High Dose Rate Brachytherapy

Information for patients, families and friends
About this booklet

This booklet is for patients having high dose-rate brachytherapy treatment to the prostate. It provides general information to help you understand and prepare for your treatment.

You may find it useful to bring this booklet with you to your appointments.

Contact Numbers - During Business Hours

General Enquires +61 3 9076 2337
Radiation Oncologist +61 3 9076 2337
Melbourne Prostate Institute Nurse +61 3 9076 2961

After Hours or Weekends

Alfred Hospital Switchboard +61 3 9076 2000

Please ask to speak to the Radiation Oncology Registrar on call

If you are unable to pass urine:

Private patients – Contact your private urologist.

Public patients – During business hours contact The Melbourne Prostate Institute.

Outside business hours go to your nearest emergency department.

Do not wait until morning if the problem arises at night.
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1. What is the Melbourne Prostate Institute?

The Melbourne Prostate Institute, based at The Alfred Hospital, is a team of highly experienced and specialised staff, utilising modern equipment and ensuring the best possible advice, treatment and follow-up for men with prostate cancer.

Melbourne Prostate Institute commenced seed implants after training in Seattle in 1998. To date we have successfully treated more than a thousand men throughout Australia, New Zealand, the Pacific and Asia.

2. What is prostate cancer?

Prostate cancer is a form of cancer that develops in the prostate gland. Most commonly, prostate cancer originates from glandular cells in the prostate. These cells make the fluid component of semen. Some prostate cancers can grow and spread quickly, however most are slow growing.

3. What is brachytherapy?

Brachytherapy is a form of radiation treatment in which a radioactive source is placed inside or near the area that requires treatment.

The radioactive sources used in prostate brachytherapy naturally decay and give off radiation in this process. This radiation is absorbed into the surrounding tissue.

4. What is high dose-rate brachytherapy?

High dose-rate brachytherapy involves placing a radioactive source directly into the area requiring treatment for a brief period of time.
To do this catheters or tubes are positioned in or near the treatment area. These catheters allow the high dose rate radioactive source to travel within the area of interest and deliver the radiation treatment. The catheters are removed once all treatments are finished.

High dose-rate brachytherapy is usually given in a number of treatments, over the course of a couple of days. This type of treatment allows a high dose of radiation to be given to the area, while minimising the radiation dose to surrounding healthy tissue.

**Why use high dose-rate brachytherapy to treat prostate cancer?**

The radiation damages the DNA (genetic code) of cancer cells in the treated area making them unable to grow or divide. As cancer cells are more sensitive to radiation than normal cells, the normal cells are able to repair some of the damage and survive.

**How does high dose-rate brachytherapy fit in with other treatments for prostate cancer?**

High dose-rate brachytherapy is most commonly used to boost or escalate the radiation dose to the prostate provided by a course of external beam radiation therapy treatment. This dose escalation has been shown to increase the cure rate.

The cure rates from the combination of external beam radiation therapy and high dose-rate brachytherapy are equivalent to that seen after surgery for equivalent men.

Many men prefer the side effect profile and the convenience of radiotherapy with brachytherapy, compared with major surgery. Other men might have medical problems that make surgery a bad choice.
Over the last 15 years, seed brachytherapy and surgical removal of the prostate have had the same cure rate for men with prostate cancer.

5. Preadmission clinic

About four weeks before admission to hospital, we will ask you to come for preadmission. This is carried out at Alfred Health Radiation Oncology on the lower ground floor. If you have any cardiac history, we will ask you to see the anaesthetists in the Alfred Centre preadmission clinic on the ground floor. This visit can take up to 3 hours.

The medical resident will:

- Take your medical history and write up your medications.
- Complete a surgical consent form with you.

The clinic nurse will:

- Take your height and weight.
- Electrocardiogram (ECG – a tracing of your heart rate and rhythm).
- Pulse and blood pressure.

The pharmacist will:

- Make a list of all of your normal medications.

The Melbourne Prostate Institute nurse will:

- Explain the procedure and what to do before you come to hospital.
- Answer any questions you may have.
- Send you for a chest x-ray and blood test.
6. Admission to the hospital

Your implant is at the Alfred Centre Level 2 (Procedural Suite).

Please arrive at 6.45am on the morning of your brachytherapy.

Date:________________________

Countdown instructions:

It is very important to prepare your bowel prior to the brachytherapy treatment.

14 days prior to admission: ________________________________

- Cease taking any drugs containing aspirin (Cartia, Astrix, Cardiprin or Asasantin) or any anti-inflammatory drugs.
- Paracetamol is fine to take for a headache.

7 days prior to admission: _________________________________

- Stop antiplatelet drugs (such as Plavix, Clopidogrel, Iscover or Ticagrelor, Brilinta or Persantin).

3 days prior to admission: ________________________________

- Commence low fibre diet (see page 8).

1 day prior to admission: _________________________________

- Commence clear fluid diet (see second table on page 9).
- No solid food is allowed on this day.
- Take Picolax sachet in the early afternoon.
- Have nothing to eat or drink from midnight.

On the day of admission: _________________________________

- Nothing to eat or drink including medications.
- Bring to hospital: toiletries, pyjamas, reading material and any medications you take.
### 7. Diet Instructions

#### Low fibre diet – Please begin 3 days prior to admission.

<table>
<thead>
<tr>
<th>Foods to include</th>
<th>Foods to avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vegetables</strong></td>
<td></td>
</tr>
<tr>
<td>Peeled potatoes, pumpkin, mushrooms, carrots, beetroot, tomato paste.</td>
<td>All other vegetables including legumes e.g. baked beans, split peas.</td>
</tr>
<tr>
<td><strong>Fruit</strong></td>
<td></td>
</tr>
<tr>
<td>Strained fruit juices e.g. clear apple or blackcurrant juice. Tinned peaches, pears or apple. Bananas, honeydew, cantaloupe and peeled apples.</td>
<td>Dried fruits, unstrained fruit juices, all other fresh fruit and tinned pineapple.</td>
</tr>
<tr>
<td><strong>Dairy products</strong></td>
<td></td>
</tr>
<tr>
<td>Milk, cheese, yogurt – vanilla or natural, ice cream and custard.</td>
<td>Yogurt, cheese or ice cream containing fruit, nuts or seeds.</td>
</tr>
<tr>
<td><strong>Meat</strong></td>
<td></td>
</tr>
<tr>
<td>All meats e.g. beef, lamb, chicken or pork. Fish and seafood. Eggs.</td>
<td>Spicy meats e.g. curried. Fatty meats e.g. salami, sausages. Crumbed or battered fish, meat or chicken.</td>
</tr>
<tr>
<td><strong>Cereals</strong></td>
<td></td>
</tr>
<tr>
<td>White bread, crumpets, plain English muffins, plain cakes, biscuits or pikelets. Rice bubbles or cornflakes. White pasta, rice or noodles.</td>
<td>Breads: rye, wholemeal, multigrain, raisin, seeded or high-fibre. Cakes or biscuits containing fruit &amp; nuts, or made with wholemeal flour. All other cereals.</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
</tr>
<tr>
<td>Lollies, jelly, plain chocolate, butter, margarine, honey, vegemite, coffee, tea, cordial and soft drinks.</td>
<td>Nuts, peanut butter, jam or marmalade. Coconut. Popcorn, potato chips, pickles, relish. Chocolate with fruit or nuts.</td>
</tr>
</tbody>
</table>
### Sample menu of low fibre diet.

<table>
<thead>
<tr>
<th>Time</th>
<th>Menu</th>
</tr>
</thead>
</table>
| **Breakfast** | Rice bubbles or Cornflakes with milk.  
Egg on toast.  
White toast with margarine and honey.  
Clear apple juice.  
Cup of tea or coffee. |
| **Morning tea** | Cordial, clear juice, tea or coffee.  
Plain sweet biscuit.  
Fruit e.g. banana, melon, peeled apple. |
| **Lunch** | Ham and cheese sandwich with white bread (margarine optional).  
Scrambled egg on toast.  
Fruit salad or melons, banana and ice cream.  
Vanilla yogurt.  
Cup of tea or coffee. |
| **Afternoon tea** | Soft drink, cordial, tea or coffee.  
White dry biscuit and cheese.  
Plain scone with margarine and honey. |
| **Dinner** | Poached eggs on white toast.  
Chicken, fish or meat with peeled pumpkin, carrot, mushrooms and mashed potatoes (or white rice, pasta or noodles).  
Canned apple or jelly and ice cream.  
Cup of tea or coffee. |

### Clear fluid diet – Please begin the day before admission.

<table>
<thead>
<tr>
<th>Category</th>
<th>Items</th>
</tr>
</thead>
</table>
| **Soups**         | Broth.  
Consommé (no vegetables or meat pieces). |
| **Fruit juices**  | Strained apple juice.  
Blackcurrant juice.  
Cranberry juice. |
| **Other beverages** | Water.  
Tea or coffee with no milk.  
Carbonated beverages (including flavoured mineral waters lemonade etc.). |
| **Desserts/Sweets** | Jelly, hard boiled lollies, icy poles. |
| **Condiments**    | Sugar.  
Salt. |
8. In the hospital

a) Day 1

You are required to come into hospital at 6:45am on the day of your procedure. You will be admitted by the reception staff and prepared for theatre by the nurses. The anaesthetist will visit you in the waiting area, have a quick discussion and make an assessment. We prefer a spinal anaesthetic for a high dose-rate brachytherapy implant but it is the anaesthetist’s decision.

During this period you will meet a whole range of staff in quick succession and many of them will check things related to safety, your identity, what you’re having done, etc.

You will see your radiation oncologist just before you go to the theatre or in the theatre. There are a lot of people in the theatre, including the brachytherapy radiation therapist, a physicist, a scrub nurse, a circulating nurse, an anaesthetist, the radiation oncology registrar and a theatre technician.

The high dose-rate brachytherapy implant

Under anaesthetic your radiation oncologist will insert 15-18 plastic hollow catheters through the skin of the perineum (the skin between the anus and scrotum) into the prostate.
The placement of the plastic catheters is guided by an ultrasound machine, x-ray and a template. The template secures the catheters so they cannot move. Once all the catheters are in place the template is secured to the perineum.

A urinary catheter will be inserted to drain urine, as you will be lying flat in a bed for approximately 24 hours, not able to sit up or walk around. Most patients do not experience pain due to the catheters in the prostate, however the urinary catheter tends to cause more discomfort.

The procedure will take 1-1.5 hours.

Planning
You will have a CT scan at the Alfred Health Radiation Oncology to determine the exact position of the catheters in relation to the prostate. With this information, we can individually calculate the dose of radiation to your prostate.

Time is taken to carefully plan your treatment. We minimise the amount of radiation to important structures, like the urethra and rectum, which reduces the likelihood of side effects. This planning process takes a few hours, so in the mean time you will be given some food and drink.

Treatment
You will be given two treatments over a 24 hour period.

You will be brought to the brachytherapy suite where you will be positioned on the treatment bed. Each plastic catheter is connected to the high dose-rate brachytherapy treatment machine by a special connecting cable.
Once the radiation therapist, physicist and your radiation oncologist are happy with the connection of all the cables the treatment can begin. We leave the room during the treatment and sit at a console area around the corner from you. We are watching you on video monitor and can easily hear you.

The high dose-rate treatment machine automatically transfers the tiny Iridium-192 radioactive source into each implanted catheter. The treatment is painless. You will only hear a clicking sound and might feel some vibration in the connecting cables. The whole treatment takes 15-30 minutes depending on your treatment plan.

After the first treatment you will return to the Alfred Centre and stay overnight. There is no radiation inside you once the treatment is complete, so there is no restriction on nursing care and visitors are welcome.

b) Day 2

On the second day you will come back to Alfred Health Radiation Oncology early in the morning for another CT scan of your prostate. We replan your treatment in case the brachytherapy catheters have moved overnight.

Most men have bowel gas on the second day. This is due to the bowel preparation, medication and hospital diet which stops bowel motions during treatment. Bowel gas can be extremely uncomfortable and is often the biggest complaint from men who have this treatment. It can also change the position and shape of the prostate, so we remove it before the second scan.

When the new plan is completed you will have your second treatment.
How are the catheters removed?
After your last treatment the catheters and template are removed under light sedation. This is usually done by a registrar at Alfred Health Radiation Oncology in the brachytherapy suite.

Once the catheters are removed you will return to The Alfred Centre where you will shower, return to a normal diet and stay overnight.

When can I get out of hospital?
There is usually some blood in the urine after the treatment catheters are removed. Once this settles, usually by the next morning, the urinary catheter is removed. Once you are able to pass urine without the catheter you can be discharged.

9. Discharge medications
The following medication prescriptions will be given to you before leaving the ward:

Paracetamol (Panadol) or Paracetamol with Codeine (Panadeine)
These are over the counter pain medications. Take two tablets every four hours as needed if you have pain. These may be taken with Naprosyn. The codeine in Panadeine may cause constipation. Do not take more than eight Panadeine or Panadol tablets per day without first talking to your doctor.

You should rest for a few days after the procedure and not engage in any strenuous activity.
10. After discharge from the hospital

The Melbourne Prostate Institute nurse will call you after discharge to check on your progress. If you have any worrying or unexpected problems, the nurse can arrange an appointment with your radiation oncologist or urologist. You can always call us if you have any problems.

Our nurse is contactable during business hours (8:00am – 5:00pm Monday to Friday).

If you are unable to pass urine or have any other urgent problems out of work hours, contact the on-call radiation oncology registrar at The Alfred and go directly to your nearest emergency department. Most men can get back to their normal activities within a day or so of the procedure, however it is important not to do any heavy lifting or strenuous activity for at least a month after the implant.

11. Side effects

Below is a list of the most common side effects associated with high dose-rate brachytherapy for prostate cancer. Side effects may not be limited to the following, so if you have any concerns please speak to your radiation oncologist.

Side effects can be divided into three groups:
- Immediate – Those which happen in the hours or days after treatment.
- Short term – Those which happen 10 days to a year or so after treatment is completed.
- Long term – Those which happen years after treatment is completed
Immediate side effects

Discomfort
- You will be given sufficient pain relief to alleviate any problems with the catheters and template during treatment.
- Lying flat in bed for 24 hours or so, unable to walk or sit up.

General
- Nausea – The anaesthetic might make you feel sick like you want to vomit.
- Blood clots in leg veins – Are prevented by compression stockings and medication.
- Infections – Are very uncommon and are prevented by the antibiotics given in theatre.
- Tiredness.
- Muscle aches and pains.

Urinary
- Blood in urine for a day or so.
- Occasional blood clots.
- Difficulty passing urine.

Short term side effects
Generally these side effects are worst at one to three months after treatment and then improve. These side effects are caused by the effect of the radiation.

Urinary
- Discomfort with urination and sometimes for a while afterwards.
- Discomfort at the end of the penis.
• Abnormal urine flow – Due to bruising and swelling in the prostate.
• Difficulty passing urine.
• Frequency – Needing to pass urine more often.
• Urgency – Needing to pass urine in a hurry.
• Nocturia – Needing to pass urine at night.
• Urinary obstruction – Would require a catheter. Please see your urologist or go to an emergency department if this happens.

Bowel
• Occasional blood in bowel motions.
• Constipation or diarrhoea.
• Mucous discharge or minor alteration in bowel habit – May persist for many months.

Long term side effects
Long term problems after high dose rate brachytherapy are not common but are possible. Most men will return to their pre-treatment state 1-2 years after treatment.

Urinary
• Urethral stricture – Narrowing of the tube through which the urine flows out from the bladder. This is uncommon but might require stretching by a urologic surgeon.
• Irritable bladder – The bladder is abnormally sensitive to filling, resulting in the need to pass urine frequently and in a hurry. There can also be associated penile discomfort. This is very uncommon and can be helped with simple medication.
• Urinary leak or incontinence – Is very uncommon and usually associated with irritable bladder.
Bowel

- Serious bowel problems are very uncommon but may increase the frequency and urgency of bowel motions and/or cause mucous or blood to be mixed with bowel motions.
- Rectal ulceration – Very uncommon.
- Rectal fistulas – Very rare.
- If bowel problems persist it is important to investigate properly to make sure there is no sinister underlying cause.

Sexual

- Impotence (erectile dysfunction) – There may be a period after brachytherapy and external beam radiation therapy when men are temporarily impotent. It is thought in general terms, that men who are fully potent prior to treatment, 60-70% will regain and maintain this.
- Discomfort with ejaculation.
- Decreased volume of ejaculate – Is common.

12. External beam radiation therapy information

External beam radiation therapy can be given prior to or after high dose-rate brachytherapy. You will receive separate information sheets and appointment lists for the external beam radiation therapy treatments.

What is external beam radiation therapy?

Radiation therapy is treatment using radiation, such as x-rays and electrons, to kill or damage cancer cells to stop them from growing and multiplying. Radiation therapy can also be used to treat a variety of benign (non-cancerous) diseases.
Prior to starting external beam radiation therapy treatment

Gold Markers
Prior to the starting your external beam radiation therapy treatment gold markers are inserted into the prostate. If your high dose-rate brachytherapy treatments are scheduled before your external beam radiation therapy, the gold markers will be inserted in theatre. If not, a separate appointment will be made with radiology for the gold marker placement. The gold markers are used each day prior to treatment, to ensure the prostate is in the correct position for treatment.

Planning (Simulation) appointment
A CT scan of the pelvis is done to accurately define the treatment area.

Planning your radiation therapy treatment
Between your planning appointment and your first treatment appointment a treatment plan is created. This can take up to a week depending on the complexity of the plan.

Treatment
You will have treatment every day, excluding weekends, for about 5 weeks.

Radiation therapists are responsible for your daily treatment. They will position you on the treatment bed as you were for the planning appointment. It is important to remain still, relaxed and breathe normally throughout the treatment.

Treatment is painless and usually takes 15 to 20 minutes to complete. Most of this time is spent making sure you are positioned correctly, including imaging the position of your gold markers.
The machine is only turned on for about 60 seconds at a time, from multiple planned angles. You won’t see or feel anything when the machine is turned on, you will just hear a buzzing noise.

**Side Effects**

There are some possible side effects associated with external beam radiation therapy. Medications are available to help with symptoms and most of these side effects settle within a few weeks after treatment is completed.

**Common side effects**

- Tiredness – Particularly towards the end of treatment.
- Skin reaction – The skin may become pink and feel irritated.
- Hair loss – In the treatment area.
- Irritation of bowel and bladder – Increased frequency, urgency and discomfort.
- Discomfort on ejaculation

**13. Follow up**

You will be seen regularly after your treatment to assess your progress. Our nurse will review you over the phone three months after you finish treatment. This is to make sure that all the immediate side effects of the treatment have worn off.

Follow-up with your radiation oncologist and referring urologist is then done six monthly. At the 6 month mark you will see your urologist and the 12 month mark your radiation oncologist and so on. After two years you will be seen annually. If necessary, you are able to see your doctors more frequently.
14. PSA tests

The most sensitive way of monitoring your response to treatment is by following the PSA blood test. Prostate cancer responds progressively, but slowly, after the course of treatment. The PSA will decline, but may not disappear because the prostate is still present and continues to make a small amount of PSA.

During the first year after your treatment is finished you will be asked to have a PSA blood test at 3, 6 and 12 months. You will then have the blood tests annually.

15. Survey Forms

We are continually trying to improve our treatments and reduce side effects. To do this we need to understand the side effects experienced by our patients.

We use standardised, patient completed survey forms for assessing the short and long term side effects of our patients. This allows us to compare your results over time and make comparisons with other men.

The survey forms ask questions about urinary, rectal and sexual function at various time points:

- Prior to the commencement of hormone treatment.
- Prior to high dose-rate brachytherapy implant and treatment.
- Three, six, twelve and eighteen months after treatment (i.e. after last brachytherapy or external beam treatment – whichever is later).
- Annually there-after.
Most men have only minor things come up but some may have a number of problems. Regardless of which category you fall into, please take the time to complete the forms, as we really value the information we are able to gain from them.

In addition to helping us better understand how you are going, this information may be the basis for future research. Our data manager records and manages this information in a secure database and no personal details are divulged. If you have any concerns about this information please speak with your radiation oncologist.

16. Research.

The Melbourne Prostate Institute is committed to improving brachytherapy techniques for the treatment of prostate cancer. Our dedicated team of radiation oncologists, physicists, radiation therapists, nurses and data managers work together to analyse a large quantity of data related to treatment, clinical outcomes and quality of life.

Our team has published many journal articles and presented research work at many conferences in Australia and overseas. We continue to be a leader in clinical brachytherapy research in Australia, with the main focus on improving clinical outcomes for our patients.

17. Frequently asked questions

What should I do if I cannot pass urine?

During business hours private patients should contact their private urologist and public patients should contact the Melbourne Prostate Institute. If it is outside business hours, please go to your nearest emergency department. Please do not wait until morning if the problem arises at night.
What is PSA?

PSA is Prostate Specific Antigen. It is an enzyme made predominantly in the prostate and is found in semen. A small amount of PSA leaks back into the blood and can be measured with a blood test.

Why can PSA be elevated in the blood test?

It will be elevated if more of it is made or more leaks into the bloodstream. Things that will cause this are benign enlargement of the prostate, prostate infections, inflammation or injury and prostate cancer.

If my PSA is elevated, does this mean I have prostate cancer?

No, it might be due to any of the causes listed above. The only definitive way to diagnose prostate cancer is a biopsy.

What happens to my PSA after treatment with hormones?

In greater than 99% of cases the PSA drops to low levels as the prostate cancer regresses under the influence of the treatment. Prostate cancer will remain in regression for an average of two years before it starts to regrow, uncontrolled by the hormone treatment.

What happens to the PSA after radiation treatment to the prostate?

It gradually falls over the course of a year or more, down to low levels.
What happens to PSA in the long-term after curative radiation treatment?

It will be low but detectable because you still have a prostate. It will fluctuate up and down by a small amount because of the natural variation in the test result.

Does PSA always continue to decrease?

Not necessarily. The PSA may increase over a previous lower level for a number of reasons, including the day-to-day variation in all men's blood. Also, the test to determine the PSA concentration varies slightly between different laboratories.

How can the PSA tell if the cancer has reoccurred?

If the PSA shoots up suddenly to a very high level, it can be suggestive of problems. Around one in three men will have minor upward bounces which later turn out to be nothing to worry about.

What does biochemical recurrence mean?

It is a definition used for study purposes. It means the PSA has gone down to low levels and then increased to more than 2 ng/mL and stayed up.

What happens after a biochemical recurrence?

In most men it is an early sign that their prostate cancer was not totally cured by the radiation treatment. Men usually remain well for many years and would not usually have any problems caused by prostate cancer. For at least 5 years after biochemical failure, men are no more likely to die from prostate cancer than other men who do not have a biochemical failure.
Is family history a risk factor for prostate cancer?

Prostate cancer seems to run in some families, which suggests there may be an inherited or genetic factor. Having a brother or father with prostate cancer doubles your risk of developing prostate cancer.

This is very overwhelming, are there other people I can talk to?

At Alfred Health Radiation Oncology we have psychology and psychiatry services available to our patients. Please speak to your radiation oncologist if you would like a referral to these services.

The Cancer Council of Victoria has valuable resources and people to talk to who have had prostate cancer. They can be contacted on 13 11 20 or visit their website www.cancervic.org.au.
18. Alfred Health campus map
You may find it useful to bring this booklet with you to your appointments.

Please write any questions that you may have or notes here

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High Dose Rate Brachytherapy
Information for patients, families and friends

Alfred Health
Radiation Oncology
55 Commercial Road
Melbourne VIC 3004
T 03 9076 2337
F 03 9076 3465
alfredhealth.org.au

Further information:
The Alfred
alfredhealth.org.au
Alfred Health Radiation Oncology
alfredhealth.ro
Latrobe Regional Hospital
lrh.com.au
Melbourne Prostate Institute
melbourneprostate.org
Cancer Council Victoria
cancervic.org.au

If you would like to provide feedback or request a copy of this information in a different format, contact us at patient.information@alfred.org.au

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