PROCEDURE

Prostate brachytherapy

Prostate brachytherapy treats prostate cancer by placing a radiation source inside the prostate.

PURPOSE
Treating prostate cancer with radiation placed inside the prostate

PROCEDURE TYPE
Therapeutic; minimally invasive internal radiation treatment

WHERE IT IS DONE
Operating theatre or dedicated brachytherapy suite

ANAESTHESIA
General, or spinal anaesthesia with sedation

HOW LONG IT TAKES
About one to three hours per treatment

PREPARATION
Fasting; possible enema and planned blood-thinner changes

RECOVERY
Same day or overnight; no driving after anaesthesia

MAIN RISKS
Urinary problems, bowel irritation, erectile dysfunction, bleeding or infection

RESULTS
Treatment confirmed immediately; PSA response assessed over months

Overview

Prostate brachytherapy is a type of internal radiation treatment for prostate cancer. A radiation source is placed directly inside the prostate, the gland below the bladder that makes part of semen.

Because the radiation starts inside the prostate, nearby tissues receive less radiation than they would if the same dose came entirely from outside the body. Treatment may still affect the bladder, urethra-the tube carrying urine out of the body-and rectum.

There are two main forms:

LDR is usually one procedure. HDR may require more than one treatment session. Brachytherapy can be used alone or with external beam radiation and hormone therapy.

- Low-dose-rate (LDR) brachytherapy: small radioactive seeds are permanently placed in the prostate. Their radiation becomes weaker over weeks or months.
- High-dose-rate (HDR) brachytherapy: thin tubes are temporarily placed in the prostate. A radioactive source enters each tube for several minutes and is then removed.

Why the procedure is performed

The aim is to destroy prostate cancer cells while limiting radiation exposure to surrounding organs.

Brachytherapy is mainly used when cancer is confined to the prostate or nearby tissues. For some lower-risk cancers, it may be the only treatment. For higher-risk disease, it may provide an extra radiation dose after external beam radiation.

It does not provide an immediate test showing that every cancer cell has been destroyed. Success is assessed over time using prostate-specific antigen, or PSA, blood tests and your clinical follow-up.

Who should and should not have it

Brachytherapy may be considered if your cancer's location and risk level can be treated effectively with radiation. Your general health, prostate size, urinary function and previous treatments also matter.

It may be less suitable if you already have severe difficulty passing urine. Swelling after treatment could make this worse. A very large prostate can make accurate seed or tube placement difficult, although treatment to shrink the prostate may sometimes help.

Previous prostate surgery, including transurethral resection of the prostate, does not always rule out brachytherapy. It can increase the risk of urinary leakage or other problems, so careful assessment is needed.

Treatment may be avoided or delayed if you have:

Inflammatory bowel disease or previous pelvic radiation may raise the risk of bowel injury. These situations require individual review rather than an automatic exclusion.

- An active urinary or other significant infection
- A bleeding risk that cannot be managed safely
- A health problem making anaesthesia or the required position unsafe

- Anatomy that prevents accurate placement of the needles
- Widespread cancer that needs treatment throughout the body instead

How to prepare

Your treating facility's own instructions take priority because preparation differs between LDR and HDR treatment.

You may have an MRI scan, ultrasound, urine test, blood tests or a prostate volume study before treatment. These help the team plan where radiation should be placed.

You will usually need to stop eating for several hours before anaesthesia. You may be asked to use an enema or other bowel preparation so the rectum is relatively empty.

Tell the team about all medicines and supplements you take. Blood thinners like warfarin or apixaban can increase bleeding, but stopping them can also be dangerous. Do not stop a prescribed blood thinner unless the clinician responsible for it and the procedure team have given you a clear plan.

Arrange for someone to take you home. Ask whether you should bring your regular medicines and whether an overnight stay is expected.

What happens during the procedure

You will usually receive a general anaesthetic, which makes you unconscious, or a spinal anaesthetic, which numbs the lower half of your body. Sedation may help you relax.

You lie on your back with your legs supported. An ultrasound probe is placed in the rectum to show the prostate. Using the ultrasound image, the clinician passes needles through the skin between the scrotum and anus and into the prostate.

For LDR treatment, radioactive seeds are inserted through the needles and left in place. The needles are then removed. The seeds usually remain permanently, but they become inactive over time.

For HDR treatment, narrow tubes called catheters are placed through the needles. A machine moves a radioactive source into each catheter for a planned amount of time. The source and catheters are removed after treatment. Nothing radioactive remains inside you.

A urinary catheter may be inserted to drain your bladder. It is often removed before you leave, although it may need to stay in temporarily if you cannot pass urine.

Recovery and what to expect afterward

Mild soreness or bruising between the legs is common. Burning when urinating, needing to urinate more often and a weaker urine stream may develop or worsen over the following days. Simple pain relief may be recommended.

You can usually drink and eat once you are awake and not feeling sick. Fluids may help with mild urinary irritation unless you have been told to restrict them.

Take it easy for the first few days. Avoid heavy lifting, cycling and strenuous exercise for the period given by your treatment team. Sexual activity can usually resume when comfortable, although semen may look brown or blood-stained for a while.

Do not drive yourself home. After general anaesthesia or sedation, you should not drive for at least the period specified by the facility, commonly 24 hours.

Many people return to desk-based work within several days. You may need longer if your work is physical, urinary symptoms are troublesome or you are having several HDR sessions.

After LDR treatment, follow the radiation-safety instructions you receive. These may include temporarily limiting close contact with pregnant people or young children. The restrictions do not usually apply after HDR because the source has been removed.

Risks and possible complications

Urinary symptoms are the most common short-term problem. They can include urgency, frequent urination, burning and a slow stream. Occasionally, swelling blocks urine flow and a catheter is needed.

Other possible risks include:

A serious injury connecting the rectum and urinary tract, called a fistula, is uncommon but can require surgery. LDR seeds can occasionally move from their intended position. Your treatment plan accounts for small changes, but your team will explain any relevant precautions.

- Blood in the urine or semen
- Bruising, bleeding or infection
- Rectal discomfort, urgency, bleeding or loose stools
- Narrowing of the urethra, called a urethral stricture
- Urinary leakage, particularly after previous prostate surgery

- Difficulty getting or maintaining an erection, sometimes developing gradually
- Reduced semen, dry orgasm and loss of fertility
- Anaesthetic complications

Results and follow up

The placement and radiation dose are checked during or shortly after the procedure. After LDR treatment, you may have a scan to confirm seed positions.

Follow-up usually includes appointments and PSA blood tests. PSA should fall, but it may take months or years to reach its lowest level. A temporary PSA rise, known as a PSA bounce, can happen after radiation and does not automatically mean the cancer has returned.

Your team will interpret the PSA pattern over time. Further imaging or tests may be recommended if the results do not follow the expected course.

Alternatives

The reasonable alternatives depend on the cancer's risk level, your health and what matters most to you.

Ask how each option may affect cancer control, urination, bowel function, sexual function and the need for future treatment.

- Active surveillance: regular PSA tests, examinations, scans and sometimes biopsies delay treatment unless the cancer changes. It avoids immediate side effects but requires ongoing monitoring and may lead to treatment later.
- Surgery: radical prostatectomy removes the prostate. It provides tissue for examination but has risks including urinary leakage and erectile dysfunction.
- External beam radiation: radiation is delivered from outside the body. It avoids needles in the prostate but usually requires several visits and can still affect urinary, bowel and sexual function.
- External radiation plus hormone therapy: often considered for higher-risk cancer. It treats a wider area, but hormone therapy can cause hot flushes, reduced sexual function, fatigue and bone or metabolic effects.

- Focal treatment: methods such as high-intensity focused ultrasound or cryotherapy treat selected areas. Long-term evidence and availability are more limited, and untreated prostate tissue still needs monitoring.
- Watchful waiting: treatment focuses on symptoms rather than regular tests intended to cure the cancer. This may suit someone whose health or life expectancy makes treatment burdens greater than the likely benefit.

When to call your healthcare team

Mild burning, bruising and increased urinary frequency can be expected. Mention symptoms that persist, worsen or interfere with sleep and daily life at routine follow-up.

Contact your healthcare team promptly if you:

Seek emergency help for severe breathing difficulty, chest pain, fainting, confusion or uncontrolled bleeding. Follow the emergency instructions given by your facility.

- Cannot pass urine or develop painful bladder swelling
- Have a fever, chills or worsening pain
- Pass large blood clots or have increasing bleeding
- Have persistent vomiting or cannot keep fluids down
- Develop severe or continuing rectal bleeding

Common questions

Will I be asleep?

Often, yes. General anaesthesia is common. Some centres use spinal anaesthesia with sedation, so you may be awake but relaxed and numb below the waist.

Can I drive home?

No. Arrange for someone to take you home. Anaesthesia and sedation can affect judgment and coordination after you feel awake.

How painful is it?

You should not feel the needle placement during anaesthesia. Soreness, bruising and burning when passing urine are common afterward but are usually manageable.

When will I know whether it worked?

The radiation delivery is confirmed around the time of treatment. Cancer response is judged from PSA results over months and years, not from an immediate result.

Will I be radioactive afterward?

After HDR treatment, no radioactive material remains in your body. LDR seeds give off low-level radiation for a limited time, so temporary contact precautions may be needed.

Can I still have sex?

Usually, once you feel comfortable. Sexual function may change gradually, and semen may be reduced or blood-stained. Follow any short-term condom or radiation-safety advice from your team.

Sources

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