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This is a booklet for men who are either considering treatment, or are being treated, for prostate cancer with brachytherapy. It also provides useful advice and information for their families. It is best read in conjunction with the more general booklet in this series, *A Patient's Guide to Prostate Cancer*, which provides an overview of the subject and introduces terms used in this booklet. This booklet may have already been given to you, or it may be viewed and downloaded from the website: www.prostatebrachytherapycentre.com

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Introduction

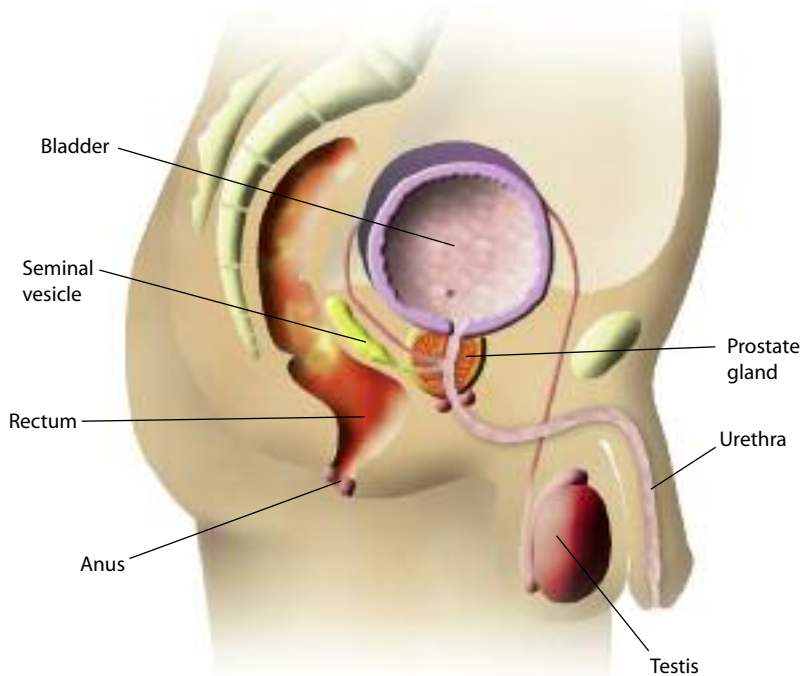
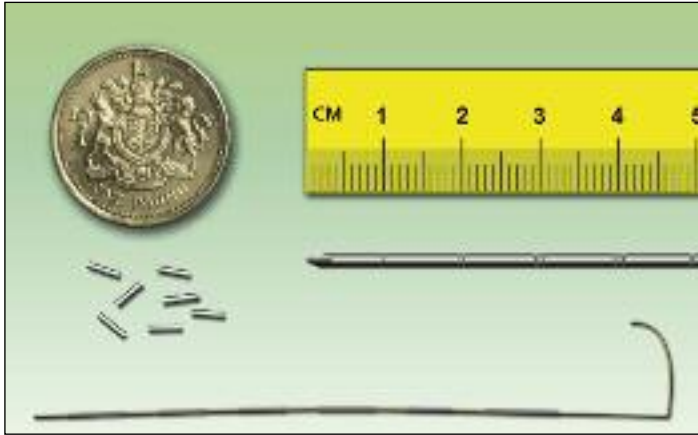


Diagram showing the position of the prostate.

Brachytherapy is a technique for treating prostate cancer, using tiny radioactive seeds of Iodine-125 (I^{125}) that are inserted permanently into the prostate gland. 'Brachy' means close and, in this treatment, the radioactivity is inserted directly into the cancerous organ. This is unlike conventional external beam radiotherapy, where it travels through the body tissues before reaching the prostate gland. Brachytherapy provides a higher, more localised radiation close to the prostate and minimises the effects on the surrounding tissues, such as the rectum and bladder.



Radioactive seeds shown next to a £1 coin and the needle through which they are inserted.

The seeds are tiny canisters of Titanium (4.5mm long by 0.8mm diameter) which contain the radioactive isotope Iodine-125. The half-life of radioactive Iodine-125 is approximately 60 days, which means that most of the radiation is released from the seeds into the prostate gland over the first 3 months. They continue to be biologically active for about 9 months in total. After that, they become effectively inactive.

The latest techniques for brachytherapy were developed in the mid-1980s with the arrival of sophisticated ultrasound probes. These devices enable the accurate implantation of seeds into the prostate, allowing high doses of radiation to be delivered to the cancerous gland.

There are now long-term results from patients who were treated up to 20 years ago, which show that this form of treatment is highly effective in treating and curing patients with early prostate cancer.

Brachytherapy appears to be as effective as other conventional treatments, such as surgery (radical prostatectomy) or external beam radiotherapy, but with a lower side-effect profile (see **Table 1**).

However, brachytherapy is not the only effective treatment for prostate cancer and some patients may be better suited by other methods of treating their prostate cancer.

Table 1: Relative complication rates from local control treatments for prostate cancer.

Clinical Decision Making: Early Prostate Cancer.				
Site	Prostatectomy	External beam radiotherapy	Brachytherapy	External beam radiotherapy and brachytherapy
Rectal	+	+++	+	++
Sexual (impotence)	+++	++	+	++
Urinary				
Incontinence	+++	+	+	+
Retention	+	+	+++	+++

Increasing number of +s indicates increasing complication rates.

Jani and Hellman 2003 *Lancet* **361** 1045-1053

Patient selection

Patients ideally suited for brachytherapy are those for whom there is a good chance that their cancer is confined to the prostate and has not spread outside of the gland. Occasionally, where it is thought there is a higher likelihood that the prostate cancer may have spread to the tissues surrounding the gland, patients will be offered a shortened five-week course of external beam radiotherapy prior to undergoing a brachytherapy implant. This combination therapy allows a greater margin of tissue around the prostate to be treated.

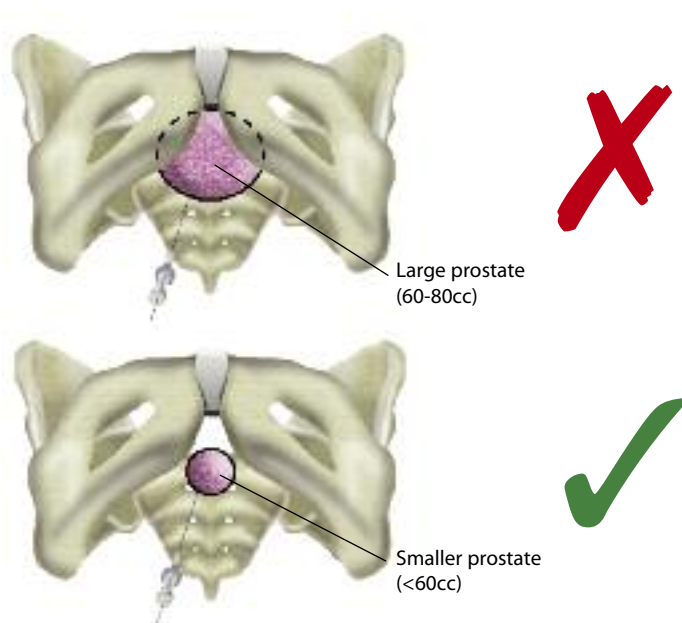
For more information on radiotherapy, please read *A Patient's Guide to External Beam Radiotherapy*, which should be available at your hospital or may be viewed and downloaded from the internet at:

www.prostatebrachytherapycentre.com

The brachytherapy team will advise you whether your prostate cancer is suitable for treatment by brachytherapy. Suitable patients will normally have the following characteristics:

- The **PSA** (Prostate-Specific Antigen) level should ideally be less than 25ng/ml at the time of their diagnosis.
- The **stage** of the cancer should be either T1 or T2 on rectal examination, indicating a prostate cancer confined to the gland.

- The **grade** of the cancer should ideally be a Gleason score of 8 out of 10 or less.
- Patients should not suffer with severe urinary symptoms, such as a very weak stream or difficulty emptying their bladder. Occasionally, a small prostate operation ('limited' TURP [transurethral resection of the prostate]) may be performed to unblock the urinary system, before the implant is performed (see *A Patient's Guide to TURP*, which should be available at your hospital or may be viewed and downloaded from the internet at: www.prostatebrachytherapycentre.com).
- Ideally, the prostate should be relatively small – less than 60cc. If the gland is too large, areas of the prostate may be shielded by the bony skeleton, preventing an adequate implant being performed. In this case, patients are given a 3-month course of



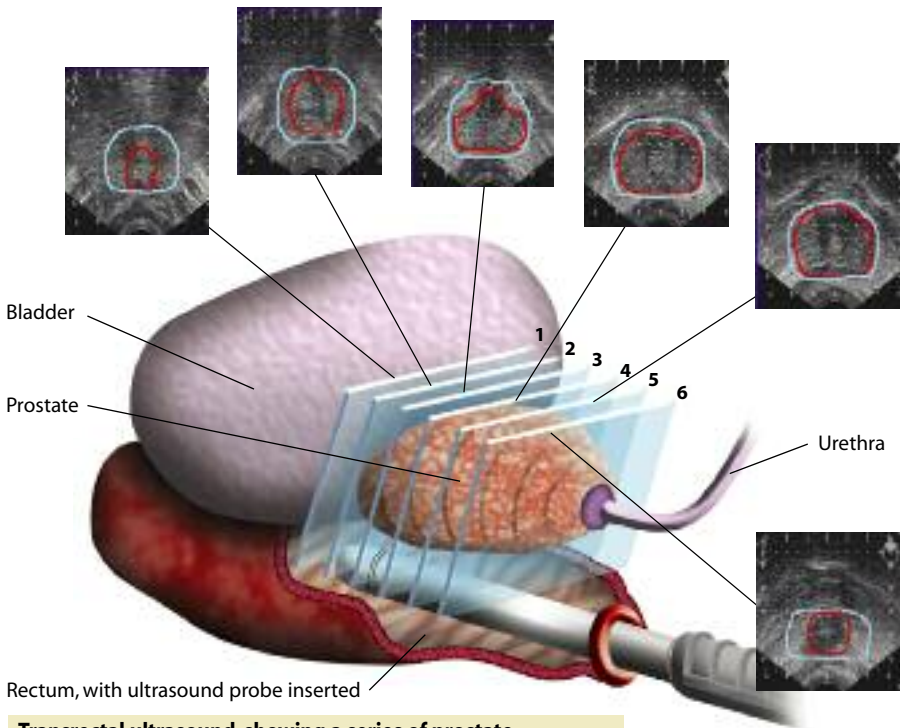
Illustrations showing how the pelvic bones can shield parts of larger prostate glands, preventing adequate implantation of radiation seeds to the whole gland.

hormone therapy to shrink the prostate down to a size that will allow implantation.

- Patients who have had previous prostate surgery, such as a conventional TURP, are usually best treated by an alternative therapy (e.g. radical prostatectomy or conformal external beam radiotherapy).

The assessment visit

Once referred to the brachytherapy team for assessment as to your suitability for this treatment option for your prostate



Transrectal ultrasound, showing a series of prostate ultrasound images used to construct a 3-dimensional image of the prostate (volume study) and treatment plan.

Key: red line = prostate; blue line = limit of radiation to be delivered.

cancer, you will be sent an outpatient appointment, along with this booklet and an information video.

At your outpatient visit, you may see many members of the brachytherapy team, including a Consultant Urologist and/or a Consultant Oncologist.

A general history will be taken as to previous illnesses, operations, medication, etc.

You will have a rectal examination carried out to assess the stage of the cancer. You will also undergo a painless transrectal ultrasound (TRUS) to assess the size and shape of the prostate.

You will be asked to complete a short questionnaire (see pages 20 and 21) to assess your urinary symptoms and to come to the clinic with a comfortably full bladder. This is because a flow rate and bladder scan to measure the residual volume of urine left behind after voiding will be performed.

Discussion of the stage and grade of your cancer will take place, as well as your suitability for prostate brachytherapy.

Following your visit, if you are suitable for brachytherapy and are happy to proceed with this as a treatment option for your prostate cancer, the Brachytherapy Co-ordinator will then be able to schedule your potential dates.

An application for funding from your primary care trust may be necessary, if the procedure is to be carried out on the NHS. This can take several weeks and, unfortunately, not all applications are successful. If not, then you will have the option to appeal to your primary care trust or to self-fund your treatment. We can assure you that we will help to fight your cause as strongly as possible. In 2008, the National Institute for Clinical Excellence (NICE) approved the use of prostate brachytherapy for the treatment of early prostate cancer and it is the only minimally invasive procedure to receive such an endorsement.

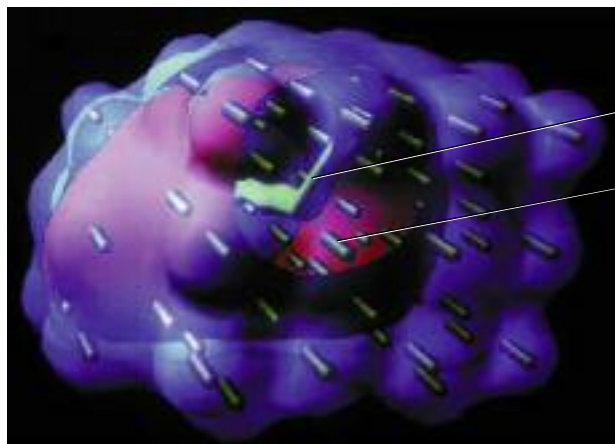
The Procedure

Prostate brachytherapy is now usually carried out as a one-stage real-time technique. An ultrasound of the prostate to accurately assess the size and shape of the gland will normally have been performed in clinic at the time of the initial assessment. This information will allow us to order the specific number of seeds needed for the implant. Occasionally, patients require a period of hormone therapy before their brachytherapy, which will shrink the prostate size down. In this situation, a new ultrasound assessment will be performed approximately 3 weeks before the procedure to measure the new size of the gland.

Very occasionally, we may wish to perform the volume assessment under a general anaesthetic as a day-case procedure. This enables us to assess whether the pelvic skeleton will allow adequate access to a large prostate gland for the implant, when doubt exists from the clinical assessment.

The brachytherapy implant will usually be performed at least 3 weeks after the clinical assessment. This is due to the time required to calculate the number of radioactive seeds needed, which are prepared in the USA and then sent to us for implantation on a specific date.

The day before the implant, you will need to have bowel preparation, to ensure that the rectum is empty, so that clear ultrasound images of the prostate can be obtained. You will be sent a sachet of Picolax powder to mix with water and to drink the day before. It is important that you drink plenty of water both the day before and for 48 hours afterwards to re-hydrate yourself.



Urethra

Seed in place

Computer simulation of prostate gland, with plan of ^{125}I implants to give effective radiation.

Key:

green = urethra;

red = prostate;

purple = delivered radiation zone.

You will be admitted on the day of the implant. The procedure is performed under a general anaesthetic in the operating theatre. Radioactive Iodine-125 seeds are inserted into the prostate under transrectal ultrasound guidance, using needles that pass through the skin between the legs behind the scrotum (the perineum).

Each needle may deliver between 2-6 seeds and, normally, 20-30 needles are required to deliver between 60-120 seeds in total. The seeds implanted around the edge of the prostate are woven into a strand of absorbable material to help maintain their position.

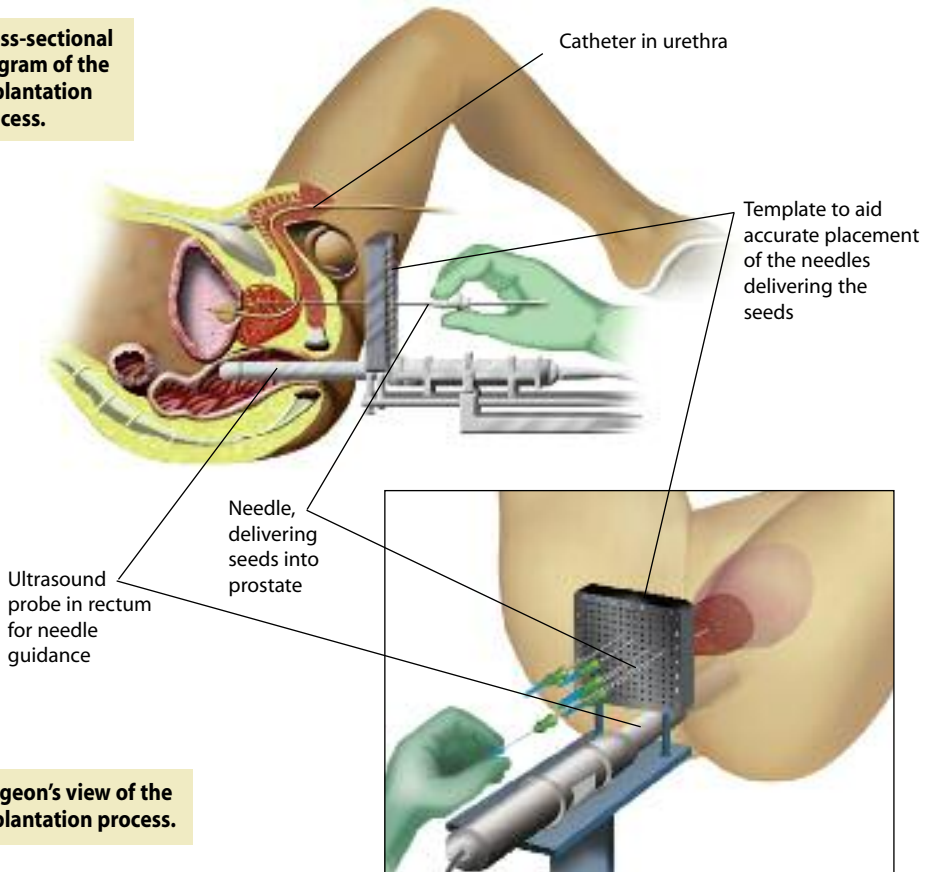
Using the planning computer in the operating theatre, we can accurately determine where to implant the seeds within the centre of the gland. These seeds are implanted individually, rather than in strands, to maximise our ability to tailor the treatment to the prostate shape. This latest technique allows us to optimise the radiation dose to the prostate whilst minimising the dose received to the surrounding tissues and so reduce any side-effects.

A catheter is placed into the urethra once you are under anaesthetic. This remains in place until after the CT scan and the effects of the anaesthetic have fully worn off. X-rays are taken throughout the procedure, to check the position of the seeds.



Seed/needle preparation.

Cross-sectional diagram of the implantation process.



Surgeon's view of the implantation process.



Artist's impression of the Stage 2 implantation process.



Post-implant X-ray of seeds in prostate gland, with the ultrasound probe in the rectum.

CT scan

You will have a CT scan either directly following your implant, or early the following morning. This procedure will allow us to check the position of the seeds, to ensure

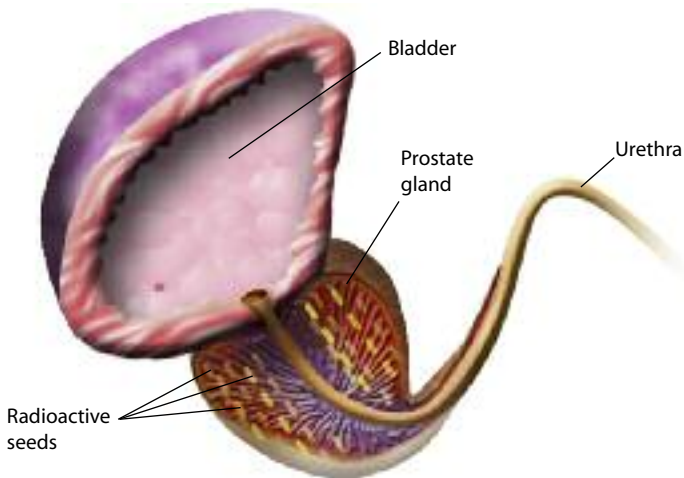


Illustration showing the seeds lying in the prostate gland after implantation.

that an adequate radiation dose has been delivered and it is also an essential part of the ongoing audit process of our brachytherapy programme.

Your catheter will be removed once you have had your CT scan.

Post-Operative Side-Effects

Immediate

Immediately after the operation, you may notice some bruising beneath the scrotum and tenderness between the legs. You will have an ice bag placed between your legs whilst in the recovery room, to help reduce this bruising and discomfort.

Once the catheter has been removed, you may notice some discomfort when passing urine. While in hospital, your urine will be filtered, to ensure that any loose seeds that you may pass are caught. This event is rare and usually will happen within the first 24 hours following implant.

We will ensure that you are able to pass urine satisfactorily before you are discharged home.

A small percentage of patients (approximately 2%) may hold a significant residual amount of urine in their bladder immediately after the implant. This may result in either requiring a catheter to be left in place for a week, or patients being taught how to pass a fine catheter themselves for a period of time. This is normally only for two weeks or less, until normal voiding returns.

It is quite common to see some blood in the urine for a

day or two after the procedure. This is quite normal, so do not be alarmed.

Advice on drinking

For one week after the implant, you are encouraged to drink plenty of water to flush through any small blood clots that may develop out of the bladder. Thereafter, you should return to a normal drinking pattern and your daily intake should not normally exceed 1.5 litres per day.

It is important that you avoid all caffeinated drinks (tea, coffee, coke) in the first few months after the implant, as these are likely to aggravate your urinary symptoms. We would ask that you also avoid the decaffeinated varieties, as they do contain some caffeine.

Caffeine-free drinks are ideal and many of our patients choose to drink Red Bush Tea as a caffeine-free alternative.



Alcohol, however, in moderation, is fine.

You may also find that cranberry juice is helpful. 1-2 glasses per day is enough.



Urinary symptoms

After the implant, it is common for patients to notice a gradual worsening of their urinary symptoms. Often, patients will find that they do not have too many problems during the first couple of weeks following implant. Symptoms will then peak at around 4-6 weeks post-implant, but improve over the ensuing months. For this reason, we would normally advise that you do not travel outside of the UK for the first 2-4 weeks following the implant.

Typically, patients complain of a slow stream, with urinary frequency and urgency during the day and night. There may also be a feeling of incomplete emptying of the bladder, with the need to strain. Most often, the symptoms are worse at night and during periods of inactivity.

These side-effects are due to the swelling of the prostate following the procedure and irritation of the prostate and bladder lining due to radiation from the seeds. They are temporary and will settle in time.

We would normally expect that by 6-9 months following implant a patient's urinary symptoms will have returned to how they were before treatment began.

Medications

After the brachytherapy implant, all patients will receive:

- An alpha-blocker, such as tamsulosin (Flomax®) or alfuzosin (Xatral®).
- An anti-inflammatory painkiller, such as diclofenac sodium (Voltarol®).
- A course of antibiotics, usually ciprofloxacin, for one week.
- A supply of a laxative, such as Senna.

Alpha-blocker

This tablet relaxes the muscle within the prostate gland and helps to reduce the narrowing of the water pipe as it runs through the swollen prostate, so minimising urinary symptoms. This is best taken in the early evening.

You will be encouraged to take this tablet for at least 3-6 months after the implant and you should get a repeat prescription from your GP.

Anti-inflammatory painkiller

This tablet has two benefits. It is an effective painkiller and is also useful in reducing the inflammation from the swollen prostate gland, so helping to relieve urinary symptoms. You will receive a one-week supply of this tablet from the hospital. Some patients find that they may require a longer course of this medication and this can usually be obtained from your GP.

Antibiotic

You will receive a one-week course of antibiotics, such as ciprofloxacin. These will help to prevent infection following the implant. They are safe to take with an alcoholic drink if desired.

Urinary retention

As previously mentioned, approximately 1 in 50 patients may have temporary difficulty in emptying their bladder after the implant and this can result in urinary retention.

The symptoms of urinary retention are an inability to pass urine and lower abdominal discomfort, usually with a constant desire to urinate. Should this occur, we suggest that you either contact us (via the number at the back of this booklet) or, in a painful emergency situation, it may be necessary to contact your GP or local A & E department.

In the first instance, you will merely need to have a catheter inserted into your bladder to drain the retained urine. Normally, however, we do prefer to teach patients to catheterise themselves, using single-use disposable catheters, which most patients find is easier and more convenient. This avoids having a permanent, indwelling catheter. The inability to pass urine is usually transient and, within a few weeks, you will find that your bladder starts to empty properly again and the need for catheterisation will stop.

Bowels

Some patients find that, immediately following the implant, their bowels tend towards constipation. This can usually be relieved by an increase in fresh fruit, vegetables and fibre. Also recommended is a daily tablet of Senna.

Occasionally, patients can experience troublesome rectal symptoms following their implant, such as frequency of opening their bowels or diarrhoea. This symptom is more common following additional external beam radiotherapy than with a brachytherapy implant alone. The symptoms are usually self-limiting and can often be helped by Normacol®, a dietary fibre supplement best taken each morning with cereal. Very occasionally, steroid suppositories are required. These symptoms tend to start 6 months after the implant.

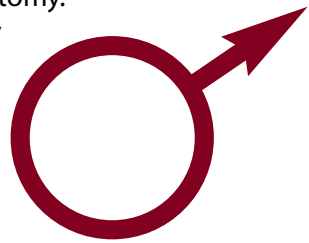
Erectile dysfunction

Erection of the penis may be affected by brachytherapy. The risk is lower in younger men who have had no previous difficulties obtaining an erection and it tends to affect about 20% of our patients following treatment.



Current research suggests that the risk is lower than with other treatments, such as radical prostatectomy. Treatment with tablets, such as Viagra, is usually effective in approximately 80% of patients, should difficulties in achieving and sustaining an erection occur.

Some men notice a decreased or dry ejaculate following brachytherapy. This is a common, temporary, side-effect of Flomax, but can also occur as a result of the brachytherapy implant itself.



Follow-up after brachytherapy

Patients will be regularly reviewed in clinic and their PSA will be first checked 3 months after the implant. Usually, it will then be checked every 3 months for the first year and every 6 months thereafter. Approximately 25% of patients will experience a temporary small rise in PSA (a 'PSA bounce'), typically anywhere between 6 months-2 years after the procedure. This is quite common, with the PSA dropping again after a few months. The reasons for this bounce phenomenon are unclear, but it does not have any effect on the overall success of the treatment.

Other Information

Resuming normal physical activities

You should be able to resume normal activities (e.g. work, shopping) within a few days. However, we would normally advise you to avoid heavy lifting or strenuous activity for the first two weeks after your implant.

Many patients are concerned about whether an implant poses any potential dangers of radiation exposure to their family and friends. It is important to remember that although the seeds are radioactive, you



are not. Objects that you touch or items that you use do not become radioactive. Other people may use linen, clothing, tableware, or dishes after you without special precautions. Your bodily waste (urine and stool) are not radioactive.

There are no restrictions on travel or physical contact with other adults. However, special precautions listed below should be taken when in contact with small children and pregnant women in the first 2 months following treatment.

Family relations

You may sleep in the same bed as your partner, provided she is not pregnant. Sexual intercourse, using a condom, may be resumed after 1 month, once you feel comfortable to do so. Initially, a condom should be used, because there is a very small risk that a seed may be passed in the semen.

Your semen may be discoloured dark brown or black. This is normal and is a result of bleeding that may have occurred during the implant. Following 2-3 ejaculations, it will not be necessary to use a condom.

Radiation protection

There are no formal restrictions on your activities when you return home. However, we recommend that the following precautions are followed for the first 2 months after the implant, after which time the radiation levels reduce significantly and you may resume life as normal.

1. Women who are or may be pregnant should not sit very close to you (e.g. on the same sofa or bed) for more than a few minutes a day. However, you may continue to greet or hug them as you would have done before the implant and spend as long as you wish in the same room as them.
2. Do not sit children on your lap for long periods. As

explained above, you may briefly cuddle them for a few minutes and they may stay in the same room as you for as long as you wish.

3. Other adult family, friends and colleagues are not at risk and restrictions on time and activities are not necessary.

What happens if the cancer returns?

Whilst the success rate of brachytherapy seems to be as high as for surgery, neither treatment option can guarantee cure. Should the cancer return in the prostate gland, a radical prostatectomy, cryotherapy or high-intensity focused ultrasound (HIFU) are possible further treatment options that can still provide cure.

Summary

Brachytherapy is a very effective treatment for early prostate cancer, with patients rapidly returning to normal activities.

Urinary incontinence after this procedure is rare (less than 1%) and the risk of impotence seems much lower than with surgery and external beam radiotherapy.

Patients do, however, experience a temporary deterioration in their urinary symptoms for the first 6 months or so after their implant.

It is important to remember that the day you are discharged from hospital after the implant is really the day that your radiotherapy treatment starts.

Other Resources

Information video

The Prostate Brachytherapy Centre has produced a patient information video, entitled *An Introduction to Prostate Brachytherapy*, that describes the procedure in more detail and reports the individual experiences of patients treated by this technique. The video may be downloaded and viewed through the website at:

www.prostatebrachytherapycentre.com

Alternatively, a video or DVD can be sent through the post by contacting the Prostate Brachytherapy Centre on:

Tel: 0845 50 50 560

Useful website addresses and support networks

Macmillan Cancer Support

www.macmillan.org.uk

Provides information on Macmillan nurses and the help that they can provide for patients and their families.

PCaSO

www.pcaso.com

'To improve the diagnosis, treatment, care and support to those troubled by this cancer.'

The Bladder and Bowel Foundation

www.bladderandbowelfoundation.org

'For people with bladder and bowel problems.'

The Prostate Brachytherapy Centre

www.prostatebrachytherapycentre.com

'The UK's largest centre for prostate brachytherapy, with experience of over 1400 successful procedures.'
Tel: 0845 50 50 560

The Prostate Cancer Charity

www.prostate-cancer.org.uk

'Prostate cancer is our sole concern.'

The Sexual Dysfunction Association

www.impotence.org.uk

'To help sufferers of impotence (erectile dysfunction) and their partners.'

The Prostate Project

www.prostate-project.org.uk

'A local charity promoting male health.'

1. **Incomplete Emptying** Over the past month, **how often** have you had a sensation of not emptying your bladder completely after you finish urinating?

Not at all
1 time in 5

Less than half the time

About half the time

More than half the time

Almost always

0 1 2 3 4 5

2. **Frequency** Over the past month, **how often** have you had to urinate again less than 2 hours after you finished urinating?

Not at all
1 time in 5

Less than half the time

About half the time

More than half the time

Almost always

0 1 2 3 4 5

3. **Intermittency** Over the past month, **how often** have you found you had stopped and started again several times when you urinated?

Not at all
1 time in 5

Less than half the time

About half the time

More than half the time

Almost always

0 1 2 3 4 5

4. **Urgency** Over the past month, **how often** have you found it difficult to postpone urination?

Not at all
1 time in 5

Less than half the time

About half the time

More than half the time

Almost always

0 1 2 3 4 5

5. **Weak Stream** Over the past month, **how often** have you had a weak urinary stream?

Not at all
1 time in 5

Less than half the time

About half the time

More than half the time

Almost always

0 1 2 3 4 5

7. **Nocturia** Over the past month, **how many times** on average did you get up each night to urinate?

None
1 time
2 times
3 times
4 times
5 times or more

0 1 2 3 4 5

Quality of Life due to Urinary Symptoms If you were to spend the rest of your life with your urinary condition just the way it is now, **how would you feel** about that?

Delighted	Pleased	Mostly satisfied	Mixed (Equally satisfied & dissatisfied)	Mostly dissatisfied	Unhappy	Terrible
0	1	2	3	4	5	6

These questions relate to your **bowel function**.

1. Have your daily activities been limited by your bowel problems?

Not at all

A little

Quite a bit

Very much

1 2 3 4

2. Have you had any unintentional release (leakage) of stools?

Not at all

A little

Quite a bit

Very much

1 2 3 4

3. Have you had blood in your stools?

Not at all

A little

Quite a bit

Very much

1 2 3 4

4. Did you have a bloated feeling in your abdomen?

Not at all

A little

Quite a bit

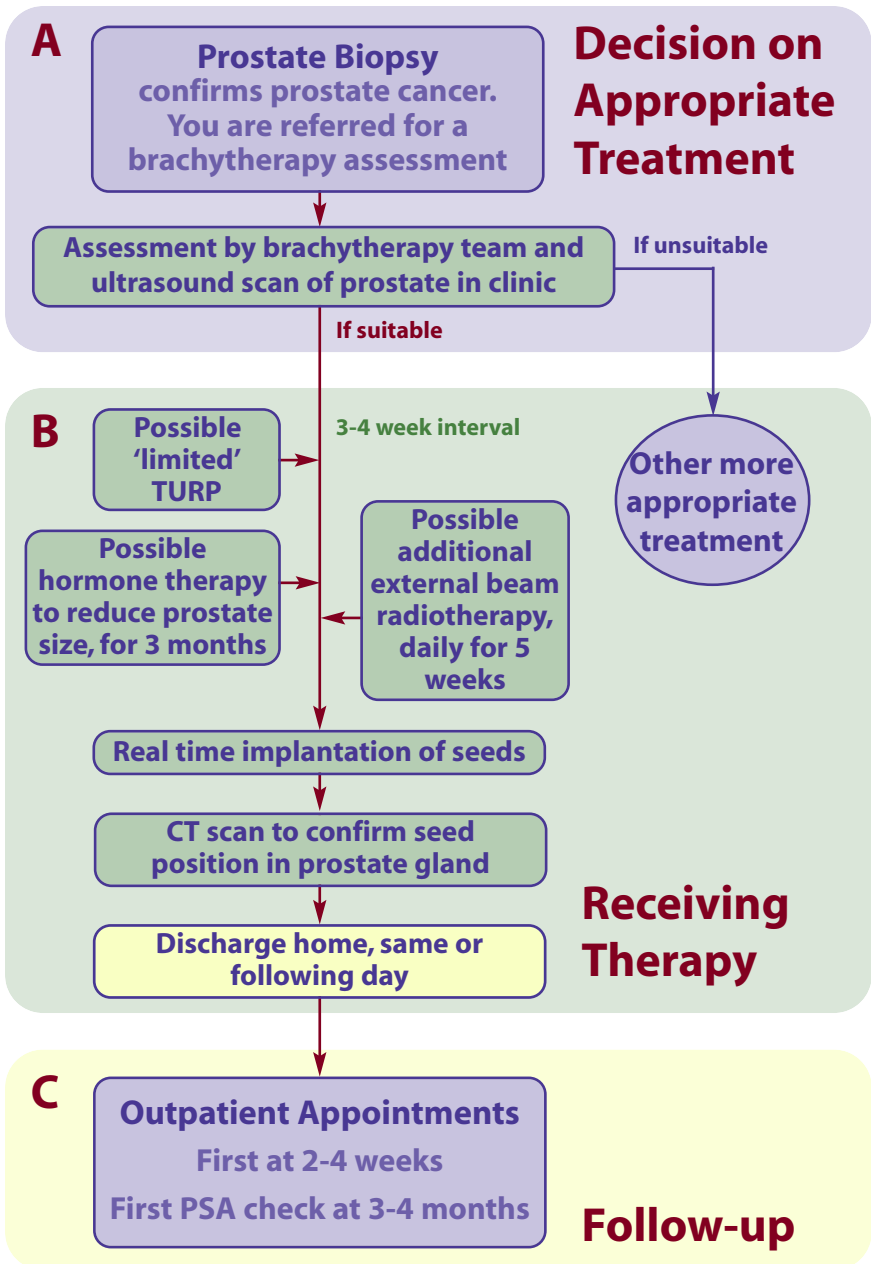
Very much

1 2 3 4

Prostate brachytherapy: questions to ask your doctor

- Will I be given hormone treatment prior to brachytherapy? If yes, why? If not, why not?
- How long does the procedure take?
- How many of these procedures do you do a year?
- Will I require external beam radiotherapy as well as brachytherapy?
- In your experience, how successful is this procedure?
- What are your results in respect of impotence and incontinence?
- How long will I be in hospital?
- Will I have much pain after the implant?
- How soon is my follow-up appointment after discharge, and when will the PSA first be measured?
- How often will my PSA be checked?
- What should the PSA be after brachytherapy? What would it mean if it doesn't reach that level? What would you do then?

The steps in your treatment for prostate cancer



Patient Notes

Useful Telephone Numbers/Contact Details

During office hours: 9.00am - 5.00pm

For administrative matters, treatment dates, or general enquiries please contact:

Fiona Fisk,
Brachytherapy Co-ordinator

Telephone: 01483 402770
Fax: 01483 406626
E-mail: fiona@thepbcentre.com

For enquiries relating to patient care or problems after brachytherapy, please contact:

Donna Higgins or Claire Deering
Brachytherapy Nurse Specialists


Telephone: 01483 571122 Ext: 2058
Fax: 01483 408308
Pager: 01483 571122 Bleep 6511
E-mail: donna@thepbcentre.com
claire@thepbcentre.com

Clinic and general administrative matters please contact the following medical secretaries:

Private Patients:

Julia Denyer
Telephone: 01483 575511
Fax: 01483 555848
E-mail: private.secretary@thepbcentre.com

NHS Patients:

Toni Manley 
Telephone: 01483 402770
Fax: 01483 406626
E-mail: nhs.secretary@thepbcentre.com


Out of office hours

For enquiries relating to patient care or problems after brachytherapy, please contact: one of the wards below or discuss with your GP.

Private Patients:

Surgical Ward
Guildford Nuffield Hospital
Telephone: 01483 555881

NHS Patients:


Urology Ward
Royal Surrey County Hospital
Telephone: 01483 571122

The Prostate Brachytherapy Centre

Telephone: 8845 50 50 560
E-mail: info@thepbcentre.com

