
Cancer treatments - radiotherapy

Summary

- Radiotherapy is the use of precisely targeted x-rays to destroy cancer cells while reducing the impact of radiation on healthy cells.
 - Almost all side effects will disappear once radiotherapy treatment is completed.
 - Radiotherapy can be administered by a variety of machines and devices, depending on which body part is affected, and the type and stage of the tumour.
 - The two main types of radiotherapy are external and internal.
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Radiotherapy is the use of precisely targeted x-rays to destroy cancer cells while reducing the impact of radiation on healthy cells. The length of treatment varies depending on factors such as the location, type and stage of the cancer, and whether or not the radiotherapy is combined with other treatments, such as chemotherapy or surgery. Radiotherapy can be used to treat cancer in many sites of the body.

Radiotherapy treatment decisions

Before a decision is made about whether radiotherapy is appropriate for your condition, your case is discussed in a healthcare team meeting. At this meeting, representatives of all the medical specialists involved in the care of your specific type of cancer are present.

These may include:

- specialist surgeons
- medical oncologists
- radiation oncologists
- pathologists
- radiologists.

At these meetings, medical staff look at all the information relating to your case, which may include information about your lifestyle and results of various tests. They then offer specialist advice about the best way to treat your type of cancer.

Radiotherapy treatment length

Depending on the purpose of the treatment, some people receive only one treatment of radiotherapy, while others may receive regular treatments for one to eight weeks. Radiotherapy is usually (but not always) given once a day, five times a week, and takes a few minutes each time.

Radiotherapy can be administered by a variety of machines and devices, depending on which body part is affected, and the type and stage of the tumour. The two main types of radiotherapy are external and internal.

Most people just have external radiotherapy, although some may need both external and internal radiotherapy, depending on the site and type of cancer.

Different uses of radiotherapy

Depending on factors such as the location, type and stage of your cancer, and your age and general health, radiotherapy may be used:

- as the only treatment
 - together with chemotherapy
 - before surgery to shrink the tumour
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- after surgery to kill off any remaining cancer cells
- as a method of pain relief and to ease symptoms such as bleeding.

External radiotherapy

External radiotherapy is administered in hospital by a team of medical professionals including the radiation oncologist (a medical cancer specialist) and the radiation therapist (a specially trained health professional). Other professionals involved in a course of radiation therapy may include medical physicists and nurses, and other allied health professionals.

Before treatment begins, the precise area to be targeted is identified using a special computed tomography (CT) scanner within the radiotherapy department. This procedure may be called 'simulation' or 'planning'. Magnetic resonance imaging (MRI) and positron emission tomography (PET) scans may also be required.

Your individual treatment plan (including the radiation dose and the precise area to be targeted) is prescribed by your radiation oncologist. It is calculated by the radiation therapist based on information from the simulator and CT, MRI or PET scans.

If you are having treatment to your head or neck, your specialist may decide to make a cast of your upper body. The cast is worn during treatment to make sure your head doesn't move.

In other cases, snug-fitting supports will be placed around your body during treatment to keep you stable. Some treatments require that you lie face down in a special cradle or on a belly-board, which allows part of your bowel to be outside the treatment area.

The radiation therapist may mark the treatment areas on your body with non-permanent ink. These marks help to line up the radiotherapy equipment correctly. After finding the ideal position for your treatment, the radiation therapist may mark certain points on your skin with a tiny, permanent skin mark to make sure any further treatments are accurately delivered.

You may also be given a contrast agent, also called contrast medium or dye, to swallow or have injected into one of your veins. This helps your internal organs and structures show up during treatment.

External radiotherapy procedure

External radiotherapy is similar to having a regular x-ray examination. There is no need for anaesthesia (except for infants). Usually, no medication is needed before treatment. However, if your treatment is likely to cause nausea or vomiting, you may be given medication to prevent this before each treatment.

The machine that delivers the high-energy x-rays is called a 'megavoltage machine' or a 'linear accelerator'.

When you receive radiotherapy, you can expect that:

- You will lie down on the treatment table beneath the machine.
- Radiation therapists will position your body to make sure the treatment will precisely target the tumour and the area to be treated. Accuracy is achieved by using the information from your simulation or planning procedure and following the prescription from your radiation oncologist.
- Blocking devices, called shielding, will protect the areas of your body that don't require treatment. These are attached to, or inside, the linear accelerator.
- Staff will leave the treatment room to operate the machine, but you can talk to them on the intercom. They can also see you on a television monitor.
- Treatment will take a few minutes and will be painless. You will hear a drone similar to that of a vacuum cleaner while the linear accelerator delivers the treatment.
- The radiation therapists may reposition the machine to give further treatment from different positions, which can often be done remotely from outside the room.
- During your treatment, the radiation therapists will take an electronic x-ray of the treatment area. This checks the accuracy of your treatment and allows for any minor adjustments in position due to body movements. Your doctor will not be able to tell about your progress from these pictures.

Traditional external radiotherapy is delivered by using multiple fields of treatment – back to front and side to side, or at oblique angles around your body. You are not required to move to achieve the different angles as the linear accelerator can rotate right around you.

Increasingly, computers are being used to 'modulate' the shape of the radiotherapy beam to increase the accuracy of the treatment and reduce the chance of including areas that do not need to be treated. This process is known as intensity-modulated radiation therapy. It may be delivered with the beam in a fixed position, or while the beam rotates around your body.

External radiotherapy doesn't make you radioactive. As soon as the machine is off, there is no radiation in you or the room. You may come into contact with anyone outside with no concern for their health or safety.

Sometimes, your specialist will recommend both external and internal radiotherapy, depending on your cancer.

Internal radiotherapy (brachytherapy)

Internal radiotherapy, also known as brachytherapy – from the Greek words meaning 'treatment from a short distance' – is given from a localised implant. The procedure generally includes:

- Hollow tubes of different shapes, or hollow needles, are put inside your body through or around the tumour.
- A precisely controlled computerised machine places a source of radiation inside these tubes or needles.
- How long the radiation source is left in varies depending on the strength of the source and the dose required.
- Treatments may be single or may be repeated a number of times depending on the situation.

Brachytherapy is commonly used to treat cancer of the cervix, uterus, vagina and prostate gland. It may also be used for other types of cancer.

Internal radiotherapy – slow and fast radiation

Two types of radiation sources are available. One works slowly over a number of days (low-dose rate), such as radiation seed implants. The other works very quickly and only takes minutes to give the treatment (high-dose rate).

Most treatments are given using high-dose-rate sources. This may require between one and five treatments on separate occasions.

Internal radiotherapy – implants

Implants come in different sizes and shapes, including needles, plastic tubes, catheters, capsules and rods, depending on the type of cancer and the area of the body to be treated.

Some implants can be placed in already existing spaces inside the body (called intra-cavitary implants) and others are placed through the skin near the cancer (interstitial implant).

The implant chosen for you is inserted into your body under anaesthetic. Brachytherapy implants can be temporary or permanent.

Internal radiotherapy – temporary implants

A temporary implant is removed after treatment is given. It may need to be re-inserted each time, or may be left in place for a few days to allow treatments to be completed before removal. This will depend on the nature of the treatment.

While the radiation source is inside the needles or tubing, your body will emit small traces of radioactive energy. Once the source is withdrawn, even if the implant is in place, there is no radiation left in your body.

While you are being treated in the brachytherapy room or suite (which may be in an operating theatre), staff will be in a shielded room observing you closely. They can start and stop the treatment as required.

Most treatments take a few minutes and there is no sensation from the actual treatment. After the implant is removed, it is unusual to have any symptoms. If needles have been used, there may be some swelling. Bleeding and infection is very rare, but may occur and require medical care.

If you are being treated in a hospital using low-dose-rate radiotherapy, the source of radiation may be left inside the tubing for up to 40 hours, and you will be isolated from staff and other people. This type of treatment is less common now.

Internal radiotherapy – permanent implants

A permanent implant is usually performed using radiation seeds (especially for prostate cancer). These implants stay in place. The therapy is given over days and weeks, but the seeds become weaker and eventually stop being radioactive after some months, depending on the variety of implant used.

The hospital staff will isolate you in a single room and limit the time you spend with visitors (especially children and pregnant women) in the first few days after the implant is inserted.

The radiation fades with time, so other people will be safe to be near you once you are discharged from hospital. Special instructions will be given about coming close to children and pregnant women while the sources are still active inside the body.

Side effects of radiotherapy

Radiotherapy works by killing cells that are dividing rapidly. This is why it works on cancer cells. It also explains why radiotherapy causes side effects, as it acts on cells in the body that naturally divide rapidly, such as those in the lining of the gut, the skin, the bladder and the bone marrow.

Not everyone experiences side effects, although usually, one or two side effects occur. Side effects will depend on the type and dose of radiotherapy you receive and which part of your body is being treated.

After treatment is complete, almost all side effects will disappear. Some may return after months or years, and may affect other tissues in the treatment area. It is important to discuss side effects with your doctor because treatments are available.

General side effects may include:

- fatigue
- nausea or loss of appetite
- skin changes – including dryness, reddening, itching, blistering, flaking, tanning and superficial ulceration (which will heal in two to six weeks). Heat, sunlight, harsh soaps, chemicals, dyes and abrasive washing may make skin symptoms worse. Your radiotherapy nurse will discuss skincare with you. You may need special gels, creams and dressings
- hair loss (alopecia) – this may affect parts of the body that were treated, including the head, facial hair, armpits and pubic hair
- mouth issues, including mouth dryness, difficulty chewing and swallowing, and dental decay. You may need to see a specialist dentist prior to treatment to prevent future dental problems
- chest problems, including coughing, shortness of breath and painful swallowing
- abdominal problems, including diarrhoea, bleeding (rarely), a burning sensation when urinating, the urge to urinate more often, vaginal dryness and discomfort. If the ovaries are present and working, they may cease to work after four weeks and menopause may affect some women. People with prior bowel disorders, such as diverticular disease, may find their symptoms become worse.

You should notify your doctor at once if you experience severe or distressing side effects that do not respond to medication, such as severe vomiting, chronic diarrhoea, bleeding or some other change in your health that worries you.

If you can't contact your doctor, go to the emergency department of your nearest hospital. Tell the staff that you are having radiotherapy.

Coping with radiotherapy side effects

It is important to remember that almost all side effects will disappear once treatment is completed. In the meantime, helpful strategies include:

- Rest as much as you can. Plan your activities for times when you know you'll feel the most energetic, perhaps in the mornings, and take afternoon naps if necessary.
- Exercise gently whenever possible.
- Avoid sun exposure. When outside, wear protective clothing such as a broad-brimmed hat and a long-sleeved top. Ask your doctor if it is okay to use sunscreen on exposed skin.
- Avoid using perfumes, deodorants, soaps, creams and make-up. Use a soap-free wash instead.

- Avoid scratchy or stiff clothing.
- Avoid hot showers or baths, scratchy towels and shaving the treatment area. Do not scrub the skin over the treatment area.
- Avoid over-the-counter drugs, natural therapies or any other type of supplement, unless your doctor says it is okay to take them.
- Seek help if you feel depressed or anxious. See your doctor for advice and referral if talking about your feelings with family and friends doesn't make you feel any better.

If you are having radiotherapy to the head and neck region:

- Use gentle shampoos and avoid harsh hair treatments such as dyes, perms, hair rollers, gels and sprays if you are having radiotherapy to the head (which can cause hair loss).
- Try satin or cotton pillowcases – they may feel more comfortable against your scalp.
- Choose high-energy foods. If you don't feel like eating, opt for supplemented drinks such as milkshakes with egg, honey or supplement powders.
- Avoid over-the-counter mouthwashes, alcohol and cigarettes if you are having radiotherapy to the head or neck, as this treatment can cause swallowing problems and a dry mouth. Your doctor may prescribe artificial saliva products. A speech therapist may assess swallowing and speech difficulties if necessary. Avoid food and drink that is too hot or too cold.
- Visit your dentist before, during and after radiotherapy to best manage dental problems such as decay.

If you are having radiotherapy to the chest, abdomen or pelvis

- Avoid high-fibre foods if you are having radiotherapy to the abdomen as this treatment can cause nausea and diarrhoea. Choose bland foods such as toast or dry biscuits. Specific medication may be required. Avoid spicy food and food with seeds.
- Try to snack lightly throughout the day, rather than having three main meals.
- Using a vaginal cylinder and hormone cream may help women receiving radiotherapy for cancer of the cervix, uterus, bladder, bowel or other pelvic area. This will prevent narrowing and drying of the vaginal lining. Your sexual function may be affected and can be discussed with your doctor or nurse. Referral to a gynaecologist may be helpful. Fertility and hormonal function may also be affected and should be discussed with your specialists.
- Treat the burning sensation when urinating, or the urge to urinate more often – a common side effect of radiotherapy to the bladder region – by reducing acid in your urine. You can do this with medication, but if you have ongoing or severe symptoms, discuss them with your doctor.

Regular tests during and after radiotherapy

During treatment, your doctor will order medical tests such as physical examinations, x-rays, other scans and blood tests to find out how you are tolerating the treatment. During therapy, it can be hard to tell how well the radiotherapy is working. This will be assessed after your course of treatment is completed.

Where to get help

- Your doctor
- Specialist surgeon
- Radiation oncologist
- Hospital staff

Things to remember

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