

Secondary Bone Cancer

J A S C A P

**JEET ASSOCIATION FOR SUPPORT TO CANCER PATIENTS,
MUMBAI, INDIA**

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JASCAP is a charitable trust that provides information on various aspects of cancer. This can help the patient and his family to understand the disease and its treatment and thus cope with it better.

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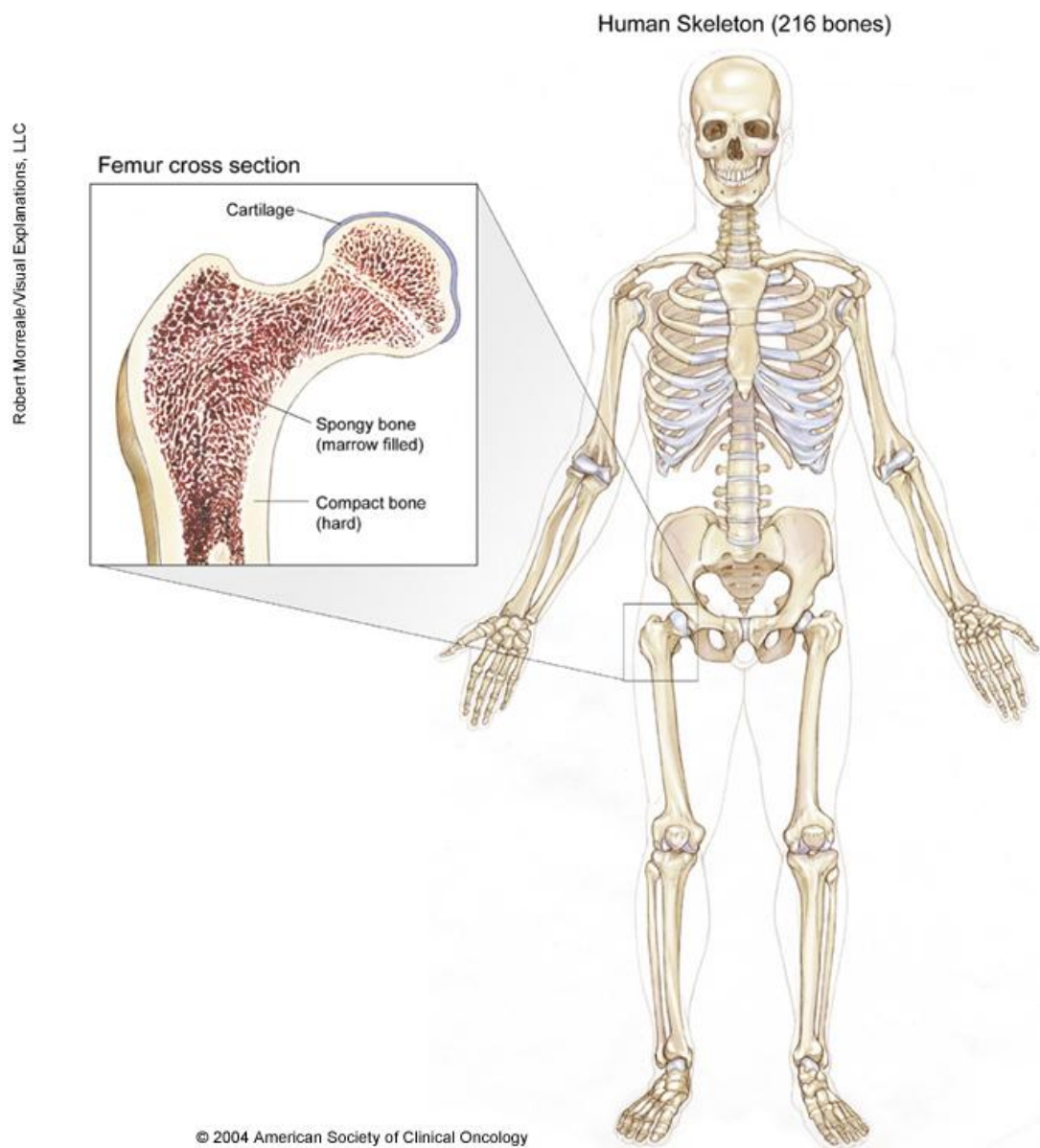
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Understanding Secondary Bone cancer

This booklet is for you if you have or someone close to you has secondary bone cancer.

It has been prepared and checked by cancer doctors, other relevant specialists, nurses and patients. Together they represent an agreed view on this cancer, its diagnosis and management, and the key aspects of living with it.

If you are a patient your doctor or nurse may wish to go through the booklet with you and mark sections that are particularly important for you.



The skeletal system and a cross-section of the femur.

Anatomy

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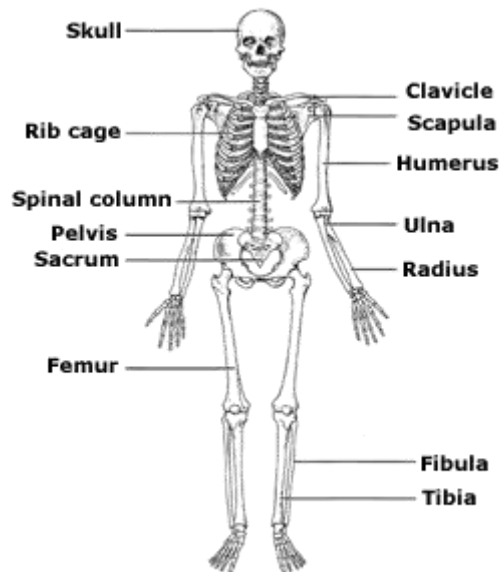
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The bones

The human body contains over 200 bones of different shapes and sizes.

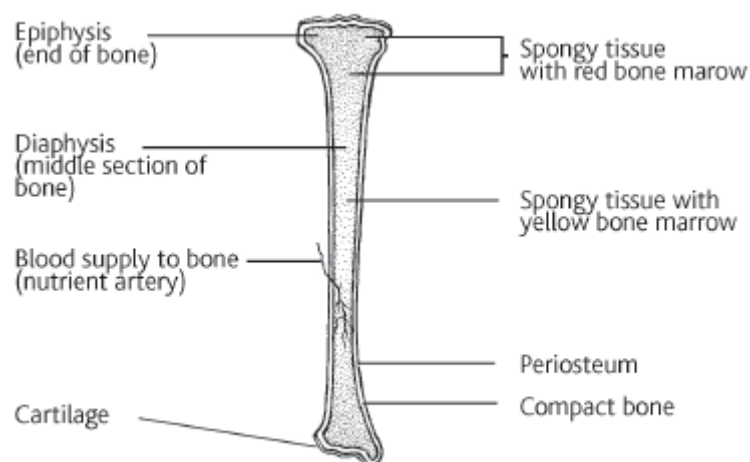


The human skeleton

Bone is a living tissue made up of calcium and various proteins that make the bone strong and rigid. It also contains living cells which continuously break down and remove old bone, replacing it with new bone to maintain the bone's strength.

Each bone consists of a compact outer shell and a spongy inside. The inside contains the bone marrow, which produces blood cells.

The joints of the bones are covered in cartilage – a tough, flexible material, rather like gristle. Cartilage is more stretchy than bone, and it allows the bones to move freely at the joints. It also cushions the bones at the joint to stop them rubbing against each other.



Structure of a bone

The bones have several important functions.

The skeleton gives the body rigid support.
The joints act as levers so that the body can move.

The bones protect organs in the body; for example, the rib cage protects the heart and lungs, and the skull protects the brain.

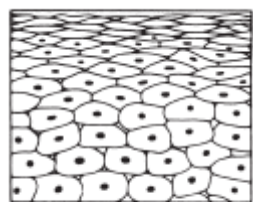
The bones also store some of the body's essential minerals, especially calcium.

Although a secondary bone cancer can occur in any bone in the body, the most commonly affected bones are those of the spine, ribs, pelvis, skull, and the upper bones of the arms (humerus) and the legs (femur).

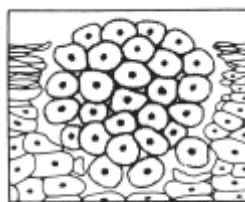
What is cancer?

The organs and tissues of the body are made up of tiny building blocks called cells. Cancer is a disease of these cells.

Cells in different parts of the body may look and work differently but most reproduce themselves in the same way. Cells are constantly becoming old and dying, and new cells are produced to replace them. Normally, cells divide in an orderly and controlled manner. If for some reason the process gets out of control, the cells carry on dividing, developing into a lump which is called a **tumour**.



Normal cells



Cells forming a tumour

Tumours can be either **benign** or **malignant**. Cancer is the name given to a malignant tumour. Doctors can tell if a tumour is benign or malignant by examining a small sample of cells under a microscope. This is called a **biopsy**.

In a benign tumour the cells do not spread to other parts of the body and so are not cancerous. However, if they continue to grow at the original site, they may cause a problem by pressing on the surrounding organs.

A malignant tumour consists of cancer cells that have the ability to spread beyond the original area. If the tumour is left untreated, it may spread into and destroy surrounding tissue. Sometimes cells break away from the original (primary) cancer. They may spread to other organs in the body through the bloodstream or lymphatic system.

The lymphatic system is part of the immune system - the body's natural defence against infection and disease. It is a complex system made up of organs, such as bone marrow, the thymus, the spleen, and lymph nodes. The lymph nodes (or glands) throughout the body are connected by a network of tiny lymphatic ducts.

When the cancer cells reach a new area they may go on dividing and form a new tumour. This is known as a **secondary cancer** or **metastasis**.

It is important to realise that cancer is not a single disease with a single type of treatment. There are more than 200 different kinds of cancer, each with its own name and treatment.

Types of cancer

Carcinomas

The majority of cancers, about 85% (85 in a 100), are carcinomas. They start in the epithelium, which is the covering (or lining) of organs and of the body (the skin). The common forms of breast, lung, prostate and bowel cancer are all carcinomas.

Carcinomas are named after the type of epithelial cell that they started in and the part of the body that is affected. There are four different types of epithelial cells:

- squamous cells - that line different parts of the body, such as the mouth, gullet (oesophagus), and the airways
- adeno cells - form the lining of all the glands in the body and can be found in organs such as the stomach, ovaries, kidneys and prostate
- transitional cells - are only found in the lining of the bladder and parts of the urinary system
- basal cells - that are found in one of the layers of the skin.

A cancer that starts in squamous cells is called a squamous cell carcinoma. A cancer that starts in glandular cells is called an adenocarcinoma. Cancers that start in transitional cells are transitional cell carcinomas, and those that start in basal cells are basal cell carcinomas.

Leukaemias and lymphomas

These occur in the tissues where white blood cells (which fight infection in the body) are formed, i.e. the bone marrow and lymphatic system. Leukaemia and lymphoma are quite rare and make up about 6.5% (6.5 in 100) of all cancers.

Sarcomas

Sarcomas are very rare. They are a group of cancers that form in the connective or supportive tissues of the body such as muscle, bone and fatty tissue. They account for less than 1% (1 in 100) of cancers.

Sarcomas are split into two main types:

- bone sarcomas - that are found in the bones
- soft tissue sarcomas - that develop in the other supportive tissues of the body.

Others forms of cancer

Brain tumours and other very rare forms of cancer make up the remainder of cancers.

Secondary cancer in the bone

When cancer occurs in the body, the place where it starts is known as the **primary tumour**. A malignant (cancerous) tumour is made up of millions of cancer cells. Some of these cells may break away from the primary cancer and be carried in the bloodstream to another part of the body. The cancer cells may settle in that part of the body and then form a new tumour. If this happens it is referred to as a **secondary cancer** or a **metastasis**.

Secondary bone cancer does not start in the bone, but is the result of cancer cells spreading to the bone from a primary tumour as described above. Sometimes only one area of bone is affected, but in some people a number of bone secondaries develop, often in different bones in the body. Not all the secondaries will cause symptoms or problems.

Although any type of cancer can spread to the bone, the most common types are cancers of the breast, prostate, lung, thyroid and kidney. People who develop secondary bone cancer usually know that they have a primary cancer, although occasionally a secondary bone cancer is found

before a primary cancer is diagnosed. If the primary cancer can't be found it is called an unknown primary tumour.

Secondary cancer in the bone is very different to primary bone cancer, where cancer begins in the bone itself. Primary bone cancer is a completely different type of cancer with very different treatments.

Causes of secondary bone cancer

The cause of a secondary cancer in the bone is always a primary cancer somewhere else in the body.

Symptoms of secondary bone cancer

- Bone pain
- Weakened bones
- Raised calcium level
- Pressure on the spinal cord
- Other symptoms

Bone pain

The most common symptom of secondary bone cancer is pain in the affected area. The pain may be a dull, persistent ache that often gets worse at night when the muscles are relaxed. There may also be swelling and tenderness in the area.

If you experience this type of pain and it lasts for more than one to two weeks, it's best to let your doctor know as soon as possible. Although bone secondaries can occur in several different bones at the same time, usually only one or two areas are painful.

Weakened bones

Sometimes if a bone is weakened by cancer it will break (fracture), even if you have not had an accident or fall. This is known as a pathological fracture.

Raised calcium level

When bones are affected by secondary cancer cells, increased amounts of calcium (the substance that helps to build bones) may be released into the blood. A raised level of calcium in the blood is called hypercalcaemia. It can cause symptoms such as tiredness, feeling sick (nausea), constipation, thirst and confusion.

However, in many people hypercalcaemia is discovered with a blood test, before any symptoms develop.

Pressure on the spinal cord

If secondary bone cancer affects the bones of the spine it can put pressure on the nerves in the spinal cord. This is called spinal cord compression and may cause symptoms such as pain, muscle weakness and sometimes tingling and numbness of the limbs. If the lower spine is affected, it may also affect how the bowel and bladder work.

If you have weakness, pain, tingling or numbness in the legs it is very important to let your doctor know as soon as possible so that treatment can be given to prevent permanent damage.

Other symptoms

Sometimes secondary cancer in the bone can make you feel more tired than usual.

Occasionally secondary cancer in the bone can affect the way that the bone marrow works. The bone marrow is the spongy material that fills the bones and produces blood cells. The different types of blood cells are:

- red cells, which carry oxygen around the body
- white cells, which help to fight infection
- platelets, which help the blood to clot and prevent bleeding.

If the bone marrow is unable to produce enough blood cells you may become anaemic, and be more likely to get infections or to have bruising or bleeding.

How secondary bone cancer is diagnosed

Your doctor is likely to arrange a number of tests for you if they think it's possible that your cancer has spread to the bones.

Waiting to have tests, and waiting for the results, will be a worrying time for you and the people close to you. You may worry that the cancer has come back or spread, but without the results of the tests you cannot know for sure. In this situation you may find yourself torn between believing there is some other cause for your symptoms and thinking the worst.

Often the uncertainty is the hardest part. It can sometimes be easier to cope once the results of the tests are known. If the tests show that that you have secondary bone cancer, this can come as a huge shock. You may like to talk to your healthcare staff at the hospital, or a support organisation.

- Blood tests
- Chest x-ray
- Bone x-ray
- Bone scan
- CT scan
- MRI scan
- PET scan
- Biopsy

If a secondary bone cancer is found before the primary cancer

Blood tests

A blood test may be done to check your general health and the level of calcium in your blood.

Chest x-ray

You will probably have a chest x ray to see if there are any signs of cancer in the lungs.

Bone x-ray

This is a simple x ray that can show up certain changes in the bone and may show that a secondary bone cancer is present. A cancer of the bone may not always show up on a bone x ray though.

Bone scan

This is a more sensitive test than a simple x ray and shows up any abnormal areas of bone more clearly. A small amount of a mildly radioactive substance is injected into a vein, usually in your arm. Abnormal bone absorbs more radioactivity than normal bone, so these areas are highlighted and picked up by the scanner as hot spots. You will probably have to wait 2–3 hours between having the injection and the scan itself, so you may like to take a magazine or book with you to pass the time. The level of radioactivity used in the scan is very small and does not cause any harm to your body.

Even if an abnormality is detected on the bone scan, it is not always clear whether it is caused by cancer or by another condition such as arthritis. Sometimes a CT or MRI scan may help the doctors to decide whether the changes seen on a bone scan are caused by secondary bone cancer or another condition.

CT scan

A CT (computerised tomography) scan takes a series of x rays, which build up a three-dimensional (3D) picture of the inside of the body. The scan is painless but takes from 10–30 minutes.

Some people may be asked not to eat or drink for a few hours before the scan. Most people who have a CT scan are given a particular drink or injection of a dye just before the scan, to allow certain areas to be seen more clearly. Sometimes, both a drink and an injection may be given.

This may make you feel hot all over for a few minutes. If you are allergic to iodine or have asthma, you could have a more serious reaction to the injection. You should tell your doctor beforehand as you can usually still have the injection, but may need to take steroids for the day before and on the day of the scan.

You will probably be able to go home as soon as the scan is over.

MRI scan

An MRI (magnetic resonance imaging) scan is similar to a CT scan, but uses magnetic fields instead of x-rays to build up a series of cross-sectional pictures of the body. During the test you will be asked to lie very still on a couch inside a metal cylinder that is open at both ends. The whole test may take up to an hour and is painless – although the machine is very noisy. You will be given earplugs or headphones to wear.

The cylinder is a very powerful magnet, so before going into the room you should remove all metal belongings. You should also tell your doctor if you have ever worked with metal or in the metal industry or if you have any metal inside your body (for example, a cardiac monitor, pacemaker, surgical clips, or bone pins). You may not be able to have an MRI because of the magnetic fields. Some people are given an injection of dye into a vein in the arm, but this usually does not cause any discomfort.

You may feel claustrophobic inside the cylinder, but you may be able to take someone with you into the room to keep you company. It may also help to mention to the staff beforehand if you do not like enclosed spaces. They can then offer extra support during your test.

PET scan

A PET (positron emission tomography) scan uses low-dose radioactive glucose (a type of sugar) to measure the activity of cells in different parts of the body. Before the scan, a very small amount of a mildly radioactive substance is injected into a vein, usually in your arm. Areas of cancer are usually more active than surrounding tissue and show up on the scan.

This is a newer type of scan and you might have to travel to a specialist centre to have one. PET scans are not often needed, but you can discuss with your doctor whether one would be useful.

Biopsy

Very occasionally after scans, the doctors may still not be certain of the cause of the abnormality in the bone, and you may need to have a small sample of cells taken from the affected area of bone (a biopsy). A biopsy can be carried out in either of the following ways:

Needle biopsy

This test involves taking a sample of bone and examining it to see if it contains cancer cells. A local anaesthetic is injected to numb the area before the sample is taken. A needle is then passed through the skin into the bone and a small piece of the bone is taken. This part of the test can be painful. If you are feeling very anxious, you may be given an injection of a sedative to help you relax. The bone sample is examined under a microscope.

The test does not take very long and you may have it as an outpatient. If the sample is taken from your back, you may need to stay in hospital overnight. You may have to wait about 10–14 days for the results of the needle biopsy. You are likely to be sore for a few days after the test, so your doctor may prescribe painkillers for you.

Open biopsy

For this test, a small piece of bone is removed while you are under a general anaesthetic. Bone is extremely hard, and the piece that has been removed has to be softened so that it can be examined under a microscope. The softening process takes several days and because of this you may have to wait 10–14 days for the results of the biopsy.

If a secondary bone cancer is found before the primary cancer

If a secondary cancer in the bone is found before a primary cancer is diagnosed, your doctor may arrange for you to have tests to find where the primary cancer is in your body. For example, your doctor may ask you to have:

- a mammogram to look for primary cancer in the breast
- a chest x ray and CT scan to check for lung cancer
- a CT or ultrasound scan of the abdomen and pelvis to look for a kidney cancer
- a prostate ultrasound and a blood sample to check for prostate cancer.

Your doctor, together with other medical staff, will look at the results of all your tests before a firm diagnosis can be made. This may take some days or possibly a few weeks. The waiting period may be a worrying time for you, but it is important that an accurate diagnosis is made. While you are waiting for your test results, you may find it helpful to have the support of a relative, a close friend or a support organisation.

Treatment for secondary bone cancer

- Treating the cancer
- Relieving symptoms
- Types of treatment used

Giving consent
Second opinion

Treating the cancer

A number of different types of treatment can be used to treat people with secondary bone cancer. The treatment you have will depend on:

- which bone is affected
- where the cancer first started (the primary cancer)
- how damaged and weakened the bone is
- how the cancer is affecting you – the symptoms you have.

The aim of treatment for a secondary bone cancer is to:

- relieve any symptoms and make you more comfortable
- reduce the number of cancer cells
- lower the risk of developing a bone fracture
- reduce the risk of developing a high calcium level in the blood (hypercalcaemia).

Relieving symptoms

Apart from painkillers and other pain relieving drugs, the main treatment used to relieve symptoms is radiotherapy. Radiotherapy may be given by a machine (similar to an x ray machine) as external beam radiotherapy, or as a radioisotope. A radioisotope is a radioactive liquid, usually given as an injection or by a drip into a vein.

Bisphosphonates (bone strengthening drugs) may be used to reduce the risk of fracture or hypercalcaemia, and to relieve pain.

Types of treatment used

The type of treatment you have depends on where your cancer started. This is because the secondary cancer cells in the bone have come from where the primary cancer is and will usually respond to the same type of treatment as the primary cancer.

To treat the cancer you may be offered:

- chemotherapy
- hormonal therapy
- a combination of hormonal therapy and chemotherapy.

Giving consent

Before you have any treatment, your doctor will explain the aims of the treatment to you. You will usually be asked to sign a form saying that you give your permission (consent) for the hospital staff to give you the treatment. No medical treatment can be given without your consent. Before you are asked to sign the form you should have been given full information about:

- the type and extent of the treatment you are advised to have
- the advantages and disadvantages of the treatment
- any other treatments that may be available
- any significant risks or side effects of the treatment.

If you don't understand what you have been told, let the staff know straight away so that they can explain it again. Some cancer treatments are complex, so it's not unusual for people to need repeated explanations.

It's often a good idea to have a friend or relative with you when the treatment is explained. This can help you remember the discussion more fully.

Patients often feel that hospital staff are too busy to answer their questions, but it's important for you to be aware of how the treatment is likely to affect you. The staff should be willing to make time for you to ask questions. You can always ask for more time to decide about the treatment if you feel that you can't make a decision when it's first explained to you.

You are also free to choose not to have the treatment. The staff can explain what may happen if you don't have it. It is important to tell a doctor or your nurse if you decide not to have treatment, so that they can record your decision in your medical notes. You do not have to give a reason for not wanting to have treatment, but it can be helpful to let the staff know your concerns so that they can give you the best advice.

Second opinion

Usually a number of cancer specialists work together as a team and they use national treatment guidelines to decide on the most suitable treatment for a patient. Even so, you may want to have another medical opinion. Either your specialist, or your GP, should be willing to refer you to another specialist for a second opinion, if you feel it will be helpful.

Getting a second opinion may cause a delay in the start of your treatment, so you and your doctor need to be confident that it will give you useful information. If you do go for a second opinion, it may be a good idea to take a friend or relative with you, and have a list of questions ready so that you can make sure your concerns are covered during the discussion.

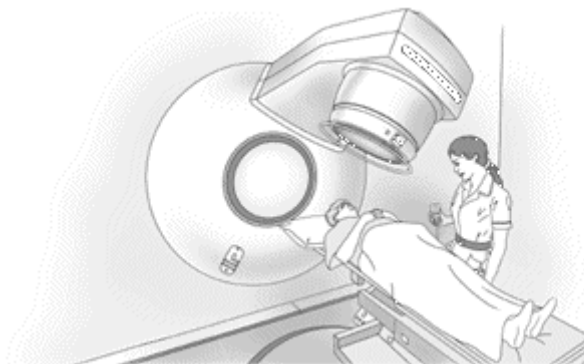
Radiotherapy for secondary bone cancer

External beam radiotherapy
Radioisotopes

External beam radiotherapy

Radiotherapy is the use of high-energy rays to destroy cancer cells, while doing as little harm as possible to normal cells. It is the most common type of treatment for secondary bone cancer as it is very effective for relieving symptoms such as pain or swelling.

Radiotherapy can be given in different ways. Sometimes a single dose is given. This has the advantage that you will only need to make one visit to the radiotherapy department. Sometimes your treatment may be divided into a number of sessions. Each session is known as a fraction.



Positioning the radiotherapy machine

The way in which your treatment is given will depend on the type of cancer and its position in the body. Your doctor will discuss your treatment with you beforehand and answer any questions that you have.

Radiotherapy is normally given to the area of the bone affected by the cancer. However, if the cancer is in several areas of bone it may be necessary to give radiotherapy to a larger area. This may be referred to as hemibody irradiation, which means treating half the body.

It usually takes from 7–10 days for the radiotherapy to start reducing the pain and it may take up to six weeks before you feel the full effect. You may notice that the pain becomes slightly worse before getting better. During this time it is important to continue taking the painkillers prescribed by your doctors. As the pain improves, it may be possible to reduce the amount of painkillers you are taking. It's a good idea to discuss this with your doctor or nurse before adjusting the dose.

Side effects

Usually this type of radiotherapy causes very few side effects. However, treating bones in certain areas of the body, such as the ribs or the spine, may cause some sickness for a day or so after the treatment. This can usually be prevented by taking anti sickness tablets.

Our booklet on radiotherapy discusses the treatment and how to cope with the side effects.

Radioisotopes

Radioisotopes are mildly radioactive substances. Some radioisotopes are taken up (absorbed) by bone and they are sometimes used to treat secondary cancers in the bone. The radioisotope is usually given as a liquid injected into a vein, usually in the arm.

The radioisotope travels through the bloodstream to the bones, where it gives a dose of radiotherapy to the areas affected by the cancer cells. This can help to reduce pain, often within a few days, but sometimes it will take a few weeks to start working.

The advantage of radioisotope treatment is that all the bones in the body affected by cancer will be treated. This makes it an ideal treatment if a number of your bones are affected. However, it is only suitable for treating secondary cancers (secondaries) from certain types of primary cancer.

For instance:

An injection of strontium89 may be used to treat secondaries from cancer of the prostate or breast.

Secondaries from cancer of the thyroid may be treated with iodine131.

Strontium89 A single injection is given through a small tube (a cannula) inserted into a vein. People are normally given the injection as an outpatient. Pain caused by the cancer is normally reduced several weeks after the injection. In most people the pain relief lasts for several months. The treatment is sometimes repeated if the pain comes back. After the injection of strontium, it is

safe to be with other people, including children. However, your urine and blood will be very slightly radioactive for about seven days afterwards. You will be given advice to follow to reduce any risk to others.

Iodine131 is given as a treatment for bone secondaries from thyroid cancer. The iodine is given as a capsule that is swallowed, or as an odourless and colourless drink. If the iodine is used as a treatment for other types of cancer, or if it's attached to another chemical, it is likely to be given as a drip (intravenously) over a period of up to one hour.

The radioactivity in iodine131 breaks down slowly and you will need to stay in hospital in a single room for a few days. When the radioactivity reduces to a safe enough level to allow you to mix with other people you can go home.

You may need to take some special precautions for a short time after going home, such as avoiding spillages of urine. The hospital staff will explain these to you.

Side effects

Radioisotopes such as strontium89 can temporarily reduce the number of normal red and white blood cells produced by the bone marrow. When the number of white blood cells is low, you're more likely to get an infection. If necessary, you'll be given antibiotics to treat any infection. If the number of red blood cells is low (anaemia), you may get tired easily. If the number of red blood cells is very low you may be given a blood transfusion.

Tumour flare may occur – this is swelling around the tumour area in the days following treatment. It can cause a temporary increase in pain and tenderness and you may need to take painkillers for a few days.

Hormonal therapy for secondary bone cancer

Hormonal therapies are often used to treat secondary cancers in the bone which have spread from primary cancers in the breast or prostate gland. Hormones are substances that occur naturally in the body. They control the activity and growth of normal cells. However, certain hormones can also affect the growth of breast cancer or prostate cancer cells.

Hormonal therapies work by lowering the levels of particular hormones in the body, or by preventing hormones from being taken up by the cancer cells. This can slow down or stop the growth of the cancer cells in the bone. Hormonal therapies can shrink the cancer and reduce, or get rid of, symptoms such as bone pain.

There are many different types of hormonal therapy and they work in slightly different ways. Sometimes two different types of hormonal therapy may be given together. Hormonal therapy is given as tablets or injections.

Side effects

Hormonal therapy can cause side effects for some people, including hot flushes and sweats in both men and women. Although the effects can be mild for many people, for others they may be quite severe. It's important to discuss the possible effects with your doctor before you start treatment. We have information on all the commonly used hormonal drugs.

Our factsheets on menopausal symptoms, and on hormonal symptoms in men have information about reducing hot flushes and sweats.

Chemotherapy for secondary bone cancer

Chemotherapy is the use of anti-cancer (cytotoxic) drugs to destroy cancer cells. They work by disrupting the growth of cancer cells.

Whether chemotherapy can be used, and the type of drugs used, will depend on where the cancer started in the body. For example, if you have cancer of the breast that has spread to the bones, you will have the chemotherapy drugs which treat breast cancer cells.

How chemotherapy is given
Benefits and disadvantages

How chemotherapy is given

The drugs may be given by injection into a vein (intravenously) or as tablets. Chemotherapy is usually given as a course of several treatments, each treatment lasting from a few hours to a few days. This is followed by a rest period of a few weeks, which allows your body to recover from any side effects. The number of treatments you have will be planned in advance, but may be altered depending on how well the chemotherapy works.

Usually, chemotherapy is given as an outpatient. Occasionally a short stay in hospital may be necessary.

Benefits and disadvantages

Many people are frightened about the idea of having chemotherapy because of the potential side effects that can occur. Chemotherapy can cause side effects but these will depend on the drugs used. Any side effects can usually be well controlled with medicines that your doctor can prescribe.

Chemotherapy for secondary bone cancer is designed to try and shrink the secondaries, to improve symptoms and quality of life, and to extend life if possible. For some people the chemotherapy will help to shrink the cancer leading to a reduction in the symptoms. However, for other people the chemotherapy will not have any effect on the cancer and they will have the side effects of the treatment with little benefit.

Making decisions about treatment in these circumstances is always difficult. You may need to discuss the possible benefits and disadvantages in detail with your doctor, before you decide whether you wish to have chemotherapy. If you choose not to have chemotherapy, you can still be given other treatments to control any symptoms that you have.

Our booklet on chemotherapy discusses the treatment and its side effects in detail. Factsheets about individual drugs and their particular side effects are also available.

Surgery for secondary bone cancer

Very occasionally, if tests show that only one area of bone has cancer in it, the affected area may be removed under general anaesthetic. The bone is then strengthened with a metal pin or replaced with a false part (prosthesis).

If a secondary tumour is near to a joint – such as the hip, knee or shoulder – the joint and the area of bone containing the tumour are usually both removed. The joint is then replaced with an artificial hip, knee or shoulder (prosthesis). If surgery is a possible option for you, your doctor will explain about the operation and answer any questions you may have.

Treating weakened bones resulting from secondary bone cancer

Bones can sometimes be weakened by secondary cancers in them. If this happens they can sometimes be strengthened or repaired.

Weak thigh or arm bones
 Weak hip or shoulder joints
 Percutaneous cementoplasty

Weak thigh or arm bones

Sometimes an x-ray shows that a secondary cancer has weakened a long bone such as the thigh bone (femur) or upper arm bone (humerus). If there's a risk of the bone breaking, you may need an operation to strengthen it and prevent a break from happening.

A metal pin or a locking nail (a nail with screws at each end) can be put down the middle of the weakened bone. This secures and strengthens the bone, holding it firm so that it won't break. The operation is carried out under a general anaesthetic. The pin or nail can stay in permanently to continually protect the bone. Whether this operation is appropriate for you will depend on which bone is affected by your secondary cancer.

You may need to stay in hospital for up to a couple of weeks after the operation to recover fully, but most people are able to start walking a couple of days after surgery. A physiotherapist may give you exercises to do to help you move your leg more easily.

Sometimes the weakness caused by the secondary bone cancer leads to a crack or a fracture in the bone before a strengthening operation has been done. If this happens, it may still be possible to mend the bone. Your doctor or specialist nurse will discuss this with you.

Weak hip or shoulder joints

If secondary cancer has caused a lot of damage to your hip or shoulder joint then you may need to have an operation to replace the joint. You will need to stay in hospital for around three to five days and will have physiotherapy afterwards to help you get used to the new joint.

You may have radiotherapy before and/or after your operation to try to destroy any cancer cells left in the area and help the bone to repair itself.

Percutaneous cementoplasty

A newer technique to strengthen a weakened bone involves injections of a bone cement. The doctor puts a needle through the skin and, using x-rays or CT scanning to guide the way, injects the cement into the weakened bone. The operation is carried out either under a general anaesthetic or after you have been given a sedative to make you feel drowsy. This technique can be used to treat bones in the arm or leg, and can sometimes be used when a tumour is affecting the spine, when it is known as vertebroplasty.

Percutaneous cementoplasty is mainly used after other treatments to strengthen the bone have been tried. Your doctor can discuss whether it would be appropriate for you. Percutaneous cementoplasty can also help to relieve bone pain.

Treating spinal cord compression resulting from secondary bone cancer

A common place for a secondary bone cancer to occur is the spine. This often causes back pain. If this affects you, your doctors will make sure you have painkillers to relieve any discomfort.

Less often, the cancer can cause pressure on the nerves in the spine. This is known as spinal cord compression and can cause symptoms, such as:

weakness in the legs
 numbness or pins and needles in your toes or fingers

strange sensations
 problems passing urine
 constipation or problems controlling your bowels.

If you develop any of these symptoms it's important to let your doctor know as soon as possible. If you have spinal cord compression, treatment is needed straight away to relieve the pressure and prevent permanent damage to the nerves.

High doses of steroids are used to reduce the swelling and pressure around the spine. This is often followed by radiotherapy to shrink the cancer and reduce the pressure. Sometimes surgery may be used to relieve pain and strengthen the spine. The dose of steroids will be gradually reduced after the radiotherapy or surgery.

We have separate information about steroids and their possible side effects. We also have information on spinal cord compression.

Treating pain resulting from secondary bone cancer

Pain is the most common symptom of secondary bone cancer. There are different types of pain which may need different treatments. Different types of painkiller are available to treat all levels of pain and these are usually very effective. They may be given alone or alongside radiotherapy. The medical staff will discuss your pain with you. It's important to let them know if it's not controlled.

You may need to try a few different painkillers before you find one that is effective for you. Sometimes you may need to take a combination of painkillers to get the right level of pain control. You might also need to take painkillers temporarily while having other treatment. For example, it may take two to three weeks for radiotherapy to relieve the pain caused by secondary bone cancer, so you'll need to take painkillers during this time.

You may be prescribed other drugs, such as non-steroidal anti-inflammatory drugs (NSAIDs) or bisphosphonates to help relieve your pain, or be given other treatments, such as cementoplasty.

If you are having trouble sleeping, your doctor may prescribe a mild sleeping tablet for you. Other general ways of relaxing and helping to reduce your pain include:

listening to relaxation tapes or CDs
 applying heat and gentle massage to painful areas
 a long soak in a warm bath.

If your pain isn't controlled at any time, it's important to let your doctor or specialist palliative care nurse know as soon as possible. Palliative care nurses (sometimes called Macmillan nurses) can visit you – they are specialists in advising on pain and symptom control and giving emotional support.

You can ask your doctor to refer you to a specialist in palliative medicine. This is a doctor who is expert in treating symptoms such as pain.

You may find it helpful to read our booklets on controlling cancer pain and symptoms of cancer.

Research is continually going on to find new drugs, different ways of giving drugs, and new techniques to control pain for people with secondary cancer in the bone.

Bisphosphonates for secondary bone cancer

Bisphosphonates are drugs commonly used to treat secondary cancer in the bones.

There are two different types of cells found in bone – **osteoclasts** and **osteoblasts**. Osteoclasts destroy the old bone and osteoblasts deposit new minerals and build new bone. Cancer cells which have spread to the bone produce chemicals that change the activity of these cells, upsetting the normal balance. The osteoclasts (the cells that destroy old bone) become overactive and this commonly causes small holes in the bone.

Bisphosphonates are drugs that restrict the action of the osteoclasts. They are not a treatment for the cancer itself but may help to reduce the breakdown of the bone. This can reduce the risk of fracture, hypercalcaemia and spinal cord compression, and reduce discomfort. Your doctor may recommend that you have treatment with bisphosphonates to treat bone-pain, prevent broken bones and reduce the need for radiotherapy treatment. Bisphosphonates are also commonly used to treat high blood calcium levels.

Bisphosphonates may be given into a vein through a drip (intravenously) in the outpatient department, every 3–4 weeks. Some bisphosphonates can be taken as tablets, which must be taken on an empty stomach at least half an hour before food. You can't eat or drink for six hours (usually overnight) before taking some of the tablets and they should be taken when you are sitting or standing, not lying down. Your doctor, nurse or the pharmacist will explain how you should take your tablets.

Treating hypercalcaemia resulting from secondary bone cancer

If you have secondary cancer cells in the bone, this may release calcium into the blood. High levels of calcium in the blood (hypercalcaemia) can make you feel sick (nauseous), drowsy, confused and unwell. It can also cause constipation. You may need to spend a few days in hospital for treatment to reduce the calcium levels.

Your doctor or nurse may ask you to drink lots of liquids. You are also likely to have a drip (intravenous infusion) of fluids into a vein in your arm. This will increase the fluid/liquid content of your blood, and encourage your kidneys to get rid of the calcium from your body in the urine.

Your doctor will also give you medicines, such as bisphosphonates, to reduce the level of calcium in the bloodstream. These may be given through a drip over a few hours, although some bisphosphonate treatments only take 15 minutes. This treatment can be repeated if the calcium levels rise again. You should feel much better within a couple of days.

Bisphosphonates can also be taken as tablets, which may be used to maintain normal levels of calcium in the blood.

Managing the effects of secondary bone cancer treatment on the bone marrow

The bone marrow is the spongy material in the centre of some of our bones which produces blood cells. If you have secondary cancer in the bone, this may affect how the bone marrow works and may lower the number of cells in your blood. If you have a low level of red blood cells (anaemia) you may be breathless and get tired more easily. Low levels of white blood cells may make you more likely to get an infection, and a low platelet count will increase the risk of bruising and bleeding.

It may be possible to raise the number of red blood cells in your blood by giving you a blood transfusion. This may need to be repeated. Less commonly, platelet transfusions may also be given. Antibiotics can be given to treat any infection.

Newer treatments for secondary bone cancer

A number of new treatments are being tested for secondary bone cancer. These treatments may not be widely available. If your doctor thinks a newer treatment may be helpful for you, they can refer you to a specialist hospital where the treatment is being given. You may have to travel a long way to a specialist hospital.

Radiofrequency ablation

Radiofrequency ablation (RFA) uses heat to destroy cancer cells. It can help to relieve pain that hasn't responded to radiotherapy and is usually only used to treat small secondary bone tumours. A doctor places a needle into the bone tumour. This is usually done using a CT scanner to make sure the needle is in the right place. Radiowaves are then passed down the needle into the tumour to heat, and so destroy, the cancer cells.

There are very few side effects with this treatment although it is quite common for people to have some pain or discomfort and to feel tired. You usually need to stay in hospital overnight with this treatment.

Embolization

Embolization involves injecting a drug directly into the secondary bone cancer. The drug causes the blood vessels in the tumour to block, which starves the tumour of nutrients and oxygen. This can cause it to shrink and can help to relieve pain and spinal cord compression.

Embolization is mainly used to treat secondary bone tumours in people who had primary kidney (renal) cancer and some types of thyroid cancer. The treatment can be repeated if necessary.

Research - clinical trials for secondary bone cancer

Cancer research trials are carried out to try to find new and better treatments for cancer. Trials that are carried out on patients are known as clinical trials. Clinical trials may be carried out to:

- test new treatments, such as new chemotherapy drugs, surgery, hormonal therapies or biological therapies
- look at new combinations of existing treatments, or change the way they are given, to make them more effective or to reduce side effects
- compare the effectiveness of drugs used to control symptoms
- find out how the treatments work
- see which treatments are the most cost-effective.

Trials are the only reliable way to find out if a different operation, type of chemotherapy, radiotherapy, or other treatment is better than what is already available.

Taking part in a trial

You may be asked to take part in a treatment research trial. There can be many benefits in doing this. Trials help to improve knowledge about cancer and develop new treatments. You will also be carefully monitored during and after the study. Usually, several hospitals around the country take part in these trials. It's important to bear in mind that some treatments that look promising at first are often later found not to be as good as existing treatments, or to have side effects that outweigh the benefits.

If you decide not to take part in a trial your decision will be respected and you do not have to give a reason. There will be no change in the way that you are treated by the hospital staff and you will be offered the standard treatment for your situation.

Blood and tumour samples

Many blood samples and tumour biopsies may be taken to help make the right diagnosis. You may be asked for your permission to use some of your samples for research into cancer. If you are taking part in a trial you may also be asked to give other samples which may be frozen and stored for future use, when new research techniques become available. These samples will have your name removed from them so you can't be identified.

The research may be carried out at the hospital where you are treated, or it may be at another hospital. This type of research takes a long time, and results may not be available for many years. The samples will, however, be used to increase knowledge about the causes of cancer and its treatment. and will hopefully improve the outlook for future patients.

Current research

There are several research trials in progress. Men who have prostate cancer that has spread to the bones may be asked to take part in a trial called the RIB trial. This trial is comparing radiotherapy with a bisphosphonate called ibandronate. The aim of the trial is to see which treatment is better at controlling pain caused by secondary bone cancer.

Another trial, called the SC20 trial, is looking to see if a second course of radiotherapy can help to control pain that has come back or hasn't been relieved by an initial course of radiotherapy. The trial may close at the end of 2008 or during 2009.

You can talk to your doctor about any trials that you think may be appropriate for you.

Follow-up after treatment for secondary bone cancer

Following any treatment, you will have regular check-ups. These may be carried out by your GP and your hospital doctors. Further tests may be done and your treatment will focus on controlling your symptoms. If you have any problems between appointments, contact your doctor or specialist nurse as soon as possible.

Resources and support for living with cancer

Talking about your cancer

Practical advice and guidance for cancer patients to help them communicate with family, friends, carers and health professionals about emotional and practical issues arising from a diagnosis of cancer and cancer treatment.

Talking to children about cancer

Practical advice and guidance to help parents with cancer talk to their children about their cancer.

Talking to someone with cancer

Practical advice and guidance for friends, carers and family members to help them talk to their friend or relative with cancer, and provide emotional and practical support.

Note: JASCAP has booklets on each of the above subjects.

Questions you might like to ask your doctor or surgeon

You can fill this in before you see the doctor or surgeon, and then use it to remind yourself of the questions you want to ask, and the answers you receive.

1. _____

Answer _____

2. _____

Answer _____

3. _____

Answer _____

4. _____

Answer _____

5. _____

Answer _____

JASCAP : We need your help

We hope that you found this booklet useful.

To help other patients and their families we need and intend to extend our Patient Information Services in many ways.

Our Trust depends on voluntary donations. Please send your donation by Cheque or D/D payable in Mumbai in favour of "JASCAP".

Note for Reader

This JASCAP booklet is not designed to provide medical advice or professional services and is intended to be for educational use only. The information provided through JASCAP is not a substitute for professional care and should not be used for diagnosing or treating a health problem or a disease. If you have, or suspect you may have, a health problem you should consult your doctor.

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