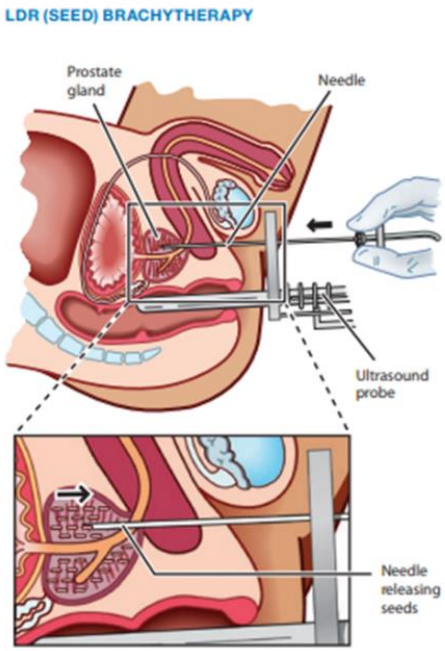
Volume studies and low dose rate brachytherapy

What is low dose rate brachytherapy?

Brachytherapy is an effective radiation treatment for low and intermediate grade prostate cancer in which the radiation source is placed throughout the prostate.



Low dose rate (LDR) brachytherapy treatment for prostate cancer is commonly referred to as seed brachytherapy because numerous small radioactive seeds are implanted within the prostate.

These very small radioactive metal seeds coated in radioactive Iodine 125 are placed into your prostate gland. Each radioactive seed is the size and shape of a grain of rice (0.9 mm diameter x 4.9 mm in length). The seeds stay in the prostate permanently releasing a rapidly declining dose of radiation. In the first 6 months after implantation, 90% of your radiation dose will have been delivered constantly. By 12 – 18 months, the seeds are no longer radioactive.

This form of radiation treatment results in a very high, localised dose of radiation to be delivered to the prostate and less to the surrounding structures. The radiation from each seed only penetrates a few millimetres however, combined, the seeds produce a high level of prostate targeted radiation minimising exposure to the surrounding tissues.

LDR brachytherapy is used to treat prostate cancer that is;

- Localised to the prostate,
- Gleason score equal to or less than 7 (3+4=7 but not 4+3=7) or ISUP 2,
- Initial PSA level's lower than 10ng/ml,
- Less than 50% of biopsy cores involved with cancer,
- A prostate volume of less than 40cc is ideal but we can treat up to 60 cc,
- Minimal associated urinary symptoms,
- No previous prostate surgery.

A flow rate study (measure of how fast you pass urine and how much is left in the bladder) is a mandatory requirement prior to the procedure. In conjunction with your urinary symptom scores, we assess your suitability to proceed with brachytherapy.

Why is LDR brachytherapy a treatment option?

LDR brachytherapy is a precise, stereotactic targeted radiation therapy administered with the intention of a cure.

Who is involved in LDR brachytherapy?

The procedure is carried out by a team consisting of a Urologist, Radiation Oncologist and a Medical Physicist as per Australian radiation safety guidelines.

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What does LDR brachytherapy involve?

You will require an appointment with a Urologist and a Radiation Oncologist prior to the procedure.

The procedure is performed in two stages.

Stage 1 – Treatment planning/ volume studies.

This is where we plan how many seeds are required and where they will be placed in the prostate.

- This is a day procedure performed under a general anaesthetic.
- A volume study specifically measures the size and shape of the prostate which varies between all individuals which in turn allows the brachytherapy team to determine the number of seeds required, where they will be positioned and the radiation strength of the seeds.
  These characteristics are very specific to each patient and so the ordering process is referred to as “the prescription dose”. It is patient specific not unlike prescription medications.
- An ultrasound probe is placed in the rectum. Ultrasound images of the prostate are obtained at 5mm intervals and captured in the planning computer for calculating the number of seeds, their positioning and radioactive strength to ensure the appropriate coverage of the radiation.
- A cystoscopic assessment of the bladder (look into the bladder via the urethra) will also be undertaken to ensure that there are no abnormal anatomical constraints that need to be taken into account in the treatment planning or that may render the patient unsuitable for a seed implant.
- Patients are discharged with verbal confirmation as to whether or not they are suitable to proceed to an implant in the future. As a urethral catheter is placed during the volume study (removed before you wake up), it is common for patient’s to have some mild discomfort when urinating in the first 24 hours for which we recommend regular Ural therapy for 1-2 days post volume study.

Calculating the prescription dose.

The radiation oncologist and the Physicist will study the imaging obtained during the volume study. The boundaries of the prostate and rectum are marked. The location of the cancer(s) based on your MRI biopsies and in some cases a PET scan are marked. Virtual seeding is then carried out to determine the number of seeds, their radiation strength and optimal positioning is determined. This takes several hours to perform and is then validated by all members of the team (Urologist, Radiation oncologist, Radiation physicist).

Stage 2 – LDR Brachytherapy implant placement.

- About 4-6 weeks following the volume studies, we perform your seed implant (it can be delayed for up to 4 months if circumstances dictate). This procedure is performed under a general anaesthetic. The prescription dose of seeds manufactured in the USA will be inserted using fine needles passed through the skin behind the scrotum and in front of the anus (perineum).
- A catheter is placed in the bladder and remains overnight. It is removed the next morning after a pelvic CT scan and prior to your discharge the same day.
- An ultrasound probe will be placed into the rectum so that the prostate can be viewed on a screen.
- A template is place over your perineum, the area between the scrotum and the anus Using 25 to 35 needles, each containing between 1 to 4 seeds, 60 – 100 (depending on the size of the prostate) will be placed into the prostate under Ultrasound and xray guidance.

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- The needle puncture sites do not need suturing.
- The template and ultrasound are used to ensure correct positioning of the seeds to match the plan.
- The seeds are on a strand of soluble suture material to ensure perfect alignment.

What is the recovery after LDR brachytherapy?

You will be admitted to hospital overnight. A lead apron will cover your pelvis as per hospital radiation protocol. Immediately after the implant you may experience some;

- Mild soreness.
- Bruising and discolouration between the legs.
- Slight bleeding or burning beneath the scrotum.
- Blood in the urine, which may last several days.

These side effects are temporary and caused either by the needles used to place the seeds, the catheter or other instruments used for the procedure.

You can return to work when comfortable.

Sexual Activity

- You can resume sexual activity when you feel comfortable to do so.
- A condom is recommended for use for the first 6 weeks after implantation. If your partner is pregnant, use condoms for the duration of the entire pregnancy as a precaution.
- Your seminal fluid may be discoloured and you may experience discomfort with the first few orgasms. This will settle with time.

Radiation Aftercare

Although the seeds are radioactive, **you are not**. There are no restrictions on travel or contact with adults. Most of the radiation is absorbed by the prostate. Normal social contact will not put you or anyone around you at risk. However, for the first couple of months you should, as a precaution, avoid having small children on your lap for continual periods of time (beyond a few minutes), as well as prolonged physical contact with pregnant women.

What are the risks of LDR brachytherapy?

The risks of this procedure include (but are not limited to):

Almost all patients

- Passing blood stained urine.
- Bruising of the perineal skin.
- Infertility following treatment.

Common risks

- Difficulty passing urine with a reduced flow and increased frequency, particularly at night. All patients are given 3 months of a drug to relax the prostate to address this.
- General lethargy and tiredness.
- Some increased bowel frequency.
- Urgency of urination.
- The need to defecate after a substantial meal.

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- Reduction in erectile function. 20% of men will get a reduction in the first 12 months. By 4 years, 40% of men will notice a reduction. These issues can be addressed with drugs such as Viagra.

Occasional risks

- Infection in the bladder requiring antibiotics. You will be given a 1 week course of oral antibiotic on discharge.
- Prolonged difficulty urinating.
- Some mucous bowel motions.
- Additional treatments if the cancer does not respond completely including surgery or hormone therapy.

Rare risks

- Permanent urinary incontinence.
- Rectal ulceration and fistula (a path between the prostate and the bowel).
  This is very rare and can result in the need for diversion of the bowel motion (colostomy).
- Anaesthetic or cardiovascular problems (inc. chest infection pulmonary embolus, stroke, deep vein thrombosis, heart attack and death).
- A new cancer following treatment caused by the radiation (approx. 1% risk for every 10 years after treatment).

Other uncommon or very uncommon risks of surgery and anaesthesia include:

- Blood clots in the legs (Deep vein thrombosis (DVT)) or lungs (Pulmonary embolus).
- Chest infection (Pneumonia).
- Heart attack.
- Stroke.
- A serious allergic reaction (Anaphylaxis).
- Death.

What are the alternative treatment options?

- Active surveillance.
- External beam radiotherapy.
- Radical prostatectomy.

This is general information only. Please consult your doctor for more information and treatment options.

For appointments and enquiries please contact 07 3830 3300.

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