PROCEDURE

Radiation therapy

Radiation therapy uses high-energy radiation to destroy or control cancer cells.

PURPOSE
Destroy or control cancer cells and relieve cancer-related symptoms

PROCEDURE TYPE
Therapeutic - noninvasive external beam or minimally invasive internal treatment

WHERE IT IS DONE
Outpatient cancer centre; operating theatre for some internal treatments

ANAESTHESIA
None externally; sedation or anaesthesia for some internal treatments

HOW LONG IT TAKES
10-60 minutes per session; some internal treatments take hours

PREPARATION
Planning scan; site-specific bladder, bowel, fasting, or medicine instructions

RECOVERY
Same day usually; no driving after sedation or anaesthesia

MAIN RISKS
Fatigue, skin changes, organ effects, and late tissue damage

RESULTS
Response assessed over weeks to months with follow-up

Overview

Radiation therapy, also called radiotherapy, uses high-energy radiation to damage cancer cells so they stop growing or die. It may be the main treatment or may be combined with surgery, chemotherapy, immunotherapy, or hormone therapy.

A radiation oncologist is a doctor who plans and oversees this treatment. The exact technique depends on the cancer's type, location, size, and whether it has spread.

The main forms are:

Radiation affects healthy cells as well as cancer cells. Treatment is planned to limit the dose to nearby healthy tissue. Healthy cells can often repair radiation damage more effectively than cancer cells.

- External beam radiation therapy: A machine directs radiation at a carefully planned area from outside your body.
- Brachytherapy: A radioactive source is placed inside or close to the treatment area, temporarily or permanently.
- Systemic radiation therapy: A radioactive medicine is swallowed or given through a vein. It travels through the body to cells that absorb it.

Why the procedure is performed

Radiation therapy may be used to cure a cancer, lower the chance that it will return, slow its growth, or relieve symptoms.

It may be given before surgery to shrink a tumour or after surgery to treat cancer cells that may remain. In other situations, it is used instead of surgery when radiation offers similar control or surgery would be difficult.

Radiation can also ease symptoms from advanced cancer. For example, it may reduce pain from cancer in a bone, control bleeding, or reduce pressure caused by a tumour.

Who should and should not have it

Radiation therapy may be offered when the cancer is expected to respond and the treatment area can be reached without causing unacceptable harm to healthy organs. Your overall health, treatment goals, previous treatments, and personal preferences all matter.

It is not the right choice for every cancer. Treatment may be avoided, changed, or delayed when:

Some connective tissue disorders can increase the risk of radiation injury. Brachytherapy and systemic radioactive medicines have additional limits based on the treatment location, blood counts, kidney function, and ability to follow radiation-safety precautions.

Tell the team if you are or could be pregnant, are breastfeeding, or have had radiation before. Previous radiation does not always prevent further treatment, but it changes planning.

- The expected benefit is lower than the risk of tissue damage
- The same area has already received a high radiation dose
- Pregnancy could expose an unborn baby to radiation
- A wound, infection, or another illness needs treatment first

- You cannot safely remain in the required position, although supports or sedation may help
- Surgery, medicine, monitoring, or supportive care is more suitable

How to prepare

Your treating facility's own instructions take priority because preparation differs by treatment area and technique.

Before external beam treatment, you usually have a planning appointment called a simulation. A CT scan maps the treatment area. You may receive small skin marks or tiny permanent tattoo dots to help place you in the same position each time. A mould, mask, cushion, or other support may be made for you.

Depending on the area being treated, you may be asked to:

Give the team a current list of medicines and supplements. Do not stop a blood thinner or any prescribed medicine unless the treating team specifically tells you to.

Ask about dental care if your head or neck will be treated. Discuss fertility preservation before treatment if radiation could affect the ovaries, uterus, testes, or nearby organs.

- Attend with a full bladder or empty bowel
- Avoid food for a set period
- Follow specific skin-care instructions
- Have blood tests or imaging
- Arrange transportation if sedation or anaesthesia is planned

What happens during the procedure

For external beam treatment, you lie on a treatment table in the position used during planning. The team checks your position and may take images before delivering radiation.

The machine may rotate around you, but it does not touch you. You will not see or feel the radiation. The staff leave the room while the beam is on, but they can see, hear, and speak with you. You need to stay still and breathe normally unless given other instructions.

External treatment is often divided into several sessions, called fractions. Some people receive one or a few high-dose treatments; others attend on multiple days over several weeks.

For brachytherapy, an applicator, tube, or small implant is placed in or near the treatment area. Sedation, local anaesthetic, or general anaesthesia may be used. The radioactive source may

remain for minutes, hours, days, or permanently, depending on the treatment.

Systemic radiation therapy is given as a capsule, drink, injection, or infusion. You may need temporary precautions to reduce other people's exposure to radiation.

Recovery and what to expect afterward

Pain: External beam radiation itself is painless. Skin tenderness or discomfort in the treated area can develop as treatment continues. Brachytherapy may cause soreness where an applicator or implant was placed.

Eating: You can usually eat normally unless the treatment affects your mouth, throat, stomach, or bowel. Nausea, swallowing difficulty, or appetite changes may require diet changes and support from a dietitian.

Activity: Light activity is often helpful, but fatigue can build over the treatment course and may continue afterward. Increase activity gradually and rest when needed.

Driving: You can generally drive after external beam treatment if you feel well. Do not drive after sedation or anaesthesia, or while taking medicine that affects alertness. Arrange a ride when instructed.

Work: Some people continue working, while others reduce their hours or take leave. This depends on fatigue, side effects, treatment timing, and the physical demands of the job.

Risks and possible complications

Side effects depend mainly on the body area treated, total radiation dose, session schedule, and other cancer treatments.

Early effects can include fatigue, skin redness or darkening, soreness, swelling, nausea, bowel or bladder changes, and hair loss within the treated area. Many improve after treatment, although recovery may take time.

Later effects can appear months or years afterward. These may include firm or scar-like tissue, ongoing bowel or bladder changes, reduced organ function, infertility, lymph fluid swelling, or bone weakness. The specific risks should be explained as part of consent.

Brachytherapy can also cause bleeding, infection, or injury related to placing the applicator. A new cancer caused by radiation can occur years later, although this risk is generally small compared with the expected treatment benefit.

Results and follow up

Radiation does not always destroy cancer cells immediately. The effects can continue for weeks or months after the final session.

Your team will assess your response through symptoms, examination, blood tests, or imaging. Scans are often delayed until treatment-related swelling has settled. The timing depends on the cancer and the purpose of treatment.

Routine follow-up also checks for side effects and helps manage nutrition, pain, skin changes, fatigue, emotional health, and rehabilitation needs. Keep these appointments even if you feel well.

Alternatives

The realistic alternatives depend on the cancer and the goal of treatment.

Surgery removes a tumour directly and may provide tissue for testing. It is more invasive and may require anaesthesia and a longer recovery, but it can be the preferred treatment for some localised cancers.

Drug treatment includes chemotherapy, immunotherapy, hormone therapy, and targeted therapy. These treatments can reach cancer throughout the body, but may cause effects beyond one treatment area and may not control a local tumour as effectively.

Ablation destroys selected tumours using heat, cold, electrical energy, or other methods. It may require only a small incision, but it is suitable only for certain tumours and locations.

Active surveillance uses scheduled tests instead of immediate treatment. It avoids treatment side effects for now, but requires follow-up and accepts the possibility that treatment may be needed later.

Supportive or palliative care without radiation focuses on comfort and quality of life. Medicines, procedures, and practical support may control symptoms, but they do not provide the local tumour control radiation might offer.

Choosing no cancer-directed treatment is also an option. Ask what each choice is expected to achieve and what may happen without treatment.

When to call your healthcare team

For routine concerns, contact the radiation team during office hours about worsening fatigue,

skin irritation, eating problems, bowel or bladder changes, or symptoms that interfere with daily life.

Contact the team promptly for:

Do not touch a displaced radioactive source. Move away and follow the emergency instructions provided by the treatment centre.

Seek emergency help for severe breathing difficulty, chest pain, a seizure, fainting, sudden weakness or confusion, or heavy uncontrolled bleeding.

- Fever at or above the threshold they gave you
- Repeated vomiting, severe diarrhoea, or difficulty drinking
- Increasing pain, skin breakdown, bleeding, or signs of infection
- New trouble passing urine or opening your bowels
- An internal radiation applicator or implant that moves or falls out

Common questions

Will I be asleep?

You are awake for external beam treatment. Some brachytherapy procedures use sedation or general anaesthesia while an applicator or implant is placed.

Can I drive home?

Usually, yes, after external beam treatment if you feel well. You need someone else to drive after sedation or anaesthesia.

How painful is radiation therapy?

You cannot feel the radiation beam. Pain or soreness may develop later from inflammation, skin changes, or an internal treatment procedure.

Will I be radioactive afterward?

External beam treatment does not make you radioactive. Temporary brachytherapy stops exposing others once the source is removed. Permanent implants and systemic treatments may require short-term precautions.

When will I know if it worked?

Some symptom relief may occur during treatment, but tumour response often takes weeks or months. Your team will schedule the appropriate examination, blood tests, or scans.

Sources

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