

Radiotherapy

Information sheet 11

Radiotherapy - an overview

Introduction

Radiotherapy is the use of high energy x-rays to destroy cancer cells while doing as little harm as possible to surrounding normal cells. The cells that grow and divide quickly (cancer cells) are much more sensitive to radiation than non-dividing, resting (normal) cells.

What is radiotherapy?

In the brain most normal cells and certainly the important nerve cells (neurons) do not divide. This means that radiotherapy will be much more damaging to the tumour than to the surrounding brain. Nevertheless, the specialists try to make sure as few normal cells as possible are affected by the treatment.

Radiotherapy is effective for many brain tumours. It can stop a tumour growing and may cause it to shrink or in some cases disappear completely. It may be used to reduce cancer symptoms. It is usually given using beams delivered from outside the body, better known as external radiotherapy.

Our information on radiotherapy will help you talk to your doctor or medical team about your condition. It should not be used as a substitute for professional care. Radiotherapy may differ from person to person and you should ask the doctor, nurse or radiographer looking after you for further information about your treatment.

Why do I need radiotherapy?

Often brain tumours cannot be removed completely through surgery without causing permanent damage.

Even if you have had surgery and the whole tumour seems to have been removed, small cells, too small to be seen by the surgeon, may remain behind. These cells can be treated with radiotherapy.

It can also be given to treat secondary brain tumours, or when a primary brain tumour can't be removed or has come back after surgery. The cells of many malignant brain tumours are killed by radiotherapy and that is why this treatment is often recommended. It works by killing the cells directly or by interfering with their ability to grow. The tumour may shrink as tumour cells are destroyed. These cells are then disposed of by the body's natural process over a long time.

Surgery and medication such as steroid tablets and anti-epileptic drugs (for seizures) may also have helped your symptoms. You may therefore be feeling better at the time you have radiotherapy. Radiotherapy is only used for tumours showing signs of progression.

Some tumours are very sensitive to radiotherapy and the hope is for a cure for some benign tumours.

Some tumours are less sensitive to it. In this case it may not be possible to cure it. However

radiotherapy will usually bring relief of symptoms and make you live longer. Radiotherapy will also delay or stop the tumour from coming back.

How is radiotherapy given?

External radiotherapy is normally given as a series of short, daily treatments called fractions using a machine similar to a large x-ray machine. The treatment is given in the hospital radiotherapy department.

It is given at different intervals; daily, every few days or very rarely twice daily. How many fractions or daily treatments you have will depend on your tumour type and fitness. Your doctor will plan the treatment with you considering all the factors.

Radiotherapy is painless. You will not feel anything during your treatment. External radiotherapy does not make you radioactive and it is safe for you to be with other people, including children, throughout your treatment.

Radiotherapy - planning your treatment

Planning your treatment

Before the radiotherapy can begin, the exact treatment plan, the radiotherapy dose, the number of fractions and the amount of brain that will be treated is decided by the oncologist. An oncologist is a doctor who specialises in the treatment of tumours using radiotherapy. Your treatment plan will depend on what type of tumour you have. Careful planning ensures that the radiotherapy is as effective as possible. It ensures the radiotherapy rays are aimed exactly at the tumour cells and cause the least possible damage to the surrounding healthy tissues.

Moulding: your first visit for radiotherapy

Your first appointment will be to the mould room. To help you stay very still during your treatment, you will need a 'mould'. This will be made before planning starts. The mould allows your head to be kept in the same position and helps to stop it moving during the treatment. Marks can be drawn on it, instead of on your skin in order to line up the treatment machine.

The mask is applied before each fraction of radiotherapy and removed immediately afterwards. An impression of your head and face is taken in the position that you will be in for your treatment in order to make the mould or shell. This could be lying on a couch on your back, rarely on the side or even lying on your stomach. The mould is made using strips of wet plaster bandage that are laid across your head. The plaster takes about five minutes to set. Some people may find this claustrophobic or a little frightening, but it only feels like this for a few minutes. Once the bandage starts to set, it is removed and you can leave. The procedure takes about 20-30 minutes.

The mould room technician then makes a plaster cast using this impression and a sheet of thin transparent perspex is moulded over the plaster cast. An alternative is to use a plastic sheet which can be moulded when warm. The shell needs to fit quite closely and it helps if you are relaxed during the taking of the impression. It does not hurt but most people say it becomes a little hot under the plaster bandage.

Moulds covering the face will have holes cut for the eyes, nose and mouth.

CT planning scan

10-14 days after the moulding session, you will visit the simulator machine for a dummy run. This is a special x-ray machine that can take films and 'simulate' the treatment and the position of the x-ray beams that will be used for your treatment. You will need to lie in the treatment position wearing your

newly made moulded shell. The oncologist, with the help of a radiographer, plans the position of the radiotherapy beams using information from scans and previous examinations. This session lasts about 30 minutes. It is often much longer than the treatment time on the machine during therapy.

At the end of this simulator session you will be given a date and time for starting treatment. This may be a few days later.

Will I have to stay in hospital?

Whether you have radiotherapy as an outpatient or an inpatient will depend on how fit you are and whether you are able to travel. Your doctor will discuss this with you and make specific arrangements. You will be given a fixed appointment time for your treatment and every effort is made to keep closely to these times. However inevitably, occasionally, there will be some delays.

Other ways of giving radiotherapy

Stereotactic/Gamma Knife radiotherapy (also known as SRT)

This type of radiotherapy gives the treatment using x-ray beams from a standard radiotherapy machine which has been adapted. The machine sends out concentrated beams of radiation from different angles which overlap at the brain tumour.

This is done either by moving the machine during treatment or by aiming individual beams from a number of different directions. You need to wear a special frame fitted to your head to keep it still. The radiotherapy dose to the tumour is very high and the dose to surrounding healthy tissues is very low. Several doses are given. Before the treatment is carried out, several scans will be analysed by computers to target the radiotherapy precisely. This treatment is only available in specialist hospitals and is not suitable for everyone with a brain tumour.

Radiotherapy - during your treatment

Having your treatment

It is quite normal to feel worried about having your treatment, but as you get to know the staff and understand what is going on, it should become easier.

The sight of large radiotherapy machines can be frightening, especially for children. Don't be afraid to talk about any fears or worries to the staff, they are there to help you, and the more you understand about your treatment the more relaxed you will be. Radiotherapy itself is painless and each session may take anything from a few seconds to several minutes.

Radiologists sit in an adjacent room as a patient receives treatment. Because your positioning is so important, the radiographers may take a little while to get you ready (they may call this 'setting up'). The radiographers will position you carefully on the table and adjust the height and position of the table. The room may be in semi-darkness while this is happening. Once you are in the correct position the staff will need to leave you alone in the room, to prevent them from being exposed to radiation. Try to relax as much as you can. Some treatment rooms play music to help you relax. During treatment you will be alone for a few minutes but you can usually talk to the radiographers via an intercom. They will be watching you carefully from the next room, either through a window or on a television screen. To protect your privacy, nobody else will be able to see you. If you have any problems, you can raise your hand to attract the radiographer's attention and they will come in to help you.

Most radiotherapy machines will be able to rotate around your body to give the treatment from several different directions. This can be unsettling at first. The radiographers may have to come into the treatment room to change your position slightly in the middle of your treatment. Small changes sometimes have to be made to your treatment plan, which should be explained by the specialist or staff.

What are the side-effects of radiotherapy?

The side effects depend on how much of your brain is being treated or if the spinal canal has to be treated as well. Most side effects are quite mild. However, some are inevitable.

Early side-effects

Hair loss: You will lose your hair in the treatment area. Hair starts to fall out between the second and third weeks of treatment and will usually grow back after three to six months. Sometimes the hair does not grow back or only grows back partially. Sometimes hair grows back with a slightly different colour and texture, and perhaps not as thickly as before.

- **Skin changes:** You may notice some skin changes in the area being treated. After about three weeks it may become red, itchy and dark, as sunburn does. You must use a sunhat when outdoors and stay out of the sun to reduce further damage to the scalp. After your treatment has ended you may use sunblock to the scalp, but not during treatment. Do not try to treat this by yourself. Check with your doctor, nurse or radiographer for advice on how to care for your skin.
- **Tiredness:** Most people will feel tired and a little sleepy towards the end of their course of radiotherapy. A sleep in the afternoon and periods of rest can help you cope with the tiredness. This feeling of tiredness can last for a few weeks and can be quite extreme. Some people may also feel tired around six to ten weeks after radiotherapy has finished. This is quite normal.
- **Feeling sick:** Sometimes people feel sick. This usually lasts just a few hours after treatment. For example, if your treatment is at 9am, you may feel queasy and not have much appetite for lunch, but by dinner time you are hungry again and ready to eat. Alternatively, it may be helpful to eat small but frequent meals throughout the day. Avoid fatty foods and keep your diet bland if you are feeling sick. If the nausea does not go away, your doctor may prescribe anti-sickness tablets.
- **Weight:** You may find that your weight has increased, especially if you have been on steroid tablets. Try to eat sensibly.
- **Blood count:** The blood count is not usually a problem unless the spinal canal is being treated as well as the head.
- **Feeling drowsy:** This could happen six to twelve weeks after radiotherapy. You may find that you generally slow down, have very little energy and cannot be bothered to do much. It gradually gets better over a few weeks.

Later side-effects

Some side-effects can develop many months or years after the radiotherapy.

If, for instance, the pituitary gland or the hypothalamus receives a high radiotherapy dose, this could affect the hormones, which may lead to a loss of periods, or sexual function and sometimes an under-active thyroid. However all of these symptoms can be treated by hormone replacements.

Most people worry that radiotherapy will affect their intelligence. Some damage to the normal brain is sometimes inevitable. But the tumour itself may cause damage and it is about getting a balance between effective treatment and the minimum side effects.

If the tumour does not grow back, many people enjoy the same lifestyle as before.

A long term risk of radiotherapy to the brain is a radiation induced brain tumour, although this is very rare in adults.

Radiotherapy - after your treatment

After your treatment

Some people feel quite depressed after the treatment is over, even though they have been looking forward to it being over.

While you are having treatment, you have a specific goal in mind and specific activities that have to be performed. You feel that you are involved in your treatment. Once radiotherapy is over you no longer have such an active role, which may feel like an anti-climax.

Your task now is to stay as healthy and active as possible.

Exercise. Eat well. Keep appointments for tests and check ups. See your doctor or nurse if you have any questions or notice any changes you find worrying.

When will I start to see the results from the treatment?

The brain takes a long time to clear away dead tumour cells.

The radiotherapy also stops the tumour from growing by damaging its reproductive cycle. Therefore cells die gradually over a period of time and it may be several months or even longer before you see the full effects of therapy. The results of scans taken during this time are often confusing. This is because of swelling caused by the treatment. Dead cells often appear as a mass larger than the original tumour. This mass may cause symptoms similar to the tumour.

Early scans are not performed for this reason unless required for planning further treatment. Don't be disappointed if the first scans do not show shrinkage of the tumour.

The combined effects of your surgery and radiotherapy may mean that the positive results that you hope for will not be obvious for a while. The changes expected may show up on a later scan. What is much more important is how you feel and whether you feel you are more able to do some of the things you may have found difficult before.

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Brain Tumour UK is the leading, caring charity committed to fighting brain tumours. Our personalised support is available online, on the phone, by email and through our support groups. Our scientific research improves the quality of life for brain tumour patients and identifies better treatments. We raise awareness to change things for the better, for everyone affected by a brain tumour.

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