal gland fossa
9. Closure of lid crease incision
10. Removal of the corneal shield

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_93

Complications

– Hemorrhage
– Infection
– Wound dehiscence
– Scarring
– Dry eye

Template Operative Dictation

Preoperative diagnosis: Lacrimal gland dislocation on the (*right*/*left*)

Procedure: Anterior orbitotomy with lacrimal gland resuspension (*right*/*left*)

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male*/*female*) had developed (*right*/*left*/*bilateral*) (*superior sulcus fullness*/*mechanical upper lid ptosis*) over the past ____ (*months*/*years*) and on clinical evaluation was found to have (*right*/*left*/*bilateral*) lacrimal gland prolapse. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s), and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right*/*left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia*/*Monitored conscious sedation*) was administered by (*hospital*/*surgery center*) anesthesia department. Topical anesthetic proparacaine was placed into the (*right*/*left*) eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ________ was injected into the (*right*/*left*) upper eyelid. A corneal shield was placed in the (*right*/*left*) eye.

Attention was then turned to the (*right*/*left*) lower lid. Calipers were used to mark an incision inferiorly _*7–10*_ mm from the lid margin. A #15 Bard-Parker blade was used to incise the skin. The dissection was then continued with 0.5 Castroviejo forceps and Westcott scissors. Hemostasis was maintained with (*monopolar*/*bipolar*) cautery. The septum was incised and dissection was carried out superiolaterally to expose the prolapsed lacrimal gland. Sharp (*iris*/*Westcott*) scissors were then used to incise the brow fat pad above the right superior orbital rim. A blunt (*Metzenbaum scissors*/*iris scissors*/*hemostat*/___ *elevator*) were then used to dissect preperiosteally into the superiolateral orbit toward the lacrimal gland fossa. A *6-0 Prolene* suture was then passed through the lacrimal gland capsule in a mattress fashion. The suture was then anchored to the periosteum just inside the superior orbital rim. This moved the lacrimal gland into a more anatomically correct position. The skin of the lid incision was then closed with simple interrupted *6-0 plain gut* sutures.

The corneal shield was then removed from the (*right*/*left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right*/*left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 94
Orbit: Percutaneous Sclerotherapy

Daniel Straka and Craig N. Czyz

Abstract Lymphatic, venous, and combined lymphatic-venous malformations of the orbit typically present during childhood and can cause recurrent episodes of severe proptosis, pain, strabismus, exposure keratopathy, and optic neuropathy. Usually these episodes occur due to acute bleeding into the cystic space due to fragile neovascular tufts and fine capillaries within the stroma of the lesion. In the pediatric patient, the risk of amblyopia is significant. Cysts can be large (macrocysts) or small (microcysts) and be primarily lymphatic or venous in origin. Many of the lesions encountered in the orbit are a combination of the two. The size and hemodynamics of the cyst will usually determine the method and agent used for percutaneous sclerotherapy, and the procedure should be performed in conjunction with interventional radiology. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Percutaneous sclerotherapy for lymphangioma • Lymphatic • Malformation • Combined malformations • Venous • Proptosis • Pediatric

Indications

Lymphatic, venous, and combined lymphatic-venous malformations of the orbit causing severe proptosis, pain, strabismus, exposure keratopathy, and/or optic neuropathy. In the pediatric patient, the risk of amblyopia is also an indication.

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_94

Essential Steps

For macrocyst:

1. Preoperative marking of the site and induction of general anesthesia
2. Ultrasound-guided visualization of the cyst(s) with Doppler flow analysis
3. Insertion of 14-gauge angiocatheter sheath system
4. Advancement of 5-French locking pigtail catheter through the angiocatheter system
5. Aspiration of cyst fluid with documentation of volume and appearance
6. Constrast cystogram under fluoroscopic guidance
7. Aspiration of contrast
8. Injection of 3 % sodium tetradecyl sulfate in the cyst for 2 min dwell time followed by aspiration
9. Injection of 98 % dehydrated ethanol into the cyst with 15 min dwell time followed by aspiration
10. Jackson-Pratt suction bulb placement to the pigtail catheter

For microcyst:

1. Preoperative marking of the site and induction of general anesthesia
2. Ultrasound-guided visualization of the cyst(s) with Doppler flow analysis
3. Advancement of (*23/25*)-gauge needle into the microcyst with aspiration of content
4. *Contrast venogram is performed in venous malformations to confirm stasis of blood within the venous lake*
5. Bleomycin or doxycycline foam is made by agitating air and albumin
6. The preferred agent is injected into the cyst under sonographic guidance
7. The needle is removed and the procedure is complete

Complications

– Hemorrhage
– Mydriasis
– Swelling/chemosis
– Infection
– Recurrence
– Exposure keratopathy
– Pain
– Vision loss/blindness

Template Operative Dictation

Preoperative diagnosis: Orbital (l*ymphatic/venous/lymphatic-venous*) malformation of the (*right/left*) eye

Procedure: Percutaneous sclerotherapy (*right/left*) eye

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) presented with a history of (*right/left/bilateral*) orbital (*lymphatic/venous/lymphatic-venous*) malformation with a significant ocular morbidity requiring intervention. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient (*patient's guardian*). Following this, the patient (*patient's guardian*) elected to undergo the procedure(s), and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room (*fluoroscopy suite*) and placed supine on the operating room table. General anesthesia was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic consisting of proparacaine was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

[Choose one]:

If percutaneous sclerotherapy performed on a macrocyst—*Ultrasound guidance was used to locate and visualize the macrocyst(s). Doppler flow analysis was performed to look for active venous or arterial flow. Once it was confirmed to be a static lesion with minimal flow, a 14-gauge angiocatheter needle and sheath system was obtained and advanced into the macrocyst under sonographic guidance. Through the 14-gauge angiocatheter sheath, a 5-French locking pigtail drainage catheter was advanced and coiled within the cyst. The catheter was used to aspirate the cyst contents, and the volume of fluid was recorded to be ____ml. Under fluoroscopic guidance, a contrast cystogram was performed demonstrating no intercommunication between the dominant macrocyst and any additional orbital structures or vessels. Following aspiration of the contrast, ____ml of 3 % sodium tetradecyl sulfate was injected into the cyst and left to dwell for 2 min. After 2 min, the fluid was aspirated, ____ml of 98 % dehydrated ethanol was injected into the cyst and allowed to dwell for 15 min. The ethanol was then aspirated from the cyst, and the pigtail catheter was connected to a Jackson-Pratt suction bulb with a planned duration of suction for 3 days. The catheter and Jackson-Pratt drain were secured with a bio-occlusive dressing.*

If percutaneous sclerotherapy performed on a microcyst—*Under real-time ultrasonography, the microcystic network was identified. Color flow Doppler analysis was used to confirm absence of venous or arterial outflow or inflow. A 25-gauge needle was then advanced under sonographic guidance into the microcyst. The fluid was then aspirated and noted to be (venous/lymphatic) in appearance. (A contrast venogram was performed demonstrating poor venous drainage and no evidence of rapid flow in the venous malformation.) (Doxycycline/bleomycin) foam made from* *agitation with air and albumin was injected into the cyst with sonographic confirmation of placement. The needle was removed. Once all of the cysts were treated, a sterile dressing was placed*, *and the procedure was complete*.

Ophthalmic antibiotic ointment was instilled into the (*right*/*left*) eye and across the injection site(*s*). The patient tolerated the procedure well, was awoken from general anesthesia, and was then taken to the recovery area in stable condition.

Chapter 95
Orbit: Eye Socket Reconstruction with Mucous Membrane Graft

Larissa Ghadiali and Bryan Winn

Abstract Contracture of the conjunctiva of an anophthalmic socket is a common complication following enucleation (Int J Oral Maxillofac Surg 29(2):96–98, 2000; Ophthal Plast Reconstr Surg 9(4):267–272, 1993; Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier, 2008). The lower fornix is typically affected before the upper fornix (Int J Oral Maxillofac Surg 29(2):96–98, 2000; Ophthal Plast Reconstr Surg 9(4):267–272, 1993; Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier, 2008). Loss of forniceal depth can make it impossible for an ocularist to fit a prosthetic. In such cases, forniceal reconstruction may be considered (Int J Oral Maxillofac Surg 29(2):96–98, 2000; Ophthal Plast Reconstr Surg 9(4):267–272, 1993; Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier, 2008). If the conjunctiva is sufficiently elastic, fornix deepening sutures can be used to recreate the upper and lower fornices. However, if the conjunctiva is scarred and inelastic, mucous membrane grafting may be considered (Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier, 2008). Buccal mucosa is similar in consistency to conjunctiva, consisting of non-keratinized squamous cell epithelium and a thin lamina propria (EAU-EBU Update Series 5(5):179–187, 2007). When harvesting buccal mucosa, care must be taken to avoid the parotid (Stensen) duct, located on the inner cheek, across from the second superior molar tooth. Additionally, damage to the underlying buccinator muscle should be avoided. When choosing the size of the graft to harvest, one should overestimate the amount of mucosa required, as oral mucosal grafts can shrink up to 20 % from their original size (EAU-EBU Update Series 5(5):179–187, 2007). After harvesting the graft, it is important to use a second set of sterile surgical instruments and replace the surgeons' gloves in order to prevent contamination of the eye socket with oral bacteria (EAU-EBU Update Series 5(5):179–187, 2007).

L. Ghadiali (✉) • B. Winn
Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA
e-mail: grover.larissa@gmail.com; bjw15@cumc.columbia.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_95

Keywords Eye socket reconstruction • Mucous membrane graft • Mucosal graft • Buccal mucosal graft • Forniceal contracture

Indications

Eye socket reconstruction using a mucous membrane graft is indicated for significant contracture of the conjunctiva in an anophthalmic socket preventing the fitting of an ocular prosthetic.

Essential Steps

1. (*Remove prosthesis*.)
2. Infiltrate local anesthetic into the conjunctiva of the orbit.
3. Lyse contracture bands.
4. Create pocket for mucosal graft.
5. Outline graft.
6. Infiltrate local anesthetic into graft.
7. Harvest graft.
8. Thin graft.
9. Soak graft in antibacterial solution.
10. Change instruments and gloves.
11. Secure graft into socket.
12. Replace prosthesis (*place conformer*).
13. Place pressure patch.

Complications

– Infection
– Bleeding/hematoma
– Pain
– Postoperative contracture of eye socket
– Inability to fit an ocular prosthetic
– Scarring of Stensen's duct

Template Operative Dictation

Preoperative diagnosis: (*Right*/*left*) eye socket contracture

Procedure: (*Right*/*left*) reconstruction of upper and lower fornices with buccal mucosa graft

Postoperative diagnosis: Same

Indication: This is a ___-year-old (*male*/*female*) with (*right*/*left*) conjunctival contracture of an anophthalmic socket. Due to cicatricial changes in (*his*/*her*) socket, (*he*/*she*) is currently unable to be fitted with a comfortable prosthesis. The decision was made to proceed with reconstruction of the upper and lower fornices using a buccal mucosa graft. The patient was informed of the risks, benefits, indications, and alternatives of the procedure, and informed consent was obtained.

Description of the procedure: The patient was identified in the holding area, and a marking pen was used to mark the operative eye(*s*). The patient was escorted into the operating suite and placed in the supine position. Tetracaine eye drops were instilled into the non-operative eye. The patient's face was prepped and draped in the usual sterile fashion for oculoplastic surgery. General anesthesia with endotracheal intubation was administered by the anesthesia service. A surgical time-out was performed in accordance with hospital policy, verifying the correct patient, procedure, site, positioning of the patient, special equipment, and safety precautions. (*The eye prosthesis was removed and soaked in antibiotic solution.*) The area of the eye socket was infiltrated with a 50/50 mixture of 2 % lidocaine and epinephrine 1:100,000 and 0.5 % Marcaine (*plain 2 % lidocaine with epinephrine 1:100,000*) for local anesthesia.

The socket was explored and conjunctival contracture with multiple scar bands causing forniceal shortening in the superior and inferior fornices was noted. The scar bands were lysed with sharp and blunt dissection using the Westcott scissors, releasing tension on the lid margins and creating a pocket for a mucosal graft. The defect in the conjunctiva was measured and found to be __cm × __cm.

Attention was then turned to the oral mucosa where Stensen's duct was identified and marked. An elliptical graft measuring __cm × __cm was marked, being sure not to include Stensen's duct. The graft was infiltrated with a 50/50 mixture of 2 % lidocaine and epinephrine 1:100,000 and 0.5 % Marcaine (*plain 2 % lidocaine with epinephrine 1:100,000*) and harvested with a Colorado tip needle on Bovie cautery. Once the graft was harvested, it was thinned using Westcott scissors over a gloved finger and placed in antibiotic solution.

At this time, the instruments on the field were removed and exchanged for a new set of sterile instruments. The surgeons replaced their sterile gloves. The mucosal graft was then placed into the conjunctival defect and secured using several interrupted *6-0 Vicryl* sutures.

Following the procedure, the patient's face was cleaned. The patient's prosthesis was placed back into the eye socket (*a conformer was placed*) with antibiotic and steroid ointment. A pressure patch was placed over the closed socket. The patient was then escorted to the postoperative care area, where they remained for approximately 45 min before being discharged to the care of a responsible adult.

References

1. Klein M, Menneking H, Bier J. Reconstruction of the contracted ocular socket with free full-thickness mucosal graft. Int J Oral Maxillofac Surg. 2000;29(2):96–8.
2. Molgat YM, Hurwitz JJ, Web MC. Buccal mucous membrane fat graft in the management of the contracted socket. Ophthal Plast Reconstr Surg. 1993;9(4):267–72.

3. Tyers AG, Collin JR. Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier; 2008.
4. Markiewicz MR, Margarone III JE, Barbagli G, Scannapieco FA. Oral mucosa harvest: an overview of anatomic and biologic considerations. EAU-EBU Update Series. 2007;5(5):179–87.

Chapter 96
Orbit: Enucleation

Mehdi Tavakoli, Benjamin Erickson, and Wendy W. Lee

Abstract Enucleation, which is defined as the whole globe removal, is a common and sometimes lifesaving procedure in ophthalmology. Enucleation is performed along with primary implant insertion in most cases to maintain the orbital volume and to improve cosmetic outcomes. A good surgical technique is essential to reduce the rate of socket and implant complications.

Keywords Enucleation • Porous polyethylene implant • Hydroxyapatite implant • Anophthalmic socket • Intraocular tumor • Malignant melanoma • Sympathetic ophthalmia • Tenon's space • Optic nerve • Conformer • Prosthesis

Indications

(1) Intraocular tumor (definite or suspicious), (2) blind painful eye, (3) trauma with the risk of sympathetic ophthalmia, and (4) cosmesis in a blind and disfigured eye.

Essential Steps

1. Confirm and mark the appropriate eye
2. Administer anesthesia
3. Perform 360° peritomy
4. Isolate and secure the rectus muscles with locking Vicryl sutures, and disinsert from the globe
5. Cut the optic nerve after clamping for hemostasis, and remove the eye

M. Tavakoli (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
e-mail: Mehditavakolimd@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_96

6. Select a proper size implant and wrap the implant in donor sclera
7. Sew the isolated recti muscles to the implant after creating windows in donor sclera
8. Close the Tenon's capsule with interrupted sutures
9. Close the conjunctiva
10. Insert a conformer and apply a pressure patch

Complications

– Hemorrhage
– Infection
– Wound dehiscence
– Implant exposure/extrusion/migration
– Granuloma formation
– Deep superior sulcus
– Socket contracture
– Upper eyelid ptosis

Template Operative Dictation

Preoperative diagnosis: *Blind painful eye on the* (*right/left*) side

Procedure: Enucleation with placement of a scleral-wrapped __mm diameter porous polyethylene implant in the (*right/left*) socket

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) has a *blind* (*right/left*) *eye with pain that is refractory to topical therapy with prednisolone and atropine*. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, implant extrusion, socket contracture, poor cosmesis, poor motility, and need for further procedures. Afterward, (*the patient requested that we perform the above-listed surgery and signed the required consent form/two physicians concurred regarding the appropriateness of the procedure, and this was documented in the medical record prior to proceeding with the proposed operation*).

Description of the procedure: The patient's clinical history was reviewed in detail, and the appropriate eye was marked after careful confirmation with the patient and all members of the surgical team. Anesthesia was administered without complications. The patient's eye and corresponding adnexal structures were sterilized with 5 % Betadine ophthalmic solution. The patient was draped in the standard sterile fashion for ophthalmic surgery. Time-out was then performed confirming the correct patient, site, surgery, and any known drug allergies.

A wire lid speculum was placed in the operative eye. A 360° conjunctival peritomy was performed with Westcott scissors. Tenon's fascia was dissected from the globe in each quadrant using Stevens scissors. The rectus muscles were isolated in turn using Jamison muscle hooks. Each muscle was secured with a locking double-armed *5-0 Vicryl* suture and then transected at the insertion. All other attachments to the globe, including the superior and inferior obliques, were subsequently released.

The optic nerve was identified and cross-clamped with a hemostat for approximately 1 min to establish hemostasis. The hemostat was then removed, and the nerve was transected using curved Metzenbaum scissors. The globe was removed from operative field and sent for histopathologic evaluation.

At this time, (*packing/a test tube*) was placed in the orbit to establish hemostasis. Supplemental bipolar cautery was applied as needed. Inspection of the anophthalmic socket revealed no gross abnormalities. A 20 mm acrylic sphere was placed in the socket in order to gauge the appropriate implant size for the patient's anatomy. A ___mm porous polyethylene sphere was selected as the largest implant permitting tension-free closure and then soaked in gentamicin solution. The implant was then wrapped in donor sclera after making two scleral relaxing incisions 180° apart. These incisions were closed using interrupted *4-0 Vicryl* sutures to secure the implant. Four rectangular windows were cut in the anterior surface of the sclera. The wrapped implant was again soaked in gentamicin solution and then inserted into the socket. Each of the previously isolated rectus muscles was then sewn to the anterior lip of the corresponding scleral window, placing the muscle belly in contact with the implant. The overlying Tenon's fascia was closed with buried, interrupted *5-0 Vicryl* sutures. Conjunctival closure was then achieved with running *6-0 chromic* gut.

At the end of the case, aliquots of 0.75 % Marcaine was injected into each orbital quadrant. Additional gentamicin was injected subconjunctivally. A (*small/medium/large*) conformer coated with ophthalmic ointment was then placed, followed by a pressure patch. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the case. The patient was sent to the recovery room in stable condition and will be seen in eye plastic clinic in/on _____.

Chapter 97
Orbit: Evisceration

Andrew Rong, Benjamin Erickson, and Wendy W. Lee

Abstract Evisceration can be performed for the management of a chronic blind painful eye or for the treatment of acute endophthalmitis with no light perception. When compared to enucleation, it offers several advantages: a shorter operating time, quicker postoperative recovery, and—according to some surgeons—better socket motility and a decreased risk of anophthalmic socket syndrome. It is not an appropriate procedure, however, for phthisical eyes, extensively traumatized eyes with an increased risk of sympathetic ophthalmia, or eyes in which an occult intraocular tumor has not been ruled out preoperatively. It should also be avoided in patients with history of scleral inflammation, orbital hardware placement, or if there is any reason to suspect that the source of pain is intrinsic to the outer layers of the globe.

Keywords Evisceration • Blind painful eye • Removal of eye • Chronic blind painful eye • Acute endophthalmitis

Indications

Blind painful eye, endophthalmitis

Essential Steps

1. Ensure no intraocular malignancy preoperatively
2. Administer retrobulbar anesthesia, sterilization
3. Perform 360° conjunctival peritomy
4. Perform 360° keratectomy
5. Disinsertion of uvea from underlying sclera with evisceration spoon and remove

A. Rong (✉)
Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ajr211@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_97

6. Cleanse sclera with 70 % ethanol
7. Create scleral relaxing incisions
8. Place implant and close sclera over implant
9. Close Tenon's with interrupted sutures
10. Close conjunctiva with running suture
11. Place of conformer and pressure patch

Complications

– Infection
– Bleeding
– Pain (occasionally persistent after successful evisceration)
– Implant extrusion
– Sympathetic ophthalmia
– Poor cosmesis
– Poor socket motility

Template Operative Dictation

Preoperative diagnosis: *Blind painful eye on the* (*right/left*) side

Procedure: (1) Evisceration of the (*right/left*) eye and (2) prosthesis implantation

Postoperative diagnosis: *Same*

Indication: This **____**-year-old (*male/female*) has a *blind* (*right/left*) *eye with pain that is refractory to topical therapy with prednisolone and atropine*. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, implant extrusion, sympathetic ophthalmia, poor cosmesis, poor motility, and need for further procedures. Afterward, (*the patient requested that we perform the above listed surgery and signed the required consent form/ two physicians concurred regarding the appropriateness of the procedure, and this was documented in the medical record prior to proceeding with the proposed operation*).

Description of the procedure: The patient's clinical history was reviewed in detail, and the appropriate eye was marked after careful confirmation with the patient and all members of the surgical team. *General* anesthesia was administered without complications. The patient's (*right/left*) eye and corresponding adnexal structures were sterilized with 5 % Betadine ophthalmic solution. The patient was draped in the standard sterile fashion for ophthalmic surgery. Time-out was then performed confirming the correct patient, correct site, correct surgery, and any known drug allergies.

A wire lid speculum was placed in the operative eye. A 360° conjunctival peritomy was performed with Westcott scissors. A (*#66 blade or #11 Bard-Parker blade*) was then used to penetrate the globe at the limbus, and a 360° keratectomy was performed with (*cornea/Westcott*) scissors. An evisceration spoon was then used to disinsert the ciliary body from the scleral spur and enter the suprachoroidal space. The uveal tissues were removed in toto and sent for histopathologic processing. Hemostasis was achieved with a combination of packing and judicious bipolar electrocautery. The exposed inner scleral surface was then cleaned with *70 % ethanol* to remove any uveal remnants. Scleral relaxing incisions were then created ____ degrees apart, and the posterior sclera was fenestrated to permit fibrovascular ingrowth. An *18* mm acrylic sphere was placed in the socket in order to gauge the appropriate implant size for the patient's anatomy. A ___ mm porous polyethylene implant was selected as the largest implant permitting tension-free scleral closure and soaked in gentamicin solution. The implant was then inserted into the sclera, which was closed with buried, interrupted *5-0 Vicryl* sutures. The overlying Tenon's fascia was also closed with buried, interrupted *5-0 Vicryl* sutures. Conjunctival closure was achieved with a running *6-0 chromic gut* suture. At the end of the case, aliquots of 0.75 % Marcaine were injected into each orbital quadrant. Additional gentamicin solution was infiltrated subconjunctivally. A (*small/medium/large*) conformer coated with ophthalmic ointment was then placed, followed by a pressure patch.

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the case. The patient was sent to the recovery room in stable condition and will be seen in eye clinic in/on _____.

Chapter 98
Orbit: Orbital Exenteration with Split-Thickness Skin Graft

Mehdi Tavakoli, Benjamin Erickson, and Wendy W. Lee

Abstract Exenteration is surgical removal of the orbital contents, including the globe, ocular adnexa, and eyelids. The eyelids may be spared in certain circumstances and used to line the exenteration cavity. It is usually indicated for invasive or devastating orbital neoplasms (primary or secondary from adjacent structures) or the treatment of angioinvasive fungal infections. The exposed orbital walls may be left to heal spontaneously, by granulation tissue or covered with a split-thickness skin graft. Given the radical nature of exenteration with a significantly associated cosmetic penalty, patients must be extensively counseled preoperatively regarding the necessity of the procedure and its potential drawbacks.

Keywords Exenteration • Orbital malignancy • Orbital infection • Sinus malignancy • Cutaneous basal cell carcinoma • Mucormycosis • Split-thickness skin graft

Indications

(1) Primary malignant orbital tumors, including invasive adenoid cystic carcinoma of the lacrimal gland, (2) primary intraocular tumors with extension outside the globe, (3) primary cutaneous malignancies with extension to the orbit, (4) periorbital sinus malignancies with extension to the orbit, (5) orbital fungal infections (usually mucormycosis).

M. Tavakoli (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
e-mail: mehditavakolimd@med.miami.edu

B. Erickson
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: berickso@stanford.edu

W.W. Lee
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_98

Essential Steps

1. Confirm and mark the appropriate eye
2. Administer anesthesia
3. Incise the skin overlying the orbital rim
4. Incise and dissect the orbital rim periosteum
5. Separate the periorbita from the orbital walls
6. Sharply dissect tightly attached structures along the orbital walls and transect blood vessels after careful hemostasis
7. Transect the contents of the superior and inferior orbital fissures, including the optic nerve
8. Prepare a split-thickness skin graft from the patient's upper thigh using a dermatome and place and secure the graft in the socket
9. Pack the socket with lubricated gauze

Complications

– Intraoperative bleeding
– Postoperative infection
– Fistula between the sinus and orbit
– CSF leakage
– Forehead and periocular skin numbness
– Unsatisfactory appearance

Template Operative Dictation

Preoperative diagnosis: *Orbital primary malignancy*, (*right/left*) side

Procedure: (1) Total orbital exenteration with (2) split-thickness skin graft (*right/left*) side

Postoperative diagnosis: *same*

Indication: This ____-year-old (*male/female*) presented with a *primary orbital malignancy* of ______ in the (*right/left*) orbit. This diagnosis was confirmed preoperatively with permanent histologic sections. An extensive discussion of the pros and cons of orbital exenteration was undertaken with (*the patient and/or family members*). The risks, benefits, and alternatives to the proposed procedure were outlined, including the risk of infection, bleeding, pain, poor cosmesis, socket complications, failure to control the underlying disease process, and the need for further procedures. The potentially disfiguring nature of the surgery was fully disclosed. Afterward, the (*patient/patient's health care proxy*) requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient was brought to the operating room where general anesthesia was induced. The (*right/left*) eye, adnexal structures, and face were sterilized with 5 % Betadine ophthalmic solution. The patient was draped in the standard sterile fashion for head and neck surgery. The patient's (*right/left*) anterior thigh was also prepared using the standard sterile technique in order to permit the harvesting of a split-thickness skin graft to line the exenterated orbit. A time-out was then performed confirming the correct patient, correct sites, correct surgery, and any known drug allergies.

The planned incision over the orbital rim was marked, and the periocular region was infiltrated with 2 % lidocaine with epinephrine (1:100,000) to aid hemostasis. A *4-0 silk* traction suture was placed through the lid margins to aid with subsequent manipulations. Monopolar electrocautery was then used to incise the skin. This incision was continued through the orbicularis to expose the periosteum overlying the orbital rim. The supraorbital and supratrochlear neurovascular bundles were identified, cauterized, and transected. The periosteum was then incised circumferentially, ____mm outside of the orbital rim. The periosteum was then raised with a Freer elevator, and the periorbita was gently separated from the orbital walls. The perforating vessels, including the anterior and posterior ethmoidal arteries, were cauterized and transected. Sharp dissection was used to free the trochlea as well as the medial and lateral canthal tendons from bone. The lacrimal sac was identified within its fossa and transected. The inferior orbital fissure was isolated, and the associated tissues were partially transected.

[Choose one]:

If enucleation snare was used—*An enucleation snare was passed and tightened for _5_ min to compress the apical tissues. The snare was then tightened until the tissues were transected.*

If cross-clamp technique was used—*The apical tissues were cross-clamped with curved hemostats for __ min, and then transected with enucleation scissors.*

Additional biopsies of the apical remnants were taken and sent for frozen section. Hemostasis was achieved with the judicious application of bipolar wetfield cautery, and the orbit was loosely packed with 4×4 gauze, while attention was directed toward harvesting of the skin graft.

The previously prepared anterior surface of the (*right/left*) upper thigh was coated with a thin layer of mineral oil. A 0.0012×__×__in. split-thickness graft was then harvested with a pneumatic dermatome. Xeroform gauze was then applied to the donor site, which was dressed with an ABD pad, and wrapped with a Kerlix and Ace bandage. The skin was then passed through a 1:1 ratio mesher. The orbit was then unpacked, and the graft was sutured to the skin edges with interrupted followed by running, locking *5-0 Vicryl*. Antibiotic ointment was instilled into the orbit. A Telfa pad was placed over the skin graft and _#_ detergent-free sterile scrub sponges were packed into the socket. This packing was held in place with interrupted *4-0 silk* sutures passed through the intact skin over the orbital rim in horizontal mattress fashion.

The drapes were removed, and a pressure patch was applied with eye pads, benzoin, and paper tape. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then extubated and taken to the recovery room in stable condition.

Chapter 99
Orbit: Orbital Exenteration (Subtotal/Total/Extended)

Cameron B. Nabavi and Craig N. Czyz

Abstract Orbital exenteration is a procedure to address potentially fatal malignant tumors of the orbit and adnexa. Subtotal exenteration spares some periocular tissues while a total exenteration spares none. An extended exenteration involves removal of the bony orbit, adjacent sinuses, and other involved facial bones.

Keywords Exenteration • Malignant tumors • Orbit • Adenoid cystic carcinoma • Mucormycosis • Subtotal • Total • Extended • Trauma

Indications

Certain orbital and ocular malignancies can have local and/or distant metastases that may include bone and sinus spaces. Depending on the condition, exenteration can be a primary or secondary treatment after failure of medical therapy. Primary indications include adenoid cystic carcinoma, intraocular melanoma or retinoblastoma with orbital extension, orbital squamous cell carcinoma, malignant epithelial tumors of the lacrimal gland, and malignancies extending into the orbit with resistance to medical treatment. Secondary indications include primary orbital malignancies that do not respond to medical therapy and fungal infections nonresponsive to antibiotic therapy and limited debridement. Depending on the location of the lesion, subtotal, total, or extended exenteration may be indicated.

C.B. Nabavi (✉)
Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA
e-mail: cnabavi@yahoo.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_99

Essential Steps

1. General anesthesia is administered.
2. Local infiltration of the periocular tissues (*a retrobulbar anesthetic can also be administered*).
3. A time-out is repeated to confirm the correct side of the exenteration.
4. ***If a subtotal exenteration planned***—*The lid skin is spared and an incision superior to the superior lash line and inferior to the inferior lash line is marked. An incision through the skin and orbicularis is performed. A dissection anterior to the orbital septum is performed to gain access to the periosteum of the superior, inferior, medial, and lateral orbital rims.*
5. ***If a total or extended exenteration planned***—*A marking just inferior to the brow tissue is marked. This mark is extended in a circumferential pattern to include all the orbital tissues. The tissue is incised and cutting electrocautery is used to gain access to the periosteum of the superior, inferior, medial, and lateral orbital rims.*
6. A Freer elevator is used to free the periosteum of the orbital tissues from the underlying nasal wall, while the lacrimal sac is freed from the underlying lacrimal sac fossa (*care must be taken to not fracture the lamina papyracea to prevent postoperative fistula formation*).
7. The dissection plane is extended to the orbital apex.
8. A large hemostat is used to clamp the orbital tissue at the apex along with its blood supply from the ophthalmic artery.
9. Scissors are used to remove the orbital contents en bloc.
10. Hemostasis is gained with a combination of pressure, Gelfoam, thrombin, and/or electrocautery.
11. ***If a total or extended exenteration was performed***—*The bony orbit, adjacent sinus tissue, and/or adjacent facial bones may need to be removed in conjunction with skull base, ENT, or neurosurgical specialists.*
12. Once hemostasis is achieved, the surgeon can choose to cover the orbital bone with a split-thickness skin graft or leave bare for epithelialization by secondary intention.

Complications

- Intra- or postoperative hemorrhage
- Recurrence of tumor
- Incomplete resection of tumor
- Motor nerve paralysis
- V1 or V2 hypoesthesia
- Infection
- Fistula formation
- CNS retrograde anesthesia
- CSF leak
- Meningitis
- Osteomyelitis
- Graft failure

Template Operative Dictation

Preoperative diagnosis: *Primary orbital malignancy (with orbital extension/_____ include any involved tissues) (left/right)* eye

Procedure: (1) Orbital exenteration (*subtotal/total/extended*) and (2) *split-thickness skin graft* of the (*right/left*) eye

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) with a history of (*insert orbital malignancy or pathology specific to this case*) has evidence of orbital disease concerning for risk for further (*local extension/intracranial extension/distant metastasis*). Based on the patient history and clinical examination, a (*subtotal/total/extended*) orbital exenteration has been recommended. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) orbit was marked with a surgical marking pen. The patient was brought into the operating room under anesthesia care and placed supine on the operating room table. General endotracheal anesthesia was administered. Local anesthetic consisting of 2% lidocaine with 1:100,000 epinephrine and 0.75% marcaine was injected into the (*right/left*) periocular tissues. *A ___ cc retrobulbar injection of the same anesthetic mix was also placed*. The patient was prepped and draped in a standard sterile fashion suitable for oculofacial plastic surgery. (*The patient's (right/left) anterior thigh was also prepared using the standard sterile technique in order to permit the harvesting of a split-thickness skin graft to line the exenterated orbit*.) A secondary time-out was performed to confirm the correct side and location(s) of surgery. Imaging was reviewed one more time to confirm that surgery was being performed on the appropriate eye.

[Choose one]:

If a subtotal exenteration was performed*—A marking pen was used to mark an incision superior to the lash line for the upper lid and inferior to the lash line for the lower lid. These were united laterally and medially past the lateral and medial canthus, respectively. An incision was then made with the #15 Bard-Parker blade following the markings. A sub-orbicularis dissection was performed with Westcott scissors, staying anterior to the orbital septum. This was extended in a circumferential fashion to gain access to the periosteum of the medial, lateral, superior and inferior orbital rims.*

If a total or extended exenteration was performed*—A marking pen was used to mark a border around all the periocular tissues to the inferior border of the brow superiorly, nasal sidewall medially, lateral orbital rim laterally, and inferior orbital rim inferiorly. An incision was then made with the #15 Bard-Parker blade following* *the markings. Cutting electrocautery or Westcott scissors was used to dissect through the subcutaneous tissue down to the periosteum of the medial, lateral, superior, and inferior orbital rims.*

Cutting electrocautery was used to incise the periosteum of the orbital rims in a 360° fashion. A Freer elevator was used to free the periosteum from the underlying orbital walls. The lacrimal sac was also elevated from the lacrimal sac fossa. The subperiosteal dissection was extended to the orbital apex. A curved hemostat was used to clamp the orbital tissue at the apex along with its blood supply. After the tissues were clamped for 5 minutes, the tissue was removed with Metzenbaum or enucleation scissors en bloc and sent for pathological examination. Hemostasis was achieved with (*electrocautery*, *Gelfoam*, *thrombin*, *and hydrogen peroxide*) as needed. Once hemostasis was achieved, the case continued.

If extended exenteration was performed*—Directed bone and sinus tissue removal was performed using an (osteotome/ burr/oscillating saw). (_____ list bone/structures removed)*

[Choose one]:

If a split-thickness skin graft was used*—The exenteration wound was measured with a ruler and it was determined*; *a ___×___ cm split-thickness graft was required. Attention was then turned to the (left/right) thigh where the area for a split-thickness graft was marked. A dermatome was used to harvest a graft of 0.012-in. thickness that was ___×___ cm. The donor site was generously coated with antibiotic ointment and covered with an (______) dressing. The split-thickness skin graft (was meshed 1:2 and) secured into place with interrupted and running 6-0 plain gut suture, joining it to the bordering skin of the exenteration site.*

If healing by secondary intention was elected*—The orbit was left to heal via secondary intention.*

The exenterated orbit was then dressed with antibiotic ointment, Xeroform gauze, and eye pads with paper tape. The patient was extubated and taken to the recovery area in stable condition. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure.

Chapter 100
Eyelid: Blepharoplasty, Upper Lid

Andrew Rong, Benjamin Erickson, and Wendy W. Lee

Abstract Dermatochalasis, or the excess of skin of the upper eyelid, may cause obstruction of the visual axis or patient dissatisfaction with cosmesis. Prominence of the nasal orbital fat compartment and/or the pre-aponeurotic fat pad often accompanies these age-related cutaneous changes. Upper eyelid blepharoplasty may be performed to either improve the superior visual field or for cosmesis. Patients should be educated about the risks of the procedure, including alternatives. It is important to recognize when blepharoplasty alone is sufficient to address the patient's complaints and when it is necessary to perform adjunctive procedures such as eyelid and brow ptosis repair to optimize surgical outcomes.

Keywords Blepharoplasty • Dermatochalasis • Upper eyelid • Superior visual field • Fat prolapse

Indications

Dermatochalasis and upper eyelid fat prolapse resulting in visual symptoms or cosmetic complaints.

Essential Steps

1. Careful measurement and marking of the upper eyelid creases and region of excision
2. Removal of skin only or skin-orbicularis flap
3. Opening of the orbital septum for excision or sculpting of pre-aponeurotic and nasal orbital fat
4. Lid crease reformation (if appropriate)

A. Rong (✉)
Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ajr211@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_100

Complications

- Retrobulbar hematoma
- Scarring or keloid formation (rare)
- Milia or inclusion cysts along lid crease incisions
- Asymmetry
- Infection
- Ptosis
- Unmasking of brow ptosis due to postoperative relaxation of frontalis muscle
- Lagophthalmos
- Dry eye exacerbation

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) *upper eyelid dermatochalasis*

Procedure: (*Right/Left/Bilateral*) upper eyelid blepharoplasty

Postoperative diagnosis: *Same*

Indication: This __-year-old *male/female* patient has redundant eyelid soft tissues obstructing the visual axis and causing difficulties with activities of daily living. Suprathreshold Humphrey visual fields demonstrated greater than 30 % improvement with taping of the excess skin. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, exacerbation of dry eye symptoms, poor cosmesis, asymmetry, and need for further procedures. Afterwards, the patient requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient's clinical history was reviewed in detail and the appropriate eye was marked in the preoperative area. The patient was brought into the operating room where the (*right/left*) eye, adnexal structures, and face were sterilized with 5 % Betadine ophthalmic solution. *General* anesthesia was administered without complications. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, sites, surgery, and any known drug allergies.

The patient's natural lid creases were identified and found to be ___ mm above the lid margin in the midpupillary axis. A sterile violet marking pen was used to delineate these creases. Medial to the punctum and lateral to the outer canthus, these markings were gently inflected upwards to prevent webbing and eliminate temporal hooding. Castroviejo calipers were then used to measure a (*11–13*) mm margin of sub-brow skin to preserve. Using 0.5 mm non-toothed forceps, the redundant tissue within these confines was then grasped and marked. The pen was then used to complete elliptical outlines for excision. Contour and symmetry were carefully evaluated and adjustments were made as needed.

Attention was then directed toward the (*right/left*) upper eyelid. Approximately 2 cc of the _____ anesthetic was infiltrated subcutaneously. Gentle traction was applied, and the previously marked ellipse was incised with a #15 Bard Parker blade. A skin muscle flap (*or skin only flap*) was subsequently elevated with blunt Westcott scissors and 0.3 mm forceps (*or Bovie cautery*). Hemostasis of the tissue bed was achieved with judicious application of monopolar electrocautery. The underlying orbital septum (*or orbicularis and underlying septum if skin only*) was buttonholed and then opened along the horizontal axis. The nasal fat pad was then identified and pediclized using gentle blunt dissection. Supplemental anesthetic was infiltrated at the base. The pedicle was then subsequently cross-clamped with a Kelly hemostat and transected. Meticulous electrocautery was applied to the base of pedicle and complete hemostasis was confirmed before permitting it to retract. The pre-aponeurotic fat pad was then sculpted with cautery. The eyelid crease was reformed with _#_ interrupted *7-0 nylon* sutures, incorporating small bites of the underlying levator into the closure (*this step not needed if skin only blepharoplasty*). The skin was then closed with running *7-0 nylon* suture. The drapes were removed and ophthalmic ointment was applied to both incisions.

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition and will be seen in the eye plastics clinic in/on _____. The patient was informed to apply frequent ice packs the eyelids for 48 h, and abstain from heavy lifting, straining, or use of blood thinners. The patient was instructed to return to the emergency room immediately if any loss of vision or deep orbital pain is noted.

Chapter 101
Eyelid: Levator Resection

Daniel Straka and Craig N. Czyz

Abstract The levator resection procedure is most commonly used in cases of congenital ptosis with a moderate amount of levator function (>6 mm). Due to the high incidence of concurrent amblyopia, patients should have a thorough ophthalmologic evaluation prior to surgery including a cycloplegic refraction to screen for meridional amblyopia or other refractive errors. Patients should have been evaluated and deemed appropriate for such surgical intervention. The amount of resection performed is multifactorial and depends on the degree of ptosis as well as the amount of levator function. For very large resections, a portion of the conjunctiva may need to be excised to avoid prolapse postoperatively. Patients (or the patient's guardian) should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Ptosis • Eyelid • Levator aponeurosis • Congenital • Levator resection • Resection • Oculoplastics

Indications

Bilateral or unilateral amblyogenic upper eyelid ptosis or symptomatic superior visual field constriction in the setting of moderate to normal levator function.

Essential Steps

1. Preoperative marking of the upper eyelid crease incision with surgical marking pen
2. Administration of subcutaneous local anesthetic
3. Corneal shield placement

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_101

4. Eyelid crease incision with #15 blade scalpel
5. Identification of the levator muscle and aponeurosis
6. Disinsertion of the levator aponeurosis from the tarsal plate
7. *If a large resection is being performed—a full-thickness eyelid incision is made with straight iris scissors*
8. Dissection of the levator-Müller's muscle complex from the underlying conjunctiva
9. *If a large resection is being performed and there is concern for conjunctival prolapse—a small strip of conjunctiva is excised.*
10. Hemostasis with monopolar or bipolar cautery
11. Placement of ptosis clamp on the levator-Müller's muscle complex for easier mobilization
12. Partial-thickness passes of suture through the tarsal plate and then through the muscle complex to allow for advancement of the muscle
13. The sutures are tied down and the height and contour of the eyelid are checked
14. The excess levator-Müller's muscle complex is then resected followed by additional hemostasis
15. Close incision with running or interrupted sutures
16. Removal of the corneal shield

Complications

- Hemorrhage
- Lagophthalmos
- Infection
- Foreign body sensation
- Wound dehiscence
- Scarring
- Corneal abrasion
- Ptosis
- Eyelid retraction
- Asymmetric eyelid contour
- Exposure keratitis

Template Operative Dictation

Preoperative diagnosis: Upper eyelid ptosis on the (*right/left/bilateral*)

Procedure: Levator resection (*right/left/both*) upper eyelid(s)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of (*bilateral/unilateral*) ptosis of the upper eyelid(s) since birth necessitating surgical intervention. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient and/or patient's guardians. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eyelid incision was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, Proparacaine was placed into the (*right/left*) eye. A surgical marking pen was used to mark the planned incision site. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ______ was injected into (*right/left/both*) upper eyelid(s). A corneal shield was placed in the (*right/left/both*) eye(s).

A caliper was used to measure a lid crease incision of ___mm on the (*right/left*) upper eyelid. A #15 Bard-Parker blade was used to make an incision through the skin and orbicularis muscle. Westcott scissors and 0.3 forceps were used to dissect through the remaining orbicularis fibers until the orbital septum was identified. The junction of the orbital septum and levator muscle was identified and the septum was opened. The levator muscle was identified deep to the pre-aponeurotic fat. The fat was dissected away from the elevator tendon and muscle to expose the entire muscle belly. Hemostasis was obtained with (*mono/bi*) polar cautery. The levator aponeurosis was then disinserted from the anterior border of the tarsal plate using Westcott scissors. Westcott scissors and 0.3 forceps were then used to carefully dissect the levator-Müller's muscle complex away from the underlying conjunctiva.

If a large levator resection was performed—*The conjunctiva was incised with straight iris scissors creating a full-thickness eyelid incision.*

If there was concern for conjunctival prolapse postoperatively—*A small strip of conjunctiva was excised secondary to concern for conjunctival prolapse postoperatively.*

Once an adequate amount of the muscle complex was isolated, the ptosis clamp was used to grasp the tissue securely. *Three* double-armed *6-0 Vicryl* sutures on a spatulated needle were passed in a horizontal mattress fashion, partial thickness through the anterior aspect of the tarsal plate at *three* locations across the length of the tarsus. Both ends of the suture were then passed through the levator muscle/aponeurosis posterior to the ptosis clamp. The ptosis clamp was then removed and each suture tied down securely. The corneal shield was removed and the height and contour of the lid was checked and noted to be satisfactory. The excess levator aponeurosis and muscle was then resected with Westcott scissors and forceps. Additional hemostasis was obtained with (*mono/bi*) polar cautery. The wound was then closed with interrupted *6-0 plain gut* sutures.

The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 102
Eyelid: External Levator Resection

Mehdi Tavakoli, Benjamin Erickson, and Wendy W. Lee

Abstract Blepharoptosis is an unpleasant complaint of the patients referring to oculoplastic clinics. Following a thorough medical and neurologic work-up, the surgical correction is the main treatment strategy in many cases. Levator muscle function is a measure of maximal lid excursion and crucial for selecting the best surgical approach. Once the levator muscle function is measured as reasonable, along with a good Bell's phenomenon, the strengthening of the muscle by the shortening or resection techniques through an external approach can favorably elevate the eyelid.

Keywords Ptosis • Levator aponeurosis • Levator muscle • Levator function • Orbicularis oculi muscle • Eyelid crease • Tarsus plate • Orbital septum • Preaponeurotic fat • Muller muscle

Indications

Congenital (in most cases) or acquired ptosis (myogenic or neurogenic) with levator muscle function > 4 mm and good Bell's phenomenon.

Essential Steps

1. Administration of local or general anesthesia
2. Skin incision on the natural lid crease
3. Dissection of the orbicularis muscle
4. Opening the orbital septum

M. Tavakoli (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
e-mail: mehditavakolimd@gmail.com

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_102

5. Disinsertion of the levator aponeurosis from the tarsus
6. Reinsertion of the anterior-superior part of the upper tarsus to the aponeurosis from the planned level of the resection
7. Removal of the excess skin
8. Crease reformation
9. Wound closure

Complications

– Undercorrection
– Overcorrection
– Lagophthalmos and corneal exposure
– Conjunctival prolapse
– Lid margin contour deformity
– Lid crease asymmetry
– Lid lag in downward gaze
– Lash ptosis
– Entropion
– Ectropion

Template Operative Dictation

Preoperative diagnosis: (*Congenital/acquired*) ptosis (*right/left*) side

Procedure: External levator resection (*right/left*) side

Postoperative diagnosis: Same

Indication: This ____-year-old *male/female* presented complaining of ptosis on the (*right/left*) side that (*obscured the visual field/created an asymmetric appearance of the eyelids*). The levator muscle had good functioning confirmed with measurement. The risks, benefits, and alternatives to the proposed procedure were discussed with the patient, including the risk for infection, bleeding, pain, exacerbation of dry eye symptoms, poor cosmesis, undercorrection, overcorrection, asymmetry, and need for further procedures. Afterward, the patient requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient was brought to the operating room where the (*right/left*) eye, adnexal structures, and face were sterilized with 5 % Betadine ophthalmic solution and 10 % Betadine skin preparation. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, correct sites, correct surgery, and any known drug allergies.

The patient's (*right/left*) natural lid crease was identified, and found to be ___ mm above the lid margin in the mid-pupillary axis. A sterile violet marking pen was used to delineate the creases. Approximately ___cc of *2 % lidocaine with epineph-*

rine was infiltrated subcutaneously. Gentle traction was applied, and the previously lid crease marking was incised with a #15 Bard-Parker blade. Hemostasis was achieved with the judicious application of bipolar wet field cautery. The orbicularis muscle fibers were spread to expose the underlying orbital septum, which was then buttonholed and opened along the horizontal axis. The preaponeurotic fat pad was then identified and elevated, exposing the underlying levator aponeurosis. A pretarsal pocket was created using Westcott scissors, and a small strip of orbicularis muscle was excised. The aponeurosis was disinserted from the tarsus, and dissection was carried out superiorly between the aponeurosis and Muller's muscle, after hydrodissection of the plane with anesthetic. A *5-0 Mersilene* suture was placed through the tarsal plate in a horizontal mattress fashion at the desired location of the lid margin apex. The lid was everted to confirm lamellar and not full-thickness passage. This suture was then passed through the levator aponeurosis and temporarily tied. The patient was instructed to open (his or her) eyes, and the lid height was assessed. (*Insert comments here if adjustments were made*.) _#_ interrupted sutures were placed (*temporally/temporally and nasally*) to optimize the lid contours, and all sutures were tied permanently. The redundant distal part of the aponeurosis was then resected. Excess skin and orbicularis from above the lid crease were overlapped and conservatively excised. Continued hemostasis was achieved with bipolar wet field cautery. The eyelid crease of each eye was reformed with _#_ interrupted *7-0 nylon* sutures, incorporating small bites of the underlying levator into the closure. The skin was then closed with running *7-0 nylon* suture. The drapes were removed, and ophthalmic ointment was applied to both incisions.

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition and will be seen in the eye plastics clinic in 1 week. The patient was instructed to apply frequent ice packs to the eyelids for 48 h and abstain from heavy lifting, straining, or use of blood thinners. The patient was instructed to return to the emergency room immediately if any loss of vision or deep orbital pain is noted.

Chapter 103
Eyelid: Levator Advancement

Kimberly D. Tran, Benjamin Erickson, and Wendy W. Lee

Abstract Ptosis that obstructs the visual axis, causes visual disability, affects activities of daily living, and/or causes cosmetically unacceptable appearance are indications for this procedure. Patients should be educated about the risks, benefits, and alternatives to the procedure prior to proceeding, and informed consent obtained.

Keywords Levator disinsertion • Ptosis • External levator advancement • Upper lid blepharoplasty • Levator advancement

Indications

Upper eyelid ptosis obstructing the visual axis and causing difficulties with activities of daily living. Suprathreshold Humphrey visual fields demonstrating greater than 30% improvement or Goldmann visual fields showing greater than 12° of improvement with taping of the lids.

Essential Steps

1. Transfer the patient to the operating room
2. Measure and mark the patient's natural lid crease
3. Subcutaneous infiltration of local anesthetic
4. Incision along lid crease
5. Hemostasis
6. Dissect through the skin and orbicularis and then open orbital septum
7. Inflect and dissect preaponeurotic fat pad off of underlying levator aponeurosis and expose dehisced edge
8. Create pretarsal pocket

K.D. Tran (✉)
Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: KimberlyDTran@gmail.com

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_103

9. Excise small strip of orbicularis muscle
10. Pass 5-0 Mersilene suture through partial thickness central tarsal plate. Evert the lid to ensure that there is no exposure of suture. Pass Mersilene suture through dehisced edge of levator aponeurosis and temporarily tie
11. Instruct the patient to open his/her eyes and adjust sutures for symmetry, height, and contour
12. *If bilateral procedure*: Identical procedure in fellow contralateral eyelid
13. *If bilateral procedure*: Instruct the patient to again open his/her eyes; adjust sutures for symmetry, height, and contour
14. Permanently tie all sutures
15. Excise excess skin and orbicularis above lid crease
16. Reform eyelid crease with 7-0 nylon sutures
17. Close skin with 7-0 nylon sutures

Complications

– Infection
– Bleeding
– Pain
– Exacerbation of dry eye symptoms
– Poor cosmesis
– Undercorrection
– Overcorrection
– Asymmetry
– Exposed suture
– Need for further procedures
– Retrobulbar hemorrhage

Template Operative Dictation

Preoperative diagnosis: Bilateral levator dehiscence

Procedure: Bilateral upper lid levator advancement

Postoperative diagnosis: Same

Indication: This ____-year-old (*male/female*) has upper eyelid ptosis obstructing the visual axis and causing significant difficulties with activities of daily living. Suprathreshold Humphrey visual fields demonstrated greater than 30 % improvement with taping of the lids. The risks, benefits, and alternatives to the proposed procedure were discussed with the patient, including the risk for infection, bleeding, pain, exacerbation of dry eye symptoms, poor cosmesis, undercorrection, overcorrection, asymmetry, and need for further procedures. Afterward, the patient elected to undergo the procedure and signed the required consent forms.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye(*s*) were marked with a marking pen. The patient was brought to the operating room where the eyes, adnexal structures, and face were prepped in the usual sterile ophthalmic fashion with 10 % Betadine skin preparation. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, site, surgery, and any known drug allergies.

The patient's natural lid creases were identified and found to be ____mm above the lid margin in the midpupillary axis. A sterile violet marking pen was used to delineate these creases. Medial to the punctum and lateral to the outer canthus, these markings were gently inflected upward to prevent webbing and eliminate temporal hooding. Contour and symmetry were carefully evaluated and adjustments were made as needed.

Attention was then directed toward the (*right/left*) upper eyelid. Approximately ___ cc of 2 % lidocaine with epinephrine (1:100,000) was infiltrated subcutaneously. Gentle traction was applied, and the previously lid crease marking was incised with a #15 Bard-Parker blade. Hemostasis was achieved with judicious application of bipolar wet field electrocautery.

The orbicularis muscle fibers were dissected to expose the underlying orbital septum, which was then buttonholed and opened along the horizontal axis. The preaponeurotic fat pad was then identified and elevated, exposing the dehisced edge of the underlying levator aponeurosis. The fat was gently dissected off of the underlying aponeurosis. A pretarsal pocket was created using Westcott scissors, and a small strip of orbicularis muscle was excised.

A partial thickness bite of the tarsal plate using a *5-0 Mersilene* suture was taken in a vertical mattress fashion at the desired location of the lid margin apex. The lid was everted to confirm lamellar, and not full-thickness, passage. The suture was then passed through the levator aponeurosis and temporarily tied using a slipknot. The patient was instructed to open (*his/her*) eyes, and the lid height was assessed. Adjustments were made as needed.

Attention was then turned to the (*left/right*) upper eyelid, where the identical procedure was performed. Appropriate symmetry of the lid margin apexes was confirmed. Additional interrupted sutures were placed (*temporally and/or nasally*) to optimize the lid contours, and all sutures were tied permanently and trimmed. Excess skin and orbicularis from above the lid crease was overlapped and conservatively excised. Hemostasis was achieved with bipolar wet field cautery.

The eyelid crease of each eye was reformed with _#_ interrupted *7-0 nylon* sutures, incorporating small bites of the underlying levator into the closure. The skin was then closed with a running *7-0 nylon* suture. The drapes were removed and ophthalmic ointment was applied to both incisions.

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition. The patient was instructed to apply frequent ice pack to the eyelids for 48 h and abstain from heavy lifting, straining, or the use of blood thinners.

Chapter 104
Eyelid: Conjunctival Müllerectomy

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. The procedure should be considered for patients with unilateral or bilateral upper eyelid ptosis of up to 2 mm with levator function greater than 11 mm. Phenylephrine testing may be conducted to further identify surgical candidates. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Fibrin sealant • Ptosis • Eyelid • Müller's muscle • Conjunctiva

Indications

Upper eyelid ptosis (less than 2 mm) causing symptomatic superior visual field constriction in the setting of normal levator function (>11 mm), confirmed by improvement of the ptosis after topical 2.5 % or 10 % phenylephrine instillation.

Essential Steps

1. Administration of topical and local anesthetic in a transcutaneous and transconjunctival manner superior to the tarsus.
2. Corneal shield placement
3. Traction suture placed in gray or lash line of the upper eyelid
4. Eversion of the upper eyelid over a Desmarres retractor
5. Putterman clamp placement to engage the conjunctiva and Müller's muscle.
6. Relaxation of the Desmarres retractor once clamp is in place.
7. Suture placement in running fashion beneath the Putterman clamp through the conjunctiva and Müller's muscle.
8. A blade is then used to incise the clamped tissue immediately beneath the clamp with care taken not to cut the suture.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_104

9. Mono-/bipolar cautery is used for hemostasis.
10. The previously placed suture (or fibrin glue) used to reapproximate the conjunctival ends with the underlying muscle in a running fashion and tied with the knot buried or externalized.
11. The eyelid is then reverted back to its original position and the traction suture is removed.
12. Removal of the corneal shield

Complications

– Overcorrection
– Undercorrection/ptosis
– Scarring
– Conjunctival prolapse
– Hematoma
– Lagophthalmos
– Infection
– Foreign body sensation
– Wound dehiscence
– Corneal abrasion
– Ptosis
– Eyelid retraction
– Asymmetric eyelid contour
– Exposure keratitis
– Blood borne pathogens (if fibrin sealant is used)

Template Operative Dictation

Preoperative diagnosis: Upper eyelid ptosis (*right/left*)

Procedure: Conjunctival Müllerectomy upper eyelid (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed (*bilateral/unilateral*) ptosis of the upper eyelid(s) over the past ____ (*months/years*) and on clinical evaluation was found to have (*bilateral/unilateral*) upper eyelid ptosis causing constriction of the superior visual field confirmed with (*Goldmann/Humphrey*) visual field testing. The patient displayed normal levator function with improvement of the ptosis with (*2.5/10 %*) phenylephrine drops. The visual field impairment was affecting the patient's activities of daily living. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure and informed consent was obtained. (If fibrin sealant is used, the risk of blood-borne pathogens should be discussed).

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic consisting of Proparacaine was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________was injected into the (*right/left*) upper eyelid. A corneal shield was placed in the (*right/left*) eye.

A 4-0 silk traction suture was placed through the gray line of the (*right/left*) upper eyelid. The (*right/left*) upper eyelid was everted over a Desmarres retractor. The traction suture was placed around the handle of the Desmarres and then anchored to the drape using a hemostat. Additional local anesthetic was placed directly under the conjunctiva to expand the potential space fully. A caliper was used to measure ___ mm from the superior border of the tarsus toward the sulcus. The conjunctiva was then marked using (*mono-/bi*)polar cautery. A Putterman clamp was then used to grasp the tissue from the superior border of the tarsal plate to the previously marked conjunctiva. 0.5 locking Castroviejo forceps were used to grasp the tissue below each end of the Putterman clamp.

[Choose one]:

If suture used—*A single-armed, 6-0 plain gut suture was used in a running fashion 1 mm beneath the Putterman clamp (with the initial pass taken in a manner that the final knot will be buried/externalized). Once the running suture was placed across the full length of the grasped tissue, a #15 Bard-Parker blade was used to incise the tissue with the blade angled toward the Putterman clamp with gentle upward traction applied to the clamp. Care was taken to assure the suture was not inadvertently cut. Hemostasis was then addressed with (mono/bipolar) cautery. The 6-0 suture was again used to re-approximate the edges of the conjunctiva and underlying Müller's muscle in a running fashion in the opposite direction. Once the end of the wound was reached, the suture was tied in a buried fashion/the suture was passed through the lid and tied externally. The 0.5 locking forceps were removed, and the 4-0 nylon traction suture was cut and removed. The eyelid was then replaced into its normal anatomical position.*

If tissue sealant *(e.g., Tisseel) used—A #15 Bard-Parker blade was used to incise the tissue with the blade angled toward the Putterman clamp with gentle upward traction applied to the clamp. Hemostasis was then addressed with (mono-/bipolar) cautery. Excess fluids were removed with cotton swabs to produce the driest wound bed possible. Castroviejo forceps were used to reapproximate the wound edges, and two Hartman hemostats were placed equidistant across the wound and secured. ___ ml of ______ (fibrin sealant type) was placed across the wound edges. The sealant was allowed to dry for 2 min. (Excess sealant was removed with Westcott scissors.) Any area of wound dehiscence was secured with an additional application of seal-*

ant. The Hartman hemostats and 0.5 locking forceps were carefully removed as to not dislodge the sealant.

The corneal shield was then removed from the (*right*/*left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right*/*left*/*both*) eye. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 105
Eyelid: Conjunctival Müller's Muscle Resection (CMMR)

Andrew Rong, Benjamin Erickson, and Wendy W. Lee

Abstract In patients presenting with ptosis, a complete exam, including eyelid measurements before and after instillation of 2.5 % phenylephrine, is integral in determining the optimal surgical procedure. Müller's muscle is a sympathetically innervated smooth muscle capable of elevating the upper eyelid 2–3 mm under certain physiological conditions. Instillation of phenylephrine drops in the superior fornix will stimulate Müller's muscle in many patients; those with mild to moderate ptosis who respond following instillation of phenylephrine may be suitable candidates for a conjunctival Müller's muscle resection (CMMR). Patients should be educated about the risks and benefits of the procedure, including alternatives.

Keywords Ptosis • Conjunctival Müller's muscle resection • CMMR • Conjunctiva • Müller's muscle

Indications

Upper eyelid ptosis (less than 2 mm) causing symptomatic superior visual field constriction.

Essential Steps

1. Retract lid with Desmarres retractor
2. Lift conjunctiva and Müller's muscle away from underlying aponeurosis
3. Measure the proposed resection with calipers
4. Clamp conjunctiva and Muller's muscle with Putterman ptosis clamp
5. Run plain gut suture below clamp

A. Rong (✉)
Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ajr211@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_105

6. Excise clamped tissue with a #15 blade
7. Externalize and tie off the plain gut suture

Complications

– Bleeding
– Infection
– Dry eye exacerbation
– Under or overcorrection of ptosis
– Corneal abrasion from loose or broken suture

Template Operative Dictation

Preoperative diagnosis: (*Right*/*left*/*bilateral*) *ptosis*

Procedure: (*Right*/*left*/*bilateral*) conjunctival Muller's muscle resection

Postoperative diagnosis: *Same*

Indication: This patient presented to the eye clinic complaining of decreased superior vision in (*right*/*left*/*bilateral*) eye(s), affecting activities of daily living, such as *reading and driving*. On clinical examination, the patient was noted to have (*right*/*left*/*bilateral*) upper eyelid ptosis with margin to reflex distances (MRD) of (*_x_ and _y_, respectively*). On manual elevation of the affected eyelid(s), there was a greater than 12° or 30 % improvement in the superior visual field. Following instillation of phenylephrine, the upper eyelids were noted to improve to desired levels and a conjunctival Muller muscle resection was offered. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, exacerbation of dry eye symptoms, under- or overcorrection, and need for further procedures. Afterward, the patient requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient was brought to the operating room where the eyes, adnexal structures, and face were sterilized with 5 % Betadine ophthalmic solution. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, sites, surgery, and any known drug allergies. The affected eyelid(s) (*was*/*were*) infiltrated with subcutaneously and subconjunctival ____ anesthetic.

The (*right*/*left*) lid was then everted with a large Desmarres retractor. The conjunctiva and Müller's muscle were lifted away from the underlying aponeurosis with toothed forceps. Calipers were used to measure half the distance of the proposed resection from the superior border of the tarsal plate. At the halfway marking (__ mm), bites were taken with a *6-0 silk* suture temporally, centrally, and medially. The sutures were then lifted up to elevate the conjunctiva and Müller's muscle. The Putterman ptosis clamp was then engaged on both sides of the elevated tissue and conjunctiva with Müller's muscle was clamped. The everted upper eyelid was retracted, while the clamp was elevated. A double-armed, *5-0 plain gut* suture was run beneath the clamped tissue in a mattress fashion. A #15 blade was then used to excise the tissue within the clamp. The *plain gut* suture was then externalized through the eyelid crease temporally and nasally, and tied (*to itself or to the adjacent eyelid skin*). The drapes were removed and ophthalmic ointment was applied.

If the procedure was performed bilaterally—The same procedure was then repeated on the contralateral side. Care was taken to ensure symmetry between sides.

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition and will be seen in _#_ day(s). The patient was instructed to return to the emergency room immediately if any loss of vision or deep orbital pain is noted.

Chapter 106
Eyelid: Frontalis Suspension

Daniel Straka and Craig N. Czyz

Abstract The frontalis suspension procedure is most commonly performed in cases of congenital ptosis with poor levator function (<5 mm) and in adults with poor levator function. Due to the high incidence of concurrent amblyopia, patients should have a thorough ophthalmologic evaluation prior to surgery including a cycloplegic refraction to screen for meridional amblyopia or other refractive errors. Occasionally severe amblyopia can develop due to mechanical obstruction of the pupil from the ptotic eyelid, and therefore more urgent surgery may be indicated. In adult patients, myasthenia gravis should be ruled out as a cause of ptosis prior to surgery. Patients should have been evaluated and deemed appropriate for such surgical intervention. The amount of suspension performed depends on a number of factors including the degree of ptosis, the amount of levator function, and the risk for postoperative exposure keratopathy. Both alloplastic and autologous materials can be used to associate the frontalis muscle to the eyelid (this chapter will focus on silicone). Patients (or the patient's guardian) should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Ptosis • Eyelid • Frontalis • Silicone • Congenital • Congenital ptosis • Suspension • Oculoplastics • Poor levator function

Indications

Congenital bilateral or unilateral amblyogenic upper eyelid ptosis or upper eyelid ptosis with symptomatic superior visual field constriction in the setting of poor levator function

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_106

Essential Steps

1. Preoperative marking of the eyelid and brow incision sites with surgical marking pen.
2. Administration of subcutaneous local anesthetic.
3. Corneal shield placement.
4. Vertical eyelid incisions corresponding to the nasal and temporal limbus.
5. Partial-thickness pass of the silicone tube through the tarsal plate.
6. Secure silicone tubing to the tarsal plate with suture.
7. Identification of the vector for the silicone sling toward the brow.
8. Stab incisions in the brow.
9. Pass the silicone tube from eyelid incisions to the nasal and temporal brow incisions, followed by the central incision.
10. Formation of a pre-periosteal dissection pocket superior to the central incision.
11. Securing the silicone tubing through the silicone sleeve.
12. Close eyelid incision sites with 6-0 plain gut suture prior to setting eyelid height.
13. Remove corneal shield and confirm appropriate eyelid margin height and contour, and adjust as needed.
14. Secure the silicone tubing length with square knots and place in pre-periosteal pocket.
15. Close remaining skin incisions.

Complications

- Lagophthalmos
- Infection
- Hemorrhage
- Scarring
- Wound dehiscence
- Corneal abrasion
- Overcorrection (eyelid retraction)
- Undercorrection (residual ptosis)
- Asymmetric eyelid contour
- Exposure keratitis
- Allergy/intolerance to silicone

Template Operative Dictation

Preoperative diagnosis: Upper eyelid ptosis (*right/left*)

Procedure: Frontalis suspension with silicone sling (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of (*bilateral/unilateral*) ptosis of the (*right/left/both*) upper eyelid(s) (*since birth/over the past*) ____ (*months/years*) necessitating surgical intervention. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the (*patient/patient's guardians*). Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by the (*hospital/surgery center*) anesthesia department. Topical anesthetic, proparacaine, was placed into the (*right/left*) eye. A surgical marking pen was used to mark the planned incision site on the eyelid corresponding to the nasal and temporal limbus as well as the brow incisions. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ________was injected into the (*right/left*) upper eyelid and brow.

A corneal shield was placed in the (*right/left*) eye. A #15 Bard-Parker blade was used to make two small vertical incisions through the eyelid skin and orbicularis muscle at the previously marked surgical sites. Westcott scissors were then used to dissect down to the tarsal plate. The eyelid was then grasped and gently lifted away from the globe as a Seiff suspension cable with needle was passed from the temporal eyelid incision, partial thickness through the tarsal plate, out through the nasal incision. A partial-thickness pass was confirmed by everting the eyelid. Hemostasis was obtained with (*mono-/bi-*) polar cautery. The silicone tubing was then secured to the tarsal plate with one *6-0 Vicryl* suture at the nasal and temporal incisions. The location of the brow incisions was then determined by directing the ends of the silicone tubing upward along the eyebrow while confirming satisfactory eyelid contour.

A #15 blade was used to make stab incisions along the brow. A blunt hemostat was used to create a pre-periosteal pocket above the central brow incision. The Wright fascia passer was then used to pass each free end of the Seiff suspension cable from the eyelid incisions to the nasal and temporal brow incisions. Care was taken to remain as deep as possible and course just anterior to the frontal bone prior to exiting the brow incisions. The ends were then passed in a similar manner to incorporate the frontalis muscle from the nasal and temporal incisions to the central incision. A silicone sleeve was then placed over both ends of the tubing. The eyelid incisions were closed with ___ *6-0 plain gut* suture, and the corneal shield was removed. The silicone tubing was then tightened until the eyelid assumed the appropriate height and contour. Three square knots were tied over the silicone sleeve to secure the sling and then placed into the pre-periosteal pocket. The deep tissue of the central incision was closed with ___ *6-0 Vicryl* suture(s) and the skin of each brow incision was closed with interrupted *6-0 plain gut* sutures.

Ophthalmic antibiotic ointment was instilled into the (*right/left*) eye and across the incision(s). The patient tolerated the procedure well, was awoken from general anesthesia, and was then taken to the recovery area in stable condition.

Chapter 107
Eyelid: Transverse Everting Sutures (Quickert Sutures, Three-Suture Technique)

Larissa Ghadiali and Bryan Winn

Abstract Entropion of the lower eyelid can lead to ocular surface irritation due to the lashes and eyelid skin rubbing against the cornea. If not corrected, permanent scarring of the cornea and loss of vision can result. Involutional entropion is believed to occur secondary to dehiscence of the lower eyelid retractors, horizontal eyelid laxity, and overriding of the preseptal orbicularis over the pretarsal orbicularis (Techniques in ophthalmic plastic surgery. Philadelphia: Saunders Elsevier, 2010). In spastic entropion, ocular irritation or inflammation leads to spasm of the eyelids, resulting in entropion (Techniques in ophthalmic plastic surgery. Philadelphia: Saunders Elsevier, 2010). The Quickert suture technique, first described by Quickert and Rathbun (Arch Ophthalmol 85:304–305, 1971), temporarily corrects lower eyelid entropion by plicating the lower eyelid retractors. This technique does not address the horizontal laxity component that contribute to involutional entropion and is not a permanent solution for involutional or spastic entropion. It is, however, a powerful tool to temporarily relieve patient discomfort and prevent scarring of the cornea until definitive surgery can be performed.

Keywords Quickert sutures • Transverse everting sutures • Entropion • Spastic entropion • Involutional entropion • Protective blepharospasm

Indications

Temporary correction of spastic or involutional entropion of the lower eyelid

L. Ghadiali (✉) B. Winn
Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA
e-mail: grover.larissa@gmail.com; bjw15@cumc.columbia.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_107

Essential Steps

1. Infiltrate local anesthetic at the lower eyelid conjunctival cul-de-sac and at the skin of the lower eyelid.
2. Pass three double-armed dissolvable sutures full thickness through the lower eyelid from the fornix to the subciliary skin.

Complications

– Infection
– Bleeding/hematoma
– Pain
– Poor cosmesis
– Corneal abrasion
– Suture dehiscence/erosion
– Recurrence of entropion

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) (*spastic/involutional*) entropion

Procedure: (*Right/Left/Bilateral*) placement of Quickert sutures

Postoperative diagnosis: Same

Indication: This is a ___-year-old male/female with an in-turning (*right/left/bilateral*) lower eyelid(*s*), leading to chronic ocular surface irritation and discomfort. A decision was made to proceed with placement of Quickert sutures to temporarily correct the entropion and improve discomfort. The patient was informed of the risks, benefits, indications, and alternatives of the procedure and informed consent was obtained.

Description of the procedure: The patient was identified in the holding area and a marking pen was used to mark the operative eye(*s*). The patient was escorted into the operating suite and placed in the supine position. Tetracaine eye drops were instilled into both eyes. The patient's face was prepped and draped in the usual sterile fashion for oculoplastic surgery. IV sedation was administered by the anesthesia service. A surgical time-out was performed in accordance with hospital policy, verifying the correct patient, procedure, site, positioning of the patient, special equipment, and safety precautions. The area of the (*right/left/bilateral*) conjunctival fornix and skin of the lower eyelid was infiltrated with a 50/50 mixture of 2 % lidocaine with epinephrine 1:100,000 and 0.5 % Marcaine (*plain 2 % lidocaine with epinephrine 1:100,000*) for local anesthesia. A corneal protective shield was placed in the eye.

A double-armed (*4-0 chromic suture/5-0 Vicryl*) suture was passed full thickness from the conjunctival cul-de-sac to the skin of the (*right/left*) lower eyelid 1–2 mm below the lower eyelid lashes in the center of the eyelid and tied. Two additional (*4-0 chromic/5-0 Vicryl*) sutures, one medially and one laterally, were passed in a similar fashion full thickness through the lower eyelid and were tied. At the conclusion of the procedure on the (*right/left*) eye, the lower eyelid entropion was noted to be corrected, and there was no contact between the lower eyelid lashes or skin and the cornea.

If procedure was performed bilaterally—*Antibiotic ointment was placed on the wound and the same procedure was then performed for the contralateral eye*.

Following the procedure, the corneal shield was removed and the patient's face was cleaned. Antibiotic ointment was placed in the eye, and the patient was then escorted to the postoperative care area, where they remained for approximately 45 min before being discharged to the care of a responsible adult.

References

1. Nerad JA. Techniques in ophthalmic plastic surgery. Philadelphia: Saunders Elsevier; 2010.
2. Quickert MH, Rathbun E. Suture repair of entropion. Arch Ophthalmol. 1971;85:304–5.

Chapter 108
Eyelid: Entropion Repair (Internal)

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Retractors • Involutional • Tarsus • Entropion repair • Tarsal strip

Indications

Involutional entropion of the lower eyelid margin causing symptomatic complications. Symptoms may include foreign body sensation, epiphora, keratitis, and corneal ulceration. Horizontal lid laxity and lower eyelid retractor disinsertion are the primary causes of involutional entropion. Horizontal laxity should be evaluated using the snapback and distraction tests. Patients with congenital, spastic, or cicatricial entropion may require additional or unique treatment; thus, it is imperative to investigate and determine the underlying cause(s) preoperatively.

Essential Steps

1. Administration of topical anesthetic and local anesthetic.
2. Corneal shield placement.
3. Traction suture placed in gray or lash line of the lower eyelid.
4. *Perform horizontal lid tightening (tarsal strip) if required.*
5. Identification and dissection of lower eyelid retractors.
6. Reinsertion of retractors to the inferior tarsus.
7. Removal of the corneal shield.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_108

Complications

- Hemorrhage
- Overcorrection (ectropion)
- Lower lid retraction
- Undercorrection (entropion)
- Infection
- Wound dehiscence
- Scarring
- Corneal injury
- Milphosis
- Eyelid margin necrosis

Template Operative Dictation

Preoperative diagnosis: Involutional entropion (*right/left*) lower eyelid

Procedure: Repair of entropion (*right/left*) lower eyelid (*with tarsal strip*)

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed (*bilateral/unilateral*) (*epiphora, foreign body sensation, keratitis, and/or corneal abrasion/ulceration*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*bilateral/unilateral*) lower eyelid entropion. The patient had a (*positive/negative*) snapback test, and distraction testing produced ___ mm (>6 mm) of lower lid distraction from the globe. *Based on these results, the patient was found to have horizontal lower lid laxity contributing to the entropion. The patient was also found to have orbicularis override on clinical observation*. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, proparacaine, was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________was injected into the (*right/left*) lower eyelid (*and lateral canthus*). A corneal shield was placed in the (*right/left*) eye.

Attention was then turned to the (*right/left*) lower lid.

If tarsal strip used- A *#15 Bard-Parker blade was used to make a ___ mm incision in the* (*right/left*) *lateral canthal angle. The lateral canthal tendon and inferior crus were then disinserted. A tarsal strip was then fashioned using Westcott scissors and 0.5 forceps. Hemostasis was maintained with* (*monopolar/bipolar*) *cautery.*

A *4-0 silk* traction suture was placed through the (*lash line/gray line*) of the (*right/left*) lower lid. The lid was then everted. A (*#15 Bard-Parker blade/monopolar cutting cautery*) was used to make an incision in the conjunctiva just below the inferior tarsal border from the lateral canthus to just lateral of the puncta. Dissection was continued toward the inferior orbital rim using 0.5 forceps and Westcott scissors. The orbital fat was dissected to expose the lower lid retractors and hemostasis was maintained with (*monopolar/bipolar*) cautery. The retractors were then dissected free from the conjunctiva for ____ mm. A *6-0 Vicryl* suture (*on a spatulated needle*) was passed through the inferior, anterior portion of the tarsus. It was then passed in a buried fashion through the lower lid retractors beneath the conjunctiva toward the globe advancing them onto the anterior, inferior tarsus. _#_ sutures were placed at equidistance across the (*right/left*) lower eyelid. This caused appropriate eversion of the eyelid without displacing the puncta from proper position.

If tarsal strip used- A *5-0 Vicryl* suture was passed in a whipstitch fashion through the anterior and posterior tarsus of the lid. The suture was then passed through the periosteum at the lateral orbital rim. The suture was temporally tightened to assess lid position. Lid position was found to be appropriate. *A* buried, interrupted *6-0 Vicryl* suture was then passed from gray line to gray line, upper to lower lid, to reform the lateral canthal angle. The 5-0 Vicryl suture was then tied down. The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion. The skin incision was then closed using simple, interrupted 6-0 plain gut sutures.

The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 109
Eyelid: Entropion Repair (External)

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Retractors • Involutional • Tarsus • Entropion repair • Involutional entropion

Indications

Involutional entropion of the lower eyelid margin causing symptomatic complications. Symptoms may include foreign body sensation, epiphora, keratitis, and corneal ulceration. Horizontal lid laxity and lower eyelid retractor disinsertion are the primary causes of involutional entropion. Horizontal laxity should be evaluated using the snapback and distraction test. Patients with congenital, spastic, or cicatricial entropion may require additional or unique treatments; thus, it is imperative to investigate and determine the underlying cause(s) preoperatively.

Essential Steps

1. Administration of topical anesthetic and local anesthetic.
2. Corneal shield placement.
3. Traction suture placed in gray or lash line of the lower eyelid.
4. Subciliary incision.
5. Identification and dissection of lower eyelid retractors.
6. Reinsertion of retractors to the inferior tarsus.
7. *Perform horizontal lid tightening (tarsal strip), if required.*

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_109

8. *Removal of a portion of the preseptal orbicularis muscle, if override is present.*
9. Closure of skin incision.
10. Removal of the corneal shield.

Complications

– Hemorrhage
– Overcorrection (ectropion)
– Lower lid retraction
– Undercorrection (entropion)
– Infection
– Wound dehiscence
– Scarring
– Corneal injury
– Milphosis
– Eyelid margin necrosis

Template Operative Dictation

Preoperative diagnosis: Involutional entropion (*right/left*) lower eyelid

Procedure: Repair of entropion (*right/left*) lower eyelid (*with tarsal strip*)

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed (*bilateral/unilateral*) (*epiphora, foreign body sensation, keratitis, and/or corneal abrasion/ulceration*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*bilateral/unilateral*) lower eyelid entropion. The patient had a (*positive/negative*) snapback test, and distraction testing produced ___ mm (>6 mm) of lower lid distraction from the globe. *Based on these results, the patient was found to have horizontal lower lid laxity contributing to the entropion. The patient was also found to have orbicularis override on clinical observation*. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, proparacaine, was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________ was injected into the (*right/left*) lower eyelid (*and lateral canthus*). A corneal shield was placed in the (*right/left*) eye.

Attention was then turned to the (*right/left*) lower lid. A *4-0 silk* traction suture was placed through the (*lash line/gray line*) of the (*right/left*) lower lid. A surgical marking pen was then used to mark an incision at the inferior border of the tarsus from the puncta to the lateral canthus. A #15 Bard-Parker blade was used to make a skin incision at the marking. The inferior portion of the incision was elevated (*by the assistant*) with a lacrimal rake while caudally tractioning the cheek tissue. Dissection was continued toward the inferior orbital rim using 0.5 forceps and Westcott scissors. The orbital septum was opened, and the preaponeurotic fat identified. The fat was dissected to expose the lower lid retractors, while hemostasis was maintained with (*monopolar/bipolar*) cautery. The retractors were then dissected free from the conjunctiva for 5–10 mm. A *6-0 Vicryl* suture (*on a spatulated needle*) was passed through the inferior, anterior portion of the tarsus. It was then passed in a buried fashion through the lower lid retractors advancing them onto the inferior tarsus. _#_ sutures were placed at equidistances across the (*right/left*) lower eyelid. This caused appropriate eversion of the eyelid without displacing the puncta from proper position.

If tarsal strip was used*—A #15 Bard-Parker blade was used to make a ___ mm incision in the (right/left) lateral canthal angle. The lateral canthal tendon and inferior crus were then disinserted. A tarsal strip was then fashioned using Westcott scissors and 0.5 forceps. Hemostasis was maintained with (monopolar/bipolar) cautery.*

A 5-0 Vicryl suture was passed in a whipstitch fashion through the anterior and posterior tarsus of the lid. The suture was then passed through the periosteum at the lateral orbital rim. The suture was temporally tightened to assess lid position. Lid position was found to be appropriate. A buried, interrupted 6-0 Vicryl suture was then passed from gray line to gray line, upper to lower lid, to reform the lateral canthal angle. The 5-0 Vicryl suture was then tied down. The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion. The skin incision was then closed using simple, interrupted 6-0 plain gut sutures.

If orbicularis was excised*—Westcott scissors and 0.5 forceps were used to remove ___ mm of the pretarsal orbicularis across the subciliary incision. Hemostasis was then maintained with (monopolar/bipolar) cautery.*

The skin incision was then closed using simple, interrupted 6-0 plain gut sutures.

The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 110
Eyelid: Ectropion Repair FTSG (Cicatricial)

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Cicatricial • Skin graft • Anterior lamella • Ectropion repair • FTSG

Indications

Cicatricial ectropion of the lower eyelid causing symptomatic complications. Symptoms may include foreign body sensation, hyperemia, epiphora, exposure keratitis, and corneal ulceration. Anterior lamellar shortening is the primary cause of cicatricial ectropion and any associated systemic/dermatologic causes should be addressed. Horizontal lid laxity can further exacerbate the ectropion. Patients with congenital, paralytic, mechanical, or involutional ectropion require different treatments; thus, it is imperative that the cause(s) of ectropion be identified preoperatively. Similarly, medial tendon laxity and/or punctual ectropion may require additional procedures to correct.

Essential Steps

1. Administration of topical anesthetic and local anesthetic.
2. Corneal shield placement.
3. Traction sutures placed in gray or lash line of the lower eyelid.
4. Subciliary incision.
5. Dissection to release scarring until the posterior lamella returns to anatomical position.
6. *Perform tarsal strip for horizontal lid tightening (if required).*
7. Measure or draw a template of the area requiring graft.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_110

8. Mark/transfer template to donor site.
9. Closure of donor site skin incision.
10. Debride the dermis aspect of the graft of any extraneous subcutaneous tissue.
11. Suture graft into the wound bed.
12. *Close the lateral canthal skin (if horizontal lid tightening was performed).*
13. Removal of the corneal shield.
14. *Place a Frost suture (if required).*

Complications

– Hemorrhage
– Undercorrection
– Infection
– Wound dehiscence
– Graft failure
– Scarring
– Skin redundancy
– Lateral canthal angle dystopia (*if tarsal strip was used*)
– Conjunctival cyst (*if tarsal strip was used*)
– Overcorrection (*if tarsal strip was used*)

Template Operative Dictation

Preoperative diagnosis: Cicatricial ectropion (*right/left*) lower eyelid

Procedure: (1) Repair of ectropion (*right/left*) lower eyelid, (2) Full-thickness skin graft (*right/left*) lower eyelid, ((3) *Temporary tarsorrhaphy (Frost suture)* (*right/left*) *lower eyelid*

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed (*bilateral/unilateral*) (*epiphora, hyperemia, foreign body sensation, exposure keratitis, and/or corneal ulceration*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*bilateral/unilateral*) cicatricial lower eyelid ectropion. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, proparacaine, was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual, full-face oculofacial plastic fashion. (*The ___ graft site was also prepped and draped in a typical sterile fashion*). A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________ was injected into the (*right/left*) lower eyelid (*and lateral canthus*) and _______ donor graft site. A corneal shield was placed in the (*right/left*) eye.

Attention was turned to the (*right/left*) lower eyelid. A surgical marking pen was used to draw a subciliary incision line across the full horizontal length of the lid and extended *4–5* mm past the canthi. _#_ *4-0 silk* traction sutures were placed in the lash line of the LLL nasal and temporal. The sutures were reflected superiorly and secured to the head drape using Hartmann hemostats. A #15 Bard-Parker blade was used to make a skin incision on the marked area. The dissection was continued inferiorly using 0.5 Castroviejo forceps and Westcott scissors. Scar tissue was released until the posterior lamella returned to its anatomical position. Wound hemostasis was then achieved with (*monopolar/bipolar*) cautery.

If tarsal strip was used—*A tarsal strip was then fashioned by splitting the anterior and posterior lamella of the lateral aspect of the lower lid for approximately ___ mm. The skin, orbicularis, and conjunctiva were then removed from the strip using a combination of cautery, scissors, and #15 blade. The strip was then distracted toward the insertion of the lateral canthal tendon on the orbital rim to estimate the amount of redundant tarsus to be removed. (Approximately __ mm of redundant tarsus was excised using the Westcott scissors or there was no redundancy that required excision.)*

A 5-0 Vicryl suture was passed in a whipstitch fashion through the anterior and posterior tarsus of the lateral lid. The suture was then passed through the periosteum and tendon at the lateral orbital rim immediately inferior of the superior crus of the canthal tendon. The suture was temporally tightened to assess lid position. This caused appropriate tightening of the eyelid without displacing the puncta from proper position. (Redundant *anterior lamella was excised using Westcott scissors. A buried, interrupted 6-0 Vicryl suture was then passed gray line to gray line from the upper to lower lid to reform the lateral canthal angle).* The 5-0 Vicryl suture was then tied down. The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion. The skin incision was then closed using simple, interrupted 6-0 plain gut sutures.

Calipers were used to measure the graft site and then used to mark the ______ donor site. An elliptical graft measuring ___mm × ____mm was then marked and excised using a Bard-Parker #15 blade and Westcott scissors. Extraneous subcutaneous tissue was removed from the dermis surface of the graft. The graft was then placed in a saline-soaked surgical sponge. The skin edges of the donor site were then undermined. The site was closed in a running fashion with *5-0 chromic gut* suture.

The graft was then placed into the wound bed created below the (*right/left*) lower eyelid. The graft was secured at the poles with *6-0* simple, interrupted *Vicryl* sutures.

Simple, interrupted *6-0 plain gut* sutures were then placed between the Vicryl sutures.

The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. (*A _____ dressing was placed over the donor graft site*).

If frost suture was used—The two 4-0 silk traction sutures were taped above the (*right/left*) brow using Mastisol and ___ inch Steri-Strips.

The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 111
Eyelid: Ectropion Repair, Tarsal Strip (Involutional)

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Involutional • Tarsus • Horizontal laxity • Ectropion repair • Tarsal strip

Indications

Involutional ectropion of the lower eyelid margin causing symptomatic complications. Symptoms may include foreign body sensation, hyperemia, epiphora, exposure keratitis, and corneal ulceration. Horizontal lid laxity and lower eyelid retractor disinsertion are the primary causes of involutional ectropion. Horizontal laxity should be evaluated using the snapback and distraction tests. Patients with congenital, paralytic, mechanical, or cicatricial ectropion may require additional or unique treatment; thus, it is imperative that the cause(s) of ectropion are identified preoperatively. Similarly, medial tendon laxity and/or punctual ectropion require additional procedures to correct.

Essential Steps

1. Administration of topical anesthetic and local anesthetic.
2. Corneal shield placement.
3. Lateral canthal incision with canthotomy and inferior cantholysis.
4. Split the anterior and posterior lamella of the lateral lower lid.
5. Remove the skin, muscle, and conjunctiva to form tarsal strip.
6. Distract lid laterally to the rim in order to estimate the amount of tarsus required and excise the redundancy.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_111

7. Anchor the strip to the periosteum of the lateral rim.
8. Excise any redundant anterior lamella.
9. Closure of skin incision.
10. Removal of the corneal shield.

Complications

– Hemorrhage
– Overcorrection
– Undercorrection
– Infection
– Wound dehiscence
– Scarring
– Trichiasis (foreign body sensation)
– Conjunctival cyst
– Canthal angle dystopia
– Skin redundancy (lid/lateral canthus)
– Punctal dystopia
– Lateral canthal angle dystopia (*if tarsal wedge used*)

Template Operative Dictation

Preoperative diagnosis: Involutional ectropion (*right/left/bilateral*) lower eyelid

Procedure: Repair of ectropion (*right/left/bilateral*) lower eyelid with (*tarsal strip/tarsal wedge*)

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed (*bilateral/unilateral*) (*epiphora, hyperemia, foreign body sensation, exposure keratitis, and/or corneal ulceration*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*bilateral/right/left*) lower eyelid ectropion. The patient's snapback test was (*positive/negative*), and distraction testing produced ___ mm (>6 mm) of lower lid distraction from the globe. Based on these results, the patient was found to have horizontal lower lid laxity contributing to the ectropion. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic proparacaine was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________ was injected into the (*right/left*) lower eyelid (*and lateral canthus*). A corneal shield was placed in the (*right/left*) eye.

A #15 Bard-Parker blade was used to make a ___ mm incision in the (*right/left*) lateral canthal angle. Using (*Westcott scissors/monopolar cutting cautery*) and 0.5 Castroviejo forceps, dissection of the orbicularis and subcutaneous tissues proceeded toward the lateral orbital rim exposing the canthal tendon, inferior crus, and periosteum. The scissors were then used to cut the lower limb of the tendon in order to fully disinsert. Hemostasis was then maintained with (*monopolar/bipolar*) electrocautery.

If tarsal strip was used—A tarsal strip was then fashioned by splitting the anterior and posterior lamella of the lateral aspect of the lower lid for approximately ___ mm. Skin, orbicularis, and conjunctiva were then removed from the strip using a combination of cautery, scissors, and #15 blade. The strip was then distracted toward the insertion of the lateral canthal tendon on the orbital rim in order to estimate the amount of redundant tarsus to be removed. (Approximately __ mm of redundant tarsus was excised using the Westcott scissors, or there was no redundancy that required excision.)

If full-thickness excision of the lid was performed (tarsal wedge)—Grasping the lateral aspect of the lower lid with 0.5 Castroviejo forceps, it was distracted toward the insertion of the lateral canthal tendon on the orbital rim to estimate the amount of tissue to be removed. Westcott scissors were then used to excise ___ mm of full-thickness eyelid. The lid margin was then cauterized with (monopolar/bipolar) cautery.

A *5-0 Vicryl* suture was passed in a whipstitch fashion through the anterior and posterior tarsus of the lateral lid. The suture was then passed through the periosteum and tendon at the lateral orbital rim immediately inferior the superior crus of the canthal tendon. The suture was temporally tightened to assess lid position. This caused appropriate tightening of the eyelid without displacing the puncta from proper position. Redundant anterior lamella was excised using Westcott scissors. *A buried, interrupted 6-0 Vicryl suture was then passed gray line to gray from the upper to lower lid to reform the lateral canthal angle*. The *5-0 Vicryl* suture was then tied down. *The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion*. The skin incision was then closed using simple, interrupted *6-0 plain gut* sutures.

The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 112
Eyelid: Medial Ectropion Repair

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Involutional • Punctal eversion • Horizontal laxity • Ectropion repair • Medial

Indications

Involutional medial ectropion of the lower eyelid margin causing symptomatic complications. Symptoms may include epiphora, foreign body sensation, hyperemia, exposure keratitis, and corneal ulceration. Horizontal lid laxity due to medial and/or lateral tendinous laxity and lower eyelid retractor disinsertion are the primary causes of medial involutional ectropion. Horizontal laxity should be evaluated using the snapback and distraction tests. Special attention should be paid to the punctal position with lateral lid distraction. Patients with congenital, paralytic, mechanical, or cicatricial ectropion may require additional or unique treatment; thus, it is imperative that the cause(s) of ectropion are identified preoperatively.

Essential Steps

1. Administration of topical anesthetic and local anesthetic.
2. Corneal shield placement.
3. Evert the lid margin with traction suture and/or Bowman probe.
4. Excise a diamond/ellipse of conjunctiva and lower lid retractors.
5. *Excise a portion of the lateral caruncle (if performing caruncular recruitment)*.
6. Pass a double-armed suture through the lower lid retractors, the apex near the punctum, and then the apex inferiorly, and out full thickness through the lid.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_112

7. *Pass a double-armed suture through the lower lid retractors and then through the medial tendon beneath the caruncle. The second arm is then passed through the apex near the punctum incorporating the tendon and caruncle. Both arms are then passed full thickness through the lid (if performing caruncular recruitment).*
8. *Perform lateral tarsal strip (if required).*
9. Tie the sutures to invert the punctum appropriately.
10. Removal of the corneal shield.

Complications

- Hemorrhage
- Overcorrection
- Undercorrection
- Infection
- Wound dehiscence
- Scarring
- Trichiasis (foreign body sensation)
- Conjunctival cyst
- Canthal angle dystopia
- Punctal dystopia
- Skin redundancy (lid/lateral canthus) (*if tarsal wedge used*)
- Lateral canthal angle dystopia (*if tarsal wedge used*)

Template Operative Dictation

Preoperative diagnosis: Involutional medial ectropion with punctal eversion (*right/left*) lower eyelid

Procedure: Repair of medial ectropion with punctal eversion (*right/left*) lower eyelid (*with medial spindle/caruncular fixation*)

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed (*right/left*) (*epiphora, hyperemia, foreign body sensation, exposure keratitis, corneal ulcer ulceration*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*right/left*) medial lower eyelid ectropion with punctal eversion. The patient's snapback test was (*positive/negative*), and distraction testing produced ___ mm (>6 mm) of lower lid distraction from the globe. Punctal eversion did not correct with lateral lid distraction. *The punctum was translocated laterally with lateral lid distraction*. Based on these results the patient was found to have horizontal lower lid laxity due to attenuation of the (*lateral/medial*) canthal tendons contributing to the medial ectropion and punctal eversion. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic proparacaine was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________ was injected into the medial (*right/left*) lower eyelid and inferior fornix (*and lateral canthus*). A corneal shield was placed in the (*right/left*) eye.

(A 4-0 silk suture was passed through the skin and tarsus of the (right/left) lower eyelid for traction, and/or a Bowman probe was placed in the inferior punctum for increased lid eversion.) An approximately _*4*_ × _*4*_ mm diamond-shaped incision was marked on the conjunctiva with a surgical marking pen immediately inferior to the tarsus at the punctum. The marked area was then incised using a (*#15 Bard-Parker blade/Westcott scissors*). The conjunctiva and lower lid retractors were then excised using Westcott scissors. Hemostasis was maintained with (*monopolar/bipolar*) cautery. A double-armed *5-0 Vicryl* suture was passed through lower lid retractors in the center of the diamond. Both arms were then passed through the apex of the diamond adjacent to the punctum. The suture arms were then passed full thickness through the inferior apex of the incision emerging through the lid at the junction of the lower lid and cheek skin.

If tarsal strip performed—A #15 Bard-Parker blade was used to make a ___ mm incision in the (right/left) lateral canthal angle. Using (Westcott scissors/monopolar cutting cautery) and 0.5 Castroviejo forceps, dissection of the orbicularis and subcutaneous tissues proceeded toward the lateral orbital rim exposing the canthal tendon, its inferior crus, and periosteum. The scissors were then used to cut the lower limb of the tendon to fully disinsert. Hemostasis was then maintained with (monopolar/bipolar) cautery. A tarsal strip was then fashioned by splitting the anterior and posterior lamella of the lateral aspect of the lower lid for approximately ___ mm. The skin, orbicularis, and conjunctiva were then removed from the strip using a combination of cautery, scissors, and a #15 blade. The strip was then distracted toward the insertion of the lateral canthal tendon on the orbital rim to estimate the amount of redundant tarsus to be removed. (Approximately __ mm of redundant tarsus was excised using the Westcott scissors, or there was no redundancy that required excision.)

If caruncular fixation performed—An obliquely oriented ellipse with medial extension into the lateral edge of the caruncle was outlined on the conjunctiva with a sterile marking pen. The ellipse extended inferiorly to include the superior edge of the lower eyelid retractors and lateral caruncular surface. The area was then incised using a #15 Bard-Parker blade. An elliptical-shaped strip of conjunctiva and lower eyelid retractors was excised with monopolar cautery on a Colorado needle tip. A double-armed 5-0 Vicryl suture was passed horizontally through the lower lid retractors and then through the exposed tendon beneath the caruncle. The second arm of the suture was then passed through the upper edge of the elliptical incision incorporating the orbicularis along the inferior border of the tarsus, the anterior limb of the medial canthal tendon, and the caruncle inferior to the punctum. The suture exited the conjunctival incision just medial to the punctum. The suture arms were then passed full thickness through the inferior apex of the incision emerging through the lid at the junction of the lower lid and cheek skin. See tarsal strip dictation above if performed as well.

Suture(s) were (*secured to a bolster/other*) and tightened to provide the proper amount of punctal inversion.

The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 113
Eyelid: Lateral Tarsal Strip with Medial Spindle for Ectropion Repair with Punctal Eversion

Larissa Ghadiali and Bryan Winn

Abstract The lateral tarsal strip operation is a procedure used to address eyelid laxity by horizontally shortening the lower eyelid at the lateral canthus. Evaluation of horizontal eyelid laxity includes the eyelid distraction test and the eyelid snap test (Techniques in ophthalmic plastic surgery. Philadelphia: Saunders Elsevier, 2010). Patients with incipient involutional ectropion often complain of tearing, especially in the wind and cold. In such patients, it is important to evaluate the lacrimal system. When punctal eversion accompanies involutional ectropion, one must determine whether shortening the lower eyelid horizontally will reposition the punctum to its correct anatomical position alone. If stretching the lower eyelid laterally at the slit lamp does not correct punctal eversion, a medial spindle procedure may be used in combination with a lateral tarsal strip procedure to address both the involutional ectropion and punctal eversion (Nerad, Techniques in ophthalmic plastic surgery. Philadelphia: Saunders Elsevier, 2010). In a medial spindle procedure, the posterior lamella is shortened vertically and pulled inwards to tip the punctum back into globe apposition.

Keywords Ectropion • Punctal eversion • Lateral tarsal strip • Medial spindle procedure • Horizontal eyelid laxity

Indications

The lateral tarsal strip procedure can be used in both involutional ectropion and entropion. The medial spindle procedure can be used in cases of involutional punctal eversion.

L. Ghadiali (✉) B. Winn
Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA
e-mail: grover.larissa@gmail.com; bjw15@cumc.columbia.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_113

Essential Steps

1. Infiltrate local anesthetic at the lateral canthus, lateral lower eyelid, internal aspect of lateral orbital rim, and conjunctiva of the medial inferior fornix.
2. Lateral canthotomy.
3. Lateral inferior crus cantholysis.
4. Excise a diamond-shaped area of conjunctiva and lower eyelid retractors below the punctum.
5. Close the conjunctiva and lower lid retractors.
6. Determine the length of the strip.
7. Denude the epithelium.
8. Split the anterior and posterior lamellae.
9. Disinsert the lower eyelid retractors and conjunctiva from the strip.
10. Excise anterior lamella from the strip to remove lash follicles.
11. Attach the strip to the periosteum of the inner aspect of the lateral orbital rim.
12. Reform the sharp angle of the lateral canthus.
13. Close the skin.

Complications

– Infection
– Bleeding/hematoma
– Pain
– Poor cosmesis
– Corneal abrasion
– Suture dehiscence/erosion
– Retrobulbar hematoma
– Lower eyelid retraction
– Canthal dystopia

Template Operative Dictation

Preoperative diagnosis: (*Right*/*Left*/*Bilateral*) (1) involutional ectropion, (2) punctal eversion, (3) epiphora

Procedure: (*Right*/*Left*/*Bilateral*) lateral tarsal strip with medial spindle procedure

Postoperative diagnosis: Same

Indication: This is a ___-year-old male/female with an outturning (*right*/*left*/*bilateral*) lower eyelid(*s*), particularly in the area of the punctum, with a history of chronic epiphora. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient, and informed consent was obtained. A decision was made to proceed with ectropion repair via lateral tarsal strip along with a medial spindle procedure to repair the punctal eversion.

Description of the procedure: The patient was identified in the holding area and a marking pen was used to mark the operative eye(*s*). The patient was escorted into the operating suite and placed in the supine position. Tetracaine eye drops were instilled into both eyes. The patient's face was prepped and draped in the usual sterile fashion for oculoplastic surgery. IV sedation was administered by the anesthesia service. A surgical time-out was performed in accordance with hospital policy, verifying the correct patient, procedure, site, positioning of the patient, special equipment, and safety precautions. The area of the (*right/left/bilateral*) lateral canthus, lateral lower eyelid, internal aspect of the lateral orbital rim, and the conjunctiva of the medial inferior fornix was infiltrated with a 50/50 mixture of 2 % lidocaine with epinephrine 1:100,000 and 0.5 % Marcaine (*plain 2 % lidocaine with epinephrine 1:100,000*) for local anesthesia. A corneal protective shield was placed in the operative eye.

The lateral canthotomy and inferior crus cantholysis were performed as follows: a scratch incision was made along the horizontal raphe with a Colorado tip needle on Bovie cautery (#*15 Bard-Parker blade*), approximately *0.5* cm in length. Dissection was then carried out through the orbicularis muscle to the periosteum of the lateral orbital rim with a Colorado tip needle (*Westcott scissors*). With the aid of a strumming technique, an inferior crus cantholysis was performed with the Colorado tip needle on Bovie cautery (*Westcott scissors*). Hemostasis was achieved with the (*mono/bi*)polar cautery.

Attention was then turned to the area of the posterior lamella underneath the punctum. The eyelid was everted. The Colorado tip needle on Bovie cautery (*Westcott scissors*) was used to create a diamond-shaped excision of conjunctiva and lower eyelid retractors beginning approximately *5* mm below the punctum, extending *6* mm laterally and *4* mm vertically. A double-armed (*6-0 plain gut/5-0 chromic*) suture was then passed through the conjunctiva and lower eyelid retractors of the posterior lamella to close the diamond-shaped wound, and the knot was tied percutaneously. This completed the medial spindle procedure.

The remainder of the lateral tarsal strip was performed as follows: The lower eyelid was pulled laterally. When adequate tension was noted, the lower eyelid margin was marked where it intersected with the most lateral aspect of the upper eyelid margin. The epithelium of the lower eyelid margin was denuded lateral to this point using Westcott scissors. The anterior and posterior lamella were then split lateral to this point using Westcott scissors. A small amount of the anterior lamella containing the lash follicles was trimmed in a rectangular fashion in this area using Westcott scissors. The conjunctiva and lower eyelid retractors were released from the tarsus in this area to create a lateral tarsal strip. Hemostasis was achieved using a Colorado tip needle on Bovie cautery (*bipolar cautery*). The conjunctiva was purposefully not denuded along the tarsal strip so as to preserve the blood supply and prevent postoperative dehiscence. A (*5-0 Vicryl suture on a P-2 needle/ double-armed 5-0 Vicryl suture/ double-armed 4-0 Mersilene suture*) was passed twice through the tarsal strip and then (*twice*) through the periosteum of the lateral orbital rim correlating to the level of the Whitnall's orbital tubercle and the insertion of the superior crus of the lateral canthal tendon. The corneal protective shield was removed. Tension on the suture was adjusted so the eyelid could be distracted approximately _*1*_ mm from the globe. The suture was then tied down. Next, a (*6-0 plain/6-0 fast-absorbing/5-0 plain/5-0 fast*) gut suture was passed through the cut edge of the gray line of the upper and lower eyelid margins and tied inside the wound to help reform the sharp lateral canthal angle. The skin was then closed with two interrupted (*6-0 plain/6-0 fast-absorbing/5-0 plain/5-0 fast*) gut sutures.

If procedure was performed bilaterally—*Antibiotic ointment was placed on the wound and the same procedure was then performed for the contralateral eye*.

Following the procedure, the patient's face was cleaned. Antibiotic ointment was placed on the wound and in the eye, and the patient was then escorted to the postoperative care area, where they remained for approximately 45 min before being discharged to the care of a responsible adult.

Reference

1. Nerad JA. Techniques in ophthalmic plastic surgery. Philadelphia: Saunders Elsevier; 2010.

Chapter 114
Eyelid: Lateral Canthotomy

Ashley Crane, Benjamin Erickson, and Wendy W. Lee

Abstract Patients should be evaluated and deemed appropriate for such surgical intervention. Patients with orbital compartment syndrome due to hemorrhage, pneumo-orbita, or other causes of increased intraorbital pressure, who are at risk for optic nerve compression or hypoperfusion, are candidates for this procedure. Experimental studies demonstrate that permanent ischemic changes can occur within 90 min, so this procedure is performed emergently in appropriate patients, without waiting for radiographic studies. Additional therapeutic measures, such as the administration of ocular hypotensive drops or systemic osmotic diuretics, may also be indicated. The technique can also be utilized on an elective basis in conjunction with other procedures for horizontal lid tightening or reconstruction. Patients should be educated about the risks and benefits of the procedure, including alternatives.

Keywords Canthotomy • Canthotomy and cantholysis • Lateral canthotomy • Retrobulbar hemorrhage • Orbital compartment syndrome

Indications

Lateral canthotomy with inferior (and occasionally superior) cantholysis can be used in order to decompress the orbit in patients with orbital compartment syndromes. The technique can also be used as a step in eyelid-tightening procedures, such as lateral tarsal strip, or in reconstruction procedures to repair eyelid defects or access the orbital contents.

A. Crane (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ACrane@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_114

Essential Steps

1. Transfer the patient to the operating room.
2. Subcutaneous infiltration of local anesthetic at the lateral canthus.
3. Clamp from the lateral canthus to the orbital rim with hemostat (optional).
4. Incise the lateral canthus.
5. Identify and incise the inferior crus of lateral canthal tendon.
6. *If superior and inferior procedure*: repeat step 5 with superior crus of lateral canthal tendon.
7. *If bilateral procedure*: identical procedure on contralateral site.

Complications

– Infection
– Bleeding/hematoma
– Pain
– Poor cosmesis
– Incomplete canthal release
– Failure to prevent vision loss (due to irreversible ischemic changes or concomitant traumatic optic neuropathy unrelated to the compartment syndrome)
– Loss of lower lid suspension
– Canthal deformity requiring revision surgery
– Globe injury
– Adnexal injury

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) orbital compartment syndrome

Procedure: (*Right/Left/Bilateral/Superior/Inferior*) canthotomy and cantholysis

Postoperative diagnosis: Same

Indication: This ____-year-old (*male/female*) has a (*right/left/bilateral*) orbital compartment syndrome caused by (*retrobulbar hemorrhage/ pneumo-orbital/ trauma/postsurgical bleeding*) with elevated intraocular pressure likely resulting in compressive optic neuropathy. The risks, benefits, and alternatives to the procedure were discussed with the patient/next of kin including the risk for infection, bleeding, pain, poor cosmesis, failure to prevent loss of vision, loss of lower lid suspension, globe and adnexal injury, and need for further procedures. Afterward, the patient requested that we perform surgery and signed the required consent forms. (*The patient was incapacitated/unconscious and two-physician emergency consent was obtained*.)

Description of the procedure:

[Choose one]
If patient brought to the OR—*The patient was brought to the operating room where the eyes, adnexal structures, and face were sterilized with 5% Betadine ophthalmic solution. The patient was draped in the standard sterile fashion for oculoplastic surgery.*

If done emergently at bedside—*The procedure was performed emergently at bedside, where the eyes and adnexal structures were swabbed with Betadine swabs.*

A time-out was then performed confirming the correct patient, correct sites, correct surgery, and any known drug allergies. Two percent lidocaine with epinephrine (1:100,000) was infiltrated subcutaneously at the lateral canthus. Westcott (*or Steven's*) scissors were then used to incise an approximately 1-cm length of tissue from the lateral canthal angle toward the rim. The cut margin of the lower lid was then elevated with forceps, and the scissor tips were pointed toward the ipsilateral nasal ala and used to strum the inferior crus of the lateral canthal tendon. Once identified, the cantholysis was performed. The drapes were removed and ophthalmic ointment was applied.

After canthotomy and cantholysis had been performed, the lower lid structures were noted to be freely moveable. Intraocular pressure was rechecked with a Tono-Pen and found to have decreased from ____ to ____. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. (*She*/*He*) will be observed with ongoing intraocular pressure checks and pharmacological treatment as needed.

Chapter 115
Eyelid: Lateral Canthopexy

Craig N. Czyz

Abstract Lateral canthal tendon disinsertion is an anatomical defect that can alter the dynamics of blinking and lacrimal pump function. The clinical features of lateral canthal tendon disinsertion include lateral canthal angle dystopia, incomplete apposition of the eyelid margins on closure, temporal eyelid imbrication on attempted lid closure, and/or pseudo upper eyelid retraction.

Keywords Lateral canthal tendon • Disinsertion • Horizontal laxity • Lacrimal pump • Canthopexy

Indications

Disinsertion of the lateral canthal tendon causing symptomatic complications. Symptoms may include ocular irritation, epiphora and/or mild lid malposition. Patients with congenital, paralytic, mechanical, or cicatricial lid malposition may require additional or unique treatment; thus, it is imperative that the cause(s) of the lid malposition is identified preoperatively. Similarly, medial tendon laxity requires additional procedures to correct. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. Administration of topical and local anesthetic.
2. Corneal shield placement.
3. Lateral canthal incision with canthotomy and inferior cantholysis.
4. Dissection within the suborbicularis plane 4–5 mm superior and inferior to the incision in order to expose the tendon.
5. Double-armed suture is passed through the tendon close to the bifurcation and tied.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_115

6. One arm of the suture is passed through the inferior crus of the tendon and the other through the superior crus.
7. Each arm of the suture is passed through the periosteum on the inner surface of the lateral orbital rim.
8. The appropriate tension is placed on the suture to obtain the desired canthal angle position and then tied.
9. Closure of skin incision.
10. Removal of the corneal shield.

Complications

- Hemorrhage
- Overcorrection
- Undercorrection
- Infection
- Wound dehiscence
- Scarring
- Conjunctival cyst (internal approach)
- Canthal angle dystopia

Template Operative Dictation

Preoperative diagnosis: (1) *Epiphora (right/left)* (2) *lateral canthal malposition* (*right/left*)

Procedure: Lateral canthopexy (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) had developed (*right/left*) *eye* (*epiphora, hyperemia, foreign body sensation, exposure keratitis, corneal ulceration*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*bilateral/unilateral*) lateral canthal tendon disinsertion. This was confirmed by distracting the lateral eyelid toward the lateral orbital rim with a cotton tip applicator to simulate tightening of the tendon. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic proparacaine was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________ was injected into the (*right/left*) upper eyelid. A corneal shield was placed in the (*right/left*) eye.

A #15 Bard-Parker blade was used to make a ___ mm incision in the (*right/left*) lateral canthal angle. Using Westcott scissors (*and/or monopolar cutting cautery*) and 0.5 Castroviejo forceps dissection proceeded in the suborbicularis plane toward the lateral orbital rim exposing the canthal tendon, it's inferior and superior crus, and periosteum. Hemostasis was then maintained with (*monopolar/bipolar*) cautery. With the tendon exposed, a double-armed *5-0* (*Vicryl/Prolene*) suture on a spatulated needle was passed through the tendon close to its bifurcation. The suture was then tied. One arm of the suture was then passed through the inferior crus of the tendon (*and secured with a locking knot*). The other arm of the suture was passed in a similar manner through the superior crus (*and locked*). Each arm of the suture was then passed through the periosteum on the inner surface of the lateral orbital rim. (*A buried, interrupted 6-0 Vicryl suture was then passed gray line to gray from the upper to lower lid to reform the lateral canthal angle.*) The suture was then tied with appropriate tension to produce the desired positioning of the canthus. (*The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion*). The skin incision was then closed using simple, interrupted *6-0 plain gut* sutures.

The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 116
Eyelid: Floppy Eyelid Syndrome Repair (Wedge Resection)

Craig N. Czyz and Kenneth V. Cahill

Abstract Floppy eyelid syndrome is generally seen in obese individuals and is associated with obstructive sleep apnea. A decrease in the elastin content causes the upper eyelids to become horizontally lax. This laxity leads to eversion of the lids and chronic papillary conjunctivitis of the upper palpebral conjunctiva via mechanical irritation and/or tear film compromise. The upper eyelid may also appear elongated, thickened, and overlap over the lower eyelid laterally.

Keywords Floppy eyelid • Papillary conjunctivitis • Obstructive sleep apnea • Wedge resection • Floppy eyelid syndrome

Indications

Patients with chronic papillary conjunctivitis of the upper eyelid that can be easily everted or spontaneously evert on exam. Patients should be treated with medical management prior to surgical intervention. Associated systemic issues such as obesity and sleep apnea should be treated with the assistance of an internist and sleep disorder specialist. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

K.V. Cahill
Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA

Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: Kcahill@columbus.rr.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_116

Essential Steps

1. Administration of topical and local anesthetic
2. Corneal shield placement
3. Pentagonal lid incision with full-thickness excision
4. Repair of lid defect—sutures to align lid margin and reapproximate tarsus
5. Closure of skin
6. Removal of the corneal shield

Complications

– Hemorrhage
– Infection
– Wound dehiscence
– Scarring/lid notching
– Entropion (overcorrection)
– Undercorrection
– Lacrimal gland injury

Template Operative Dictation

Preoperative diagnosis: Floppy eyelid syndrome, (*right/left*) upper eyelid

Procedure: Excision and repair of (*right/left*) *u*pper eyelid, full-thickness

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) (*with a history of sleep apnea/obesity*) had developed laxity of the (*right/left*) upper eyelid over the past ____ (*months/years*) causing ocular irritation. Clinical evaluation found (*redundancy/laxity*) of the (*right/left*) upper eyelid (*with overlap of the lid margins laterally*) which is (*easily/spontaneously*) everted. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, proparacaine, was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ________was injected into the (*right/left*) upper eyelid. A corneal shield was placed in the (*right/left*) eye.

Attention was then turned to the (*right/left*) upper eyelid. A surgical marking pen was used to draw a pentagonal incision starting approximately one-third of the horizontal lid distance from the lateral canthus (*in the area of greatest lash misdirection*). Based on the amount of redundancy, the excisional width was ___ mm. A malleable retractor was placed between the eyelid and globe, and a #15 Bard-Parker blade was used to make a skin, orbicularis, and tarsal incision. Dissection was continued using iris scissors to fully excise the marked lid portion. Care was taken to avoid violating the lacrimal gland or its capsule. Hemostasis was then obtained using (*monopolar/bipolar*) cautery.

[Choose one]:

If using vertical mattress closure—A 6-0 Vicryl vertical mattress suture was placed through the meibomian gland orifices to provide lid margin alignment and eversion. Two interrupted 5-0 Vicryl sutures were placed in the anterior tarsus to provide tarsal alignment. A 6-0 Vicryl vertical mattress suture was placed anterior to the gray line such that the lash line was aligned and the lid margin was slightly everted. (*A 6-0 interrupted Vicryl suture was used to close the orbicularis*.) The eyelid skin was closed with _#_ interrupted 6-0 plain gut sutures.

If using simplified horizontal mattress closure—A 6-0 Vicryl suture is placed through the anterior portion of the vertical mid-tarsus and exiting at the lash line. The suture is then passed through the gray line and out the posterior vertical mid-tarsus. Next, the needle is passed through the opposite posterior mid-tarsus, exiting through the gray line. The suture is passed through the lash line and out the anterior vertical mid-tarsus where it was tied. (*_#_ additional interrupted 6-0 Vicryl suture(s) were placed in the anterior tarsus to provide additional tarsal alignment*.) The orbicularis and lid skin were reapproximated with _#_ interrupted 6-0 plain gut sutures.

The lid was well approximated and in good position. The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 117
Eyelid: Chalazion Incision and Drainage (I&D)

Daniel Straka and Craig N. Czyz

Abstract A chalazion is a common lesion of the eyelid that results from obstruction of the Meibomian glands within the tarsal plate. Obstruction of the gland can lead to accumulation of sebaceous material within the interstitium of the eyelid causing an inflammatory response. A fibrous capsule often forms around the sebaceous material resulting in a palpable bump in the eyelid. Occasionally cellulitis and abscess formation can occur simultaneously, which requires antibiotic therapy and abscess drainage. In rare instances, and particularly in older patients, chalazia can masquerade as more sinister conditions, the most serious of them being sebaceous cell carcinoma. Conservative measures include warm compresses to the eyelids, eyelid hygiene, and topical ophthalmic antibiotic ointment. Failure of conservative management should be documented prior to performing the procedure.

Keywords Abscess • Eyelid • Chalazion • Incision • Drainage • Stye • Hordeolum

Indications

Persistence of chalazion after several weeks of medical management. When the diagnosis is uncertain or in cases of recurrent chalazia with atypical features, a biopsy may be warranted. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_117

Essential Steps

1. Administration of topical ophthalmic anesthetic and local anesthetic given by subcutaneous and/or subconjunctival injection just proximal to the retrotarsal margin (monitored conscious sedation can also be used for multiple lids/lesions or patient comfort)
2. Corneal shield placement
3. Placement of chalazion clamp
4. Eversion of lid
5. Vertical incision in conjunctival surface parallel to Meibomian glands
6. Use of chalazion curette to disrupt septae and remove contents
7. Excision of fibrous capsule, if present
8. *Specimen collection for histopathologic classification (for recurrent or suspicious lesions)*
9. Use of cotton swabs to express Meibomian glands along entire lid margin
10. Use of cautery to obtain hemostasis
11. Removal of chalazion clamp
12. Removal of corneal shield

Complications

- Hematoma
- Infection
- Foreign body sensation
- Corneal abrasion
- Disruption of eyelid contour
- Notching of eyelid margin
- Recurrence
- Conjunctival scarring

Template Operative Dictation

Preoperative diagnosis: (*Recurrent*) Chalazion (*RUL/RLL/LUL/LLL*)

Procedure: Incision and curettage of chalazion (*RUL/RLL/LUL/LLL*)

Postoperative diagnosis: Same

Indication: This ___-year old *male/female* has developed a (*RUL/RLL/LUL/LLL*) chalazion that did not respond to conservative medical management for __ weeks. Management options were discussed with the patient, and the decision was made to proceed with incision and curettage of the chalazion. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient was identified in the preoperative area, and the (*RUL/RLL/LUL/LLL*) was marked with a marking pen. (*The patient was then taken to the operating room and placed supine on the operating room table. Monitored conscious sedation was administered by (hospital/surgery center) anesthesia department.*) Topical ophthalmic anesthesia was placed into the (*right/left*) eye. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of _________ was injected into the (*RUL/RLL/LUL/LLL*). The patient was then prepped and draped in the usual sterile ophthalmic fashion.

A corneal shield was placed in the (*right/left*) eye. A chalazion clamp was applied to the lid to stabilize it and achieve hemostasis. The lid was then everted. A #11 blade was used to make a vertical incision in the conjunctival surface parallel to the Meibomian glands, with care taken to avoid the lid margin. A chalazion curette was used to disrupt the internal architecture of the lesion and to remove its contents. (*Next, the fibrous capsule of the lesion was excised using Westcott scissors and forceps.*)

If a recurrent/suspicious lesion*—Due to the (recurrent/suspicious lesion), a specimen was collected and sent for histopathologic evaluation*.

Two cotton swabs were then used to express the Meibomian glands across the entire lid margin. Handheld cautery was used to maintain hemostasis throughout the procedure. The chalazion clamp was then released and the corneal shield was removed from the (*right/left*) eye.

Antibiotic ointment was instilled into the (*right/left*) eye. The patient tolerated the procedure well and was taken to the recovery area in stable condition.

Chapter 118
Eyelid: Wedge Resection for Eyelid Lesion

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Basal cell • Excisional biopsy • Wedge resection • Eyelid lesion

Indications

Lesions of the lower eyelid requiring biopsy for diagnosis or excision for treatment. The lesions may cause no symptoms or ocular irritation due to changes in lid architecture. Patients should have appropriate systemic workups based on lesion type and presentation. Defects greater than 33 % of the horizontal lid length require adjunct procedures to direct closure for repair.

Essential Steps

1. Administration of topical anesthetic and local anesthetic.
2. Corneal shield placement.
3. Pentagonal lid incision.
4. Full-thickness excision of eyelid portion with lesion and margins.
5. Specimen marked for orientation and sent for pathologic evaluation.
6. Repair of lid defect—sutures to align lid margin and reapproximate tarsus.
7. Closure of skin.
8. Removal of the corneal shield.

Complications

- Hemorrhage
- Infection
- Wound dehiscence

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_118

– Scarring/lid notching
– Entropion
– Lesion recurrence
– Metastasis

Template Operative Dictation

Preoperative diagnosis: (*Lesion of unknown origin/basal cell carcinoma/*_______) (*right/left*) (*upper/lower*) eyelid

Procedure: (1) Excision and repair of (*right/left*) (*upper/lower*) eyelid, full thickness, (2) *frozen section control*

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed a (*right/left*) (*upper/lower*) eyelid lesion over the past ____ (*months/years*) and on clinical evaluation was found to have a (*lesion of unknown origin/basal cell carcinoma/*_______). A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the (*right/left*) eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, proparacaine, was placed into the (*right/left*) eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________was injected into the (*right/left*) (*upper/lower*) eyelid. A corneal shield was placed in the (*right/left*) eye.

Attention was then turned to the (*right/left*) (*upper/lower*) lid. A surgical marking pen was used to draw pentagonal incision surrounding the lesion with approximately ___mm medial and lateral to the lesion. A malleable retractor was placed between the eyelid and globe, and a #15 Bard-Parker blade was used to make a skin incision around the margins of the lesion. Dissection was continued using iris scissors to incise the tarsus and conjunctiva. The specimen was then marked ______ using a ____ suture and sent for pathology evaluation. Hemostasis was then obtained using (*monopolar/bipolar*) cautery. (*Upon verbal confirmation from pathology that the lesion was completely removed with clear margins*, *closure was undertaken*).

[Choose one]:

For defects <33 % of lid*—see below.*

For defects 33–50 % of lid*—see canthotomy and/or Tenzel flap dictation then continue below.*

For defects greater than 75 % of lid*—see Hughes or Mustarde flap dictation only, as the below does not apply.*

[Choose one]:
If using vertical mattress closure—A 6-0 Vicryl vertical mattress suture was placed through the meibomian gland orifices to provide lid margin alignment and eversion. _#_ interrupted 5-0 Vicryl sutures were placed in the anterior tarsus to provide tarsal alignment. A 6-0 Vicryl vertical mattress suture was placed anterior to the gray line, such that the lash line was aligned and the lid margin was slightly everted. (*A 6-0 interrupted Vicryl suture was used to close the orbicularis*.) The eyelid skin was closed with _#_ interrupted 6-0 plain gut sutures.

If using simplified horizontal mattress closure—A 6-0 Vicryl suture was placed through the anterior portion of the vertical mid-tarsus and exiting at the lash line. The suture was then passed through the gray line and out the posterior vertical mid-tarsus. Next, the needle was passed through the opposite posterior mid-tarsus, exiting through the gray line. The suture was passed through the lash line and out the anterior vertical mid-tarsus where it was tied. (_#_ *additional interrupted 6-0 Vicryl sutures were placed in the anterior tarsus to provide additional tarsal alignment*.) The orbicularis and lid skin were reapproximated with _#_ interrupted 6-0 plain gut sutures.

The lid was well approximated and in good position. The corneal shield was then removed from the (*right/left*) eye. Antibiotic ophthalmic ointment was instilled into the (*right/left*) eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 119
Eyelid: Temporary Tarsorrhaphy

Nimesh Patel, Benjamin Erickson, and Wendy W. Lee

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Temporary suture tarsorrhaphy is used as a temporizing measure for the treatment of decompensated ocular surface disorders, neurotrophic ulcers, or infectious corneal ulcers in convalescent phase, nonhealing corneal epithelial defects, and cases of transient ocular exposure. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Temporary suture tarsorrhaphy • Bolster suture tarsorrhaphy • Bolsterless suture tarsorrhaphy • Tarsorrhaphy • Decompensated ocular surface disease

Indications

Decompensated ocular surface disease, neurotrophic corneal ulcer, nonhealing epithelial defects, facial nerve palsy, or sedation-related exposure keratopathy

Essential Steps

1. Transfer patient to operating room.
2. Sterile draping.
3. Local anesthesia.
4. Suture anchoring of upper tarsal plate.
5. Suture anchoring of lower tarsal plate.
6. Tying suture ends for tarsorrhaphy closure.

N. Patel (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: nap46@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_119

Complications

- Infection
- Bleeding
- Scar formation
- Pressure-related bolster complications (e.g., skin sloughing)
- Incomplete eyelid closure
- Suture migration with premature opening of tarsorrhaphy

Template Operative Dictation

Preoperative diagnosis: *Decompensated ocular surface disease*, (*right/left*) eye

Procedure: Gold weight insertion of the (*right/left*) eye

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) with *decompensated ocular surface disease*, previously presented to the office with (*mild/moderate/severe ocular surface disease*) approximately ___ months/years ago. Despite aggressive medical treatment, the patient's symptoms did not resolve, and surgical options were discussed. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, pressure-related bolster complications, incomplete eyelid closure, suture migration with premature opening of the tarsorrhaphy, and need for additional surgical procedures. Afterwards, the patient requested that we perform the above listed surgery and signed the required consent form.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the operating room where the (*right/left*) eye and associated adnexal structures were sterilized with 5 % Betadine skin preparation. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, site, surgery, and any known drug allergies. Local anesthetic consisting of 2 % lidocaine with epinephrine (1:100,000) was then infiltrated transconjunctivally and subcutaneously in the upper and lower eyelids. After a ____min interval for hemostasis:

[Choose one]
Bolsterless Intermarginal Tarsorrhaphy*—A 4-0 silk suture on a single semicircular needle was passed in and out through the meibomian glands of the center of the upper eyelid in a forehand fashion, securely anchoring the tarsal plate without penetrating the conjunctiva or anterior lamellar tissues. A similar suture pass, but in a backhand fashion, was then made through the meibomian glands in the corresponding lower eyelid margin, again securely anchoring the tarsal plate. The suture ends*

were then tied together securely and trimmed, resulting in complete eyelid closure. (If desired, similar suture passes can be taken temporally and/or nasally for additional security.)

Bolster Tarsorrhaphy—(*Two bolsters, measuring approximately 4 × 8 mm, were cut from sterile foam suture packaging or A 1 cm segment of tubing from a butterfly needle was bisected to form two bolsters). Both ends of a double armed 4-0 silk suture on a semicircular needle were then passed through the first bolster. Starting ___ mm above the superior eyelid cilia, each arm was then passed through the eyelid skin, orbicularis, tarsal plate, and exiting the margin through the meibomian gland orifices. Next, each arm was passed through the meibomian gland orifices of the corresponding lower lid tarsus, then through the orbicularis, exiting the skin approximately ____ mm below the inferior eyelid cilia. The sutures were then passed through the second bolster and secured with a temporary knot, resulting in complete eyelid closure. (If desired, a second bolster tarsorrhaphy can be placed temporally or nasally for additional security.)*

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. Antibiotic ointment was applied to the (*right/left*) eye. The patient was then taken to the recovery room in stable condition.

Chapter 120
Eyelid: Gold Weight Implantation

Kimberly D. Tran, Benjamin Erickson, and Wendy W. Lee

Abstract Indications for the procedure include facial nerve palsy with poor upper eyelid excursion, lagophthalmos, and exposure keratopathy resulting in impaired visual acuity, visual disability, and/or affecting activities of daily living. Patients should be educated about the risks, benefits, and alternatives to the procedure, and informed consent obtained.

Keywords Facial nerve palsy • Lagophthalmos • Exposure keratopathy • Gold weight insertion • Implantation

Indications

Facial nerve palsy with poor upper eyelid excursion, lagophthalmos, and/or exposure keratopathy

Essential Steps

1. Transfer patient to operating room.
2. Mark patient's natural lid crease.
3. Subcutaneous infiltration of local anesthetic.
4. Incise along lid crease centrally.
5. Hemostasis.
6. Dissect orbicularis to create pretarsal pocket.
7. Pass and anchor gold weight to tarsal plate.
8. Close overlying skin and muscle.

K.D. Tran (✉)
Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: KimberlyDTran@gmail.com

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_120

Complications

– Infection
– Bleeding
– Pain
– Allergy to implanted material
– Incomplete eye closure
– Implant extrusion
– Need for further procedures

Template Operative Dictation

Preoperative diagnosis: Facial nerve palsy with lagophthalmos, (*right/left*) eye

Procedure: Gold weight insertion of the (*right/left*) eye

Postoperative diagnosis: *Same*

Implant: ___g gold weight

Indication: This ____-year-old (*male/female*) has a history of facial nerve palsy with lagophthalmos and exposure keratopathy. The patient was previously fitted with sizers to evaluate the correct intraoperative weight implant. The risks, benefits, and alternatives to the proposed procedure were discussed with the patient, including the risk for infection, bleeding, pain, allergy to the implanted material, incomplete eye closure, implant extrusion, and need for additional procedures. Afterwards, the patient elected to undergo the procedure and signed the required consent forms.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the operating room where the (*right/left*) eye and associated adnexal structures were sterilized with 10 % Betadine skin preparation. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, site, surgery, and any known drug allergies.

Attention was directed to the (*right/left*) upper eyelid, where the patient's natural lid crease was marked centrally with a sterile violet marking pen. Approximately ___cc of 2 % lidocaine with epinephrine (1:100,000) was infiltrated subcutaneously. Gentle traction was applied, and the lid crease marking was incised with a #15 Bard Parker blade. Hemostasis was achieved with judicious application of bipolar wet-field electrocautery.

The orbicularis muscle fibers were then dissected using Westcott scissors in order to create a pretarsal pocket between the muscle and tarsal plate. The dissection remained greater than 2 mm above the lid margin at all times in order to avoid injury to the eyelash follicles.

A ____g sterile gold weight was then inserted into the pocket. The weight was anchored to the tarsal plate with a single *7-0 Prolene* suture passed through the eyelet of the weight and then through the central tarsal plate in a lamellar fashion. The overlying skin and muscle were then closed along the eyelid crease with _#_ interrupted *7-0 Prolene* sutures. The drapes were then removed and ophthalmic ointment was applied to the incision.

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition.

Chapter 121
Levator Recession

Daniel Straka and Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Levator recession • Eyelid • Retraction • Levator aponeurosis • Thyroid eye disease • Oculoplastics

Indications

Upper eyelid retraction is the most common ophthalmic sign of thyroid eye disease. Levator recession is generally performed after the patient has already had an orbital decompression and strabismus surgery, if indicated. Although not an exhaustive list, other, less common causes of upper lid retraction include postsurgical (levator advancement/resection surgery, blepharoplasty), pseudoretraction (response due to contralateral ptosis), progressive supranuclear palsy, Parkinson's diseases, Parinaud syndrome, aberrant regeneration of oculomotor nerve, and cranial nerve VII palsy. Mild cases of retraction can sometimes be observed and treated medically with ocular lubrication. However, if evidence of exposure keratopathy develops, surgery is generally recommended. Levator recession surgery can be performed from an internal or an external approach, with or without a spacer graft, and with or without hang-back sutures. The hang-back sutures are left untied so that the levator muscle can be easily tightened postoperatively if there is significant overcorrection (ptosis). We will discuss the external approach with and without hang-back sutures.

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_121

Essential Steps

1. Incision marking followed by injection of local anesthetic
2. Placement of a protective corneal shield
3. Incise the skin
4. Dissect through the orbicularis muscle and orbital septum
5. Identify the levator aponeurosis underneath the central fat pad
6. Perform a stepwise disinsertion of the levator muscle–Müller's muscle complex from the superior edge of the tarsal plate, starting temporally
7. Dissect the levator and Müllers muscle away from the underlying conjunctiva
8. Check the height and contour of the eyelid
9. *If full thickness eyelid recession is performed, carefully incise the conjunctiva similarly to the levator–Müller's muscle complex*
10. *If hang-back sutures are used, three 6-0 Prolene sutures are passed in a reverse horizontal mattress fashion through the levator muscle and left untied, externalized through the skin incision*
11. Close incision with running or interrupted sutures
12. Removal of the corneal shield

Complications

– Persistent lagophthalmos
– Infection
– Hemorrhage
– Scarring
– Wound dehiscence
– Overcorrection (eyelid retraction)
– Undercorrection (residual ptosis)
– Asymmetric eyelid contour

Template Operative Dictation

Preoperative diagnosis: Upper eyelid retraction on the (*right/left/bilateral*)

Procedure: Levator recession (*right/left/both*) eye(s)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) had developed *(bilateral/unilateral)* (*exposure keratopathy/foreign body sensation/corneal ulceration*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*bilateral/unilateral)* upper eyelid retraction. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left/both)* eyelid incision(*s*) was (*were*) marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. Monitored conscious sedation was administered by the (*hospital/surgery center*) anesthesia department. Topical anesthetic, proparacaine was placed into the *(right/left)* eye. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ______ was injected into (*right/left/both*) upper eyelid(s). A corneal shield was placed in the *(right/left/both)* eye(s).

A caliper was used to measure a lid crease incision of ___ mm on the *(right/left)* upper eyelid. A #15 Bard-Parker blade was used to make an incision through the skin and orbicularis muscle. Wescott scissors and 0.3 forceps were used to dissect through the remaining orbicularis fibers until the orbital septum was identified. The septum was then opened revealing the underlying pre-aponeurotic fat pad and levator aponeurosis. Using Wescott scissors and beginning temporally, the levator aponeurosis and underlying Müller's muscle were disinserted from the tarsal plate. The levator–Müller's muscle complex was then carefully dissected away from the underlying conjunctiva. The corneal shield was then removed from the *(right/left)* eye. The height and contour of the eyelid was then checked by having the patient open and close (*his/her*) eyes. The corneal shield was replaced and the dissection was carried medially until the desired height and contour of the upper eyelid was achieved.

If full thickness eyelid recession was performed—*Despite near maximal recession of the levator and Müller's muscle, there was still some residual retraction. The Wescott scissors were used to incise the conjunctiva at the level of the previous levator–Müller's muscle recession. This incision was carried nasally until the desired height and contour of the eyelid was achieved.*

If hang-back sutures were placed—*Once the levator aponeurosis was completely disinserted from the tarsal plate, 6-0 Prolene sutures were placed in a reverse horizontal mattress fashion through the levator muscle, partial thickness through the tarsal plate, and left untied with their tails pointing inferiorly and externalized through the skin incision. _3_ of these sutures were passed along the horizontal length of the eyelid. The skin was then closed with interrupted 6-0 plain gut sutures. The free ends of the untied prolene hang-back sutures were secured to the eyelid with steri strips in order to avoid irritating the eyes.*

If a bilateral levator recession was performed—*Attention was then turned to the opposite eye. A caliper was used to measure a lid crease incision of ___ mm on the (left/right) upper eyelid. The same exact dissection and procedure mentioned previously was applied in an identical manner. Special care was taken to ensure a symmetric appearance of both eyelids.*

The corneal shield(s) was (*were*) then removed from the *(right/left/both)* eye(s). Antibiotic ophthalmic ointment was instilled into the *(right/left/both)* eye(s) and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 122
Hard Palate Graft for Lower Eyelid Retraction Repair

Larissa Ghadiali and Bryan Winn

Abstract Lower eyelid retraction secondary to thyroid eye disease or prior lower eyelid blepharoplasty can be addressed by disinserting the lower eyelid retractors and employing a spacer graft between the tarsus and lower eyelid retractors (Colour Atlas of Ophthalmic Plastic Surgery, Boston, 2008). Graft materials include hard palate, ear cartilage, sclera, or alloplastic materials. When using ear cartilage or sclera, the graft must be covered with conjunctival epithelium (Colour Atlas of Ophthalmic Plastic Surgery, Boston, 2008). Hard palate has the benefit of combining the structural rigidity of tarsus with the mucous membrane epithelium similar to that of the conjunctiva. The biggest disadvantage of hard palate grafting is donor site morbidity. Preoperative fitting of a palate protector and postoperative oral viscous lidocaine (2 %) gel can be used to improve patient discomfort. Anesthesia during hard palate grafting can be obtained with a greater palatine nerve block (Ophthalmic Plastic and Reconstructive Surgery 8:183–195, 1992) and direct infiltration of the hard palate. Local anesthesia is injected by the greater palatine foramen, medial to the alveolar process by the third molar. The hard palate is composed of epithelium, lamina propria, and submucosa. Hard palate harvesting is done in the submucosal plane and the submucosa is removed from the graft before implantation. The area of the alveolar process and midline raphe are devoid of submucosa and should therefore be avoided (Ophthalmic Plastic and Reconstructive Surgery 8:183–195, 1992). After harvesting the graft, the graft is rinsed in a 10 % betadine solution, a second set of sterile surgical instruments are opened, and the surgeon's gloves are changed in order to prevent contamination of the eye socket with oral bacteria.

Keywords Hard palate graft • Lower eyelid retraction • Exposure keratopathy • Graves' disease • Lower eyelid blepharoplasty • Thyroid eye disease • Graft Failure

---

L. Ghadiali (✉) • B. Winn
Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA
e-mail: grover.larissa@gmail.com; bjw15@cumc.columbia.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_122

Indications

Repair of lower eyelid retraction from thyroid eye disease or post-blepharoplasty can be achieved by using a hard palate graft as a spacer between the inferior tarsal border and the lower eyelid retractors. A hard palate spacer graft can also be used to correct cicatricial lower eyelid entropion.

Essential Steps

1. Infiltrate local anesthetic into the lower eyelid, lateral canthus, and hard palate
2. Incise the conjunctiva and lower eyelid retractors below the tarsal border
3. Dissect the lower eyelid retractors from the orbicularis muscle
4. Create a stencil
5. Harvest the hard palate graft
6. Change instruments and gloves
7. Secure the graft between the tarsus and lower eyelid retractors
8. Place a temporary tarsorrhaphy

Complications

- Infection
- Bleeding/hematoma of eyelid
- Bleeding/hematoma of palate
- Pain
- Poor cosmesis
- Corneal abrasion
- Suture dehiscence/erosion
- Overcorrection/undercorrection
- Thickening of the lower eyelid
- Graft necrosis

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) lower eyelid retraction and exposure keratitis

Procedure: (*Right/Left/Bilateral*) (1) conjunctivoplasty with hard palate mucous membrane graft, *and (2) temporary tarsorrhaphy*

Postoperative diagnosis: Same

Indication: This is a ___-year-old male/female with (*right/left/bilateral*) lower eyelid retraction secondary to thyroid eye disease (*history of lower eyelid blepharoplasty*). The patient complains of chronic foreign body sensation and was found to have inferior punctate keratopathy consistent with exposure keratopathy despite lubrication. A decision was made to proceed with (*right/left/bilateral*) lower eyelid conjunctivoplasty to address the retraction with a hard palate mucous membrane graft as well as a temporary tarsorrhaphy to keep the lower eyelid on vertical upward stretch during the early phase of healing. The patient was informed of the risks, benefits, indications, and alternatives of the procedure and informed consent was given.

Description of the procedure: The patient was identified in the holding area and a marking pen was used to mark the operative eye(*s*). The patient indicated that she chewed mostly on her right (*left/right*) side, and so the decision was made to harvest the hard palate graft from the contralateral (*right/left*) side. The patient was escorted into the operating suite and placed in the supine position. Tetracaine eye drops were instilled into both eyes. The patient's face was prepped and draped in the usual sterile fashion for oculoplastic surgery. IV sedation was administered by the anesthesia service. A surgical time out was performed in accordance with hospital policy, verifying the correct patient, procedure, site, positioning of the patient, special equipment, and safety precautions. The area of the lower eyelid, lateral canthus, and (*left-sided/right-sided*) hard palate, including the area of the greater palatine foramen, was infiltrated with a 50/50 mixture of 2 % lidocaine and epinephrine 1:100,000 and 0.5 % Marcaine (*plain 2 % lidocaine with epinephrine 1:100,000)* for local anesthesia. A corneal protective shield was placed in the eye(*s*).

The lower eyelid was everted over a Desmarres retractor and an incision was made through the conjunctiva and lower eyelid retractors at the inferior tarsal border from just lateral to the punctum to the lateral canthus using a Colorado tip needle on Bovie cautery (*Westcott scissors*). This incision was approximately _*25*_ mm in length. Dissection was then carried out in the plane between the orbicularis and the lower eyelid retractors to create a pocket for the hard palate graft to be sutured into. *(Of note, there was scar tissue in this region which was lysed.)* The decision was made to measure a _*6*_ mm high by _*25*_ mm long donor hard palate graft in the shape of an ellipse (*10–12 mm by 25 mm if bilateral grafts*).

A stencil of the graft was first made with paper, and then transferred to the (*left/right*) hard palate with a marking pen. An incision was made through the hard palate along the edge of the graft with a #15 Bard-Parker blade. The graft was then harvested with blunt Westcott scissors. A combination of Bovie and bipolar cautery was used for hemostasis at the donor site. The graft was soaked in Betadine 10 % solution momentarily and then rinsed with saline. The graft was then thinned over a gloved finger to a uniform _*1–1.5*_ mm thick, smooth graft. (*The graft was then bisected along the long axis, creating two grafts, each 5–6 mm in vertical height*).

At this time, the instruments on the field were removed and exchanged for a new set of sterile instruments. The surgeons replaced their sterile gloves. Using interrupted, buried *6-0 Vicryl* sutures, the graft was sewn to the lower eyelid conjunctiva and retractors inferiorly. The superior aspect of the graft was sewn to the inferior tarsal border using a *6-0 plain gut* suture in a buried running fashion. Care was used to place the sutures deeply through the tarsus and superficially through the graft so that the graft laid flat within the pocket. This suture was then externalized laterally through the skin on both sides and tied. The corneal shield was removed. The area of the hard palate donor site was inspected and found to be dry.

If a temporary lateral tarsorrhaphy was performed*—A double-armed 4-0 silk suture was passed through a bolster and then passed through the subciliary skin in the lateral lower eyelid and out through the eyelid margin in a mattress fashion. Once the patient's face was cleaned, a tincture of benzoin was applied to the forehead and the suture was anchored to the forehead using multiple STERI-strips in a woven fashion.*

If procedure was performed bilaterally—*Antibiotic ointment was placed on the wound and the same procedure was then performed for the contralateral eye*.

Following the procedure, antibiotic ointment was placed in the eye and the patient was escorted to the postoperative care area, where they remained for approximately 45 min before being discharged to the care of a responsible adult.

References

1. Tyers AG, Collin JR. Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier; 2008.
2. Cohen MS, Shorr N. Eyelid reconstruction with hard palate mucosa grafts. Ophthal Plast Reconstr Surg. 1992;8(3):183–95.

Chapter 123
Browpexy

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Brow ptosis • Visual field loss • Dermatochalasis • Browpexy • Mild brow ptosis

Indications

Mild brow ptosis causing increased dermatochalasis (temporal hooding) and subsequent superior temporal visual field loss. Mild brow ptosis causing cosmetic issues in patients who do not desire a visible scar or endoscopic brow lift.

Essential Steps

1. Administration of topical anesthetic and local anesthetic
2. Corneal shield placement
3. Lid crease incision
4. Dissection through orbicularis and septum towards the superior orbital rim
5. Continue dissection *12–15* mm superior to the rim
6. Incision of brow fat pad at the superior lateral orbital rim
7. Blunt pre-periosteal dissection to lacrimal gland fossa
8. Suture the inferior subcutaneous brow tissue above the superior orbital rim
9. Closure of lid crease incision
10. Removal of the corneal shield

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_123

Complications

- Hemorrhage
- Infection
- Wound dehiscence
- Overcorrection
- Undercorrection
- Nerve anesthesia or paralysis
- Brow asymmetry

Template Operative Dictation

Preoperative diagnosis: *Brow ptosis* (*right/left*)

Procedure: Browpexy (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed a *(right/left/bilateral)* superior visual field loss (*or unsatisfactory brow position*) over the past ____ (*months/years*) and on clinical evaluation was found to have (*right/left/bilateral)* brow ptosis. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye(s) was marked with a surgical marking pen. The desired brow height was marked medially and laterally with the patient in an upright position. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic consisting of Proparacaine was placed into the *(right/left)* eye. The patient was then prepped and draped in the usual sterile, full-face oculofacial plastic fashion. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ________ was injected into the (*right/left*) upper eyelid and brow. A corneal shield was placed in the *(right/left)* eye.

Attention was then turned to the *(right/left)* upper eyelid. Calipers were used to mark an incision inferiorly *8–10* mm from the lid margin. A #15 Bard-Parker blade was used to incise the skin. The dissection was then continued through orbicularis with 0.5 Castroveijo forceps and Wescott scissors. Hemostasis was maintained with (*monopolar/bipolar*) cautery. The septum was incised, and dissection was carried out toward the superior orbital rim. Dissection was continued in the preseptal plane towards the orbital rim and superior to the retro-orbicularis oculi fat (ROOF) using blunt (*Metzenbaum scissors/Iris scissors/hemostat/___ elevator*).

The dissection was extended pre-periosteally superior to the orbital rim for approximately _12–15_ mm. (*The ROOF was sculpted using monopolar cautery/___ scissors*.) Calipers were used to measure approximately _10–12_ mm superior from the orbital rim. A *6-0 Prolene* suture was then passed in a whipstitch fashion through the ROOF and subcutaneous brow tissue directly inferior to the mediolateral brow cilia. The suture was then passed through the periosteum _10–12_ mm above the orbital rim and secured. The skin of the lid incision was then closed with simple, interrupted *6-0 plain gut* sutures.

The corneal shield was then removed from the *(right/left)* eye. Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 124
Direct Brow Lift

Ashley Crane, Benjamin Erickson, and Wendy W. Lee

Abstract Patients should be evaluated and deemed appropriate for such surgical intervention. Brow ptosis that obstructs the visual axis, causes visual disability and affects activities of daily living, or cosmetically unacceptable appearance are candidates for this procedure. The choice of technique for brow lift should be discussed with the patient and the appropriate procedure tailored to the individual patient's needs and preferences. Patients should be educated about the risks and benefits of the procedure, including alternatives.

Keywords Brow ptosis • Direct browplasty • Direct brow lift • Direct brow ptosis repair • Direct brow lift

Indications

Eyebrow ptosis causing obstruction of the visual axis and causing difficulties with activities of daily living. Suprathreshold Humphrey visual fields demonstrated a greater than 30 % improvement with elevation and taping of the redundant tissue.

Essential Steps

1. Transfer patient to operating room
2. Measure and mark patient's natural brow position and outline an ellipse of skin to be excised
3. Subcutaneous infiltration of local anesthetic
4. Incision along marked ellipse above brow

A. Crane (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ACrane@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_124

5. Dissect through skin, subcutaneous tissue, and orbicularis
6. Hemostasis
7. Deep plane and subcutaneous tissues closed in layers
8. Skin closed with vertical mattress and running sutures
9. *If bilateral procedure*: identical procedure on contralateral brow

Complications

- Infection
- Bleeding/hematoma
- Pain
- Exacerbation of dry eye symptoms
- Poor cosmesis
- Visible scarring
- Undercorrection
- Overcorrection
- Asymmetry
- Exposed suture
- Need for further procedures
- Retrobulbar hemorrhage
- Hypoesthesia of forehead
- Transected brow cilia

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) brow ptosis

Procedure: (*Right/Left/Bilateral*) direct brow lift

Postoperative diagnosis: *Same*

Indication: This ____-year-old *(male/female)* has significant (*right/left/bilateral*) brow ptosis obstructing the visual axis and causing difficulties with activities of daily living. Suprathreshold Humphrey visual fields demonstrated a ____ % improvement with elevation and taping of the redundant tissue. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, exacerbation of dry eye symptoms, prominent scarring, hair loss, alteration of brow contour, asymmetry, and need for further procedures. Afterwards, the patient elected to undergo the procedure and signed the required consent forms.

Description of the procedure: The patient was identified in the holding area, and the (*right/left*) eye was marked with a marking pen. The patient was brought into the operating room where the (*right/left*) eye and associated adnexal structures were sterilized with 5 % betadine ophthalmic solution. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, site, surgery, and any known drug allergies.

The superior margin of the (*right/left/both*) supra-brow elliptical incision was marked with a violet marking pen to approximate the desired height and contour of the brow(s) following surgery. This was done by manually raising the eyebrow to the desired position, and positioning the marking pen at the superior edge of the brow hairs. The brow was then allowed to fall to its original position while passively marking the skin. The inferior margins were marked at the superior margin of the eyebrow hairs. ___ % lidocaine (*with/without*) epinephrine (1:100,000) was infiltrated subcutaneously.

On the (*right/left*) side, a #15 blade was used to incise skin, subcutaneous tissue, and orbicularis muscle, following the margins and beveling cephalad in attempt to avoid transecting hair follicles. Special care was taken when extending the incision medially to prevent injuring the supraorbital and supratrochlear neurovascular bundles. The resulting ellipse was undermined and excised, and hemostasis was achieved with a bipolar wetfield electrocautery. The deep plane and subcutaneous tissues were then closed in layers with buried, interrupted *5-0 Vicryl* sutures. The skin was then closed with _#_ vertical mattress sutures, followed by a running *6-0 nylon* suture for maximum wound eversion.

If contralateral brow was done*—Attention was then directed towards the contralateral brow, where an identical procedure was performed. No involvement of the neurovascular bundles was encountered. The wound was reapproximated using the method previously described.*

The drapes were removed and ophthalmic ointment was applied. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition and will be seen in the oculoplastics clinic in 1 week. The patient will apply frequent ice packs on the eyelids for 48 h, and abstain heavy lifting, straining, or use of blood thinners. The patient was instructed to return to the emergency room immediately if any loss of vision or deep orbital pain is noted.

Chapter 125
Coronal Brow Lift

Kelly R. Everman and Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for surgical intervention. The procedure should be considered for patients with bilateral brow ptosis. Coronal approach may be modified to a pretrichial approach if forehead length is greater than 60 mm. Patients should have been educated about the risks and benefits of the procedure, including the alternatives.

Keywords Brow ptosis • Coronal • Pretrichial • Lift • Oculoplastics • Visual field loss

Indications

Brow ptosis causing obstructive superior visual field loss, brow ptosis and/or forehead rhytids causing cosmetic changes to the forehead and periorbital region.

Essential Steps

1. Administration of local anesthetic
2. Choice of incision (*pretrichial/true coronal*)
3. Incision made to preperiosteal plane
4. *Optional: placement of Raney clips*
5. Dissection and forehead release in the central preperiosteal plane.
6. Release of conjoined tendons bilaterally
7. Lateral dissection posterior to the superficial temporalis fascia
8. Release of periosteum along entire length of superior orbital rim
9. Release of periosteum in the glabellar region
10. Removal of redundant skin and muscle at incision line (typically 10–20 mm)
11. Advancement of forehead and brow as a unit with fixation to the periosteum

K.R. Everman (✉)
Oculoplastic and Reconstructive Surgery, Tennessee Oculoplastics, Nashville, TN, USA
e-mail: Keverman@tnoculoplastics.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_125

12. Closure of incision line in two layers (staples in coronal, sutures in pretrichial)

Complications

- Hematoma
- Infection
- Wound dehiscence
- Scarring
- Overcorrection
- Undercorrection
- CN VII paralysis
- Sensory nerve impairment posterior to incision
- Asymmetry in brow height
- Asymmetry in brow contour
- Alopecia
- Paresthesia
- Lagophthalmos
- Exposure keratopathy

Template Operative Dictation

Preoperative diagnosis: (1) Brow ptosis, (2) superior visual field defect, and (*3*) *forehead rhytids* on the (*right/left/bilaterally*)

Procedure: (*Right/Left/Bilaterally*) coronal brow lift

Postoperative diagnosis: Same

Indication: This ___-year-old (*race*)(*male/female*) had developed bilateral brow ptosis (*and forehead rhytids*) over the past _____ (*months/years*). Clinical evaluation revealed the (*presence/absence*) of visually significant impairment in the superior visual field by formal perimetry testing. (*The visual impairment was affecting the patient's activities of daily living.*) A detailed review of the risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. The patient voiced understanding of the inherent risks and proposed benefits of surgery and has elected to proceed with surgical intervention. Informed consent was obtained.

Description of the procedure: The patient and the operative site were identified in the preoperative holding area. This was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by the (*hospital/surgery center*) anesthesia department. Sequential placement of rubber bands was employed to hold the hair in place posterior to the operative field. The patient was then prepped and draped in the usual sterile, full face fashion for (*functional/cosmetic*) surgery of the brow and forehead. An appropriate time out and identification of the procedure was performed with all operating room personnel present. After verification of correct surgical site(s), local anesthetic consisting of _______ was injected into the area of incision in the scalp, and along the brow and glabellar region.

Attention was directed to the scalp markings, and an incision was made in standard fashion with a #10 blade moving from the top of the right ear to the top of the left ear. Incision depth extended to the level of the preperiosteum. (*Raney clips were applied at this time/gentile, judicious bipolar cautery was applied to control hemostasis*). Skin hooks were placed, and with gentle traction the forehead flap was elevated with sharp dissection being maintained in a preperiosteal plane. Both lateral conjoined tendons were released with blunt and sharp dissection. Once the conjoined tendons were released, elevation of the temporal portion of the forehead flap proceeded in a sub-superficial temporalis fascial plane. Care was taken to avoid injury to the facial nerve branch in this location. Once full flap elevation had been accomplished, exposure of the superior orbital rim was facilitated with incision of the periosteum. Sentinel vessels were identified laterally and cauterized as necessary. Both supraorbital neurovascular complexes were identified and the periosteum around them gently released. Further release of the periosteum was accomplished in the glabellar region.

Once adequate tissue release had been accomplished, attention was turned back to the original incision lines. A ___ mm resection of the flap was carried out along the entirety of the incision. The incision lines tapered laterally as approach was made towards the ear. _#_ *3-0 Prolene* sutures were used to anchor the forehead flap to the native periosteum/pericranium. Placement of these anchoring sutures was adjusted to produce the desired height and contour of the brow. A second subcutaneous layer of *4-0 Vicryl* sutures were used centrally to reapproximate the wound edges. Final scalp closure was accomplished with (*3-0 plain suture/staples*). Irrigation of operative wound sites was accomplished with sterile saline, and antibiotic ointment was placed along the incision line. Standard facial wrap compression bandages were applied to the forehead and scalp. The patient was then (*extubated and*) transferred to the recovery room in stable condition having tolerated the procedure well, without complication.

Chapter 126
Internal Lateral Browpexy

Larissa Ghadiali and Bryan Winn

Abstract Involutional brow ptosis is generally more pronounced in the lateral brow than the medial brow (Techniques in Ophthalmic Plastic Surgery, Philadelphia, 2010). Brow ptosis can become visually significant, restricting the superior and lateral field of vision. The internal lateral browpexy can be used to correct mild lateral brow ptosis through an eyelid crease incision (Colour Atlas of Ophthalmic Plastic Surgery, Boston, 2008). This procedure may be performed in combination with an upper eyelid blepharoplasty and browplasty without additional incisions (Plastic and Reconstructive Surgery 86:248–254, 1990). Moderate amounts of brow ptosis are better corrected with a direct, mid-forehead, pretrichial, or endoscopic brow lift (Colour Atlas of Ophthalmic Plastic Surgery, Boston, 2008).

Keywords Internal lateral browpexy • Transblepharoplasty browplasty • Brow ptosis • Browpexy • Lateral brow ptosis

Indications

The internal lateral browpexy is well suited for patients with mild amounts of lateral brow ptosis particularly in patients undergoing upper eyelid blepharoplasty [1–3].

Essential Steps

1. Mark the skin for blepharoplasty, the area of the lateral brow requiring lift, and the supraorbital notch
2. Infiltrate local anesthetic into the upper eyelid, internal lateral brow, and periosteum of the frontal bone below the superolateral brow
3. Make the eyelid crease incision (*perform an upper eyelid blepharoplasty*)

L. Ghadiali (✉) • B. Winn
Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA
e-mail: grovero.larissa@gmail.com; bjw15@cumc.columbia.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_126

4. Dissect through orbicularis muscle and sub-brow fat to expose frontal periosteum at the superior lateral orbital rim *(perform a browplasty)*
5. Secure the subcutaneous tissues of the brow to the frontal periosteum
6. Close the skin

Complications

Infection
Bleeding/hematoma
Pain
Poor cosmesis
Asymmetry
Overcorrection/undercorrection
Suture dehiscence/erosion

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) brow ptosis

Procedure: (*Right/Left/Bilateral*) internal lateral browpexy

Postoperative diagnosis: Same

Indication: This is a ___-year-old (*male/female*) with mild (*right/left/bilateral*) brow ptosis (*and upper eyelid dermatochalasis*) leading to obstruction of peripheral vision. A decision was made to proceed with internal browpexy, (*upper eyelid blepharoplasty, and browplasty*) to correct the mild brow ptosis (*and dermatochalasis*). The patient was informed of the risks, benefits, indications, and alternatives of the procedure and informed consent was obtained.

Description of the procedure: The patient was identified in the holding area and a marking pen was used to mark the operative eye(*s*). The upper eyelid crease was marked with a marking pen approximately _*9*_ mm above the margin (*using a skin pinch technique a conservative amount of skin to be excised during the blepharoplasty was determined*). The optimal vector for brow fixation was also determined and marked above the lateral brow. The patient was escorted into the operating suite and placed in the supine position. Tetracaine eye drops were instilled into both eyes. The patient's face was prepped and draped in the usual sterile fashion for oculoplastic surgery. IV sedation was administered by the anesthesia service. A surgical time out was performed in accordance with hospital policy, verifying the correct patient, procedure, site, positioning of the patient, special equipment, and safety precautions. The area of the upper eyelid, internal brow, and periosteum of the frontal bone superior to the lateral orbital rim was infiltrated with a 50/50 mixture of 2% lidocaine with epinephrine 1:100,000 and 0.5% Marcaine (*plain 2% lidocaine with epinephrine 1:100,000)* for local anesthesia. A corneal protective shield was placed in the eye(*s*).

A scratch incision was made along the skin of the eyelid crease (*and semilunar line above the crease*) with a Colorado tip needle on Bovie cautery (*#15 Bard-Parker blade*). (*The skin [and muscle] was removed with a Colorado tip needle on Bovie cautery [Westcott scissors]*). The lateral brow was pulled superiorly such that the wound was now above the orbital rim and dissection was carried out down through the orbicularis and sub-brow fat to find the plane between the periosteum and the deep galea aponeurotica of the sub-brow fat. Once this was found, a pocket was created with the Sayre periosteal elevator superior to the brow cilia to release the gliding plane. A *4-0 Prolene* suture was then passed through the brow from the skin into the pocket at the level of the lateral brow cilia to mark the planned brow fixation point. The suture was then passed in a mattress fashion through the periosteum approximately _*1*_ cm above the superolateral orbital rim and anchored to the deep galea aponeurica at the fixation point of the original percutaneous suture. The suture was tied down in a permanent fashion and anchored the brow into the normal anatomic position, correcting the preexisting ptosis. The eyelid crease (*blepharoplasty*) incision was then closed with interrupted *6-0 Prolene* sutures. The corneal shield was removed.

If procedure was performed bilaterally—*Antibiotic ointment was placed on the wound and the same procedure was then performed for the contralateral eye*.

Following the procedure, antibiotic ointment was placed in the eye and the patient was escorted to the postoperative care area, where (*she/he*) remained for approximately 45 min before being discharged to the care of a responsible adult.

References

1. Nerad JA. Techniques in ophthalmic plastic surgery. Philadelphia: Saunders Elsevier; 2010.
2. Tyers AG, Collin JR. Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier; 2008.
3. McCord CD, Doxanas MT. Browplasty and browpexy: an adjunct to blepharoplasty. Plast Reconstr Surg. 1990;86(2):248–54.

Chapter 127
Temporal Artery Biopsy

Daniel Straka and Craig N. Czyz

Abstract Giant cell arteritis (also known as temporal arteritis) is a condition that causes a granulomatous inflammation of medium to large-sized arteries. Patients most commonly present to the ophthalmologist due to acute or subacute vision loss often with headache. The vision loss occurs due to an ischemic optic neuropathy. The gold standard for diagnosis is a pathologic specimen showing the classic histological findings within the artery wall (transmural inflammatory infiltrate, giant cells, fragmented internal elastic lamina). The superficial temporal artery is the most common vessel affected and since it is surgically accessible it is frequently targeted for diagnostic purposes. A large specimen, generally 2–3 cm, should be obtained. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Temporal artery • Giant cell arteritis • Temporal • Arteritis • Optic neuropathy

Indications

The most common indication for a temporal artery biopsy is to diagnose giant cell arteritis (temporal arteritis). Patients can have a myriad of symptoms including headache, vision loss, diplopia, jaw claudication, myalgias, arthralgias, fever, and chills. The biopsy should be performed prior to, or as soon as possible after starting steroids or other immunosuppressants (<2 weeks) in order to reduce the risk of false negative results.

D. Straka (✉)
Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: dan.straka@gmail.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_127

Essential Steps

1. Preoperative marking of temporal artery with a surgical marking pen (*the location of the artery may be verified using a Doppler ultrasound*)
2. Administration of subcutaneous local anesthetic (*general or monitored anesthesia can be used*)
3. Incision with #15 Bard-Parker blade
4. Identification of the subcutaneous tissue plane and superficial temporalis fascia with blunt dissection
5. Isolation of the superficial temporal artery
6. Tying off the ends of the artery with silk suture
7. Harvesting the artery from the tissue bed
8. Hemostasis
9. Wound closure

Complications

– Hematoma
– Infection
– Frontal (temporal) branch of the CN VII palsy
– Scarring
– Hypoesthesia
– Alopecia

Template Operative Dictation

Preoperative diagnosis: (1) Giant cell arteritis (2) *Vision loss* (*right/left/bilateral*)

Procedure: Temporal artery biopsy (*right/left*) eye

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of *(bilateral/unilateral)* (*vision loss, headache, jaw claudication, optic ischemia, optic neuropathy*) suspicious for giant cell arteritis. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The *(right/left)* superficial temporal artery was palpated using digital pressure and marked with a surgical marking pen. (*A Doppler probe was used to confirm the location of the artery to be biopsied.*) The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ________ was injected into the planned incision site.

A #15 Bard-Parker blade was used to make an incision through the skin and subcutaneous tissue adjacent to the marked artery segment. Blunt, curved hemostats were used to carefully dissect through the subcutaneous tissue until the superficial temporalis fascia was identified. The superficial temporal artery was identified within the fascia and it was bluntly dissected free using the curved hemostats. Once approximately ___ cm of artery was exposed, the distal and proximal ends of the artery were tied off using two 4-0 silk sutures at each end. Westcott scissors and forceps were then used to dissect the artery from its bed. The specimen was then examined and measured to be ___ cm in length. The specimen was then sent for histologic examination. Hemostasis was obtained with *(mono/bipolar)* cautery. The wound was then closed with buried, subcutaneous interrupted *5-0 Vicryl* sutures followed by an (*interrupted/running*) *6-0 plain gut* sutures.

Antibiotic ointment was applied to the incision. The patient tolerated the procedure well, *(was awoken from general anesthesia)*, and was then taken to the recovery area in stable condition.

Chapter 128
Botulinum Toxin Treatment of Benign Essential Blepharospasm (BEB) and Hemifacial Spasm

Craig N. Czyz

Abstract Benign essential blepharospasm (BEB) and hemifacial spasm are two of the most common movement disorders that affect the face. The etiology of BEB is not known. The most likely etiology of hemifacial spasm is microvascular compression at the facial nerve root exit zone from the brainstem, or less commonly at its entry point into the internal auditory meatus. Botulinum toxin therapy is currently the most common treatment modality for both disorders. Botulinum toxin inhibits the release of acetylcholine at the neuromuscular junction. It should be noted that similar movement disorders can be pharmacologically produced with Levodopa and neuroleptic antipsychotic drugs, both acutely and after long-term therapy.

Keywords Blepharospasm • Hemifacial spasm • Botulinum • Neurotoxin • BEB

Indications

Patients who display involuntary facial movements that cannot be attributed to a pharmacologic agent, brain lesion, or reflex blepharospasm. Clinical findings in BEB patients may include excessive blinking, photophobia, persistent eye closure secondary to involuntary spasms, and/or contractions of the orbicularis oculi and surrounding muscles. A majority of blepharospasm patients also have involuntary movements of the paranasal muscles, mouth, and jaw. A subset of patients may display forceful contractions of the jaw, tongue, and chin thrusting consistent with oromandibular dystonia. Hemifacial spasm symptoms are characterized by unilateral intermittent clonic or tonic contractions of the muscles of facial expression supplied by the facial nerve. Patients should have been evaluated and deemed

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_128

appropriate for such surgical intervention. Contraindications to treatment include prior allergic reaction, injection into areas of inflammation, breast feeding, pregnancy category C, diseases of the neuromuscular junction, usage of aminoglycosides, and sensitivity to or concern for human blood products (albumin). Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. Per FDA regulations, a copy of the Medication Guide must be provided to the patient for review prior to treatment
2. *Administration of topical anesthetic*
3. Reconstitute botulinum in vial to desired concentration with unpreserved, sterile saline
4. Mark injection sites with patient in seated, upright position
5. *Prep skin with desired antibacterial agent*
6. Inject at desired locations at a 45° angle with a 1 cm^3 syringe and 30 gauge needle
7. Apply pressure if ecchymosis develops
8. Document units injected per site, type of botulinum injected, lot number of botulinum vial(s) used, and response/reactions to previous treatments

Complications

– Hemorrhage/hematoma
– Infection
– Ecchymosis
– Asymmetry
– Ectropion
– Eyelid ptosis
– Eyelid retraction
– Brow ptosis
– Brow retraction
– Lagophthalmos
– Dry eye syndrome
– Corneal exposure
– Epiphora
– Diplopia
– Lip droop
– Drooling
– Swallowing difficulty
– Difficulty maintaining head position

Template Operative Dictation

Preoperative diagnosis: (1) Benign Essential Blepharospasm (2) Hemifacial Spasm (*right/left*)

Procedure: Botulinum toxin injections

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) had developed _____ (*list symptoms from above*) over the past ____ (*months/years*) and on clinical evaluation was found to have uncontrolled facial movements consistent with (*Benign essential blepharospasm/Hemifacial spasm*). A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. The patient was given the Medication Guide for (*type of botulinum used*) to review. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified and marked with a surgical marking pen with the patient seated upright in the treatment chair. (*Topical anesthetic consisting of ___ was applied to the injection areas*). The patient's face was then prepped with (*alcohol/betadine/other*).

The (*type of botulinum*) was reconstituted with ____ mL of unpreserved, sterile saline per vial, lot numbers: _____. Using an 18 gauge needle, the botulinum was drawn into a 1 cm^3 syringe. A 30 gauge needle was then placed on the syringe for patient injection. Each previously marked site was injected at a 45° angle with the needle positioned (*intramuscularly/immediately superior to the muscle*). (*Pressure was applied to (area) as ecchymosis developed following injection*). A total of ___ units of botulinum was injected at the sites as depicted in the diagram. (*If unable to produce a diagram due to the limitations of the medical records system, then you will need to list each injection site and the number of units injected at each*).

The patient tolerated the procedure well and left the office in stable condition.

Chapter 129
Optic Nerve Sheath Fenestration

Scott Forman and Eric D. Rosenberg

Abstract In patients with idiopathic intracranial hypertension (IIH), papilledema, elevated intracranial pressure secondary to disease elsewhere in the body with progressive vision loss despite medical management, optic nerve sheath fenestration may be employed to help relieve the elevated intracranial pressure. In this procedure, incision(s) are made into the meninges surrounding the optic nerve in order to relieve elevated intracranial pressure. The effect of surgery is usually limited to the ipsilateral optic nerve, but the procedure has been shown to have a "filtration effect" in some cases, where there is observed improvement in headaches and contralateral disc edema as well.

Keywords Optic nerve sheath • Fenestration • Optic nerve • Papilledema • Pseudotumor • Intracranial hypertension • IIH • Orbit

Indications

Elevated intracranial pressure, papilledema due to idiopathic intracranial hypertension (pseudotumor cerebri) with rapid and progressive visual loss, optic nerve sheath hemorrhage or traumatic optic neuropathy, cryptococcal meningitis with papilledema, intracranial breast cancer metastases with papilledema, radiation induced optic neuropathy, post decompression blindness.

Essential Steps

1. 360° peritomy
2. Medial rectus isolation and division
3. Lateral retraction of the globe
4. Access to the intraconal space

S. Forman (✉)
Department of Ophthalmology, Westchester Medical Center, Valhalla, NY, USA
e-mail: Neurovision@optonline.net; opticnerve22@gmail.com

E.D. Rosenberg
Department of Ophthalmology, New York Medical College, Valhalla, NY, USA
e-mail: Rosenberg@alumni.upenn.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_129

5. Identification of the optic nerve
6. Fenestration of the optic nerve sheath
7. CSF gush visualization
8. Lysis of subarachnoid adhesions
9. Reapproximation of medial rectus
10. Closure of peritomy

Complications

– Retrobulbar hematoma
– Transient lateral rectus palsy
– Temporary motility disorders
– Pupillary dysfunction
– Transient visual loss
– Central retinal artery occlusion
– Retinal ischemia
– Over/under filtration of the CSF
– Damage to the long ciliary bundle

Template Operative Dictation

Preoperative diagnosis: *Pseudotumor cerebri with rapidly progressive visual loss (OD/OS)*

Procedure: Optic nerve sheath fenestration *(OD/OS)*

Postoperative diagnosis: *Same*

Indication: This is a ____-year-old *male/female* who had presented with pseudotumor cerebri diagnosed approximately _____ *months/years* earlier, and has subsequently developed progressive visual loss. Despite extensive medical therapies, the symptoms continued to worsen. After a detailed review of risks, benefits, and alternatives, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. After proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, general anesthesia was induced. The *(right/left)* eye was prepped and draped in the usual sterile fashion.

[Choose one]
If transconjunctival approach*—An eyelid speculum was placed in the eye. A 360° peritomy was carried out, and blunt dissection under tenons capsule was performed. The medial rectus muscle was then isolated with a hook. A double arm __-0 vicryl*

suture was imbricated at approximately ___ mm from the distal insertion site of the muscle, in a double whiplock fashion keeping the needles attached. The muscle was then disinserted from its attachment with a Westcott scissors at approximately ___ mm from the insertion site, leaving behind a stump of medial rectus muscle. The proximal muscle, medial bulbar conjunctiva, and tenon's capsule were all retracted medially by the assistant, and held in place by a platinum spatula. A __-0 dacron suture was then passed through the cut stump of the medial rectus with partial thickness bites of scleral in a continuous running fashion. The sutures were cut long to allow for appropriate manipulation, and the globe was retracted laterally. This maneuver exposed the medial orbital intraconal space, and the long ciliary nerve bundle was identified. Cotton tipped applicators were used to displace the orbital fat so that the optic nerve could be visualized.

If medial upper eyelid approach*—and using a marking pen the medial upper eye lid incision was outlined. Using a 15 blade, a full thickness linear incision was made over the previously marked area. The orbicularis muscle and the orbital septum were similarly divided in order to gain access to the intraconal space. Blunt dissection medial to the levator muscle using curved tenotomy scissors enabled for access into posterior medial intraconal space.*

At this time all necessary retractors were placed for adequate exposure, cottonoids attached to sutures were also used to assist in moving the orbital fat, and the operating microscope was centered over the (*right/left*) eye. The posterior ciliary arteries were visualized and avoided. After an avascular zone on the nerve was visualized, a diamond knife was used to make a ___ mm longitudinal opening in the dura until cerebrospinal fluid emanating from the wound was visualized. A (*small neurosurgical/sinskey*) hook was gently placed under the dura and moved slowly around the opening to lyse arachnoid trabeculations and subarachnoid adhesions and thereby expanding the incision. Every ____ (*seconds/minutes*) during the dissection, the lateral retraction of the globe was released slowly for ___ (*seconds/minutes*) to prevent excess stretch on the optic nerve. BSS was applied liberally to the cornea throughout the procedure. No lateral pupillary dilation was noted during the case. The operative site was checked carefully for any bleeding, and the cotton tipped applicators and cottonoids were removed.

[Choose one]

If transconjunctival approach*—The globe was returned to anatomical position, and the dacron suture was gently removed from the medial rectus stump. The medial rectus was reattached to the globe by passing the previously imbricated double armed ___-0 vicryl suture through the globe at the muscle stump and angled toward one another and the ends were tied. Careful attention was paid to ensure that the muscle was well attached at its previous location, and that it was not twisted. The bulbar conjunctiva was reapproximated using ___-0 gut suture. The eyelid speculum was removed carefully.* ***If medial upper eyelid approach****—The orbicularis muscle and the orbital septum were closed with __-0 Vicryl suture in an interrupted fashion. The skin was closed using a __-0 monocryl running suture.*

Antibiotic ointment was applied and a light patch was placed over the *(right/left)* eye. Intravenous Vancomycin was administered perioperatively. The patient was awoken, the endotracheal tube removed, and the patient was transferred to the post-anesthesia care unit in stable condition.

Chapter 130
Hughes Tarsoconjunctival Flap 1

Ashley Crane, Benjamin Erickson, and Wendy W. Lee

Abstract Patients should be evaluated and deemed appropriate for such surgical intervention. Patients with large margin-involving lower lid defects are candidates for this procedure. The choice of technique for eyelid reconstruction should be discussed with the patient and the appropriate procedure tailored to the individual patient's needs and anatomy. Patients should be educated about the risks and benefits of the procedure and those pertaining to any appropriate alternatives. Hughes flaps result in functional closure of the eye for 3–6 weeks before a second stage is performed to sever the conjunctival flap. From a reconstructive perspective it is advantageous to have independent blood supplies to both the anterior and posterior eyelid lamella, but temporary closure may not be appropriate for monocular patients or children at risk of amblyopia. In such cases, consideration should be given to a Tenzel flap, a sliding tarsoconjunctival flap for smaller horizontal defects, or to a free tarsal graft for larger defects.

Keywords Hughes flap • Tarsoconjunctival flap • Lower eyelid defect • Lower eyelid reconstruction • Marginal lid defect • Mohs reconstruction

Indications

The patient had a large (>50 %) margin-involving lower eyelid defect due to *trauma/neoplasm*.

A. Crane (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ACrane@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_130

Essential Steps

1. Transfer patient to operating room
2. Measure lower lid defect
3. Subcutaneous infiltration of local anesthetic
4. Dissect tarsoconjunctival flap
5. Transpose flap into the defect
6. Prepare host site
7. Suture flap in place
8. Measure anterior lamellar defect
9. Mark and undermine myocutaneous graft
10. Transpose and suture myocutaneous graft

Complications

– Infection
– Bleeding/hematoma
– Pain
– Poor cosmesis
– Visible scarring
– Madarosis (no lashes in reconstructed lid segment)
– Asymmetry
– Exposed suture
– Need for further procedures
– Retrobulbar hemorrhage
– Postoperative dry eye
– Corneal trauma
– Lower lid retraction and lagophthalmos

Template Operative Dictation

Preoperative diagnosis: (*Right/Left*) lower eyelid defect secondary to (*trauma/neoplasm)*

Procedure: (*Right/Left*) Hughes tarsoconjunctival flap with myocutaneous advancement flap

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) has a large (>50 %) margin-involving lower eyelid defect secondary to *trauma/neoplasm*. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, lagophthalmos, scarring, poor cosmesis, postoperative dry eye symptoms, asymmetry, corneal trauma, and need for further procedures. Afterwards, the patient requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient was brought to the operating room where the (*right/left*) eye, adnexal structures, and face were sterilized with 5 % betadine ophthalmic solution. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, sites, surgery, and any known drug allergies.

Attention was drawn to the (*right/left*) lower eyelid defect. The upper and lower eyelids were infiltrated transconjunctivally and subcutaneously with 2 % lidocaine with epinephrine (1:100,000). The nasal and temporal lower lid remnants were grasped with toothed forces and brought together using gentle tension. The resulting horizontal defect was measured with Castroviejo forceps. The upper lid was then clamped and everted using an extra large chalazion clamp.

The previously measured horizontal dimension was transposed onto the tarsal surface using a surgical marking pen. A 4 mm strip of residual tarsus was then marked along the posterior lid margin to prevent postoperative eyelid instability. This horizontal incision was a then initiated with a #15 Bard Parker blade and completed with Westcott scissors. The marked edges of the donor tarsus were then incised perpendicularly, and epitarsal tissue was dissected off of the anterior surface using the scissor tips. These incisions were extended into the forniceal conjunctiva on both sides, creating a vascularized pedicle. Muller's muscle was then gently dissected off the conjunctival surface and recessed using the scissor tips.

Once the tarsoconjunctival flap was fully formed, it was transposed into the lower lid defect. Skin and muscle of the nasal and temporal lower remnants was then sharply dissected off of the underlying tarsus. The lower lid retractors were also dissected free from the anterior lid tissues to complete preparation of the host site. The tarsal margins of the Hughes flap were then anchored to the adjacent lower lid tarsal remnants with interrupted lamellar passes of *5-0 Vicryl* suture. The inferior border of the Hughes flap was then approximated to the lid retractors with running *7-0 Vicryl* suture.

Attention was then directed to elevating the myocutaneous flap for reconstruction of the anterior eyelid lamella. *(Insert relevant details for construction of appropriate flap: e.g., Mustarde flap, unipedicle transposition flap from the upper lid, lower lid blepharoplasty flap with suborbicularis oculi fat (SOOF) lift)*. The myocutaneous flap was then transposed to cover the anterior lamellar defect of the lower eyelid. Deep closure was achieved with buried, interrupted *5-0 Vicryl* sutures. The graft was secured to adjacent tissues at critical points with interrupted *7-0 Vicryl* sutures. Full closure was then achieved with a running *7-0 Vicryl* suture. The superior edge of the myocutaneous flap was then secured to the Hughes flap with _#_ interrupted vertical mattress sutures, incorporating lamellar bites of tarsus.

Antibiotic ophthalmic ointment was then applied to the surgical site. A pressure dressing was applied which was to be left in place until the next visit. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition and will be seen in the oculoplastics clinic in 1 week. The patient was instructed to apply frequent ice packs to the eyelids for 48 h, and abstain from heavy lifting, straining, or use of blood thinners. The patient was instructed to return to the emergency room immediately if any severe pain developed.

Chapter 131
Hughes Tarsoconjunctival Flap 2

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Eyelid reconstruction • Tarsoconjunctival flap • Skin graft • Hughes • Full-thickness defects

Indications

Full-thickness defects of the lower eyelid greater than 50 % of the horizontal lid length. The procedure can be used in cases of primary or secondary repair. The flap provides posterior lamellar replacement with a vascular supply. An anterior lamella replacement is also required and usually consists of a full-thickness skin graft.

Essential Steps

1. Administration of topical anesthetic and local anesthetic.
2. Corneal shield placement.
3. Measure lid defect with calipers.
4. Place a traction suture in the upper lid margin and evert the lid.
5. Mark the desired graft width on the conjunctiva overlying the tarsus (be sure to leave at least 4 mm of tarsus from the lid margin).
6. Incise the conjunctiva and tarsus.
7. Use Wescott scissors to dissect the tarsus and conjunctiva towards the superior fornix.
8. Advance the flap into the lower lid defect and suture the tarsus to the remaining posterior lamella.
9. Remove the corneal shield before completely suturing posterior lamella in place.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_131

10. Repair the anterior lamella.
11. Close graft site if FTSG used for anterior lamella replacement.
12. Four to six weeks later perform stage 2 of procedure.

Complications

- Hemorrhage
- Infection
- Wound dehiscence
- Scarring/lid notching
- Entropion
- Epithelialization of lid margin
- Graft failure
- Flap failure

Template Operative Dictation

Preoperative diagnosis: Eyelid defect (≥50)% secondary to ________ on the *(right/left) lower eyelid*

Procedure—*if stage 1*: (1) Stage 1—Reconstruction of lower eyelid, full-thickenss with tarsoconjunctival flap (*right/left*) (2) full-thickness skin graft (*right/left*)

Procedure—*if stage 2*: Stage 2—Reconstruction of lower eyelid, full-thickness with transconjunctival flap (*right/left*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old _____ (*race*) (*male/female*) had developed a *(right/left)* lower eyelid lesion over the past ____ (*months/years*) and on clinical evaluation was found to have a (*lesion of unknown origin/basal cell carcinoma/*_______). A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, Proparacaine was placed into the *(right/left)* eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________ was injected into the (*right/left*) upper and lower eyelid. A corneal shield was placed in the *(right/left)* eye.

Enter dictation for procedure causing lid defect if repair is being done primarily. The above paragraph may also need to be modified to reflect the excisional portion of the procedure.

[Choose one]:

If Stage 1—Calipers were used to measure the horizontal length of the (*right/left*) lower eyelid defect. A *4-0 silk* traction suture was placed through the lash line of the (right/left) upper lid. The lid was then everted over a Desmarres retractor. Calipers were used to measure 4 mm from the upper lid margin where the tarsus was marked. It was then marked horizontally for ___ mm. A #15 Bard-Parker blade was used to incise the tarsus. The dissection was continued toward the superior fornix with 0.5 Castroviejo forceps and Westcott scissors. Vertical incisions were placed in the conjunctiva to complete flap formation. Hemostatis was maintained with with (*mono/bipolar*) cautery (*on a Colorado needle tip*). The tarsal conjunctival flap was then advanced into the defect of the lower eyelid. The tarsal graft portion of the flap was sutured to the medial and lateral tarsus of the lid with 6-0 *Vicryl suture* on a spatulated needle. The corneal shield was then removed. The inferior aspect of the graft was secured to the remaining conjunctiva with *6-0 Vicryl* suture.

The anterior lamellar defect was measured with calipers. A ___×___ mm full-thickness skin graft was outlined on the ____ (*site*). The graft was excised using a #15 Bard-Parker blade and Westcott scissors. Extraneous subcutaneous tissue was removed from the dermis surface of the graft. The graft was then placed in a saline soaked surgical sponge. The skin edges of the donor site were then undermined and the site was closed (*in a running fashion with 5-0 chromic gut suture/______*).

The graft was then placed into the anterior lamellar defect of (*right/left*) lower eyelid. The graft was secured at the poles with *6-0 simple*, interrupted *Vicryl* sutures. Simple, interrupted *6-0 plain gut* sutures where then placed between the Vicryl sutures.

Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

If Stage 2—Attention was turned to the (*right/left*) lower lid where Wescott scissors were used to incise the tarsoconjunctival flap at the lid margin leaving a slight redundancy of conjunctiva. (*The conjunctiva was then contoured to the desired proportions with Wescott scissors*). The remaining portion of the flap was excised at the tarsal plate of the upper lid using (*Wescott scissors/cutting cautery*).

Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye. The patient tolerated the procedure.

Chapter 132
Free Tarsal Graft

Craig N. Czyz

Abstract The procedure can be used in cases of primary or secondary repair as an alternative to the Hughes or Tenzel type flaps. The graft is usually harvested from the contralateral upper eyelid. The free tarsal graft provides posterior lamellar replacement without a vascular supply. An anterior lamella replacement consisting of a vascularized flap is required to cover the graft.

Keywords Eyelid reconstruction • Tarsus • Graft • Free tarsal graft • Posterior lamellar replacement

Indications

Full-thickness defects of the upper or lower eyelid greater than 50 % of the horizontal lid length. There should be adequate vascularized anterior lamella to cover the graft. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. Administration of topical and local anesthetic with either general or monitored anesthesia.
2. Corneal shield placement.
3. Measure lid defect with calipers.
4. Place a traction suture in the contralateral upper lid margin and evert the lid.
5. Mark the desired graft width on the conjunctiva overlying the tarsus (be sure to leave a minimum of 4 mm of tarsus from the lid margin).
6. Incise the conjunctiva and tarsus.
7. Use Westcott scissors to dissect the tarsus from the conjunctiva superiorly.
8. Suture the free tarsus to the remaining posterior lamella.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_132

9. Repair the anterior lamella with a vascularized flap.
10. Remove the corneal shield.

Complications

- Hemorrhage
- Infection
- Wound dehiscence
- Scarring/lid notching
- Entropion
- Epithelialization of lid margin
- Graft failure
- Flap failure

Template Operative Dictation

Preoperative diagnosis: Eyelid defect >50 % *(right/left) (upper/lower)* eyelid

Procedure: (1) Reconstruction of *(right/left) (upper/lower)* eyelid, full-thickness free tarsal graft, and (2) Skin-muscle flap

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*race*) (*male/female*) had developed a *(right/left)* (*upper/lower*) eyelid lesion over the past ____ (*months/years*) and on clinical evaluation was found to have a (*lesion of unknown origin/basal cell carcinoma/*_______). A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic consisting of Proparacaine placed into the *(right/left)* eye. The patient was then prepped and draped in the usual sterile, full-face oculofacial plastic fashion. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic consisting of ________ was injected into the (*right/left*) upper and lower eyelid. A corneal shield was placed in the *(right/left)* eye.

[*Choose One*]:

If the repair is being done primarily—*Enter dictation for procedure causing lid defect. The above paragraph may also need to be modified to reflect the excisional portion of the procedure.*

If reconstruction is secondary—*continue with below.*

Calipers were used to measure the horizontal length of the (*right/left*) (*upper/lower*) eyelid defect. A *4-0 silk* traction suture was placed through the lash line of the contralateral upper lid. The lid was then everted over a Desmarres retractor. Calipers were used to measure _*4*_ mm from the upper lid margin where the tarsus was marked. It was then marked horizontally for ___ mm. A #15 Bard-Parker blade was used to incise the tarsus. The dissection was continued toward the superior fornix with 0.5 Castroviejo forceps and Westcott scissors. Once the superior border of the tarsus was reached, it was dissected free from the conjunctiva. The tarsal graft was then placed in the defect and sutured to the medial and lateral tarsus of the lid with *6-0 Vicryl* suture on a spatulated needle. The inferior aspect of the graft was secured to the remaining conjunctiva with *6-0 Vicryl* suture.

The anterior lamellar defect was measured with calipers. A ___×___ mm (*advancement flap/sliding flap/rotational flap*) was fashioned (*adjacent/medial/lateral/superior/inferior*)______ to the defect. The flap was then (*advanced/rotated*) into the anterior lamellar defect of (*left/right*) *(upper/lower*) eyelid. The graft was secured at the poles with (*5/6*)-0 buried, interrupted *Vicryl* sutures. Simple, interrupted *6-0 plain gut* sutures where then used to reapproximate the skin edges.

Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 133
Anterior Lamellar Repositioning

Alanna S. Nattis

Abstract Eyelid malposition leading to entropion has many etiologies, and may be involutional, congenital, cicatricial, or spastic. In this condition, there is a relative lack of posterior lamellar lid tissue (tarsus, conjunctiva, eyelid retractors) in comparison with anterior lamellae of the skin and orbicularis. This results in the apparent turning-in of the eyelid and its sequelae, such as trichiasis, corneal abrasion, corneal decompensation, corneal ulcer, and patient discomfort. By repositioning the anterior lamellae of the eyelid, the ophthalmologist attempts to reestablish the normal eyelid anatomy, therefore "turning the lid outward" into its usual position.

Keywords Entropion • Eyelid malposition • Lamellae • Repositioning • Lid retractors • Orbicularis

Indications

Cicatricial, involutional, spastic, or congenital entropion of the causing epiphora, ocular irritation, exposure keratitis, or cosmesis.

Essential Steps

1. Exam under anesthesia
2. Corneal shield application
3. Identification of the gray line
4. Marginal lid split
5. Skin muscle flap with recession of anterior lamella
6. Fixation of recessed anterior lamella relative to the posterior lamella
7. Suture attachment of the lash line

Complications

– Madarosis
– Persistent abnormal lid appearance

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_133

– Recurrence of entropion
– Overcorrection
– Granuloma formation
– Ischemia of the lid margin
– Defective lid closure

Template Operative Dictation

Preoperative diagnosis: (*Cicatricial, involutional, spastic, or congenital*) entropion *(OS/OD/OU)*

Procedure: Anterior lamella repositioning *(OD/OS/OU)*

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* had developed a symptomatic entropion over the past _____ *months/years,* and on workup was found to have a grade (*0, 1, 2, 3, or 4*) entropion, likely caused by an (*cicatricial, involutional, spastic, or congenital)* etiology. After a detailed review of risks and benefits, the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the holding area, and the *(right/left)* eye was marked with a marking pen. The patient was brought into the OR on an eye stretcher in the supine position. Before a proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, intravenous sedation was administered and local anesthetic was injected in the standard fashion along the eyelid(s) using ____ mL of ___ % lidocaine (1:100,000) and 0.5 % marcaine in a 50:50 mix. The *(right/left/bilateral)* eye(s) was prepped and draped in the usual sterile fashion. The lid was everted using a *4-0 silk* traction suture placed horizontally through the lid margin, and ____ mL of local anesthetic was injected into the subconjunctival space. After identification of the meibomian orifices, an incision was carried out along the entirety of the gray line from nasal to temporal.

[Choose One]

Upper lid*—Westcott scissors were then used to dissect the entire lash line off of the tarsal surface. Upon reaching the superior tarsus, a sub-muscular plane and subseptal plane were carried out along the conjunctiva over the levator surface in order to recess the anterior lamella relative to the posterior lamella.*

Lower lid*—Westcott scissors were then used to dissect the entire lash line off of the tarsal surface. Upon reaching the inferior tarsus, a sub-muscular plane and subseptal plane were carried out along the conjunctiva over the lower lid retractors surface in order to recess the anterior lamella relative to the posterior lamella.*

Hemostasis was achieved using a Colorado needle in combination with antibiotic irrigation. Any loose follicles were dissected off of the posterior lamella with a #11 blade. The anterior lamella was recessed leaving a __×__ mm bare area in the tarsal plane inferiorly. _#_ double arm *4-0 chromic* sutures were passed in the superior fornix in a double arm fashion, and the anterior lamella was advanced relatively posteriorly and then (*superiorly/inferiorly*) and sutured into place high up in the fornix. The lash line was then sutured to the posterior lamella with partial thickness, using _#_ double arm *5-0 chromic* sutures, fixing and recessing the lash line to the posterior lamella leaving at least __×__ mm of bare eyelid. Traction suture was then removed. The surgical field was then irrigated with copious antibiotic solution. Bacitracin was applied to the (right/left/bilateral) eye(s) in addition to areas of exposed suture, and on the bare portion of the eyelid. A dressing was applied and the patient was transferred to the post-anesthesia care unit in stable condition.

Chapter 134
Tenzel Semicircular Flap

Ashley Crane, Benjamin Erickson, and Wendy W. Lee

Abstract Patients should be evaluated and deemed appropriate for such surgical intervention. Smaller eyelid defects can be repaired using direct closure with or without canthotomy and cantholysis. Larger defects may require more elaborate surgical techniques such a Hughes tarsoconjunctival flap with an independently rotated myocutaneous flap for anterior lamellar reconstruction. Patients with moderate-sized upper or lower lid defects are ideal candidates for this procedure, though some surgeons extend the application to significantly larger defects, particularly in those who would not be good candidates for an eyelid sharing procedure (monocular patients and children at risk of amblyopia). An additional advantage of the Tenzel flap is that any remaining temporal eyelashes are transposed centrally, minimizing the potential cosmetic penalty of surgical madarosis. The choice of technique for eyelid reconstruction should be discussed with the patient once the size of the defect is known and the appropriate procedure tailored to the individual patient's needs and anatomy. Patients should be educated about the risks and benefits of the procedure as well as about any alternatives.

Keywords Tenzel flap • Semicircular flap • Eyelid defect • Eyelid reconstruction • Marginal lid defect

Indications

The patient had a moderate (25–50 %) (*upper/lower*) eyelid defect due to (*trauma/neoplasm*).

A. Crane (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ACrane@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_134

Essential Steps

1. Transfer patient to operating room
2. Measure eyelid lid defect
3. Semicircular flap marked
4. Flap incised and dissected
5. Lateral canthotomy performed
6. Posterior lamellar reconstructed with periosteal flap (optional)
7. Full thickness eyelid defect closed
8. Flap closure

Complications

– Infection
– Bleeding/hematoma
– Pain
– Poor cosmesis
– Visible scarring
– Asymmetry
– Need for further procedures
– Retrobulbar hemorrhage
– Postoperative dry eye
– Corneal trauma
– Lagophthalmos

Template Operative Dictation

Preoperative diagnosis: (*Right/Left*) (*upper/lower*) eyelid defect secondary to (*trauma/neoplasm)*

Procedure: (*Right/Left*) (*upper/lower*) Tenzel semicircular flap

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) has an (*upper/lower*) eyelid defect constituting __ % of the horizontal dimension, secondary to *trauma/neoplasm*. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for infection, bleeding, pain, lagophthalmos, scarring, poor cosmesis, postoperative dry eye symptoms, asymmetry, corneal trauma, and need for further procedures. Afterwards, the patient requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient was brought to the operating room where the (*right/left*) eye, adnexal structures, and face were sterilized with 5 % betadine ophthalmic solution. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, correct sites, correct surgery, and any known drug allergies.

Attention was drawn to the (*right/left*) (*upper/lower*) eyelid defect. The nasal and temporal lower lid remnants were grasped with toothed forces and brought together using gentle tension. The resulting horizontal defect was not amenable to primary closure with canthotomy and cantholysis alone. Accordingly, a semicircular flap was marked approximately 2 cm vertically and horizontally from the lateral canthus, with the apex of the marking extending (*superiorly—for lower lid defects/ inferiorly—for upper lid defects*). The subcutaneous tissues underlying the semicircular flap and the eyelid remnants adjacent to the defect were infiltrated with 2 % lidocaine with epinephrine (1:100,000).

An incision was made through the skin and underlying orbicularis muscle along the previously created marking, and a myocutaneous flap was elevated. Westcott scissors were used to perform a lateral canthotomy, which was extended into the previously created incision. The cut margin of the lower lid was then elevated with forceps and the scissor tips were pointed towards the ipsilateral nasal ala and used to strum the inferior crus of the lateral canthal tendon. Once identified, the (*inferior—for lower lid defects/superior—for upper lid defects*) cantholysis was performed. The completed Tenzel flap was then rotated (*superiorly—for upper lid defects/ inferiorly—for lower lid defects*) into the eyelid defect.

If reconstruction of the posterior lamellar tissues was performed*—The lateral orbital rim periosteum was exposed with a Freer elevator. A periosteal flap, hinged at the lateral orbital rim, was then outlined with a surgical marking pen. The previously marked incisions were then completed with a #15 Bard Parker blade. The flap was then elevated from the underlying bone and reflected into the temporal lower lid defect in order to recreate the absent posterior lamellar tissues. It was anchored to the temporal tarsal margin of the Tenzel flap using lamellar passes of 5-0 vicryl suture.*

Attention was then redirected to the eyelid defect, where a *5-0 silk* suture was placed through the Meibomian gland orifices on either side of the defect in a vertical mattress fashion and clipped to the drape. The orbicularis muscle was then bluntly dissected for 2–3 mm on either side of the incision in order to expose the underlying tarsal plate. _#_ *interrupted 5-0 Vicryl* sutures were then passed through the cut edges of the tarsal plate in lamellar fashion. The *silk* lid margin suture was then tied and the ends left long. The lamellar *Vicryl sutures* were then tied and trimmed. The lash margin and skin were then closed with *interrupted 7-0 Vicryl* sutures, and the tails of the silk suture were incorporated to prevent corneal contact. The flap was then closed with deep *6-0 Vicryl* sutures and superficial *6-0 nylon* sutures.

Antibiotic ophthalmic ointment was then applied to the surgical site. A pressure dressing was applied which was to be left in place until the next visit. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was then taken to the recovery room in stable condition and will be seen in the oculoplastics clinic in ___ week(s).

Chapter 135
O-to-Z Plasty

Larissa Ghadiali and Bryan Winn

Abstract The O-to-Z plasty, devised by Marvin Quickert, is a rotational flap, which can be used in the reconstruction of the anterior lamella of a lower eyelid or medial canthus after tumor excision or trauma. In this procedure, a circular defect is repaired by forming two triangular rotational skin flaps along normal tension lines and aligning them in a diagonal fashion to create a Z closure (Colour Atlas of Ophthalmic Plastic Surgery, Boston, 2008). This technique minimizes vertical tension which could lead to lower lid retraction or ectropion. The procedure requires mild to moderate laxity of the eyelid skin and is best suited for small- to medium-sized defects of the lower eyelid or medial canthus. This procedure is not suited for defects involving the eyelid margin, tarsus, or lacrimal drainage system.

Keywords Mohs reconstruction • Eyelid reconstruction • Anterior lamella defect • O-to-Z-plasty • Eyelid defect

Indications

Reconstruction of the anterior lamella in the lower eyelid or medial canthus in cases of circular or oval defects not involving the eyelid margin, tarsus, or lacrimal drainage system.

Essential Steps

1. Mark the skin.
2. Infiltrate local anesthetic at the lower eyelid (*medial canthus*).
3. Create two triangular skin flaps.
4. Close the skin.

L. Ghadiali (✉) B. Winn
Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA
e-mail: grover.larissa@gmail.com; bjw15@cumc.columbia.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_135

Complications

- Infection
- Bleeding/hematoma
- Pain
- Poor cosmesis
- Corneal abrasion
- Suture dehiscence/erosion
- Tissue necrosis

Template Operative Dictation

Preoperative diagnosis: (*Right/Left*) (*lower eyelid/medial canthal*) defect

Procedure: (*Right/Left*) lower eyelid O-to-Z plasty

Postoperative diagnosis: Same

Indication: This is a ___-year-old (*male/female*) with a (*circular/oval*) (*lower eyelid/medial canthal*) defect following Mohs surgery (*tumor excision, trauma).* The defect measures approximately ___ cm × ___ cm and involves only the skin (*and orbicularis muscle*). The eyelid margin, tarsus, and lacrimal drainage system were left intact. The patient was informed of the risks, benefits, indications, and alternatives of the procedure and informed consent was obtained.

Description of the procedure: The patient was identified in the holding area and a marking pen was used to mark the operative eye. The patient was escorted into the operating suite and placed in the supine position. Tetracaine eye drops were instilled into the operative eye. The patient's face was prepped and draped in the usual sterile manner for oculoplastic surgery. IV sedation was administered by the anesthesia service. A surgical time out was performed in accordance with hospital policy, verifying the correct patient, procedure, site, positioning of the patient, special equipment, and safety precautions. The area of the lower eyelid was infiltrated subcutaneously with a 50/50 mixture of 2 % lidocaine with epinephrine 1:100,000 and 0.5 % Marcaine (*plain 2 % lidocaine with epinephrine 1:100,000)* for local anesthesia. A corneal protective shield was placed in the eye.

Given the size and location of the defect, the decision was made to close the defect using local advancement flaps in an O-to-Z fashion. A marking pen was used to mark a line in a subciliary position at the superior edge of the wound along the lateral lower eyelid *(extending past the canthus).* A second line was drawn extending medially in a curvilinear fashion from the inferior most aspect of the wound along the relaxed tension lines of the eyelid. Using Westcott scissors, skin flaps along the lower eyelid both lateral and medial to the wound were elevated and released from the underlying orbicularis muscle.

The lateral flap was approximately __ cm in horizontal width and __ cm in vertical height and was advanced into the superomedial corner of the defect and anchored to the adjacent tissue with a *6-0 Prolene* suture. Similarly, the medial flap measuring approximately __ cm in horizontal width and __ cm in vertical height was advanced into the inferolateral corner of the wound and anchored with a *6-0 Prolene* suture. Interrupted *6-0 Prolene* sutures were used to close the remainder of the wound. At the conclusion of the procedure, there was no ectropion of the lower eyelid and the wound was completely closed.

Following the procedure, the corneal shield was removed and the patient's face was cleaned. Antibiotic ointment was placed on the wound and in the eye and the patient was then escorted to the postoperative care area, where they remained for approximately 45 min before being discharged to the care of a responsible adult.

Reference

1. Tyers AG, Collin JR. Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier; 2008.

Chapter 136
Glabellar Flap

Larissa Ghadiali and Bryan Winn

Abstract Defects of the medial canthus and nose can occur due to trauma, congenital anomalies, or as a result of tumor resection. Reconstruction of this area is challenging due to a lack of adjacent mobile tissue and lack of tissue similar in color, texture, and thickness (Facial Plastic Surgery Clinics 19: 113–122, 2011; Ophthalmologica 220: 368–371, 2006; Eye 86: 597–605, 2000). Whenever possible, local flaps are preferred over free skin grafts. The glabellar flap can be used by itself or in combination with other procedures to reconstruct the medial canthus. Other options for medial canthal reconstruction include a bilobed flap, rhomboid flap, and full-thickness skin graft (Eye 86: 597–605, 2000; Colour atlas of ophthalmic plastic surgery, Boston, 2008). The glabellar flap is most appropriate for medial canthal defects that do not extend far into the eyelid, cheek, or nose region (Eye 86: 597–605, 2000). Patients with a continuous brow are poor candidates for this procedure as well. Furthermore, this procedure is generally not used in young patients as moderate skin laxity is required for this procedure (Colour atlas of ophthalmic plastic surgery, Boston, 2008). When assessing a patient with a medial canthal defect, the lacrimal drainage apparatus must be examined. Reconstruction of the lacrimal drainage apparatus will not be addressed here. In the glabellar flap operation, an inverted V is created in the glabellar region and the glabellar tissue is rotated into the medial canthal region (Colour atlas of ophthalmic plastic surgery, Boston, 2008). The size of the glabellar flap is determined by the size of the defect, with the inferior border of the flap created from the superior border of the defect (to correct the vertical height), the lateral boarder created from the most lateral border of the defect (to correct the horizontal width), and the superior border equal in length and 45° away from the lateral border (Eye 86: 597–605, 2000).

Keywords Glabellar flap • Medial canthal reconstruction • Mohs reconstruction • Nasal reconstruction • Medial canthus

L. Ghadiali (✉) B. Winn
Department of Ophthalmology, Harkness Eye Institute, Columbia University, New York, NY, USA
e-mail: grover.larissa@gmail.com; bjw15@cumc.columbia.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_136

Indications

The glabellar flap can be used to reconstruct the medial canthus in cases of tumor resection, trauma, or congenital defects. It is best suited for patients with moderate skin laxity and round defects of the medial canthus.

Essential Steps

1. Mark the skin for the flap.
2. Infiltrate local anesthetic into the medial canthus and glabellar flap.
3. Outline the flap using a #15 Bard-Parker blade.
4. Dissect in the subcutaneous fat layer using Westcott scissors to create the flap.
5. (*Trim the excess skin from the flap*).
6. Secure the flap to the subcutaneous tissues of the medial canthus.
7. Close the skin.
8. Undermine the glabella.
9. Close the subcutaneous tissue of the glabella.
10. Close the skin of the glabella.

Complications

– Infection
– Bleeding/hematoma
– Pain
– Poor cosmesis
– Graft necrosis

Template Operative Dictation

Preoperative diagnosis: (*Right/Left*) medial canthal defect

Procedure: (*Right/Left*) reconstruction of the medial canthus via glabellar flap

Postoperative diagnosis: Same

Indication: This is a ___-year-old (*male/female*) who underwent (*Mohs excision of a skin cancer, primary excision of a benign lesion, sustained trauma*) resulting in a medial canthal defect involving skin and muscle. The upper and lower puncta and canaliculi were probed and irrigated and the lacrimal drainage system was found to be intact. Given the patient's moderate skin laxity and lack of a continuous brow, the decision was made to perform a medial canthal reconstruction using a glabellar flap. The patient was informed of the risks, benefits, indications, and alternatives of the procedure and informed consent was obtained.

Description of the procedure: The patient was identified in the holding area and a marking pen was used to mark the (*right/left*) eye. The patient was escorted into the operating suite and placed in the supine position. Tetracaine eye drops were instilled into both eyes. The patient's face was prepped and draped in the usual sterile fashion for oculoplastic surgery. IV sedation was administered by the anesthesia service. A surgical time out was performed in accordance with hospital policy, verifying the correct patient, procedure, site, positioning of the patient, special equipment, and safety precautions.

An inverted V was marked with a marking pen centered in the midline of the glabellar region with the first arm of the V corresponding in length to the width of the defect and the second arm equal in length and angled 45° to the first arm. The area of the (*right/left*) medial canthus and glabella was infiltrated with a 50/50 mixture of 2 % lidocaine and epinephrine 1:100,000 and 0.5 % Marcaine (*plain 2 % lidocaine with epinephrine 1:100,000*) for local anesthesia. A corneal protective shield was placed in the eye.

The inverted V flap was created using a #15 Bard-Parker blade. The flap was then elevated in the layer of the subcutaneous fat using Westcott scissors. The flap was rotated into the area of the medial canthus and anchored to the tissues of the medial canthus using several deep, interrupted, buried *5-0 Vicryl* sutures. (*Excess skin was trimmed from the flap using Westcott scissors.*) The flap was noted to cover the entire medial canthal defect and there was no tension on the flap. The skin of the flap was sutured into the defect using several interrupted *6-0 Proline* sutures. The area of the glabella was undermined medially and laterally and then closed using several interrupted subcutaneous *5-0 Vicryl* sutures. The skin of the glabella was closed with several interrupted *5-0 Proline* sutures. The corneal protective shield was then removed.

Following the procedure, antibiotic ointment was placed in the eye and the patient was escorted to the postoperative care area, where they remained for approximately 45 min before being discharged to the care of a responsible adult.

References

1. Koch CA, Archibald DJ, Friedman O. Glabellar flaps in nasal reconstruction. Facial Plast Surg Clin. 2011;19(1):113–22.
2. Bertelmann E, Rieck P, Guthoff R. Medial reconstruction with a modified glabellar flap. Ophthalmologica. 2006;220(6):368–71.
3. Maloof AJ, Leatherbarrow B. The glabellar flap dissected. Eye. 2000;86(2):597–605.
4. Tyers AG, Collin JR. Colour atlas of ophthalmic plastic surgery. 3rd ed. Boston: Butterworth-Heinemann/Elsevier; 2008.

Chapter 137
Punctoplasty

Ashley Crane, Benjamin Erickson, and Wendy W. Lee

Abstract Patients should be evaluated and deemed appropriate for such surgical intervention. Patients with isolated punctal stenosis resulting in excessive tearing, or epiphora, can be considered as candidates for this procedure. The procedure is typically performed on the lower eyelid puncta. The distal lacrimal drainage apparatus must be intact. Patients should be educated about the risks and benefits of the procedure, including alternatives. Schirmer test should be performed because real cause of epiphora may be unrecognized reflex hypersecretion from ocular surface disease. Those with prior failed punctoplasty, ongoing inflammatory process, or an element of canalicular stenosis should be considered for concomitant nasolacrimal stenting procedures.

Keywords Punctoplasty • Three-snip punctoplasty • Punctal stenosis • Tearing • Epiphora

Indications

Clinically evident punctal stenosis resulting in excessive tearing or epiphora with intact distal lacrimal apparatus. In office punctal dilation and irrigation should be performed to exclude canalicular stenosis and nasolacrimal duct obstruction as the cause of tearing.

Essential Steps

1. Transfer patient to operating room

A. Crane (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ACrane@med.miami.edu

B. Erickson • W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu; WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_137

2. Subcutaneous and transconjunctival infiltration of local anesthetic
3. Dilation of stenotic punctum
4. Vertical incision of affected punctum with Westcott scissors
5. Horizontal incision of affected punctum with Westcott scissors
6. Oblique incision connecting the two previous incisions to excise a triangularly shaped section of tissue
7. *If bilateral procedure: identical procedure on the contralateral punctum*

Complications

– Exacerbation of dry eye symptoms
– Impaired lacrimal pump function if punctoplasty too large
– Recurrent stenosis due to ongoing inflammation
– Failure due to unrecognized canalicular stenosis
– Damage to distal lacrimal apparatus
– Need for further procedures

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) lower lid punctal stenosis

Procedure: (*Right/Left/Bilateral*) lower lid punctoplasty

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*male/female*) has significant (*right/left/bilateral*) punctal stenosis resulting in excessive tearing/epiphora. The risks, benefits, and alternatives to the procedure were discussed with the patient including the risk for exacerbation of dry eye symptoms, recurrent stenosis, persistent tearing, damage to the lacrimal apparatus, and need for further procedures. Afterwards, the patient requested that we perform surgery and signed the required consent forms.

Description of the procedure: The patient was brought to the operating/procedure room where the (*right/left*) eye and adnexal structures were sterilized with 5 % betadine ophthalmic solution. The patient was draped in the standard sterile fashion for oculoplastic surgery. A time-out was then performed confirming the correct patient, correct sites, correct surgery, and any known drug allergies.

Attention was then drawn to the (*right/left*) lower lid, where the skin and subtarsal conjunctiva of the medial eyelid were anesthetized with 2 % lidocaine with epinephrine (1:100,000). A fine punctal dilator was then used to enlarge the stenotic punctum. The punctal papilla was grasped with 0.12 mm forceps and one blade of the sharp Westcott scissors was inserted through the punctum and into the canalicular ampulla. An initial vertical cut was made. The internal scissor blade was then reoriented along the horizontal portion of the canaliculus and a second cut was made. A third oblique cut was then made connecting the first two cuts and releasing a triangular tissue section. Hemostasis was achieved with gentle pressure.

***If bilateral procedure performed**: Attention was then drawn to the lower punctum of the contralateral eyelid where the identical procedure was performed.*

The drapes were removed and ophthalmic ointment was applied. The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. The patient received instructions to apply ophthalmic ointment to the incision(s) three times a day and will be seen in the eye plastics clinic in/on _____.

Chapter 138
Probing of the Nasolacrimal Duct

Andrew Rong, Nathan Blessing, and Wendy W. Lee

Abstract Congenital nasolacrimal duct obstructions may present with mucoid discharge, epiphora, or lacrimal swelling, and is most commonly located at the distal end of the nasolacrimal duct. Nasolacrimal duct probing may be performed to treat an obstruction after conservative measures have failed. Patients should be educated about the risks and benefits of the procedure, including alternatives.

Keywords Congenital nasolacrimal duct obstruction • Probing • Epiphora • Nasolacrimal duct • Duct obstructions

Indications

Nasolacrimal duct obstruction

Essential Steps

1. Dilate the puncta.
2. Introduce a Bowman probe into the nasolacrimal duct without creating a false passage.
3. Introduce a second probe into the nare to confirm patency of the nasolacrimal system.

Complications

– Nasal bleeding
– Infection
– Creation of false passage

A. Rong (✉) • N. Blessing
Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: ajr211@med.miami.edu

W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_138

Template Operative Dictation

Preoperative diagnosis: (*Right/Left/Bilateral*) *congenital* nasolacrimal duct obstruction

Procedure: (*Right/Left/Bilateral*) probing of the nasolacrimal duct

Postoperative diagnosis: *Same*

Indication: This __-year-old *male/female* patient presented with a clinical exam consistent with *congenital* nasolacrimal duct obstruction that failed to resolve with conservative management. The risks, benefits, and alternatives to the procedure were discussed with the patient's family including the risk for infection, bleeding, pain, creation of a false passage, and need for further procedures. Afterwards, the patient's family requested that we perform the above listed surgery, and signed the required consent form.

Description of the procedure: The patient's clinical history was reviewed in detail and the appropriate eye was marked. *General* anesthesia was administered without complications. The patient's (*right/left*) eye and corresponding adnexal structures were sterilized with 5 % betadine ophthalmic solution, and 10 % betadine skin preparation. A time-out was then performed confirming the correct patient, site, surgery, and any known drug allergies. The patient was prepped and draped in the standard sterile fashion for ophthalmic surgery.

A punctal dilator was introduced to dilate the (*right/left*) (*superior/inferior*) puncta. A size ___ Bowman probe was then placed into the (*superior/inferior*) puncta and advanced until the probe reached a hard stop at the lacrimal bone. At that point, the probe was rotated inferiorly with passage into the nasolacrimal duct. A second Bowman probe was then introduced into the nare, beneath the inferior turbinate until metal on metal was felt, confirming location of the initial probe. Once the patency was confirmed, the two Bowman probes were removed. A size ___ Bowman probe was then introduced into the (*inferior/superior*) puncta with navigation through the nasolacrimal system in a similar fashion. Once patency was confirmed, all probes were removed.

If bilateral procedure performed: *Attention was then turned to the contralateral (left/right) eye, where the identical procedure was performed with size ___ and ___Bowman probes for the superior and inferior puncta, respectively.*

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. The patient was then taken to the recovery room in stable condition and will be seen in the eye plastics clinic in/on _____. The patient was informed to perform (*Qday/BID/TID/QID*) nasolacrimal duct massage for the next _#_ week(s), and apply erythromycin ointment to the eyes (*Qday/BID/TID/QID*).

Chapter 139
Lacrimal System Intubation (Bicanalicular)

Kenneth V. Cahill and Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Canaliculus • Obstruction • Epiphora • Stenosis • Dacryocystitis • Bicanalicular • Lacrimal system intubation • Lacrimal • Lacrimal system • Intubation

Indications

Canalicular and/or nasolacrimal duct obstruction resulting in epiphora. Patients with complete nasolacrimal duct obstruction require concomitant DCR for treatment. Patients with severe canalicular stenosis and not amenable to probing with stent placement require additional procedures, such as CDCR, to restore lacrimal outflow.

Essential Steps

1. General anesthesia *–OR–* Administration of topical anesthetic and local anesthetic with infiltration around the lacrimal sac, lateral nasal mucosa, and inferior turbinate (*infratrochlear and infraorbital nerve block*).
2. Packing the nasal cavity with tagged 0.5 × 3 in. neuro sponges, moistened with oxymetazoline and 4 % lidocaine.
3. Placement of protective corneoscleral shield.
4. Dilate upper and lower puncta.

K.V. Cahill (✉)
Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA

Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: Kcahill@columbus.rr.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_139

5. Irrigate upper and lower puncta with a lacrimal cannula (*lacrimal sac can be palpated during this step to see if there is resistance of fluid passing through the nasolacrimal duct*).
6. Probe the upper and lower canaliculi with successively larger Bowman probes (*probes should be passed through the NLD so that they are visible exiting in the inferior meatus*).
7. A Crawford silicone stents should then be passed through the upper and lower puncta and retrieved in the nose.
8. Stent ends are secured loosely in the nose with a knot.
9. Remove the corneoscleral contact lens.
10. *Cover eye with a firm occlusive eye patch and tape in place.*

Complications

– Epiphora
– Stent migration
– Canalicular laceration or scarring
– Hemorrhage
– Infection
– Dacryocystitis
– Epistaxis
– Foreign body sensation

Template Operative Dictation

Preoperative diagnosis: (1) (*Right/Left*) upper and lower canalicular stenosis, *(2) nasolacrimal duct stenosis, and (3) epiphora*

Procedure: Probing of nasolacrimal duct with bicanalicular silicone stent intubation (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) developed *(right/left)* epiphora over the past ____ (*weeks/months*). Clinical examination shows there is (*canalicular stenosis/nasolacrimal duct stenosis*) of the (*right/left*) eye. No nasal pathology was evident. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. The patient understands that the nasolacrimal duct probing with silicone intubation offers the possible dilation and enlargement of the constricted nasolacrimal drainage system, and may help to alleviate the symptoms. They understand that surgical risks include hemorrhage, infection, failure to alleviate tears, displacement of the silicone tubing, slitting of the canaliculi, failure to achieve relief of tearing, blindness, and possible need for further surgery. Following this discussion of complications, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient was greeted in the preoperative area where the correct patient, surgical site(s), and surgical procedure(s) were confirmed. The forehead above the *(right/left)* eye was initialed with a surgical marking pen, and an arrow drawn pointing to the operative eye. The patient was then taken to the operating room and placed supine on the operating room table. *(General anesthesia/ Monitored conscious sedation)* was administered by the *(hospital/surgery center)* anesthesia department. Topical anesthetic, Proparacaine was placed into the *(right/ left)* eye. _#_ 0.5 in. × 3 in. neurosurgical sponges were moistened with oxymetazole solution and the local anesthetic were placed in area of the inferior meatus of the nose. The tagging strings of the neurosurgical sponges were tied together and taped to the patient's cheek. The patient was then prepped and draped in the usual, sterile fashion appropriate for the procedure. A timeout was conducted with the OR staff and the correct patient, surgical site, and surgical procedure were again confirmed. Local anesthetic consisting of ________ was injected into the (*right/left*) medial canthus, lacrimal sac area, lateral nasal mucosa, and inferior turbinate. (*Additionally an infratrochlear and infraorbital nerve block was administered.*)

A protective corneoscleral contact lens was placed in the (*right/left*) eye. The upper and lower puncta were dilated with a punctual dilator. *(A ___ gauge lacrimal cannula on the 3 cm^3 syringe was used to irrigate BSS through the upper and lower puncta. There was ___ % reflux from the (upper/lower) system. During irrigation the lacrimal sac was palpated and there (was/was no) distention felt.)* The canaliculi were probed with successively sized Bowman probes beginning with ___ to ___. *(Resistance was encountered at the ____ portion of the upper/lower canaliculi. A lacrimal trephine was used to bore through the point of blockage.)* The probes were passed through the canaliculi into the lacrimal sac and then through the nasolacrimal duct into the nasal cavity. The neurosurgical sponges were removed. The presence of the probe in the nose was confirmed by direct observation.

The lacrimal drainage system was then intubated with a Crawford intubation set with a (*0.025/___ in.*) silicone diameter. The upper and lower canalicular stents were retrieved from the nose with a (*Crawford hook/other*). The stem of a cotton-tipped applicator was placed underneath the silicone tubing in the medial canthal angle. The Crawford stent was then tied with a square knot at the nasal cavity without putting undue tension on the puncta. The square knot rested within the inferior meatus. (*A 6-0 black silk ligature was tied around the silicone tubing in a figure-of-eight fashion just below the square knot.*) The cotton-tipped applicator and protective corneoscleral contact lens were removed. The silicone stents were trimmed so that they would not be long enough to protrude from the nose.

Using a nasal speculum and ____ light source, stent position was confirmed to be appropriate. Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye. After the sterile drapes were removed, the closed eyelids were covered with an eye patch, and taped securely in place. The patient tolerated the procedure well without complication, and was then taken back to the recovery area in stable condition.

Chapter 140
Lacrimal System Intubation (Monocanalicular)

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Canaliculus • Obstruction • Epiphora • Stenosis • Dacryocystitis • Monocanalicular • Lacrimal system intubation • Lacrimal • Lacrimal system • Intubation • Stenosis

Indications

Canalicular stenosis resulting in epiphora. Typically performed on the lower canaliculus. Patients with suspected nasolacrimal duct stenosis/obstruction should undergo bicanalicular intubation and/or DCR. Any canalicular blockage thought to be the result of a mass should be sent for pathologic evaluation with tissue recovered from the lacrimal trephine, if used, or other biopsy method.

Essential Steps

1. Administration of topical anesthetic and local anesthetic with infiltration of the medial canthus and medial upper and lower lids.
2. Placement of a protective corneoscleral shield.
3. Dilate upper and lower puncta.
4. *Perform punctoplasty if required.*
5. Irrigate upper and lower puncta with a lacrimal cannula (the lacrimal sac can be palpated during this step to see if there is resistance of fluid passing through the nasolacrimal duct).
6. Probe the upper and lower canaliculi with successively larger Bowman probes.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_140

7. *If entire length of canaliculi cannot be probed, consider using lacrimal trephine to remove blockage.*
8. Place Mini Monoka stent, sizing it to pass into the lacrimal sac.
9. *Suture stent into place if required (i.e., if combinant punctoplasty performed).*
10. Remove the corneoscleral shield.

Complications

– Epiphora
– Stent migration
– Canalicular laceration or scarring
– Hemorrhage
– Infection
– Dacryocystitis
– Foreign body sensation

Template Operative Dictation

Preoperative diagnosis: (1) (*Upper/Lower*) (*right/left*) canalicular stenosis, *and ((2) epiphora)*

Procedure: Probing of nasolacrimal duct with irrigation and monocanalicular silicone stent intubation (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) developed *(right/left)* epiphora over the past ____ (*weeks/months*). Clinical examination shows there is (*canalicular stenosis/nasolacrimal duct stenosis*) of the (*right/left*) eye. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. Monitored conscious sedation was administered by the (*hospital/surgery center*) anesthesia department. Topical anesthetic, Proparacaine was placed into the *(right/left)* eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A timeout was conducted with the OR staff and the correct patient, surgical site, and surgical procedure were again confirmed. Local anesthetic consisting of ________ was injected into the (right/left) medial canthus and lacrimal sac area. A corneal shield was placed in the *(right/left)* eye. Attention was then turned to the punctum of the (right/left) lower lid.

If punctoplasty was performed—The (*right/left*) (*upper/lower*) punctal papilla was grasped with 0.12 mm forceps and one blade of the sharp Westcott scissors was inserted through the punctum and into the canalicular ampulla. An initial vertical cut was made. The internal scissor blade was then reoriented along the horizontal portion of the canaliculus and a second cut was made. A third oblique cut was then made connecting the first two cuts and releasing a triangular tissue section. Hemostasis was achieved with gentle pressure.

A punctal dilator was then used to dilate the (*right/left*) (*upper/lower*) punctum. BSS on a ___ gauge lacrimal cannula was injected into the (*upper/lower*) puncta. There was approximately ___ % percent reflux. This was repeated again for the (*lower/upper*) puncta with approximately___ % reflux noted. (*During irrigation the lacrimal sac was palpated and there (was/was no) distention felt.)* An *00* Bowman probe was then passed through the upper and lower canaliculi into the lacrimal sac. The (*upper/lower*) probe passed with (*no/minimal/significant/could not be passed due to blockage at* ____) restriction. *(Due to the resistance encountered at the ____ portion of the upper/lower canaliculi, a lacrimal trephine was used to bore through the point of blockage. The tissues recovered from the trephine were sent for pathologic evaluation*.) [If trephination unsuccessful, then procedure ends as a stent cannot be placed]. (*The probe was not passed into the nasal lacrimal duct for patient comfort.*) A Mini Monoka stent was then sized to ___ mm, placed into the lower puncta, and advanced with 0.12 forceps. It seated well into the puncta.

If punctoplasty was performed*—Due to the increased punctal diameter created with the punctoplasty, the stent was secured into place with a 6-0 Prolene suture. The suture was passed through the lip of the stent, then wrapped around the stent once and secured on the anterior lid margin. The knot was trimmed short as to not cause cornea issues.*

The corneal shield was then removed from the *(right/left)* eye. Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 141
Balloon Dacryocystoplasty

Maan Alkharashi and Deborah VanderVeen

Abstract Balloon dacryocystoplasty is a safe, simple, and effective procedure for congenital nasolacrimal duct obstruction. It can be performed as an initial or secondary procedure following previous unsuccessful probing and irrigation in cases of congenital nasolacrimal duct obstruction. We aim to explain the essential steps of the procedure, the potential side effects, and an example of the dictated procedure note.

Keywords NLDO • Nasolacrimal duct • Obstruction • Dacryocystoplasty • Balloon • Probing • Tearing • Intubation • Congenital

Indications

Congenital or acquired nasolacrimal duct obstruction in patients >2 years or who have failed simple probing. Symptoms may include persistent tearing or discharge, or recurrent dacryocystitis.

Essential Steps

1. Obtain consent and mark the operative site before transferring the patient to the operating room.
2. Perform time out and cleanse the eye if needed (*with 5 % povidone iodine solution*).
3. Use a punctal dilator to dilate the (*preferably upper/alternatively lowe*r) punctum.
4. Introduce a Bowman probe through the lacrimal system from the punctum to the nasal cavity (*a second instrument (such as larger caliber probe) can be used to confirm entrance into the nasal cavity if needed by metal on metal contact*), and then withdraw the probe.
5. Inspect the Lacricath (Quest Medical, Inc.).
6. Lubricate the balloon with ophthalmic ointment.

M. Alkharashi (✉) • D. VanderVeen
Department of Ophthalmology, Boston Children's Hospital, Harvard Medical School, Boston, MA, USA
e-mail: Maan.Alkharashi@childrens.harvard.edu; Deborah.Vanderveen@childrens.harvard.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_141

7. Advance the 3 mm Lacricath catheter to the distal end of the nasolacrimal duct, and perform two cycles of inflation/deflation for 90 and then 60 s, respectively.
8. Retract the balloon catheter to the lacrimal sac and inflate it for 60 s for two cycles.
9. Withdraw the instrument from the lacrimal system and clean the eye.
10. Apply an ophthalmic ointment or drop, which can also be used postoperatively for 3–7 days depending on the degree of chronic discharge.

Complications

– Bleeding
– Infection
– False passage
– Persistent tearing with need for more surgery
– Corneal abrasion
– Damage to the eye and vision loss

Template Operative Dictation

Preoperative diagnosis: Nasolacrimal stenosis of the (*right/left*) eye

Procedure: Balloon dacryocystoplasty of the (*right/left*) eye

Postoperative diagnosis: Same

Indication: This ____-year-old (*male/female*) has persistent (*congenital/acquired*) nasolacrimal duct obstruction resulting in excessive (*tearing/epiphora/ recurrent/ chronic dacryocystitis*). The risks, benefits, and alternatives to the procedure were reviewed with the patient and (*his/her*) family; they requested that we proceed with (*right/left*) balloon dacryocystoplasty and signed the required consent forms.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table where standard cardiac and respiratory monitors were placed by anesthesia. General anesthesia was administered. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

A punctal dilator was introduced to the (*lower/upper*) punctum of the right/left eye, followed by a _#_Bowman probe, which was advanced until a hard stop was felt. The probe was then rotated and directed towards the nose until a soft pop was felt, and metal-to-metal contact was achieved to confirm complete passage. The passage was noted to be *tight*. The probe was replaced with a ___ mm Lacricath catheter, which was then advanced to the distal end of the nasolacrimal duct. The balloon was inflated to _*8*_ atm of pressure for 90 s, then deflated, and reinflated to a pressure of _*8*_ atm for 60 s, and again deflated. The catheter was then withdrawn until the balloon was within the nasolacrimal sac where it was inflated to _*8*_ atm for two cycles of 60 s each. The instruments were removed and the skin was cleaned with wet and dry towels, (*Tobramycin/dexamethasone*) (*drops/ointment*) were placed in the eye. The patient tolerated the anesthesia and procedure well, and (*he/she*) was transferred to the PACU in stable condition. Dr. ____, the attending staff, was present and scrubbed for the duration of the procedure.

Chapter 142
Conjunctivodacryocystorhinostomy (CDCR)

Kenneth V. Cahill and Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Canaliculus • Obstruction • Epiphora • Jones tube • Conjunctivorhinostomy • Dacryocystorhinostomy

Indications

Canalicular abnormality/obstruction not amenable to reconstruction to restore the tear outflow apparatus, failure of lacrimal pump function not amenable to corrective eyelid procedures, failure of canalicular reconstruction and/or DCR, epiphora as the primary symptom regardless of mechanism.

Essential Steps

1. Administration of topical anesthetic and local anesthetic with infiltration around the lacrimal sac, lateral nasal mucosa, and middle turbinate (infratrochlear and infraorbital nerve block).
2. Packing the nasal cavity with 0.5×3 in. neuro sponges, moistened with oxymetazoline and 4 % lidocaine.
3. If a previous dacryocystorhinostomy has not been performed, it can be carried out at this time, unless the Jones tube is to be placed primarily through the thin bone of the lacrimal sac fossa.
4. Placement of the eyelid speculum.

K.V. Cahill (✉)
Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA

Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: Kcahill@columbus.rr.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_142

5. Excision of excessive caruncle tissue.
6. Placement of a protective corneoscleral shield.
7. Passage of a 14-gauge angiocath catheter from the site of the caruncle through the previously constructed DCR (*or through thin bone of the lacrimal sac fossa*).
8. Placement of a straight Quickert probe through the angiocathic catheter sleeve into the nose. Nick the wall of the catheter sleeve in the medial canthus at the desired position of the collar of the Jones tube and withdraw.
9. Measure the length of the catheter from the tip to the nick and select a Jones tube of the same length.
10. Pass a Vicryl suture through the Jones tube lumen and tie (the knot should rest just below the collar, and the suture can then be wrapped around the tube just below the collar and tied again).
11. Pass a straightened 2.5 mm disposable cataract surgery keratome through the path, marked by the Quickert probe.
12. Use successive passes of the Jones tube dilators from smallest to largest.
13. Pass the Jones tube over the Quickert probe and pass it into position (the collar should rest in the desired position of the medial canthal angle, and the tip of the tube should be resting freely in the nasal cavity). *If necessary, the middle turbinate can be trimmed.*
14. Withdraw the Quickert probe.
15. Suture the Jones tube into the medial canthus by passing the needle from the conjunctival recess out through the skin several millimeters medial to the canthal angle (the second end of the suture can be passed in the same direction by passing a 20-gauge hypodermic needle through the skin and into the conjunctival recess, threading the free suture end into the lumen of the hypodermic needle, and then withdrawing the needle).
16. Remove the corneoscleral contact lens and lid speculum.
17. *Cover eye with a firm occlusive eye patch and tape in place.*

Complications

– Epiphora
– Tube migration
– Tube obstruction
– Hemorrhage
– Infection
– Dry eye
– Conjunctival scarring
– Diplopia
– Pyogenic granuloma
– Keratitis
– Air reflux
– Epistaxis
– Foreign body sensation

Template Operative Dictation

Preoperative diagnosis: (*Upper/Lower*) *(right/left) canalicular obstruction*

Procedure: Conjunctivodacryocystorhinostomy with Jones tube placement (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) developed *(right/left)* epiphora over the past ____ (*weeks/months*). Clinical examination shows there is a complete obstruction of the (*upper/lower*) canaliculi. The nasal examination confirms adequate space in the middle meatus for placement of a Jones tube. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. The patient understands that a conjunctivorhinostomy with Jones tube placement offers the best opportunity to achieve relief of excess tearing and the symptoms caused by this. They understand that air reflux through the Jones tube will occur and that care will need to be taken to prevent displacement of the Jones tube. They understand that there is a possibility that placement of a new Jones tube with different dimensions or that modifications in the position of the Jones tube may become necessary. They also understand that risks including hemorrhage, infection, failure to alleviate tearing, irritation, scarring, double vision, and blindness exist in addition to the need for future revisions and Jones tube replacement.

Following this discussion of complications, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient was greeted in the preoperative area where the correct patient, surgical site(s), and surgical procedure(s) were confirmed. The forehead above the *(right/left)* eye was initialed with a surgical marking pen, and an arrow drawn pointing to the operative eye. The patient was then taken to the operating room and placed supine on the operating room table. *(General anesthesia/ Monitored conscious sedation)* was administered by the *(hospital/surgery center)* anesthesia department. Topical anesthetic, Proparacaine was placed into the *(right/ left)* eye. Three 0.5 in. × 3 in. neurosurgical sponges were moistened with oxymetazole solution and the local anesthetic and were placed into the middle and inferior meatus of the nose. The tagging strings of the neurosurgical sponges were tied together and taped to the patient's cheek. The patient was then prepped and draped in the usual, sterile fashion appropriate for the procedure. A timeout was conducted with the OR staff and the correct patient, surgical site, and surgical procedure were again confirmed. Local anesthetic consisting of ________ was injected into the (*right/left*) medial canthus, lacrimal sac area, lateral nasal mucosa, and middle turbinate. (*Additionally an infratrochlear and infraorbital nerve block was administered.*)

An eyelid speculum was placed in the (*right/left*) eye. The most external aspect of the caruncle was excised using (*Westcott scissors/other*). Hemostasis was maintained with minimal (*monopolar/bipolar*) cautery throughout the procedure. A protective corneoscleral contact lens was placed in the (*right/left*) eye.

If DCR to be performed*—See DCR Chap. 57 or Chap. 58.*

A 14-gauge angiocatheter was passed from the position of the caruncle through the lacrimal sac fossa into the middle meatus. The neurosurgical sponges were removed. The position of the catheter in the nose was observed and found to be in a desirable location. The catheter stylet was withdrawn and replaced with a Quickert probe. The end of the plastic catheter sleeve was positioned in the nose at the site desired for the internal end of the Jones tube. The plastic catheter sleeve was then nicked with a #15 Bard-Parker blade at the desired position of the medial collar flange of the Jones tube in the medial canthus. The plastic sleeve was withdrawn. The distance from the nick to the end of the catheter was measured and a Jones tube with a ___ mm collar was selected in that length. A 2.5 mm wide disposable cataract keratome without angulation was passed along the anterior surface of the Quickert probe from the medial canthus into the nasal cavity and then withdrawn. This tract was dilated with successive passes of the three Jones tube dilators, beginning with the smallest diameter, and ending with the largest diameter.

The Jones tube was prepared by placing a (*single/double armed*) *5-0 Vicryl* suture through the fenestration in the collar and tying this securely. (*For nonfenestrated Jones tubes—The Vicryl suture was passed through the lumen of the tube and then tied with the knot coming to rest just below the rim of the tube collar.*) The Vicryl suture was then passed around, the circumference of the tube and tied again just below the collar. The largest Jones tube dilator was removed and the Jones tube was threaded over the Quickert probe and passed through the tract so that the collar came to rest in the medial canthal angle. The position of the internal end of the Jones tube in the nasal cavity was confirmed. The Quickert probe was withdrawn. The needle of the Vicryl suture securing the Jones tube was passed from the medial canthal recess through the skin just medial to the medial canthal angle.

[Choose one]:

If double armed*—The second arm of the Vicryl suture was passed adjacent to this.*

If single armed*—A(n) (18/20) gauge hypodermic needle was passed through the desired site in the skin into the medial canthal recess, and the free end of the suture was threaded through.*

The Vicryl suture was then tied, holding the Jones tube in position and preventing its migration inward or outward.

Using a nasal speculum and ____ light source, tube position was confirmed to be appropriate. Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye. After the sterile drapes were removed, the closed eyelids were covered with an eye patch taped securely in place. The patient tolerated the procedure well without complication, and was then taken back to the recovery area in stable condition.

Chapter 143
External Dacryocystorhinostomy 1 (DCR)

Mehdi Tavakoli, Benjamin Erickson, and Wendy W. Lee

Abstract Nasolacrimal duct obstruction is a common cause of chronic epiphora and may frequently lead to mucopurulent ocular discharges, chronic dacryocystitis, and acute dacryocystitis. External dacryocystorhinostomy is a standard surgery in which a new passageway is established to bypass the occluded or narrowed nasolacrimal duct for the tear drainage.

Keywords Nasolacrimal duct obstruction (NLDO) • Lacrimal surgery • Dacryocystorhinostomy (DCR) • Silicone tube • Lacrimal pump • Lacrimal sac • Nasal bone • Nasolacrimal duct • Canaliculi • Punctum • Nasal cavity

Indications

(1) Acquired primary and secondary nasolacrimal duct obstruction (chronic dacryocystitis, acute dacryocystitis after treatment of inflammation, chronic epiphora), (2) congenital nasolacrimal duct obstruction unresponsive to other treatments, (3) functional nasolacrimal duct obstruction (epiphora due to physiologic lacrimal pump dysfunction, patent nasolacrimal duct).

M. Tavakoli (✉)
Department of Ophthalmology, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
e-mail: mehditavakolimd@med.miami.edu

B. Erickson
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: BErickson@med.miami.edu

W.W. Lee
Department of Oculofacial Plastic and Reconstructive Surgery, Bascom Plamer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA
e-mail: WLee@med.miami.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_143

Essential Steps

1. Administration of general/local anesthesia
2. Incision
3. Sac dissection
4. Bony ostium creation
5. Flap creation and anastomosis
6. Silicone intubation
7. Wound closure

Complications

- Intra- and postoperative hemorrhage
- CSF leakage
- Inadvertent orbital entry
- Skin scar including web formation
- Wound infection
- Preseptal/orbital cellulitis
- Silicone tube related problems: early loss, extrusion, punctal cheese-wiring, canalicular granuloma, corneal touch
- Failure and recurrence of epiphora

Template Operative Dictation

Preoperative diagnosis: (*Right/Left*) nasolacrimal duct obstruction

Procedure: External dacryocystorhinostomy

Postoperative diagnosis: (1) (*Right/Left*) external dacryocystorhinostomy (2) Silicone stent placement on the (*right/left*)

Indication: This ____-year-old male/female had developed a nasolacrimal duct obstruction over the past ____ months/years and on workup was found to have a chronic epiphora, history of chronic and/or acute dacryocystitis, regurgitation of pus upon pressure on the lacrimal sac with or without evidence of obstruction in lacrimal scintigraphy. The tearing and discharge were affecting activities of daily living, and after a detailed review of risks and benefits, the patient elected to undergo the procedure and signed the required consent forms.

Description of the procedure: The patient was brought to the preoperative holding area, where an initial time out was performed confirming the correct patient, correct site, correct surgery, and any known drug allergies. The (*right/left*) nostril was sprayed, and then packed with neurosurgical cottonoids soaked in pseudococaine. After an appropriate interval, the patient was brought into the operating room where the relevant eye and adnexal structures were sterilized with 5 % betadine ophthalmic solution and 10 % betadine skin preparation. After a secondary timeout, the patient was draped in the standard sterile fashion for oculoplastic surgery.

An approximately _*1*_ cm incision was marked on the nasal sidewall, halfway between the midline and medial canthus, using a violet making pen. A *#15 blade* was then used to complete the incision to the level of the subcutaneous tissues. The underlying angular vessels were then cauterized with the bipolar wet field cautery. Blunt dissection was used to spread the muscle fibers and expose the periosteum, which was subsequently incised and elevated using a Freer periosteal elevator. The nasolacrimal sac was retracted laterally in an envelope of periosteum, exposing the bony lacrimal sac fossa. The medial wall of the fossa was punctured with a Kelly hemostat, and a wide bony ostium was created using Kerrison rongeurs.

Attention was then turned to the ipsilateral medial canthus, where the puncta were dilated. A Bowman probe was inserted, and after a hard stop was encountered, directed inferiorly to tent the lacrimal sac. A H-shaped incision was then made in the sac mucosa with a *#66 blade* and Westcott scissors, in order to create anterior and posterior flaps. Attention was directed back towards the exposed nasal mucosa, which was similarly incised to create corresponding anterior and posterior flaps. The nasal packing was removed. The posterior mucosal flaps were then approximated with an interrupted *4-0 vicryl* suture.

A proper stent was then passed through the upper and lower puncta, and retrieved through the nose using a grooved director. The associated silicone tubing was clamped as it exited the ipsilateral naris. A stripper was then used to remove the excess tubing, and the internal suture was tied securely. After infiltration of additional anesthetic, the resulting knot was secured to the inside of the nasal vestibule with a *5-0 Prolene* suture. The anterior flaps were then approximated with interrupted *5-0 vicryl* suture. The subcutaneous plane was closed with buried, interrupted *4-0 vicryl* suture. The subcutaneous muscle was closed with deep, buried *5-0 vicryl sutures,* and the skin incision was then closed with interrupted *6-0 nylon* sutures. The drapes were removed, and ophthalmic ointment was applied to the incision and ipsilateral medial canthal region.

The patient tolerated the procedure well without any intraoperative or immediate postoperative complications. All needle and sponge counts were correct at the end of the procedure. The patient was taken to the recovery room in stable condition and will be seen in the eye plastics clinic in/on _____.

Chapter 144
External Dacryocystorhinostomy 2 (DCR)

Cameron B. Nabavi and Craig N. Czyz

Abstract Epiphora due to insufficient drainage can be due to a partial or complete nasolacrimal duct obstruction. Proper diagnosis and surgical intervention can allow for improvement and/or resolution of excessive tearing. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Canaliculus • Obstruction • Epiphora • Dacryocystitis • Nasal lacrimal duct

Indications

Patients with primary acquired nasolacrimal duct obstruction. Other indications include recurrent dacryocystitis, chronic mucoid reflux, painful distention of the lacrimal sac, and bothersome epiphora that has failed more conservative management, such as probe and irrigation and/or stenting. In patients with dacryocystitis, active infection should be cleared before surgery is performed.

Essential Steps

1. Administration of topical and local anesthetic with infiltration around the lacrimal sac, lateral nasal mucosa, and middle turbinate. (Infratrochlear and infraorbital nerve block). General or monitored anesthesia can be used.
2. Packing the nasal cavity at the level of the middle meatus with tag 0.5 × 3 in. neuro surgical cottonoids, moistened with oxymetazoline and 4 % lidocaine.
3. Placement of protective corneoscleral shield.
4. Skin incision medial to medial canthus on thicker skin of nasal bridge.

C.B. Nabavi (✉)
Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA
e-mail: cnabavi@yahoo.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_144

5. *Placement of silk traction sutures.*
6. Dissection of subcutaneous tissue to gain access to periosteum overlying nasal bone.
7. Elevation of the periosteum from nasal bone and lacrimal sac from lacrimal sac fossa.
8. Create osteotomy starting at the suture line of the lacrimal bone and maxilla.
9. Enlarge osteotomy and remove anterior lacrimal crest and lacrimal sac fossa (take care to preserve underlying nasal mucosa and remove nasal packing prior to osteotomy).
10. Create lacrimal sac anterior and *posterior flaps*. Use a 0-00 Bowman probe and irrigation of lacrimal sac to identify sac wall and flaps. Once probe moving freely through common canaliculus without resistance, proceed to creating an anterior nasal mucosal flap.
11. *Create posterior nasal mucosa flap in alignment with posterior lacrimal sac flap.*
12. *Suture posterior nasal mucosa and posterior lacrimal sac flaps with absorbable polyglactin suture.*
13. Pass silicone intubation through upper and lower puncta, canaliculi, sac, and through the nasal opening created by the flaps.
14. Suture anterior lacrimal sac flap to anterior nasal mucosal flap with absorbable polyglactin suture.
15. *Remove silk traction sutures.*
16. Close subcutaneous tissue with absorbable polyglactin suture.
17. Close skin with absorbable suture.
18. Tie silicone stent to itself under minimal tension and replace into nasal cavity.
19. Remove the corneoscleral shield.

Complications

– Persistent epiphora
– Tube migration/dislocation
– Hemorrhage
– CSF leak
– Infection
– Dacryocystitis
– Dry eye
– Scarring
– Epistaxis
– Foreign body sensation
– Tissue necrosis (*if Kenalog injection used*)
– Vision loss (*if Kenalog injection used*)

Template Operative Dictation

Preoperative diagnosis: (1) Primary nasolacrimal duct obstruction, and (2) epiphora of the *(left/right)* eye

Procedure: (1) Dacryocystorhinostomy (right/left) with insertion of stent

Postoperative diagnosis: *Same*

Indication: This ____-year-old (*race*) (*male/female*) developed *(right/left)* epiphora over the past ____ (*weeks/months*). Clinical examination shows there is a significant obstruction of the *(right/left)* nasolacrimal duct(s). The risks, benefits, and alternatives to a (*right/left*) dacryocystorhinostomy with insertion of stent (and *kenalog injection*) were discussed with the patient including but not limited to bleeding, infection, cerebrospinal fluid leak, loss of vision, loss of the eye, and need for more surgery. Following this discussion of complications, the patient voiced understanding and elected to undergo the procedure(s). Written informed consent was then obtained.

Description of the procedure: The patient and operative site were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. Topical anesthetic, Proparacaine was placed into the *(right/left)* eye. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic with 2 % lidocaine with 1:100,000 epinephrine and 0.75 % Marcaine was infiltrated to the area medial to the (*right/left*) medial canthus. (*An infraorbital nerve block was also placed.*) Neurosurgical sponges soaked in oxymetazoline (*and 4% lidocaine*) were placed in the nasal cavity at the level of the middle meatus. The patient was prepped and draped in a standard sterile fashion suitable for surgery. A protective corneoscleral shield was placed in the (*right/left*) eye.

An incision was marked with a surgical marking pen medial to the medial canthus and incised with a #15 Bard-Parker blade. (*Two 4-0 silk traction sutures were placed on each side of the wound for added exposure.*) Cutting electrocautery (*with a Colorado needle tip*) was used to dissect through the subcutaneous tissue to the periosteum overlying the nasal bone. A Freer elevator was used to elevate the periosteum from the underlying nasal bone and the lacrimal sac from the underlying lacrimal sac fossa.

A (*Freer elevator/Hardy sella punch/Piezoelectric bone saw*) was used to begin an osteotomy through the anterior lacrimal crest and lacrimal sac fossa. (*Upbiting Kerrison rongeurs/Piezo electric burr*) was used to enlarge the ostium. Care was taken to preserve the underlying nasal mucosa. Once an osteotomy of appropriate size was created, a (*0/00)* Bowman probe was placed through the upper canalicular system to identify the location of the lacrimal sac. (*Westcott scissors/Beaver blade*) were used to create an anterior lacrimal sac and nasal mucosa flap, allowing for better visualization of the bowman probe moving under minimal resistance. (*Westcott scissors were then used to create a posterior sac flap and posterior nasal mucosa flap.*) (*Kenalog was injected around the site of the common canaliculus and lacrimal sac to prevent excessive postoperative scarring.*)

A Crawford stent was then passed through the upper and lower canalicular system, through the flaps and retrieved from the nose with a Crawford hook. (*The posterior flaps were anastamosed with interrupted 5-0 polyglactin suture.*) The anterior flaps were anastamosed with interrupted 5-0 polyglactin suture as well. (*The 4-0 silk traction sutures were removed.*) The deep subcutaneous tissue was closed with *5-0 polyglactin* suture in a buried interrupted fashion. The skin was closed with *6-0 plain gut* suture in a running fashion. The stent was tied to itself, (*A 6-0 black silk ligature was tied around the silicone tubing in a figure-of-eight fashion just below the knot*), trimmed appropriately, and replaced in the nasal cavity under minimal tension.

The corneal shield was then removed from the *(right/left)* eye. Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 145
Endoscopic Dacryocystorhinostomy (DCR)

Maan Alkharashi and Deborah VanderVeen

Abstract Congenital nasolacrimal duct obstruction (NLDO) usually resolves spontaneously during the first year of life. Persistent cases often requires probing, intubation, or balloon dacryocystoplasty. Refractory cases have been successfully managed by endoscopic dacryocystorhinostomy (DCR) in adults and children. Some children have a bony obstruction that must be opened with DCR, or some patients have acquired NLDO that requires DCR. The endoscopic technique is a safe and quick alternative to external DCR, which is considered the gold standard, but avoiding an external scar is preferable for many patients. We aim to explain the essential steps of endoscopic DCR, the potential risks, and an example of the dictated procedure note.

Keywords NLDO • Nasolacrimal duct • Obstruction • Dacryocystoplasty • Dacryocystorhinostomy • DCR • Probing • Tearing • Intubation • Congenital

Indications

Congenital or acquired nasolacrimal duct obstruction that failed less invasive procedures, or bony distal obstruction. Symptoms include constant epiphora, discharge, or recurrent and chronic dacryocystitis.

Essential Steps

1. Obtain consent and mark the operative site before transferring the patient to the operating room.
2. Perform a time out and clean the eye with 5 % povidone iodine solution.
3. Use a punctal dilator to dilate the (*lower/upper*) punctum.
4. Pass a Bowman probe through the NLD system to confirm the nature of the obstruction.
5. Use the zero-degree endoscope to visualize the intranasal anatomy, then pack the nose with oxymetazoline (Afrin®) soaked patties for 5 min.

M. Alkharashi (✉) • D. VanderVeen
Department of Ophthalmology, Boston Children's Hospital, Harvard Medical School, Boston, MA, USA
e-mail: Maan.Alkharashi@childrens.harvard.edu; Deborah.Vanderveen@childrens.harvard.edu

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_145

6. Replace the probe with an illuminated 20-gauge fiberoptic light pipe, advancing it into the nasolacrimal sac, and as far into the nasolacrimal canal as possible.
7. Remove the patties and use the endoscope with light source off to directly visual the illuminated mucosa, and identify where the ostomy should be created (*this may be under the inferior turbinate, or anterior to the middle turbinate, depending on the level of obstruction; if the middle or inferior turbinate is obstructing the view, infracture it using a periosteal elevator*).
8. Using the endoscope with the light on, visualize and inject the area of maximal illumination with 1 % lidocaine with epinephrine 1:100,000 on a long 27 gauge needle.
9. Use a sickle knife to incise the mucosa over the illuminated area.
10. Use a small rat-tail punch with gentle pressure to make a small opening in the bone covering the light.
11. Enlarge the opening, and remove excess mucosa around the new bony opening with an up-angled biting forceps.
12. Remove excess mucosa around the new bony opening with forceps.
13. Sufficient mucosal and bony tissue is removed until the light pipe can be easily passed through the new opening into the nasal vault.
14. Remove the light pipe and intubate the lacrimal system using a (*bicanalicular/monocanalicular(x2)*) tube.
15. Put a drop of combination steroid-antibiotic, and clean the eye.

Complications

- Postoperative pain
- Bleeding
- Infection
- Persistent tearing with need for more surgery
- Damage to the eye and vision loss
- Orbital injury
- Intracranial injury
- Lacrimal sac fibrosis and scarring

Template Operative Dictation

Preoperative diagnosis: Nasolacrimal obstruction of the (*right/left*) eye

Procedure: Endoscopic dacryocystorhinostomy of the (*right/left*) eye

Postoperative diagnosis: Same

Indication: This ____-year-old (*male/female*) has persistent (*congenital/acquired*) nasolacrimal duct obstruction resulting in (*excessive tearing/epiphora/recurrent/chronic dacryocystitis*). The risks, benefits, and alternatives to the procedure were reviewed with the patient and (*his/her*) family, they requested that we proceed with (*right/left*) endoscopic dacryocystorhinostomy (DCR) and signed the required consent forms.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table where standard cardiac and respiratory monitors were placed by anesthesia. General anesthesia was administered. A time-out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

Initially, inspection of the nasolacrimal system was performed. On cleansing the lids, additional massage of the nasolacrimal sac showed reflux of (*clear tears/mucopurulent/other*) material, indicating a complete obstruction. Each punctum was inspected and noted to be patent. Nasal endoscopy was performed, and a large, somewhat congested inferior turbinate was seen. Oxymetazoline-soaked patties were then used to pack the nose. A punctal dilator was introduced into the (*lower/upper*) punctum of the (*right/left*) eye, followed by a #__*1*__ Bowman probe that was passed through the lacrimal system as far as the ______. However, the probe could not be passed into or visualized in the nose.

A 20-gauge light pipe was then introduced via the (*lower/upper*) punctum, and advanced as far as possible. A zero-degree nasal endoscope was used to then visualize the area of maximal brightness from the light pipe, and this was found (*under the inferior turbinate/(near/anterior) to the middle turbinate*). Under endoscopic visualization, lidocaine 1 % with epinephrine 1:100,000 was injected over the illuminated area. The nose was again packed with oxymetazoline soaked patties for hemostasis. The sickle knife was used to excise the mucosa over the light pipe, and then a *small* rat-tail punch was used to make a small opening in the bone covering the light pipe. The opening was enlarged with the (*punch/up-biting forceps*) to a diameter of __*(4–5)*__ mm. The forceps were used to remove excess mucosa around the new bony opening. After sufficient mucosal and bony tissue were removed, the light pipe was easily passed through the opening into the nasal vault. The opening appeared to be adequate for good tear drainage. The light pipe was withdrawn and a (*monocanalicular/bicanalicular*) tube was placed via the (*upper/lower*) punctum.

[Choose one]

If bicanalicular tube was used**—**[*Chap.* *53*] *The lacrimal drainage system was then intubated with a Crawford intubation set with a (0.025/___ in.) silicone diameter. The upper and lower canalicular stents were retrieved from the nose with a (Crawford hook/other). The stem of a cotton-tipped applicator was placed underneath the silicone tubing in the medial canthal angle. The Crawford stent was then tied with a square knot at the nasal cavity without putting undue tension on the punctum. The square knot rested within the inferior meatus. A 6-0 black silk ligature was tied around the silicone tubing in a figure-of-eight fashion just below the square knot. The Q-tip applicators were removed. The silicone stents were trimmed so that they would not be long enough to protrude from the nose.*

If monocanalicular tube was used—[*Chap.* 54] *A Mini Monoka stent was then sized to ___ mm, placed into the lower punctum, and advanced with 0.12 forceps. This was again repeated with a size ___ mm stent for the upper punctum.*

The tubes were noted to be properly seated within the puncta. The instruments were removed and the skin was cleaned with wet and dry towels. Tobramycin/dexamethasone drops were placed in the eye(s). The patient tolerated the anesthesia and procedure well, and (*he/she*) was transferred to the PACU in stable condition. Dr. ____, the attending staff, was present and scrubbed for the duration of the procedure.

Part VII
Cosmetic Surgery

Chapter 146
Facelift: Deep Plane

Craig N. Czyz

Abstract A facelift (rhytidectomy) is a procedure designed to restore the youthful appearance of the aging face. There are many types of facelifts that vary in the extent and depth of dissection as well as surgical techniques. While each technique carries a unique name, the main types of facelifts are skin only, SMAS plication, SMAS ectomy, subperiosteal, and deep plane.

Keywords SMAS • Orbicularis wedge • Plication • Facial rejuvenation

The extended multiplanar multivector facelift is a type of extended sub-SMAS facelift that includes a suborbicularis oculi muscle and sub-SOOF dissection to interrupt the infraorbital osteocutaneous ligaments and also an excision of a wedge of the orbital portion of the orbicularis oculi muscle.

Indications: Patients seeking cosmetic correction of facial aging. The primary symptoms of facial aging include volume descent and/or atrophy, ligamentous laxity, bony remodeling, tissue texture changes, and muscle atrophy.

Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives. Cessation of smoking should be mandatory prior to surgery.

Essential Steps

1. Preoperative marking of the skin incisions and "danger areas."
2. Administration of tumescent local anesthetic of the face (*and neck*). General anesthesia is preferred.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_146

If submental liposuction and/or platysmaplasty performed:

(a) Skin incision posterior to the submental crease.
(b) Dissection of the fat and fascia overlying the platysma.
(c) Liposuction of the preplatysmal fat.
(d) Subplatysmal dissection from the point of skin incision to the cricoid cartilage.
(e) The midline platysma is grasped and redundancy is excised in a diamond fashion.
(f) The platysma is then sutured in a running corset manner.

3. Skin incision is made and skin flap is developed using transillumination.
4. SMAS flap is dissected inferior to the zygomatic arch and superior to the border of the mandible.
5. Orbicularis wedge dissection and excision is performed.
6. The SMAS flap is placed in traction for the desired lift vector and sutured in place.
7. Redundant SMAS is excised.
8. The skin is redraped without tension and redundancy is excised.
9. Fibrin sealant is sprayed over the SMAS flap and under the skin flap then held in place with moderate pressure for 5 min.
10. The skin incision is closed.

If submental liposuction and/or platysmaplasty performed:

(a) Hemostasis of the neck area is confirmed.
(b) Fibrin sealant is sprayed over the platysma and under the skin flap then held in place with moderate pressure for 5 min.
(c) The submental incision is closed.

11. Placement of antibiotic ointment.
12. Placement of dressings.

Complications

- Overcorrection
- Undercorrection
- Infection
- Wound dehiscence
- Hemorrhage/hematoma
- Seroma
- Sialocele
- Asymmetry
- Hypertrophic scarring
- Hemorrhage
- Motor nerve injury
- Sensory nerve injury (hypesthesia/paresthesia)
- Skin flap necrosis

– Alopecia/hairline deformity
– Earlobe malposition
– Vascular injury (external jugular vein)

Operative Dictation

Preoperative diagnosis: (1) Facial myofasciodermatochalasis; (2) cervical lipomatosis; (3) platysma redundancy

Procedure: (1) Extended multiplanar multivector facelift (rhytidectomy); (2) submental liposuction; (3) platysmaplasty

Postoperative diagnosis: *Same*

Surgeon:

Assistant:

Anesthesia:

Estimated blood loss:

Complications:

Indication: This ____-year-old _____ (*race*) (*male/female*) has a history of facial aging causing an undesired cosmetic appearance. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area. The patient was placed in an upright position and the incisions were marked. (*Additionally*, *areas of anatomic importance were marked*.) The patient was then taken to the operating room and placed supine on the operating room table. General anesthesia was administered by (*hospital/surgery center*) anesthesia department. Tumescent anesthetic consisting of ________ was infiltrated in the face (*and neck*) for a total volume of ___cc. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery.

If submental liposuction and/or platysmaplasty performed:

(*Additional local anesthetic consisting of ____ was injected in the submental incision area for a total volume of ___cc.*) A 3 cm skin incision was made with a 15 blade in the submental area approximately 2 mm posterior to the submental crease. Sharp dissection was performed through skin and superficial fat down to the fascia overlying the platysma muscle. Sharp dissection was performed for approximately 5 mm anterior to the incision in the superficial fat layer. Hemostasis was maintained with monopolar cautery. Sharp dissection was then performed with facelift scissors in the submental area and neck down to the level of the cricoid cartilage and laterally to the anterior border of the SCM muscles staying just inferior and parallel to the inferior border of the mandible in the subcutaneous fat layer leaving 2 mm of fat attached to the dermis. Liposuction was then performed with a liposuction cannula to remove the subcutaneous fat from the superficial surface of the superficial cervical fascia covering the platysma muscle.

The redundant platysma was then addressed. A small incision was made just deep to the skin incision through the platysma muscle, and facelift scissors were used to bluntly dissect just beneath the platysma muscle to the cricoid cartilage and approximately 5 cm laterally. A section of midline redundant platysma and fascia was grasped with forceps and resected with scissors to below the level of the cricoid cartilage in a diamond-like pattern. A platysmaplasty was then performed with a continuous 2-0 PDS suture starting at the submental crease and suturing down to the cricoid cartilage and oversuturing back to the submental crease in a corset fashion. The cervicoplasty submental incision was temporarily reapproximated with a single 2-0 PDS suture.

(*Additional local anesthetic consisting of ____ was injected in the area of the right side marked incision areas for a total volume of ___cc.*) A 15 Bard Parker blade is used to make the skin incision. A #10 blade is used to dissect sharply at the plane between the subdermal fat and the superficial fat over the superficial fascia (SMAS) in the preauricular area. This plane is developed anteriorly for about 4 cm and continues down to just below the earlobe. The subcutaneous dissection in the preauricular area is extended cephalically superficial to the superficial temporal fascia for 3 cm above the helix insertion, taking care to stay inferior to the zygomaticotemporal vein.

The postauricular skin flap is then developed using a #10 blade to separate along the deep layer of the superficial fat. This subcutaneous flap elevation continues with a scalpel down to approximately the insertion of the earlobe where the pre- and postauricular flaps are linked. Caution is exercised superior to and at previously marked McKinney's point to protect the great auricular nerve. The flap is elevated under direct vision down the lateral neck to the level of the cricoid cartilage and posteriorly to the anterior border of the trapezius muscle. The subcutaneous dissection is continued anteriorly with facelift scissors to approximately 3–4 cm anterior to a vertical line dropped from the preauricular incision. The anterior extent of this undermining exposes the lateral 3 cm of the posterior border of the SMAS-platysma in the neck and the SMAS-platysma in the inferior cheek and joins the previous cervicoplasty subcutaneous dissection.

The dissection focus returns to the lateral face. Starting superiorly about 1 cm above the insertion of the helix, the subcutaneous plane is opened forward to the lateral orbital rim superficial to the orbital portion of the orbicularis oculi muscle superficial investing fascia and deep to the subcutaneous fat. It is continued inferiorly in the cheek to a vertical line dropped from the lateral canthus in the upper cheek and extends to approximately 3 cm posterior to the oral commissure in the lower cheek and then extends inferior to the body of the mandible and anterior to a line drawn approximately from the lateral limbus to the midportion of the mandible. This subcutaneous dissection joins the subcutaneous dissection in the neck. Hemostasis is maintained with monopolar cautery.

The SMAS flap incision is drawn with *methylene blue/surgical marking pen*. It starts over the superficial fascia investing the orbital portion of the orbicularis oculi muscle at the junction of the lateral and infraorbital rims and is drawn to the inferior border of the anterior zygomatic arch at the palpable posterior border of the origin of the superficial head of the masseter muscle. The marking line continues posteriorly along the inferior border of the zygomatic arch to 5 mm anterior to the preauricular skin incision. The marking then is continued inferiorly to the ear lobule 5 mm anterior to the preauricular skin incision and continues 5–10° posteriorly inferior to the ear lobule to the inferior extent of the subcutaneous neck dissection (level of the cricoid cartilage).

Local anesthetic consisting of ____ was injected in the area of the marked SMAS incision areas for a total volume of ___cc. The SMAS incision was then made with a #10 blade. The sub-SMAS dissection is accomplished with the #10 blade in the plane just superior to the sub-SMAS fat superiorly and the parotid fascia inferiorly. The dissection proceeds forward to approximately the junction of the horizontal and diagonal markings. The sub-SMAS dissection superficial to the parotid fascia continues forward to the anterior portion of the parotid gland where the tissue becomes less adherent.

Neck sub-SMAS (platysma) flap dissection was accomplished with the tonsil hemostat spreading vertically over the area posterior to the angle of the mandible to protect the cervical and marginal mandibular branches of the facial nerve. Neck sub-SMAS (platysma) flap dissection is accomplished with the tonsil hemostat spreading vertically and extended beneath the neck and SMAS flap to the previous neck sub-SMAS flap dissection and down to the level of the cricoid cartilage. Anterior to the antigonial notch of the angle of the mandible, the neck sub-SMAS flap dissection is accomplished superiorly up to the inferior border of the mandible. The external jugular vein and the great auricular nerve were exposed at the posterior part of the dissection and found to be intact.

After completing the neck sub-SMAS flap dissection, the dissection is continued anteriorly over the masseteric fascia which is superficial to the buccal branches of the facial nerve. This is accomplished with gentle vertical spreading of the tonsil hemostat with blunt dissection anteriorly to the masseteric fasciacutaneous ligaments and origin of the risorius muscle at the anterior portion of the masseter muscle. Dissection is then continued into the buccal fat through these ligaments with cautious vertical dissection with the tonsil hemostat.

Orbicularis Wedge

An incision is made with a #10 blade along the diagonal marking through the superficial fascia and the orbital portion of the orbicularis oculi muscle. Anterior dissection is continued inferior to the zygomatic arch until the perforating branch of the transverse facial artery is exposed. The zygomatic osteocutaneous ligaments are next separated. Cautious blunt scissor dissection then is continued along the diagonal incision in the suborbicularis oculi fat (SOOF) in an inferomedial direction until the origin of the zygomaticus major muscle is identified. Dissection is then continued deep to the SOOF and superficial to the deep fascia inferior to the infraorbital rim extending to a vertical line dropped from the medial canthus to interrupt the infraorbital osteocutaneous ligaments. Cautious blunt scissor dissection is then accomplished superficial and parallel to the zygomaticus major muscle elevating the superficial layer of the investing superficial fascia (SMAS) over the zygomaticus major and minor muscles. Cautious blunt scissor dissection releases any osteocutaneous or fasciacutaneous ligaments that resist passive mobilization of the entire SMAS flap.

Traction is then placed on the SMAS flap in a superolateral vector, and an incision is made in the SMAS flap at the location of desired fixation to the preauricular fascia. An interrupted 2-0 PDS suture is placed to secure the SMAS flap. The SMAS flap tissue overlapping the horizontal and diagonal component of the incision is then excised with facelift scissors. A pie-shaped section of the orbital portion of the orbicularis oculi muscle is also excised with scissors. A running 2-0 PDS suture is utilized to suture the diagonal and horizontal component of the SMAS flap to adjacent SMAS.

Superolateral traction is placed on the SMAS flap, and an incision is made in the SMAS flap at the parotid cutaneous ligament and fixated with an interrupted 2-0 PDS suture. The overlying neck sub-SMAS flap in the inferior portion of the neck dissection is then excised approximately 1 cm anterior to the fixed SMAS.

Interrupted 2-0 PDS sutures were used to close the SMAS along a posterior vector.

The SMAS was then inspected for hemostasis, using monopolar cautery to address any issues. The skin flap was then redraped without tension, and the skin flap overlying the antihelix of the ear is incised with facelift scissors to the junction of the earlobe attachment. Fibrin sealant is then sprayed between the skin flap and SMAS, and the skin is redraped with compression placed over the skin flap for 5 min. The skin is incised at the level of the fixed skin at the crus helix, and a buried 5-0 vicryl suture was placed. The postauricular flap was then placed in the correct position and a second suture is placed at the conchal level. The redundant postauricular flap is then excised, and closure is performed at the hairline after a beveling of the hair-bearing portion of the flap is accomplished to allow the hair follicles to produce hair through the scar. Closure is performed using interrupted 5-0 vicryl in the deep layers and continuous 5-0 fast-absorbing gut in the skin. The flap is then trimmed to redrape the skin on the posterior conchal surface and is approximated with running 5-0 fast-absorbing plain gut.

The redundant skin overlapping the sideburn and preauricular incision is then excised, and closure is performed using buried, interrupted 5-0 vicryl sutures in the subcutaneous layer and running 5-0 fast-absorbing plain gut for the sideburn and preauricular skin incision.

The identical procedure was repeated on the left side.

If submental liposuction and/or platysmaplasty performed:

The previously placed 2-0 PDS suture was removed. The area of platysmaplasty was then inspected for hemostasis, and any issues were addressed with monopolar cautery. Fibrin sealant was sprayed into the submental and neck area and compression was held for 5 min. The submental incision was reapproximated with interrupted 5-0 vicryl sutures in the subcutaneous tissue, and the skin was closed with a running 6-0 Neurolon suture.

Ophthalmic antibiotic ointment was instilled into the (*right/left*) eye and across the incision(s). (*Described dressings placed if any.*) The patient tolerated the procedure well, was awoken from general anesthesia, and was then taken to the recovery area in stable condition.

Chapter 147
Facelift, Plication

Craig N. Czyz and Jill A. Foster

Abstract A facelift (rhytidectomy) is a procedure designed to restore the youthful appearance of the aging face. There are many types of facelifts that vary in the extent and depth of dissection as well as surgical techniques. While each technique carries a unique name, the main types of facelifts are skin only, Superficial Musculo Aponeurotic System (SMAS) plication, SMAS ectomy, subperiosteal, and deep plane.

The SMAS plication is a superficial facelift where a skin flap is formed without elevating a SMAS flap. The SMAS vectors of lifting are achieved by one or more purse-string sutures placed through the SMAS.

Keywords SMAS • Plication • Facial rejuvenation • Purse string • Facelift

Indications

Patients seeking cosmetic correction of facial aging. The primary symptoms of facial aging include volume descent and/or atrophy, ligamentous laxity, bony remodeling, tissue texture changes, and muscle atrophy. Patients with extensive issues of the lower third of the face are poor candidates for superficial lifting

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

J.A. Foster
Nationwide Children's Hospital, Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Department of Ophthalmoloby, The Ohio State University, Columbus, OH, USA
e-mail: Fosterj@jillfoster.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_147

techniques. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives. Cessation of smoking should be mandatory prior to surgery.

Essential Steps

1. Preoperative marking of the skin incisions.
2. Administration of tumescent local anesthetic of the face (*and neck*).
3. General anesthesia is preferred.
   If submental liposuction and/or platysmaplasty performed—
4. *Skin i*ncision posterior to the submental crease.
5. Dissection of the fat and fascia overlying the platysma.
6. Liposuction of the preplatysmal fat.
7. Subplatysmal dissection from the point of skin incision to the cricoid cartilage.
8. The midline platysma is grasped and redundancy is excised in a diamond fashion.
9. The *platysma is then sutured in a running corset manner.*
10. Skin incision is made and skin flap is developed using transillumination.
11. Purse-string sutures are placed in the SMAS to achieve the desired vector of lift.
12. The skin is redraped without tension and redundancy is excised.
13. Fibrin sealant is sprayed over the SMAS flap and under the skin flap, then held in place with moderate pressure for 5 min.
14. The skin incision is closed.
    If submental liposuction and/or platysmaplasty performed—
15. Hemostasis of the neck area is confirmed.
16. Fibrin sealant is sprayed over the platysma and under the skin flap, then held in place with moderate pressure for 5 min.
17. The submen*tal incision is closed.*
18. Placement of antibiotic ointment.

Complications

- Overcorrection
- Undercorrection
- Infection
- Wound dehiscence
- Hemorrhage/hematoma
- Seroma
- Sialocele
- Asymmetry
- Hypertrophic scarring
- Hemorrhage
- Motor nerve injury
- Sensory nerve injury (hypesthesia/paresthesia)
- Skin flap necrosis
- Alopecia/hairline deformity
- Earlobe malposition

Template Operative Dictation

Preoperative diagnosis: (1) Facial Myofasciodermatochalasis, *((2) Cervical Lipomatosis, and (3) Platysma Redundancy)*

Procedure: (1) SMAS plication (rhytidectomy), ((2) *Submental liposuction*, and (3) *Platysmaplasty*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of facial aging causing an undesired cosmetic appearance. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient and/or patient's guardians. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area. The patient was placed in an upright position and a surgical marking pen was used to mark a face lift incision along the left temple down to the pretragal area around the earlobe to the posterior auricular region. The same exact incision was marked along the right side as well. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/ Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Tumescent anesthetic consisting of ________ was infiltrated in the face (*and neck*) for a total volume of ___ cm^3. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery.

If a submental liposuction and/or platysmaplasty performed*—(Additional local anesthetic consisting of ____ was injected in the submental incision area for a total volume of ___ cm^3.)* A _3_ cm skin incision was made with a #15 blade in the submental area approximately _2_ mm posterior to the submental crease. Sharp dissection was performed through skin and superficial fat down to the fascia overlying the platysma muscle. Sharp dissection was performed for approximately _5_ mm anterior to the incision in the superficial fat layer. Hemostasis was maintained with monopolar cautery. Sharp dissection was then performed with facelift scissors in the submental area and neck down to the level of the cricoid cartilage and laterally to the anterior border of the SCM muscles staying just inferior and parallel to the inferior border of the mandible in the subcutaneous fat layer leaving _2_ mm of fat attached to the dermis. Liposuction was then performed with a liposuction cannula to remove the subcutaneous fat from the superficial surface of the superficial cervical fascia covering the platysma muscle.

The redundant platysma was then addressed. A small incision was made just deep to the skin incision through the platysma muscle and facelift scissors were used to bluntly dissect just beneath the platysma muscle to the cricoid cartilage and approximately _5_ cm laterally. A section of midline redundant platysma and fascia was grasped with forceps and resected with scissors to below the level of the cricoid cartilage in a diamond-like pattern. A platysmaplasty was then performed with a continuous 2-0 PDS suture starting at the submental crease and suturing down to the cricoid cartilage and over suturing back to the submental crease in a corset fashion. The cervicoplasty submental incision was temporarily reapproximated with a single 2-0 PDS suture.

Beginning on the left side, a #15 Bard-Parker blade was used to incise skin and subcutaneous tissue along the previously marked line. Beginning on the superior border near the (*left/right*) temple, small facelift scissors were used to dissect through the subcutaneous tissue. This was done using combination of blunt and sharp dissection. Hemostasis was maintained with (*mono/bi*) polar cautery. Using transillumination through the skin flap, dissection was carried down all the way around the ear and to the retroauricular areas and dissecting the flap also to the stemocleidomastoid muscle and away from the posterior auricular tissues. (*The dissected plane was connected with the submental dissection performed previously*).

2-0 (*Prolene/PDS*) suture was used to plicate the SMAS in the desired vector of lift. This was accomplished by passing the suture through the SMAS in a purse-string fashion at the comer of the mouth and anchoring it at the fascia medial to the superior portion of the tragus. Next, another purse-string suture was passed through the SMAS from the mandible to the fascia adjacent to the inferior border of the tragus and anchored. The contour of the mandible and midface were evaluated for the desired lift vector and amount. (*Additional 2-0 (Prolene/PDS) sutures were used in a similar fashion to further translocate the SMAS into the desired lifted position.*)

The identical procedure was repeated on the *right* side.

The bilateral contour and symmetry of the plication were evaluated at this time and found to be appropriate. The skin flap was then redraped with no tension, and redundant tissue was excised using facelift scissors. Hemostasis of the skin flap and SMAS was confirmed. Next, fibrin sealant was sprayed onto the SMAS surface and the skin flap was held into place over this with moderate pressure for 5 min. The earlobe angle was then reformed, excising redundant tissue and anchoring the flap to the posterior auricular tendon using a buried *5-0 Vicryl* suture. Once this had been accomplished, the skin was closed using a combination of running and interrupted *6-0 plain gut* sutures.

If submental liposuction and/or platysmaplasty performed—The previously placed *2-0 PDS* sutures were removed. The area of platysmaplasty was then inspected for hemostasis following submittal liposuction and any issues were addressed with monopolar cautery. Fibrin sealant was sprayed into the submental and neck area and compression was held for 5 min. The submental incision was reapproximated with interrupted *5-0 Vicryl* sutures in the subcutaneous tissue and the skin was closed with a running *6-0 Nurolon* suture.

Ophthalmic antibiotic ointment was instilled into the *(right/left)* eye and across the incision(s). The patient tolerated the procedure well, was awoken from general anesthesia, and was then taken to the recovery area in stable condition.

Chapter 148
Endoscopic Brow Lift

Craig N. Czyz and Jill A. Foster

Abstract Eyebrow and forehead lifting addresses eyebrow position and loose or wrinkled forehead skin and underlying tissue. The endoscopic brow and forehead lift is a procedure utilized to correct brow ptosis and forehead rhytids in a more cosmetically appealing manner than other brow lifting procedures. This is primarily accomplished by camouflaging the incisions sites in hair-bearing scalp. Additionally, eyebrow shape and asymmetry can be addressed with this type of lift. This type of brow lift is technically more demanding on the surgeon than other types of direct or open brow lifts and should only be performed by someone who has appropriate training and experience.

Keywords Endoscopic • Brow lift • Facial rejuvenation • Rhytids • Forehead lifting

Indications

Patients seeking cosmetic correction of brow ptosis and forehead rhytids. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives. Cessation of smoking should be mandatory prior to surgery.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

J.A. Foster
Nationwide Children's Hospital, Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Department of Ophthalmoloby, The Ohio State University, Columbus, OH, USA
e-mail: Fosterj@jillfoster.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_148

Essential Steps

1. Preoperative marking of incisions.
2. Administration of local anesthetic to the scalp, temple, and supraorbital nerve area (general anesthesia is preferred).
3. Three or five central/paracentral scalp incisions are made and blunt dissection is performed 2 cm superior to the orbital rims.
4. Bilateral temporal incisions are made with dissection to the deep temporalis fascia and carried out through the 2 cm superior to the orbital rims.
5. Dissection is continued endoscopically releasing the periosteum of the supraorbital rim and the conjoined tendon.
6. An anchoring apparatus is placed in the scalp incisions.
7. The forehead flap is secured to the anchoring apparatus to achieve the desired lift.
8. Scalp incisions are closed.
9. Temporal incision is closed in a layered fashion (while redundant tissue is excised).
10. Placement of antibiotic ointment.
11. Placement of compression dressing.

Complications

– Overcorrection
– Undercorrection
– Infection
– Wound dehiscence
– Hemorrhage/hematoma
– Brow asymmetry
– Motor nerve injury
– Sensory nerve injury (hypesthesia/paresthesia)
– Alopecia/hairline deformity
– Mechanical failure of fixation

Template Operative Dictation

Preoperative diagnosis: (1) Bilateral Brow ptosis and *(2) Forehead rhytids*

Procedure: (1) Endoscopic brow lift, bilateral

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of brow ptosis causing an undesired cosmetic appearance. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area. The patient was placed in an upright position and the scalp and temple incisions, as well as the location of the supraorbital notch were marked. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic ________ was injected into the area of the supraorbital notch, (*five/seven*) scalp incision sites, and zygomatic facial area, _2_ cm^3 each. (*Dilute local anesthetic consisting of ________ was infiltrated across the forehead and scalp for a total volume of ___ cm^3*.) The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery.

A #15 Bard-Parker blade was used to make the central and paracentral scalp incisions down to bone. Hemostasis was maintained with (*mono/bi*) polar cautery. A Freer elevator was used to dissect the three central incisions down to the bone elevating the periosteum. The posterior apex of the incision was marked on the bone with (*cautery/drill hole/other*). The two temporal incisions were performed with a #15 Bard-Parker blade. Blunt dissection with (*blunt scissors/#__ elevator/other*) to the depth of the deep temporalis fascia was carried out to approximately _2_ cm above the supraorbital rim, at which point the endoscopic camera and #__ elevator was used to elevate the remaining tissue along the supraorbital rim. The periosteum was released along the supraorbital rim taking care to protect the supraorbital neurovascular bundles. ((*Release/division/excision) of the procerus and corrugators was performed centrally.*)

[Choose One]

If using Endotines for fixation—Endotines (___ mm) were placed in the two pericentral scalp incisions. The forehead and scalp were advanced superiorly to the desired position and then anchored to the Endotines. *4-0 Vicryl* sutures were placed subcutaneously and the scalp incisions were closed over the Endotines.

If using bone tunnel for fixation—A ___ drill with a __ mm stopped bit was used to make oblique tunnels spaced _4–5_ mm apart that meet centrally. A *3-0* (*Prolene/PDS*) suture is passed through the tunnel and sutured to the periosteum at the edge of the inferior apex of the incision.

If using titanium plates for fixation—A _2×4_ mm titanium screw was then used to fix a two-hole titanium bone plate to the previously drilled holes at the posterior apex of the paracentral incisions. A single *2-0 PDS* suture was placed through the subcutaneous tissue, galea aponeurotica, subgaleal areolar fascia, and the periosteum of the anterior portion of the corresponding incision. This suture was passed and tied through the anterior bone plate hole. The same procedure was performed for the remaining paracentral incisions.

Attention was turned to the temporal incisions, where the desired amount of lateral lift was assessed. (*An additional __ mm of excess skin was removed from the* *posterior aspect of the incision to facilitate further temporal elevation.*) The deep tissues of the incision were fixated to the deep temporalis fascia with *4-0* (*Vicryl/Prolene/PDS*) to achieve the desired vector and amount of elevation. The skin of all scalp incisions was then closed with skin staples.

Ophthalmic antibiotic ointment was instilled into the *(right/left)* eye and across the incision(s). The patient's hair was washed. Compression dressings were placed ____. The patient tolerated the procedure well, (*was awoken from general anesthesia*), and was then taken to the recovery area in stable condition.

Chapter 149
Ablative Laser Resurfacing (CO_2)

Craig N. Czyz

Abstract Ablative carbon dioxide laser targets water in the epidermis and dermis as a chromophore causing their destruction. Thermal injury to the dermis promotes collagen remodeling and theoretically skin "tightening." New epidermal cells are regenerated from the pluripotent epithelial cells of the hair follicles. Unlike fractionated CO_2 laser therapy, the patient requires only a single treatment; however, postoperative management is more involved and extended.

Keywords Carbon dioxide laser • Ablation • Dermis • CO_2 • Ablative laser

Indications

Patients seeking cosmetic improvement of facial aging. Oral antibiotics and antivirals should be given prior to the procedure. Patients should be of appropriate Fitzpatrick classification for this type of laser treatment. Patients should not have used Accutane within 1 year of treatment. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. Anesthesia
2. Metallic corneal shield placement
3. Laser treatment
4. Skin dried with a cool air device
5. Topical ointment

Complications

– Infection (bacterial/viral)
– Hypopigmentation

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_149

– Hyperpigmentation
– Extended erythema
– Milia
– Acne
– Scarring
– Cicatricial ectropion

Template Operative Dictation

Preoperative diagnosis: Facial (*and neck*) (*Photodamage/Dyschromias/Rhytids*)

Procedure: Face (*and neck*) CO_2 laser skin resurfacing

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of facial aging causing an undesired cosmetic appearance. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area. The patient was placed in an upright position and a surgical marking pen was used to mark the facial units. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

Metallic corneal shields were placed over both eyes. A second prep of the face and neck was performed with alcohol. The facial (and neck) laser skin resurfacing was performed with a ____ (laser model). An initial pass of the face was performed with the following settings: energy per pulse ___, power ___, rate ____, density _____, and pattern/size _____. Care was taken not to overlap previously treated areas. Devitalized skin was removed with a 4 × 4 soaked in saline. A second pass of the face was performed with the following settings: energy per pulse ___, power ___, rate ____, density _____, and pattern/size _____. (The neck as then treated with a single pass using the following settings: energy per pulse ___, power ___, rate ____, density _____, and pattern/size _____).

The skin was dried well with a cool hair dryer. The corneal shields were removed from both eyes. (*Aquaphor was applied to all treatment areas/Flexzan dressing was placed on the face and neck. Polysporin was placed over the exposed skin.*)

Ophthalmic antibiotic ointment was instilled into the *(right/left)* eye. The patient tolerated the procedure well, (*was awoken from general anesthesia*), and was then taken to the recovery area in stable condition.

Chapter 150
Cosmetic Botulinum Toxin Treatment

Craig N. Czyz

Abstract Botulinum toxin has many applications for improving facial appearance by altering muscle action. This can include reducing dynamic rhytids (i.e., wrinkling of the skin from underlying muscle contraction) and balancing the facial esthetic units. There are currently multiple commercially available botulinum compounds available, all of which have the same essential mechanism of action, but slightly altered chemical compositions. It should be noted that each of these compounds has specific FDA approval for specific injection sites; however, these products are regularly used "off label" to treat other areas.

Keywords Dynamic rhytids • Wrinkles • Botulinum • Neurotoxin • Cosmetic • Botox

Indications

Patients who wish to improve facial appearance by reducing the prominence of dynamic wrinkles and/or altering the position of facial structures. Common areas of treatment include the forehead, glabella, nasal bridge (bunny lines), periocular (crows feet), brows, perioral (lipstick lines), melolabial/labiomental folds (marionette lines), chin, and neck (platysmal bands). Patients should have been evaluated and deemed appropriate for such surgical intervention. Contraindications to treatment include prior allergic reaction, injection into areas of inflammation, breast feeding, pregnancy category C, diseases of the neuromuscular junction, usage of aminoglycosides, sensitivity to or concern for human blood products (albumin), and static rhytids. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_150

Essential Steps

1. Per FDA regulations, a copy of the Medication Guide must be provided to the patient for review prior to treatment.
2. *Administration of topical anesthetic.*
3. Reconstitute botulinum in vial to desired concentration with unpreserved, sterile saline.
4. Mark injection sites with patient in seated, upright position.
5. *Prep skin with desired antibacterial agent.*
6. Inject at desired locations at a 45° angle with a 1 cm^3 syringe and 30 gauge needle.
7. Apply pressure if ecchymosis develops.
8. Document units injected per site, type of botulinum injected, lot number of botulinum vial(s) used, and response/reactions to previous treatments.

Complications

- Hemorrhage/hematoma
- Infection
- Ecchymosis
- Asymmetry
- Ectropion
- Eyelid ptosis
- Eyelid retraction
- Brow ptosis
- Brow retraction
- Lagophthalmos
- Dry eye syndrome
- Corneal exposure
- Epiphora
- Diplopia
- Lip droop
- Drooling
- Swallowing difficulty
- Difficulty maintaining head position

Template Operative Dictation

Preoperative diagnosis: (1) Facial Rhytids *and ((2) Platysmal banding)*

Procedure: (1) Botulinum toxin injections

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) had developed (*list symptoms from above*) over the past ____ (*months/years*) and on clinical evaluation was found to have dynamic rhytids of the (*list areas*) (*and malposition of the brows/oral angle/*___). A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. The patient was given the Medication Guide for (*type of botulinum used*) to review. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified and marked with a surgical marking pen with the patient seated upright in the treatment chair. (*Topical anesthetic consisting of ___ was applied to the injection areas.*) The patient's face was then prepped with ____ (alcohol/betadine/___). A time out was performed verifying correct patient, procedure, and operative site(s).

The (*type of botulinum*) was reconstituted with ____ mL of unpreserved, sterile saline per vial (lot numbers: __). Using an 18 gauge needle, the botulinum was drawn into a 1 cm^3 syringe. A 30 gauge needle was then placed on the syringe for patient injection. Each previously marked site was injected at a 45° angle with the needle positioned (*intramuscularly/immediately superior to the muscle*). (*Pressure was applied to (area) as ecchymosis developed following injection.*) A total of ___ units of botulinum was injected at the sites as depicted in the diagram in the *electronic medical records system*. (*If unable to produce a diagram due to the limitations of the medical records system, then you will need to list each injection site and the number of units injected at each.*)

The patient tolerated the procedure well and left the office in stable condition.

Chapter 151
Cosmetic Tissue Filler Treatment

Craig N. Czyz

Abstract The aging face is characterized by relative loss of bone and soft tissue, including collagen and dermal volume with a resultant deflation of soft tissue. This volume deficit and static rhytids can be improved by soft tissue augmentation with fillers. There are many varieties of FDA approved, commercially available soft tissue fillers in addition to autogenous fat. Soft tissue fillers typically are described by their chemical structure and their mechanical viscosity. Although there are often multiple choices of filler materials that may be used to treat a given area, some locations will have preferred materials based on individual filler characteristics.

Keywords Static rhytids • Volume deficit • Hyaluronic acids • Cosmetic • Dermal fillers

Indications

Patients who wish to improve facial appearance by reducing the prominence of static wrinkles, replenish facial volume, and/or alter the position of facial structures. Common areas of treatment include the glabella, superior sulcus, periocular (crows feet), brows, tear trough, malar, lips, melomental/labiomental folds (marionette lines), nasolabial folds, pre-jowl sulcus, temporal hollowing, and pre-parotid hollowing. Patients should have been evaluated and deemed appropriate for such surgical intervention. Generalized contraindications to treatment include prior allergic reaction, injection into areas of inflammation, hypersensitivity to any of the components of the product, breast feeding, and pregnancy. These vary between filler types and the package insert should be referred to for specifics. Precaution should be taken in patients with possible risk of inflammatory reaction at site of implantation, previous procedures causing a dermal response, use of immunosuppressive therapy, bleeding disorders or anticoagulation therapy, history of keloid or hypertrophic scarring, and history of recurrent herpetic eruptions. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_151

Essential Steps

1. Administration of topical (and/or local) anesthetic.
2. *Prepare product per manufacturer guidelines (if required).*
3. Mark injection sites with patient in seated, upright position.
4. Prep skin with desired antibacterial agent.
5. Inject at desired locations using product supplied needles or physician desired needle or cannula.
6. Apply pressure if ecchymosis develops.
7. Document volume injected per site, type of filler injected, lot number of vial(s) used, and response/reactions to previous treatments.

Complications (*Note Each Type of Tissue Filler Has Unique Complications***)**

– Hemorrhage/hematoma
– Infection
– Erythema
– Ecchymosis
– Asymmetry
– Over/undercorrection
– Inflammatory hyperpigmentation
– Vascular occlusion/infiltration
– Tissue necrosis
– Venous compression
– Vascular blanching
– Nodules
– Tyndall effect
– Allergic reactions
– Granulomas

Template Operative Dictation

Preoperative diagnosis: (1) Facial volume loss (*and (2) static rhytids*)

Procedure: (1) (*compound*) injection

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) had developed facial volume loss over the past ____ (*months/years*) and on clinical evaluation was found to have cosmetic deficiency of the (*list areas*). A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified and marked with a surgical marking pen with the patient seated upright in the treatment chair. Topical anesthetic consisting of ___ was applied to the injection areas. (*Local anesthetic consisting of* ___ *was injected in* ___ *(list areas).*) The patient's face was then prepped with (*alcohol/betadine/other*).

[Choose One]

For poly-L-lactic acid fillers—The (*PLLA type of filler*) was reconstituted with ____ mL of unpreserved, sterile saline and ___ mL of lidocaine per vial. Using an 18 gauge needle, the compound was drawn into a __ cm^3 syringe. The filler was then injected using a 25 gauge needle in a (*depot/fanning/crosshatching/other*) manner in the (*list area*). A total volume of ___ cm^3 was injected as depicted on the injection diagram below. (*If unable to produce a diagram due to the limitations of the medical records system, then you will need to list each injection site and the number of units injected at each*).

For all other fillers not requiring reconstitution—A __ gauge (*needle/cannula*) was then placed on the syringe. The (list area/structure) was injected in a (*depot/fanning/crosshatching/linear threading*) manner. (*Pressure was applied to (area) as ecchymosis developed following injection.*) A total of ___ units of filler was injected at the sites as depicted in the diagram below. (*If unable to produce a diagram due to the limitations of the medical records system, then you will need to list each injection site and the number of units injected at each*).

The patient tolerated the procedure well and left the office in stable condition.

Chapter 152
Dermis Fat Graft (DFG) for Superior Sulcus Volumetric Rejuvenation

Craig N. Czyz and Jill A. Foster

Abstract Aging changes of the superior sulcus require unique considerations for rejuvenation. The superior sulcus is in close proximity to the globe and orbital structures, and therefore modifications present challenges that are not encountered elsewhere on the face. Muscles of the eye and lid, and their associated nerves, pass in close proximity or directly within the superior sulcus. The superior sulcus is also the location of the lacrimal gland and the superior ophthalmic vein. Disruption of these structures can result in a spectrum of minor deleterious cosmetic alterations to vision threatening side effects. Dermis fat grafting may be utilized independently or concurrently with other facial rejuvenation procedures to improve periorbital volume and cosmesis.

Keywords Dermis fat graft • DFG • Superior sulcus • Volume • Volumetric rejuvenation

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

J.A. Foster
Nationwide Children's Hospital, Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Ophthalmic Surgeons and Consultants of Ohio, Columbus, OH, USA

Department of Ophthalmoloby, The Ohio State University, Columbus, OH, USA
e-mail: Fosterj@jillfoster.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_152

Indications

Patients with volume deficiency of the superior sulcus resulting in a "deep" or "sunken" appearance. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. Preoperative marking of the site for dermis fat graft harvesting.
2. Administration of local anesthetic at sulcus and graft harvest site (general or monitored anesthesia can be used).
3. Eyelid crease incision is made.
4. Dissection through the preaponeurotic fat pad capsules.
5. Measuring dimensions of graft required.
6. Harvesting the dermis fat graft.
7. Closing the dermis fat graft donor site.
8. Suturing the dermis fat graft in place.
9. Reforming the eyelid crease.
10. Placement of antibiotic ointment.

Complications

- Overcorrection
- Undercorrection
- Infection
- Wound dehiscence
- Graft failure
- Graft resorption
- Asymmetric eyelid contour
- Scarring
- Hemorrhage
- Dermatochalasis

Template Operative Dictation

Preoperative diagnosis: Superior sulcus volume deficiency (*right/left*)

Procedure: Dermis fat grafting to the superior sulcus (*right/left*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) has a history of *(bilateral/right/left)* volume loss in the superior sulcus causing an undesired cosmetic appearance. A detailed review of risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. Following this, the decision was made to proceed with surgery and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen, as well as, the *(right/left) (inframammary fold/abdomen/thigh)* for the dermis fat graft. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Local anesthetic, _____ was injected into the (*right/left*) superior sulcus and dermis fat graft site. The patient was then prepped and draped in the usual sterile fashion for oculofacial plastic surgery, and similarly at the donor site.

An eyelid incision was made with a #15 Bard-Parker blade at the position of the desired lid crease. The orbicularis was opened with monopolar cutting cautery using a Colorado cautery tip. Scissors were used to open the orbital septum, and the landmark of the preaponeurotic fat was identified. The capsules of the preaponeurotic and nasal fat pads were then incised. Deliberate dissection was performed to delineate and expose the anterior capsule of the fat pads. The horizontal length of the eyelid incision was then measured at ___ mm. The corresponding length was then marked at the dermis donor site.

Attention was then turned to harvesting the graft. An elliptical dermis fat graft of ___×___ mm was measured and marked on the *(inframammary fold/abdomen/thigh)* skin with a surgical marking pen. The measurement was intentionally oversized 20–30 % to account for postoperative atrophy. A #15 Bard-Parker blade was used to incise through the epidermis, with special care taken to leave the dermis intact in order to make removal of the epidermis easier. Once the epidermal incision was made, Westcott scissors and forceps were used to dissect the epidermis away from the underlying dermis. Once the epidermis was removed, the #15 Bard-Parker blade was used to complete the incision through the dermis. The graft was then harvested using curved iris scissors and forceps with attention paid to harvesting the appropriate amount of subcutaneous fat along with the dermis. Hemostasis was obtained with monopolar cautery. The donor site was closed using buried, interrupted *4-0 Vicryl* sutures for the deep subcutaneous tissue, followed by buried, interrupted *6-0 Vicryl* for the superficial subcutaneous tissue. A running *6-0* (*plain/chromic*) *gut* suture was used for skin closure. Antibiotic ointment was applied to the suture site (*and it was dressed with tefla/tegraderm*).

The dermis fat graft was shaped to the corresponding contours of the sulcus defect. The graft was placed in the eyelid with the dermis facing anteriorly and the fat in apposition to the exposed preaponeurotic fat pads. Using *6-0 polygalactin on a P-1 needle*, the superior 180° of the dermis border was anchored in place to the superior edge of the preaponeurotic fat capsule. The inferior 180° of the dermis fat graft was not sutured. (*The graft was again trimmed and contoured to fit the available space.)* The upper lid skin and orbicularis were draped over the dermis fat graft to assess volume. There was an approximately *_20–30_* % overcorrection as desired.

Eyelid crease reformation sutures of *6-0 polygalactin* were placed from the orbicularis muscle at the inferior border of the eyelid crease incision to the anterior surface of the levator aponeurosis at *2–3* mm intervals. The eyelid crease skin incision was closed with simple interrupted sutures of *6-0 plain gut*.

Ophthalmic antibiotic ointment was instilled into the *(right/left)* eye and across the incision(s). The patient tolerated the procedure well, (*was awoken from general anesthesia*), and was then taken to the recovery area in stable condition.

Part VIII
Trauma

Chapter 153
Eyelid Laceration Repair, Superficial and Deep

Alanna S. Nattis

Abstract Treatment of ocular trauma commonly involves repair of eyelid lacerations, both superficial and deep. Superficial eyelid lacerations involving just skin and orbicularis usually only require skin sutures. Occasionally, lacerations may extend deep into the eyelid or orbit, requiring more extensive tissue reapposition and repair. Repair of these lacerations should involve debridement of the wound with sterile saline +/− antibiotic solution, as well as removal of all foreign bodies/particulate matter before wound closure. Laceration depth should be carefully noted, as lacerations that violate the orbital septum need to be treated with care and meticulously closed.

Keywords Eyelid laceration • Eyelid • Trauma • Repair • Deep • Superficial

Indications

Superficial eyelid laceration, deep eyelid laceration.

Essential Steps

1. Removal of foreign bodies
2. Proper irrigation and exploration of wounds
3. Identification of layers
4. Reapposition of tissue planes
5. Wound dressing

Complications

– Missed injury
– Infection
– Lid notching
– Irregular eyelid contour

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_153

– Shortening of eyelid fornices
– Lagophthalmos
– Exposure keratopathy
– Septal perforation
– Prolapse of orbital fat
– Corneal abrasions

Template Operative Dictation

Preoperative diagnosis: Lower lid medial laceration, and lower lid lateral laceration over the (*right/left/bilateral*) *eye(s).*

Procedure: Repair of lower lid medial laceration, and lower lid lateral laceration over the (*right/left/bilateral*) *eye(s).*

Postoperative diagnosis: *Same*

Indication: This ___-year-old, (*alert/ventilatory dependent*) (*female/male*) status-post (*MVC/MCC/assault/fall/trauma with traumatic brain injury/other*) was found to have multiple facial, and eyelid lacerations with disruption of normal eyelid architecture, necessitating repair. After a detailed review of risks and benefits, informed consent was obtained from the patient's health care proxy who elected to have the patient undergo the procedure.

Description of the procedure: The patient was identified in the Trauma Intensive Care Unit (TICU), and the *(right/left)* eye was marked with a marking pen. After a proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, all lacerations were extensively irrigated and explored to rule out presence of foreign bodies or gross contamination. (*She/He*) was identified to have two (*right/left*) (upper/lower) eyelid lacerations, one located medially, approximately ___cm inferior to the eyelid margin and ___mm in length, and the other located laterally, approximately ___cm inferior to the (*right/left*) lateral canthus, approximately ___mm in length. The (*upper/lower*) eyelid lacerations (*were noted to/did not*) violate the muscular plane. The *(right/left)* eye was prepped and draped in the usual sterile fashion. Local anesthetic was injected subcutaneously using ____ mL of ___ % lidocaine (*with/without*) epinephrine. The *(right/left)* eye was prepped and draped in the usual sterile fashion.

[Choose when relevant]

If deep*—Attention was first turned toward the lateral (right/left) (upper/lower) lid laceration which was noted to involve the pretarsal orbicularis oculi muscle. The muscle fibers were reapproximated using ___ interrupted (6-0 Vicryl) sutures followed by skin closure using ___ interrupted (6-0 silk) sutures, ensuring full thickness epidermal and dermal bites. Next, the medially located (right/left) (upper/lower) eyelid laceration, which was noted to have involvement of the tarsal plate,* *was addressed. During the primary repair, each layer was carefully identified, and sequentially reapposed. First the tarsal plate, followed by the orbicularis muscle fibers were each reapproximated using ___ interrupted (6-0 Vicryl) sutures. The skin was then closed using ___ interrupted (6-0 silk) sutures.*

If superficial *– Attention was then taken to address the (right/left) (upper/lower) superficial lid lacerations. The lateral (right/left) (upper/lower) eyelid laceration was reapproximated, using ___ interrupted (6-0 silk) sutures taking full thickness epidermal and dermal bites. Similarly, the medially located (right/left) (upper/lower) eyelid laceration was also reapproximated using (6-0 silk) sutures in a similar interrupted fashion, taking care to assure atraumatic handling of the tissue with avoidance of undue tension.*

After ensuring that all wounds were well approximated using quality primary intention methods and techniques, the sites were cleaned using a wet and dry 4×4, followed by the application of bacitracin ointment. The patient tolerated the procedure without complication and remained in the trauma ICU for further care.

Chapter 154
Repair of Marginal Laceration

Alanna S. Nattis

Abstract Treatment of ocular trauma commonly involves repair of eyelid margin lacerations. Repair of these lacerations requires exquisite attention to eyelid tissue reapproximation in order to recreate a normal lid contour. Attention is directed towards recreating a regular lash line, avoiding lid notches and reestablishing normal anatomy and function. Repair of these lacerations should involve debridement of the wound with sterile saline +/− antibiotic solution, as well as removal of all foreign bodies/particulate matter before wound closure.

Keywords Marginal eyelid laceration • Eyelid • Laceration • Repair • Margin • Trauma

Indications

Marginal eyelid laceration.

Essential Steps

1. Removal of foreign bodies
2. Proper irrigation and exploration of wounds
3. Identification of layers
4. Reapproximation of tarsal plate and vertical mattress suture
5. Reapposition of tissue planes
6. Wound dressing

Complications

– Infection
– Lid notching
– Irregular eyelid contour
– Lagophthalmos
– Exposure keratopathy
– Septal perforation

A.S. Nattis (✉)
Cornea and Refractive Surgery Fellow, Ophthalmic Consultants of Long Island, Rockville Centre, NY, USA
e-mail: asn516lu@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_154

– Prolapse of orbital fat
– Corneal abrasions

Template Operative Dictation

Preoperative diagnosis: (*Upper/Lower*) lid marginal laceration over the (OD/OS) eye.

Procedure: Repair of (*upper/lower*) lid marginal laceration over the (OD/OS) eye.

Postoperative diagnosis: *Same*

Indication: This ___-year-old (*female/male*) status-post (*MVC/MCC/assault/fall/trauma/other*) was found to have a marginal eyelid laceration with disruption of normal eyelid architecture, necessitating repair. After a detailed review of risks and benefits, informed consent was obtained and the patient elected to undergo the procedure.

Description of the procedure: The patient was identified in the emergency department, and the *(right/left)* eye was marked with a marking pen. After a proper time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case, the laceration was extensively irrigated and explored to rule out presence of foreign bodies or gross contamination. (*She/He*) was identified to have a (*right/left*) (*upper/lower*) eyelid marginal laceration approximately ____ cm from the punctum and ___ mm in length. Local anesthetic was injected subcutaneously using ____ mL of ___ % lidocaine (*with/without*) epinephrine. The *(right/left)* eye was prepped and draped in the usual sterile fashion.

The first of two marginal *6-0 Vicryl* sutures was passed through the gray line in order to appose the posterior edges of the (right/left) (upper/lower) lid marginal laceration. The second suture was then passed through the lash line; while a third, *6-0 silk* suture was placed as a vertical mattress between the locations of the two previously placed sutures. After the alignment of the eyelid margin was confirmed, all three sutures were tied independently. Each layer was then carefully identified, and sequentially reapposed. First the tarsal plate, followed by the orbicularis muscle fibers were each reapproximated using ___ interrupted (6-0 Vicryl) sutures. The skin was then closed using ___ interrupted (6-0 silk) sutures.

After ensuring that the marginal wound was well approximated, the site was cleaned using a wet and dry 4×4, followed by the application of bacitracin ointment. The patient tolerated the procedure without complication and remained in the trauma emergency department for further care.

Chapter 155
Repair of Canalicular Laceration

Kenneth V. Cahill and Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Canaliculus • Laceration • Avulsion • Intubation • Trauma • Repair of canalicular laceration • Repair of canalicular avulsion • Epiphora

Indications

Canalicular laceration or avulsion. Patient may be asymptomatic at time of evaluation or experiencing epiphora.

Essential Steps

1. Administration of topical anesthetic and local anesthetic with infiltration around the lacrimal sac, lateral nasal mucosa, and inferior turbinate (infratrochlear and infraorbital nerve block).
2. Packing the nasal cavity with 0.5×3 in. neuro sponges, moistened with oxymetazoline and 4 % lidocaine.
3. Placement of protective corneoscleral shield.
4. The upper and lower puncta are dilated (*If only upper or lower canaliculus is affected, the noninvolved canaliculus is probed to the sac and irrigated to make sure that there are no preexisting or concomitant blockages in the remainder of the lacrimal drainage system*).

The original version of this chapter was revised. An erratum to this chapter can be found at DOI 10.1007/978-3-319-45495-5_161

K.V. Cahill (✉)
Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA

Department of Ophthalmology, The Ohio State University, Columbus, OH, USA
e-mail: Kcahill@columbus.rr.com

C.N. Czyz
Tennessee Oculoplastics, Nashville, TN, USA
e-mail: neverman@tnoculoplastics.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_155

5. The lateral end of the lacerated canaliculus is identified.
6. The medial lacerated edge of the canaliculus should be observable in a mirror image location (*if it cannot be located, irrigation to the opposite canaliculus can be performed using fluorescein stain solution, air, or viscoelastic material*).
7. The silicone intubation modality chosen for the patient should be passed through the canaliculus in a manner appropriate for the specific modality.
8. The cut ends of the canaliculus are directly anastomosed with three or preferably four polyglactin sutures using a small diameter one-half circle needle.
9. The lid margin and skin edges are then repaired.
10. Bicanalicular tubing should be positioned, secured, and trimmed (*Monocanalicular stent should be seated*).
11. The corneoscleral shield and any remaining nasal packing is removed. Antibiotic eyedrops and/or ointment can be instilled on the operative eye. (*Closed eyelids are covered with an occlusive eye patch taped in place*).

Complications

– Epiphora
– Stent migration
– Scarring
– Hemorrhage
– Infection
– Wound dehiscence
– Epistaxis
– Foreign body sensation

Template Operative Dictation

Preoperative diagnosis: (*Upper/Lower*) *(right/left)* canalicular (*laceration/avulsion*)

Procedure: (1) Plastic repair of (*upper/lower*) canaliculi (*right/left*) and (2) *Probing of nasolacrimal duct with insertion of stent*

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) sustained a canalicular (*laceration/avulsion*) ____ (*hours/days*) ago. Clinical examination including probing and irrigation confirmed a disruption of the (*upper/lower*) (*right/left*) canaliculus. Exploration and repair of the (*laceration/avulsion*) is warranted to achieve optimal alignment and functioning of the eyelid, and to help decrease chances for persistent epiphora. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. The patient understands that surgical risks include hemorrhage, infection, scarring, blindness, failure to eliminate the tearing problem, and possible need for further surgery. Following this discussion of complications, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient was greeted in the preoperative area where the correct patient, surgical site(s), and surgical procedure(s) were confirmed. The forehead above the (*right/left*) eye was initialed with a surgical marking pen and an arrow drawn pointing to the operative eye. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/ Monitored conscious sedation*) was administered by the (*hospital/surgery center*) anesthesia department. Topical anesthetic, Proparacaine was placed into the (*right/ left*) eye. Local anesthetic consisting of ________ was injected into the (*right/left*) medial canthus, lacrimal sac area, lateral nasal mucosa, and middle turbinate. (*Additionally an infratrochlear and infraorbital nerve block was administered.*) _#_ 0.5 in. × 3 in. neurosurgical sponge's were moistened with oxymetazole solution and placed in the middle and inferior meatus of the nose. The tagging strings of the neurosurgical sponges were tied together and taped to the patient's cheek. The patient was then prepped and draped in the usual, sterile fashion appropriate for the procedure. A timeout was conducted with the OR staff and the correct patient, surgical site, and surgical procedure were again confirmed.

A protective corneoscleral contact lens was placed in the (*right/left*) eye. The upper and lower puncta were dilated. The uninjured canaliculus was probed with a ___ Bowman probe to the lacrimal sac and irrigation of the sac flowed freely into the nasopharynx. The probe was then passed through the punctum of the lacerated canaliculus and the site of the laceration was noted with the Bowman probe being visible exiting the lacerated end. The position of the lateral lacerated end of the canaliculus was noted with respect to the lid margin, conjunctiva, and overlying skin. The corresponding location was identified and the medial lacerated portion and the canaliculus was identified.

Silicone intubation was performed utilizing (*Crawford stents/silicone intubation/Mini monoka*).

[Choose One]:

If Crawford stents were used*—The first end of the stent was passed through the punctum of the lacerated canaliculus and out the distal end. It was then passed through the previously identified proximal end, lacrimal, and nasal lacrimal duct. The stent was then retrieved from the nasal cavity using a (Crawford hook/other). The other end of the stent was passed in a similar manner through the intact canaliculus. The stent ends were left untied until closure, where they were then tied in the nose and trimmed. Interrupted 6-0 fast-absorbing plain gut sutures were then used to align the skin edges.*

If silicone tubing was used*—A pigtail probe was passed through the intact canaliculus. The probe was then gently rotated such that it passed through the common canaliculus and emerged through the lacerated proximal end. A 6-0 Prolene suture was threaded through the eye of the probe and rotated out the punctum of the intact canaliculus. The probe was then passed into the punctum of the lacerated canaliculus and out the distal end. A piece of silicone tubing ___ mm in length was then threaded over the Prolene suture. The suture with the overlying silicone tubing was advanced* *through the canaliculus. Following closure, the Prolene suture was then tied with the knot buried inside the stent. The stent was then rotated moving the knot out of the palpebral fissure into the canaliculus.*

If monocanalicular stent (Mini monoka) was used*—The monoka stent was sized to ___ mm and advanced through the punctum of the lacerated canaliculus. It was passed through the distal end and then advanced into the proximal portion. Following closure, the stent was ensured to be seated in the punctum.*

_#_ 6-0 Vicryl sutures a curved needle were used to directly anastomose the cut edges of the canaliculus and reapproximate the pericanalicular tissue. *Four* such sutures were placed and left untied. *Serrafine clips were also used to keep the ends of the preplaced 6-0 Vicryl sutures together.* Additional interrupted buried *5-0 Vicryl sutures* were used to reinforce the medial canthal tendon. Once all sutures were placed, they were then all tied and trimmed. Interrupted skin sutures of were placed to complete the repair.

The protective corneoscleral contact lens was removed from the eye.

After the sterile drapes were removed, ophthalmic antibiotic ointment was applied to the (right/left) eye and skin sutures and the closed eyelids were covered with an eye patch taped securely in place. Ophthalmic ointment was instilled into the (*right/left*) eye. The patient tolerated the procedure well without complication, and was then taken back to the recovery area in stable condition.

Chapter 156
Full-Thickness Eyelid Laceration Repair

Craig N. Czyz and Kelly R. Everman

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Laceration • Tarsus • Lid margin • Full-thickness • Trauma • Eyelid repair

Indications

Lacerations of the upper or lower eyelid involving the lid margin and tarsus. Lacerations that involve tissue loss greater than 25 % of the horizontal lid length require adjunct procedures for repair. Lacerations medial to the punctum should be probed to rule out canalicular laceration.

Essential Steps

1. Administration of topical anesthetic and local anesthetic
2. Corneal shield placement
3. Exploration, debridement, and irrigation of wound
4. Manipulation of the tissues to reapproximate anatomical position
5. *Adjunct procedures (if lid cannot be reapproximated directly under normal tension)*
6. Sutures to align lid margin and reapproximate tarsus
7. Closure of skin
8. Removal of the corneal shield

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

K.R. Everman
Tennessee Oculoplastics, Nashville, TN, USA
e-mail: Keverman@tnoculoplastics.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_156

Complications

- Hemorrhage
- Infection
- Wound dehiscence
- Scarring/lid notching
- Entropion
- Trichiasis

Template Operative Dictation

Preoperative diagnosis: (*Upper/Lower*) eyelid laceration, full-thickness *(right/left)*

Procedure: Repair of (*upper/lower)* eyelid laceration, full-thickness *(right/left)*

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) status-post (*MVC/MCC/assault/fall/trauma*) was found to have a full-thickness eyelid laceration with disruption of normal eyelid architecture, necessitating repair. After a detailed review of risks and benefits, informed consent was obtained and the patient elected to undergo the procedure.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by (*hospital/surgery center*) anesthesia department. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A corneal shield was placed in the *(right/left)* eye. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Topical anesthetic, Proparacaine was placed into the *(right/left)* eye. Local anesthetic consisting of ________ was injected into the (*right/left*) upper eyelid.

Attention was then turned to the *(right/left)* (*upper/lower*) lid. The wound was explored and debrided with ____ material *(viewed/removed).* The wound was then copiously irrigated. Two 0.5 Castroveijo forceps were then used to manipulate the tissues back into anatomical position.

[Choose One]

For defects <25 % of lid*—The free margins of the lid approximated well under normal tension.*

For defects 25–50 % of lid*—see canthotomy dictation then continue below*

For defects 50–75 % of lid*—see tenzel flap dictation then continue below*

For defects greater than 75 % of lid*—see Hughes flap dictation only as the below does not apply.*

[Choose One]

If using vertical mattress closure—A 6-0 Vicryl vertical mattress suture was placed through the meibomian gland orifices to provide lid margin alignment and eversion. _#_ interrupted 5-0 Vicryl sutures were placed in the anterior tarsus to provide tarsal alignment. A 6-0 Vicryl vertical mattress suture was placed anterior to the grey line, such that the lash line was aligned and the lid margin was slightly everted. (*A 6-0 interrupted Vicryl suture was used to close the orbicularis*). The eyelid skin was closed with _#_ interrupted 6-0 plain gut sutures.

If using simplified horizontal mattress closure—A 6-0 Vicryl suture was placed through the anterior portion of the vertical mid-tarsus and exiting at the lash line. The suture was then passed through the grey line and out the posterior vertical mid-tarsus. Next, the needle was passed through the opposite posterior mid-tarsus, exiting through the grey line. The suture was passed through the lash line and out the anterior vertical mid-tarsus where it was tied. (_#_ *additional interrupted 6-0 Vicryl suture(s) were placed in the anterior tarsus to provide additional tarsal alignment*.) The orbicularis and lid skin was reapproximated with _#_ interrupted 6-0 plain gut sutures.

The lid was well approximated and in good position. The corneal shield was then removed from the *(right/left)* eye. Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 157
Orbital Floor Fracture Repair

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Blowout fracture • Orbital fracture • Floor fracture • Fracture • Orbit • Diplopia • Trauma

Indications

Orbital floor fracture of greater than 50% and/or causing symptomatic complications. Symptoms may include diplopia, motility restriction, pain, and globe malposition. Patients with inferior rectus incarceration or entrapment require more emergent repair with age further directing interventional timing. Patients with concurrent orbital hemorrhage and/or globe injury usually undergo delayed repair once vision threatening issues have resolved. All patients should undergo CT imaging of the orbits prior to surgical planning. Those who sustained fracture as part of a penetrating injury should also receive an MRA to rule out vascular involvement prior to intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. Administration of topical anesthetic and local anesthetic
2. Corneal shield placement
3. Placement of a traction suture in lower eyelid
4. *Lateral canthal incision with canthotomy and inferior cantholysis*
5. Transconjunctival incision and dissection to orbital rim

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_157

6. Incision of perisoteum at the inferior orbital rim
7. Elevation of periosteum of the orbital floor
8. (*Release/elevation*) (*entrapped/prolapsed*) tissue
9. Size, place, *and secure* implant
10. Closure—*perisoteum, conjunctiva, canthal tendon*
11. Removal of the corneal shield
12. Placement of frost suture

Complications

– Hemorrhage
– Overcorrection
– Undercorrection (persistent enophthalmos)
– Infection
– Wound dehiscence
– Scarring
– Implant migration/extrusion
– Optic nerve injury
– Vision loss
– Persistent diplopia/motility restriction
– Inferior rectus palsy
– Infraorbital nerve injury/hypesthesia
– Eyelid retraction
– *Blood borne pathogens (if fibrin sealant used)*
– *Canthal angle dystopia (if using canthoplasty performed)*

Template Operative Dictation

Preoperative diagnosis: Orbital floor (blowout) fracture (*right/left*)

Procedure: (1) Repair of orbital floor (blowout) fracture (*right/left*) with alloplastic implant, (2) *Temporary Tarsorrhaphy* (*right/left*), *(3) Canthoplasty (right/left)*

Postoperative diagnosis: Same

Indication: This ___-year-old (*race*) (*male/female*) sustained a *(right/left)* orbital floor fracture ____ (*days*) ago and on clinical evaluation was found to have (*right/left)* (*diplopia/motility restriction/enophthalmos/infraorbital hypesthesia/subcutaneous emphysema*). A maxillofacial CT of the orbits showed a floor fracture of ___ % of the floor (*with medial rectus incarceration/entrapment/displacement/orbital fat prolapse/orbital hemorrhage*). Based on these findings (*delayed)* fracture repair was indicated. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained. (If fibrin sealant used, the risk of bloodborne pathogens should be discussed).

Description of the procedure: The patient and operative site were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. (*General anesthesia/Monitored conscious sedation*) was administered by the (*hospital/surgery center*) anesthesia department. Topical anesthetic consisting of Proparacaine placed into the (*right/left*) eye. The patient was then prepped and draped in the usual, sterile, full-face oculofacial plastic fashion. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment. Local anesthetic consisting of ________ was injected into the (right/left) lower eyelid, (lateral canthus), and infraorbital nerve region. A corneal shield was placed in the (right/left) eye.

A 4-0 silk traction suture was placed through the (*lash line/lid margin*) of the (*right/left*) lower eyelid.

If lateral canthoplasty was performed—*A #15 Bard-Parker blade was used to make a ___ mm incision in the (right/left) lateral canthal angle. Using Westcott scissors, monopolar cutting cautery, and 0.5 Castroviejo forceps dissection of the orbicularis and subcutaneous tissues proceeded towards the lateral orbital rim exposing the canthal tendon, its inferior crus, and periosteum. The scissors were then used to cut the lower limb of the tendon in order to fully disinsert. Hemostasis was then maintained with monopolar cautery on a Colorado needle tip.*

The monopolar cautery was then used to mark the conjunctiva directly inferior to the lower lid tarsus. After everting the eyelid over a cotton swab, sharp tipped Westcott scissors were used to incise across the conjunctiva and through the retractor band. Using the *4-0 silk* traction suture, upper traction to the lid was applied along with downward retraction of the cheek by the assistant. Dissection continued with the 0.5 forceps and Westcott scissors in a preseptal plane to the inferior orbital rim. The monopolar cautery was then used to incise the periosteum at the inferior orbital rim. Periosteum was subsequently elevated off the orbital rim with a Freer elevator. A *6-0 Vicryl* suture was placed through the superior portion of the conjunctiva and was then reflected superiorly and secured to the draping using a Hartman hemostat.

Dissection continued using (*cotton tip swabs, #7 French suction, and malleable retractors*) along the orbital floor posteriorly. Care was taken to avoid upward traction and compression of the optic nerve. The anterior portion of the fracture was identified (*medially, centrally, laterally*) approximately ____ mm posterior to the orbital rim. Dissection followed the fracture line *medially* and *laterally*. Tissues were gently separated as to not cause injury to the infraorbital nerve. (*Dissection was then continued to the medial and lateral walls.) (A significant amount of tissue was elevated from the depressed floor wound in the maxillary sinus.)* Dissection continued until the posterior portion of the intact orbital floor was visualized. At this time, a ______(*Titan/other*) orbital implant was sized for placement over the defect. After inserting the implant into the orbit, it was further resized for a better fit. The implant was dipped in a sterile saline and antibiotic solution and then placed over the defect beneath the periosteum and orbital tissues. (*It was then secured in place* *using one self-drilling 4-mm titanium screw placed just behind the lateral inferior orbital rim*.)

Forced duction testing was conducted with no restriction in all gazes.

The traction sutures through the conjunctiva and periosteum were then released. (*The periosteum was closed using interrupted 6-0 Vicryl sutures.*).

***If Canthoplasty performed*—*A 5-0 Vicryl suture was then placed through the lateral tarsus, inferior tendon crus, and then anchored to periosteum and tendon at the lateral orbital rim immediately inferior the superior crus of the canthal tendon. This was not tied at this time. (If tissue sealant used to close conjunctiva see below, then resume here.) The conjunctival wound was then closed with _#_ interrupted 6-0 plain gut sutures. A buried, interrupted 6-0 Vicryl suture was then passed grey line to grey from upper to lower lid to reform the lateral canthal angle. The suture was temporally tightened to assess lid position. The 5-0 Vicryl suture was then tied down. The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion. The skin incision was then closed using simple, interrupted 6-0 plain gut sutures.*

***If tissue sealant used to close conjunctiva*—*(Tisseel/Artiss/other sealant) was then used to close the conjunctival incision. Two Castroviejo 0.5 forceps were used to grasp the free conjunctival ends in order to expose the wound. Approximately ___ cm^3 of sealant was (injected/sprayed) into the wound bed and posterior surface of the conjunctiva. The free conjunctival edges were then reapproximated, and held in place for 2 min allowing the glue to dry.*

The corneal shield was then removed from the *(right/left)* eye. The *4-0 silk* traction suture placed in the lower eyelid was then taped above the right upper brow in the manner of a Frost suture. Antibiotic ophthalmic ointment was placed into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 158
Orbital Compartment Syndrome: Canthotomy/Cantholysis/Canthal Cutdown

Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords Orbital compartment syndrome • Orbital hemorrhage • Proptosis • Afferent pupillary defect • Canthotomy • Cantholysis • Canthal cutdown

Indications

Vision loss and/or afferent pupillary defect with increased orbital pressure resulting from orbital congestion, typically due to hemorrhage. Increased orbital pressure secondary to added volume results in orbital compartment syndrome—an ophthalmic emergency. Symptoms may include vision loss, increased ocular pressure, afferent pupillary defect, orbital hemorrhage, proptosis, and loss of retinal blood flow.

Essential Steps

1. Administration of deep sedation or local anesthetic.
2. Corneal shield placement.
3. Lateral canthal incision.
4. Lysis of the inferior (*and superior*) crus of the lateral canthal tendon.
5. Cautery for hemostasis of orbicularis and/or lid margin.
6. Opening of septum at the orbital rim in anatomically safe zone.
7. Removal of the corneal shield.
8. Recheck IOP.
9. Recheck retinal blood flow.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_158

Complications

- Hemorrhage
- Infection
- Scarring
- Canthal angle dystopia
- Insufficient decompression
- Optic nerve injury (*if cutdown performed*)
- Orbital muscle or nerve injury (*if cutdown performed*)

Template Operative Dictation

Preoperative diagnosis: (*1) Orbital compartment syndrome, ((2) Orbital hemorrhage, and (3) Ocular hypertension (right/left))*

Procedure: (1) Canthotomy, (2) Cantholysis (*inferior/superior*), and (3) Canthal cutdown (*anterior orbitotomy*) on the *(right/left)*

Postoperative diagnosis: Same

Indication: This ____-year-old _____ (*race*) (*male/female*) developed *(right/left)* (*vision loss, increased ocular pressure, afferent pupillary defect, orbital hemorrhage, proptosis, and/or loss of retinal blood flow*) over the past ____ (*h/min*) and on clinical evaluation was found to have (*bilateral/unilateral)* orbital compartment syndrome. Visual acuity was __/__ (*OD/OS*), IOP ___ mmHg, (+/−) APD, (+/−) proptosis, (+/−) orbital hemorrhage, and (+/−) retinal blood flow. A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified (*at bedside in the ED/in the preoperative area*), and the *(right/left)* eye was marked with a surgical marking pen.

[Choose One]

If patient brought to the OR*—The patient was brought to the operating room where the eyes, adnexal structures, and face were sterilized with 5 % betadine ophthalmic solution. The patient was draped in the standard sterile fashion for oculoplastic surgery. (General anesthesia/Monitored conscious sedation) was administered by (hospital/surgery center) anesthesia department.*

If done emergently at bedside*—The procedure was performed emergently at bedside, where the eyes and adnexal structures were swabbed with betadine swabs. Conscious sedation was provided the ED physician. The patient was then prepped and draped in a sterile fashion appropriate for the procedure.*

A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case. Topical anesthetic, Proparacaine, was placed into the *(right/left)* eye. Local anesthetic consisting of ________ was injected into the (*right/left*) lateral canthus. A corneal shield was placed in the *(right/left)* eye.

A hemostat was used to crush clamp the lateral canthus, and left in place for approximately ___ s. A (*#15 Bard-Parker blade/Stevens scissors/Iris scissors/Westcott scissors*) was used to make a ___ mm incision in the *(right/left)* lateral canthal angle. (*Adson-Brown/0.5 Castroviejo forceps*) were used to distract the lateral lower lid away from the globe. The *scissors* were inserted into the lateral canthal incision, and oriented inferiorly. The inferior crus of the tendon was then transected. The tissue was "strummed" to insure full release of the crus. (*Hemostasis was then maintained with (monopolar/bipolar) cautery*).

If superior crus of the tendon was transected—The scissors were then oriented in a superior direction and using the forceps to distract the upper lid from the globe, the superior crus of the tendon was transected. Again the tissues were "strummed" to insure complete release (*Hemostasis was then maintained with (monopolar/bipolar) cautery.*).

If canthal cutdown performed—Sharp tipped iris scissors were used to incise the septum and enter the inferior lateral quadrant of the orbit between (*right orbit: 7–8 o'clock hours –or– left orbit: 4–5 o'clock hours*) using spreading movements. Next a (*hemostat/blunt Metzenbaum scissors*) were used to expand the septal opening using spreading movements. The instrument was then advanced posteriorly along the orbital floor approximately ____ mm while gently spreading was performed to violate the compartment septae.

The corneal shield was then removed from the *(right/left)* eye. The intraocular pressure was measured using a ____ and found to be ___ mmHg. A dilated fundus exam was repeated and showed retinal blood flow was present (*with/without*) any other pathology noted.

Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and incision site. A sterile gauze was placed with paper tape over the lateral canthus. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 159
Zygomaticomaxillary Complex (ZMC) Fracture Repair

Kelly R. Everman and Craig N. Czyz

Abstract Patients should have been evaluated and deemed appropriate for such surgical intervention. The procedure should be considered for patients with unilateral or bilateral displacement of the zygomaticomaxillary complex with malar flattening, trismus, canthal dystopia, diplopia, globe malposition, or enophthalmos. Surgical treatment should be completed within 2 weeks from the time of injury. Patients with inferior rectus incarceration or entrapment require more emergent repair with age further directing interventional timing. However, patients with concurrent orbital hemorrhage and/or globe injury usually undergo delayed repair once vision-threatening issues have resolved. All patients should undergo CT imaging of the orbits and facial bones prior to surgical planning. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Keywords ZMC • Zygomaticomaxillary complex • Fracture • Repair • Tripod • Malar eminence • Enophthalmos • Trismus • Trauma

Indications

Zygomaticomaxillary fracture with symptomatic trismus, cosmetic malar deformity/flattening, lateral canthal dystopia, ocular exposure, lid retraction, diplopia, globe malposition, or enophthalmos greater than 2 mm.

Essential Steps

1. Administration of local anesthetic in periorbital region and intra-orally
2. Corneal shield placement

K.R. Everman (✉)
Tennessee Oculoplastics, Nashville, TN, USA
e-mail: Keverman@tnoculoplastics.com

C.N. Czyz, DO, FACOS, FACS
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_159

3. Lateral canthotomy and cantholysis
4. Release of conjunctiva and retractor band
5. Periosteal incision along inferior, lateral, and superolateral rim
6. Subperiosteal dissection with orbital rim fracture identification
7. Orbital subperiosteal dissection to release entrapped orbital tissues
8. Incison of gingivobuccal sulcus
9. Subperiosteal mid face dissection with identification of fractures along medial and lateral buttresses
10. Reduction of fractures and fixation with titanium microplates along inferior rim, zygomaticotemporal rim, and medial and lateral buttresses.
11. Align zygoma segment based upon rim and internal lateral orbital wall and both buttresses
12. Place subperiosteal orbital floor implant
13. Hemostasis with electrocautery
14. Suture gingivobuccal sulcus in two layers
15. Suture conjunctival incision
16. Resuspend lateral canthus and mid face
17. Skin closure
18. Removal corneal shield

Complications

- Hemorrhage
- Overcorrection
- Undercorrection (persistent enophthalmos)
- Infection
- Wound dehiscence
- Scarring
- Implant migration/extrusion
- Optic nerve injury
- Vision loss
- Persistent diplopia/motility restriction
- Inferior rectus palsy
- Infraorbital nerve injury/hypesthesia
- Ectropion/lid retraction
- Globe malposition
- Oral fistula
- Tooth loss
- Canthal angle dystopia
- Blood borne pathogens (*if fibrin sealant used*)

Template Operative Dictation

Preoperative diagnosis: Zygomaticomaxillary fracture (*right/left*)

Procedure: (1) Open reduction internal fixation zygomaticomaxillary fracture, (2) Repair of orbital floor fracture with alloplastic implant, (3) Temporary Tarsorrhaphy, and (4) Canthoplasty on the *(right/left)*
Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) sustained trauma to the face resulting in a (*right/left*) zygomaticomaxillary fracture. There was significant displacement of the zygoma with malar flattening, orbital floor fracture, and (*lateral canthal dystopia/lid retraction/diplopia/ocular exposure/globe malposition*) found on radiographic and clinical evaluation. Trismus (*is/is not*) present. (*There is associated enophthalmos of the (right/left) eye (with/without) restrictive myopathy*.) The trauma has resulted in facial deformity and functional reduction in the ability to chew and eat. (*Additionally, there is compromise of visual activities secondary to diplopia.*) A detailed review of the risks and benefits of the procedure, as well as treatment alternatives, was discussed with the patient. The patient voiced understanding of the inherent risks and proposed benefits of surgery and has elected to proceed with surgical intervention. Informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. General anesthesia was administered by (*hospital/surgery center*) anesthesia department. Appropriate time out and identification of the procedure was performed with all operating room personnel present. After verification of correct surgical site(s), local anesthetic consisting of ______ was injected into the periorbital region on the (*right/left*) side, as well as intraorally. An infraorbital nerve block of the same mixture was also performed. The patient was then prepped and draped in the usual full-face fashion for oculofacial plastic surgery of the face and the orbit. A corneal shield was placed over the (right/left) eye.

A *4-0 silk* traction suture was placed through the (*lash line/lid margin*) of the (*right/left*) lower eyelid. Attention was then directed to the lateral canthal area where a __ mm incision was made with a #15 Bard-Parker blade. A canthotomy and cantholysis was performed with sharp dissection of both the upper and lower canthal tendons. Hemostasis was achieved with monopolar cautery on a Colorado needle tip. After everting the eyelid over a cotton swab, the conjunctiva and retractor band were then incised across the entirety of the lower lid being careful to avoid the canaliculus medially. Using the *4-0 silk* traction suture, upper traction to the lid was applied along with downward retraction of the cheek by the assistant. Blunt dissection proceeded in the preseptal plane to the orbital rim and the periosteum was incised with monopolar cautery at the level of the arcus marginalis. Dissection continued in this fashion along the inferolateral orbital rim and extending superiorly to the frontozygomatic suture line.

The sub-perisosteal dissection continued along the anterior face of the orbital rim and anterior maxilla. Fracture locations were identified (*medially and superolaterally or* ____). Subperiosteal dissection proceeded into the orbit along the floor with release of (*entrapped/prolapsed*) orbital tissues. A standard hand over hand technique was used to gently reposit the tissues back into the orbit. Dissection proceeded along the fracture line until the posterior ledge of stable bone was identified. Once all tissues had been released, attention was then turned to the gingivobuccal sulcus.

A gingivobuccal sulcus incision was made with a #15 Bard-Parker blade to the level of the periosteum. Once again, a sub-perisosteal dissection plane proceeded along the medial and lateral buttresses until all fracture elements were identified. Fracture reduction was then undertaken with a (*Carol-Girardi/*___) reduction system. Adequate reduction was obtained when the inferior and lateral orbital rims were noted to be in alignment. Further rotation of the zygoma was obtained based on alignment of the internal lateral rim along the zygomatic sphenoid junction. Once the medial and lateral buttresses were noted to be in good position, microplating proceeded with placement of ___ plates along the (*inferior rim, lateral rim, medial maxillary buttress, lateral maxillary buttress*). Hemostasis was maintained throughout with electrocautery. Intra-oral wound closure was accomplished in two layers with *3-0* and *4-0* Chromic gut.

At this time, a (*Titan/*______) orbital implant was sized for placement over the defect. After inserting the implant into the orbit, it was further resized for better fit. The implant was dipped in a sterile saline and antibiotic solution and then placed over the defect beneath the periosteum and orbital tissues. (*It was then secured in place using one self-drilling 4-mm titanium screw placed just behind the lateral inferior orbital rim.*) Forced duction testing was conducted with no restriction in all gazes. The traction sutures through the conjunctiva and periosteum were then released. (*The periosteum was closed using interrupted 6-0 Vicryl sutures*).

A *5-0 Vicryl* suture was then placed through the lateral tarsus and tendon crus of both upper and lower lids, and then anchored to the periosteum and tendon at the lateral orbital rim. The suture was left untied.

[Choose One]

If tissue sealant used to close conjunctiva*—(Tisseel/Artiss/other sealant) was then used to close the conjunctival incision. Two Castroviejo 0.5 forceps were used to grasp the free conjunctival ends to expose the wound. Approximately ___ cm^3 of sealant was (injected/sprayed) into the wound bed and posterior surface of the conjunctiva. The free conjunctival edges were then reapproximated and held in place for _2_ min allowing the glue to dry.*

If conjunctiva was closed primarily*—The conjunctival wound was then closed with _#_ interrupted 6-0 plain gut sutures.*

A buried, interrupted 6-0 Vicryl suture was then passed grey line to grey line from upper to lower lid to reform the lateral canthal angle. The suture was temporally tightened to assess lid position. The previously placed 5-0 Vicryl suture was then tied down. *The orbicularis was closed using 6-0 Vicryl in a buried, interrupted fashion.* The skin incision was then closed using simple, interrupted *6-0 plain gut sutures*.

The corneal shield was then removed from the *(right/left)* eye. The *4-0 silk* traction suture placed in the lower eyelid was then taped above the right upper brow in the manner of a Frost suture. Maxitrol ointment was then instilled onto the patient's eye and to the lateral canthal area. Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye and on all suture sites. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Chapter 160
Ruptured Globe Repair

Craig N. Czyz

Abstract Globe rupture, or open globe, is the term that encompasses both penetrating and perforating injuries to the cornea and/or sclera. Globe rupture can occur from either blunt or sharp trauma. The primary goal of initial repair is to restore the integrity of the globe and prevent infection. The secondary goal is to restore vision. This typically requires subsequent procedures based on the extent of the injury. In cases which involve additional adnexal or facial injury, globe repair should be the primary procedure.

Keywords Corneal laceration • Scleral laceration • Vitreous prolapse • Uveal prolapse • Globe rupture • Open globe

Indications

Patients who sustained trauma to the globe resulting in corneal and/or scleral laceration. In cases of penetrating injury imaging of the globe and orbits should be done prior to surgical planning. In patients with a confirmed penetrating injury, or retained foreign body of the orbit, a CT angiogram should be performed to rule out vascular involvement prior to intervention. Retained intraocular foreign bodies should be evaluated by and removed with the assistance of a retinal specialist. In cases were globe salvage is not possible, primary evisceration/enculeation should be considered in light of sympathetic ophthalmia. Patients should have been evaluated and deemed appropriate for such surgical intervention. Patients should have been educated about the risks and benefits of the procedure, including alternatives.

Essential Steps

1. General anesthesia.
2. Lid speculum placement.
3. Corneal component of injury addressed.

C.N. Czyz, DO, FACOS, FACS (✉)
Division of Ophthalmology, Section of Oculofacial Plastic and Reconstructive Surgery, Ohio University/OhioHealth Doctors Hospital, Columbus, OH, USA

Department of Ophthalmology, Grant Medical Center, Columbus, OH, USA
e-mail: drczyz@gmail.com

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_160

4. Prolapsed vitreous and/or iris is reposition or resected.
5. 10-0 burried, interrupted nylon sutures are used to repair the corneal wound.
6. A peritomy is performed to expose the scleral portion of wound, if present.
7. Prolapsed vitreous and/or uvea is repositioned or resected.
8. Scleral wound is closed with partial thickness 8-0 nylon sutures.
9. If wound extends beneath a rectus muscle, the muscle is disinserted to improve access.
10. Posterior repair should not extend past the point the wound can be accessed without undue pressure on the globe or where the sclera is too thin for passage of partial thickness sutures.
11. Wounds are tested for watertightness using BSS and fluorescein.
12. Peritomy is closed with buried, interrupted 6-0 vicryl sutures.
13. Intracameral or subconjunctival antibiotics can be placed (additionally subconjunctival steroids can be injected).
14. Eyelid speculum is removed.
15. Antibiotic ointment is placed in the eye and an eye shield is placed over the eye.

Complications

- Hemorrhage
- Endophthalmitis
- Sympathetic ophthalmia
- Vision loss
- Corneal/conjunctival scarring
- Corneal irregularity
- Astigmatism
- Foreign body sensation

Template Operative Dictation

Preoperative diagnosis: (1) (*Corneal/Scleral/Corneoscleral)* laceration (*with or without uveal prolapse*), *(2) Vitreous prolapse (right/left), and (3) list all other injuries or findings (i.e., hypemia, vitreous hemorrhage, lens dislocation)* (*left/right*)

Procedure: (1) Repair of (*corneal/scleral/corneoscleral)* laceration (*with or without uveal prolapse*), *(2) Peritomy (conjunctivalplasty), (3) Anterior/mechanical vitrectomy* (*left/right*)

Postoperative diagnosis: Same

Indication: This ____-year-old (*race*) (*male/female*) sustained a *(right/left)* (*corneal/scleral/corneoscleral*) laceration *(with/with out) uveal prolapse* ____ (*hours*) ago. Clinical evaluation revealed (*right/left)* (*list all ocular/intraocular findings*). A maxillofacial CT of the orbits showed (*no/a* ___) (*intraocular or orbital foreign bodies*). A detailed review of risks and benefits of the procedure(s), as well as treatment alternatives, was discussed with the patient. Following this, the patient elected to undergo the procedure(s) and informed consent was obtained.

Description of the procedure: The patient and operative site(s) were identified in the preoperative area, and the *(right/left)* eye(s) was marked with a surgical marking pen. The patient was then taken to the operating room and placed supine on the operating room table. General anesthesia was administered by (*hospital/surgery center*) anesthesia department. The patient was then prepped and draped in the usual sterile, ophthalmic fashion. A time out was performed verifying correct patient, procedure, site, positioning, and special equipment prior to starting the case.

An eyelid speculum was placed in (*right/left*) eye with care taken to avoid pressure on the globe. The operating microscope was positioned above the operative eye. (*Local anesthetic consisting of ________ was injected subconjunctivally for a total of ___ cm³*.) A full-thickness corneal laceration was observed from __ o'clock to ___ o'clock. (*The laceration extended through the limbus.*) There (*was/was no*) uveal or vitreous prolapse.

If anterior uveal or vitreous prolapse*—(A Weck-cel and Westcott scissors/anterior vitrector) was used to removed the prolapsed vitreous from the wound. The prolapsed uveal tissue was (repositioned/resected) with a (cyclodialysis spatula/ viscoelastic/Westcott scissors).*

Simple interrupted *10-0 nylon* sutures were placed in the corneal laceration starting at the limbus and moving centrally. A total of _#_ sutures were placed. The sutures were rotated so the knot was buried.

If laceration extends through limbus to sclera*—A ____ degree peritomy was performed using 0.3 forceps and sharp Westcott scissors from __ to ___ o'clock. Hemostasis was maintained with wet field cautery. The wound was found to extend from the limbus posterior for approximately ___ mm. There (was/was no) uveal or vitreous prolapse.*

If posterior uveal or vitreous prolapse*—A Weck-cel and Westcott scissors were used to removed the prolapsed vitreous from the wound. The prolapsed uveal tissue was (repositioned/resected) with a (cyclodialysis spatula/viscoelastic/Westcott scissors).*

Simple interrupted *8-0 nylon* sutures were placed to close the scleral laceration starting at the limbus and moving posteriorly. A total of _#_ sutures were placed. BSS with fluorescein was placed over the wound sites to evaluate for watertight closure. All wounds were found to be watertight. The conjunctiva was reapproximated using buried, interrupted *6-0 Vicryl sutures*.

If intraoperative antibiotics used **[Choose One]:**

Subconjunctival—*Subconjunctival injection of (list type(s) and volumes of antibiotics and/or steroids) was accomplished with a 3 cm³ syringe with a (30/27) gauge needle.*

Intracameral*—Vigamox was drawn into a 1 cm³ syringe. A 27 gauge cannula was placed on the syringe and ___ cm³ of the antibiotic was injected into the anterior chamber via (the wound/paracentesis).*

Intravitreal*—Intravitreal injection of (list type(s) and volumes of antibiotics and/or steroids) was accomplished with a 1 cm³ syringe with a (30/27) gauge needle at the limbus.*

Antibiotic ophthalmic ointment was instilled into the *(right/left)* eye. An eye shield was placed over the operative eye. The patient tolerated the procedure well and was then taken back to the recovery area in stable condition.

Erratum to: Repair of Canalicular Laceration

Kenneth V. Cahill and Craig N. Czyz

Erratum to:
Chapter 155 in: E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*, DOI 10.1007/978-3-319-45495-5_155

In chapter titled "**Role of Glycans in Viral Infection",** it was noticed after publication that the second author's name was incorrect. Instead of **"Kenneth V. Cahill and Kelly R. Everman"** it should be **"Kenneth V. Cahill and Craig N. Czyz"**. The correction is now made in this revised version of book.

The updated online version of this chapter can be found at
http://dx.doi.org/10.1007/978-3-319-45495-5_155

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5_161

Index

E.D. Rosenberg et al. (eds.), *Operative Dictations in Ophthalmology*,
DOI 10.1007/978-3-319-45495-5

F

M

N

O