

INFORMATION GUIDE

Low Dose Rate
Brachytherapy
or permanent prostate implants

What you need to know.

BRACHYSCIENCES
a division of Biocompatibles, Inc.

This informative brochure was developed to encourage you to be screened for prostate cancer and to raise awareness of one of today's more valuable treatment options, Low Dose Rate Brachytherapy, otherwise known as permanent prostate implants.

The Canadian Cancer Society recommends that both the Prostate Specific Antigen test (PSA) and the Digital Rectal Exam (DRE) be offered annually to men 50 and older who have at least a 10-year life expectancy. Men at high risk, such as African-American men and men with a strong family history of relatives diagnosed at an early age, should begin testing at age 45.

The decision of whether to be screened for prostate cancer is a personal one. It is important that each individual talk with his personal physician about whether prostate cancer screening is right for him and, if diagnosed, what treatment options are most suitable.

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“...permanent prostate brachytherapy, a treatment which consists of implanting radioactive pellets or seeds - as they are usually called - inside the prostate.”



GENERAL INFORMATION

Introduction

In Canada, prostate cancer is the most common cancer affecting the male population, representing 15% of all new male cancer diagnoses. On average 490 Canadian men will be diagnosed with prostate cancer every week and approximately 1 in 7 will develop prostate cancer during his lifetime.

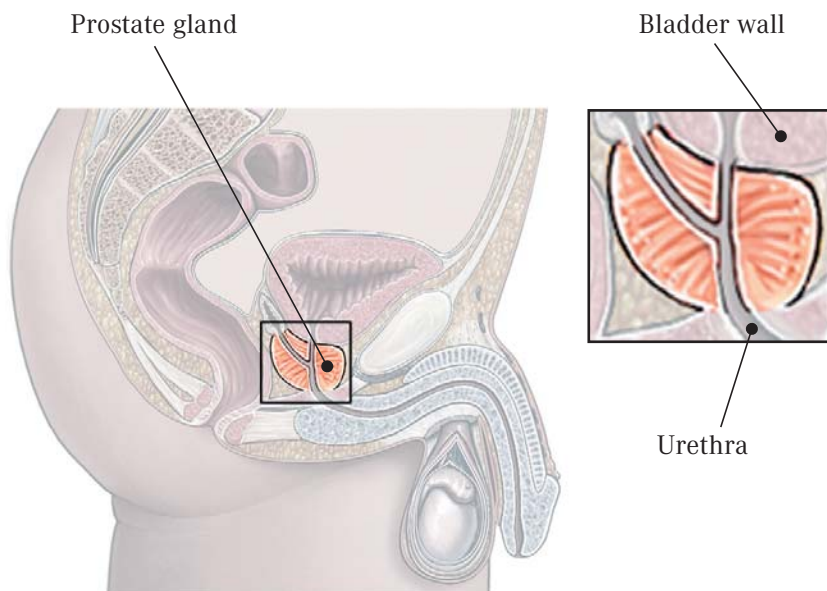
Once diagnosed, there are different options for treating prostate cancer. These include active surveillance (sometimes called watchful waiting); permanent prostate implants (Low Dose Rate Brachytherapy); external radiation therapy; and surgical removal of the prostate (prostatectomy). Each procedure presents potential advantages or disadvantages particular to the individual patient.

This Information Guide deals specifically with Low Dose Rate Brachytherapy, a treatment that involves implanting radioactive seeds, inside the prostate close to the cancer cells.

Prostate

The prostate is a gland that plays an important role in the male reproductive system. It is located in front of the rectum, just below the bladder, and is similar in shape and size to a walnut. The gland partially surrounds the neck of the bladder and the start of the urethra, the tube in which urine flows from the bladder and out the body.

The primary role of the prostate is the production of seminal fluid, the liquid component of the semen. Although the prostate plays no active role in urination, it does help to regulate the flow of urine by slightly compressing the urethra. Consequently, urinary symptoms may occur as the prostate becomes enlarged and presses the urethra.



Prostate Cancer

WHAT IS CANCER?

Mitosis is the name given to the normal process by which the body produces new cells for both growth and repair. Typically, this usually occurs in a controlled and ordered manner, but sometimes uncontrolled mitosis results in the development of tumours. In general, tumours develop when there is a problem with the dividing of cells in the body.

Definitions

- 1 A **tumour** is the direct result of irregular and uncontrolled cell production, which produces an abnormal growth of tissue. This mass of tissue may be benign or malignant.
- 2 A **benign tumour** does not invade or destroy tissue in which it originates or spread to other sites within the body.
- 3 A **malignant (cancerous) tumour** however, produces cells that do invade and destroy surrounding tissue, and may travel and establish itself at other sites within the body.

WHAT IS PROSTATE CANCER?

Prostate cancer occurs when malignant cells develop and form a malignant tumour inside the prostate. The tumour formed by these cancerous cells can grow slowly or rapidly. The cancer may also spread outside the gland and grow in other parts of the body. Survival rates for prostate cancer increase considerably when the cancer is detected and treated in the early stages, when the cancer is most likely to be confined to the prostate gland.

SYMPTOMS

Symptoms associated with prostate cancer do not always mean you have cancer, since many other prostate diseases cause similar symptoms. These symptoms may include:

- Blood in the urine.
- Blood in sperm.
- Frequent, difficult, painful or burning urination.
- Weak or interrupted flow of urine.
- Pain during ejaculation.
- Pain in the back, hips and/or pelvis.

DETECTION AND DIAGNOSIS

Prostate cancer may be detected through the following method(s).

- 1 **A digital rectal exam (DRE):** the doctor inserts a gloved finger into the rectum to feel the prostate for irregularities or lumps. This exam is extremely effective in identifying a tumour and subsequently detecting cancer even in the absence of symptoms.
- 2 **A PSA blood test (PSA):** This test measures the level of certain chemicals (prostate-specific antigen, or PSA) produced by the prostate. PSA is a protein that is produced exclusively by the prostate. A very small quantity of PSA (less than 4 ng/mL) is normal, but a higher level may indicate the presence of cancer.

The rectal exam and PSA blood test are the first tests performed when checking for prostate cancer. If one of these two exams is abnormal, a needle biopsy is performed, since it is the only test that can conclusively confirm the presence of cancerous cells.

- 3 **Needle biopsy:** This involves taking a small sample of prostate tissue for examination under a microscope. A grade is then assigned to any cancer discovered to help determine its aggressiveness. According to a system called Gleason's score (rated on a scale of 1 to 10), the higher the score, the more aggressive the cancer, and the more likely it is to grow quickly and spread outside the prostate.

Specific criteria must be adhered to for prostate cancer treatment with permanent brachytherapy.

With Low Dose Rate Brachytherapy, a patient's diagnosis and condition must meet certain guidelines established by each institution administering treatment. Talk to your physician about the specific criteria set up by the London Regional Cancer Program (LRCP) and how you may be a suitable candidate for this procedure.

If these criteria are not fully met, other treatments may be preferable. Also, even with these conditions having been met, there may be other predisposing factors which would indicate alternate treatment options. For example, a prior TURP (transurethral resection of the prostate) may be an exclusion factor for the permanent implant procedure as it may increase the risk of urinary incontinence.

For more information on prostate cancer, staging, Gleason score or PSA level, please ask your physician or consult the following:

London Regional Cancer Program:	www.lhsc.on.ca/Patients_Families_Visitors/Prostate_Cancer_Centre/ www.lhsc.on.ca/About_Us/Prostate_Cancer_Centre/QuickLinks.htm
Prostate Cancer Centre London:	www.lhsc.on.ca/About_Us/Prostate_Cancer_Centre/
The Canadian Prostate Cancer Network:	www.cpcn.org
Prostate Cancer Research Foundation:	www.pcref.org
National Comprehensive Cancer Network:	www.nccn.com
Canadian Cancer Society:	www.cancer.ca
Cancer Care Ontario:	www.cancercare.on.ca
American Cancer Society:	www.cancer.org
American Prostate Society:	www.americanprostatesociety.com
American Brachytherapy Society:	www.americanbrachytherapy.org



TREATMENT

“...the number of seeds and where they are placed is customized to match the exact radiation dose with the patient’s needs.”

Low Dose Rate Brachytherapy, also known as a seed implant, involves the placement of radioactive seeds into the prostate with the intention of destroying the cancerous cells in place.

Planning

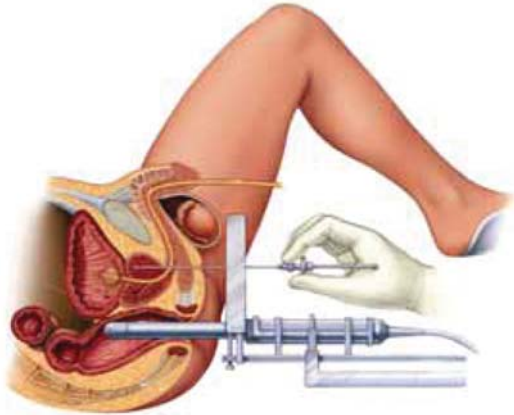
The first step consists of determining the exact size of the prostate. An ultrasound test (using sound waves produced by a probe inserted into the rectum) is performed to determine the shape of the prostate. The shape is analyzed by computer to create a three-dimensional model. Then, the number of seeds and where they are placed is customized to match the exact radiation dose with the patient’s needs.



Typical image of an ultrasound prostate contouring and seed implant simulation.

IMPLANTATION

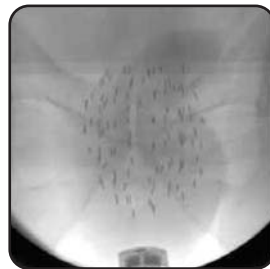
Placement of the seeds is carried out under local, regional, or general anaesthesia. The seeds are inserted by a physician into the prostate through a space between the testicles and the anus, using needles or applicators and guided by ultrasound. Each seed is carefully placed in the position calculated during the planning stage. After the procedure, x-rays are taken to verify the quality and the location of the seed placement. The seed implant procedure takes approximately one hour and is usually performed as a day-surgery.



Note: The medical procedure itself may differ slightly from one center to another.

FOLLOW-UP

The American Association of Physicists in Medicine (AAPM) recommends a medical examination and a radiological follow-up approximately one month after implant. These are performed by means of an x-ray and CAT scan. An MRI scan may also be requested by your physician. This follow-up is done to calculate the precise dose of radiation based upon the positions of the seeds in the prostate. Then, to evaluate how well the patient is responding to treatment, DRE and/or PSA tests will be performed to confirm seed distribution within the prostate. If rising PSA levels or an abnormal DRE test lead a physician to suspect cancer reoccurrence, a biopsy may be required.



Post-implant fluoroscopic image of seed distribution within the prostate.

Courtesy of Princess Margaret Hospital (Toronto, ON.)

SIDE EFFECTS

- 1 Immediately following implantation or for a few days afterwards, you may experience slight swelling and bruising around and under the testicles and the penis. This is a normal side effect, with minimal pain, and usually subsides within a couple of days.
- 2 In the weeks following the implantation, most patients experience inflammation or swelling of the prostate, which can last from one to four months. This may cause an increase in the frequency of urination, with or without a burning sensation, and a weakened or interrupted flow. A small amount of blood may also be present in the urine for a few days.
- 3 About 10-15% of patients experience a urinary blockage within a few hours or days following the procedure. This situation requires the insertion of a catheter and urination usually returns to normal within a short time.
- 4 Infrequently there may be anal irritation with or without diarrhea. The irritation may sometimes be accompanied by bleeding.
- 5 Urinary incontinence or accidental loss of urine is rare.
- 6 There is a 20% to 30% risk of impotence.

In the first few weeks following the seed implant, avoid strenuous activity in order to minimize potential side effects.

If you need help or have questions, please contact your doctor or LRCP.

Additional contact information is on the back of this Information Guide.

“The seeds used for the treatment are very small - actually smaller than a grain of rice...”



— Actual size

RADIATION SAFETY

Radiation

The seeds used for the implant are very small - actually smaller than a grain of rice. The seed capsule itself is made from titanium, and the radioactive isotope is sealed in small beads that are placed inside the capsule. The physician generally inserts 45 to 100 seeds in the prostate based on the size of the gland and the individual activity of the seeds.

The seeds send out low-energy radiation. In fact, very little radiation escapes the prostate or the body itself. (Some short-term precaution guidelines are outlined in the next section.) After the implantation, the radiation level drops significantly with a half-life of 60 days, sometimes shorter depending on the type of seeds used. In other words, radiation levels from the seeds decreases by half after each 60-day period following treatment. Thus, 50% of the activity remains after 60 days, 25% after 120 days and 12.5% after 180 days and so on. After one year, less than 2% of the radiation remains.

Recommendations

Even though only a fraction of the radiation may leave the body, a few recommendations are made in order to meet the “As Low As Reasonably Achievable” (ALARA) principle, an international standard used for reducing exposure to an absolute minimum.

TWO WEEKS

During the first two weeks, there is a slight risk of losing one of the seeds during sexual relations or when urinating. During this period, it is recommended that you wear a condom when engaging in sexual activities. Strain your urine for one week with the strainer given to you in Day Surgery. If a seed passes and gets caught in the strainer, use a tweezer to pick it up. Place the seed in a disposable container. Do not mail the container to LRCP. Return it to the clinic on your next visit.

TWO MONTHS

Because there is such a small amount of radiation involved, it is not usually considered a risk to others. However, small children and pregnant women are more sensitive to the effects of radiation. Therefore, it is recommended that for two months after treatment, you will need to keep at least six feet (2 metres) away from children and pregnant women when visiting for an extended period of time. Brief hugs are allowed.

Patients with implants can sleep in the same bed with their spouse (do not cuddle or sleep in the “spooning” position). Wear a condom each time you have sex. You will need to do this for the two months after your implant. Anal intercourse should be avoided for two months after treatment.

Your doctor can perform a rectal examination without risk.

Hospital: _____	
Patient's name: _____	
CAUTION	Patient contains radioactive material in the form of metallic implants No contamination risk
For further information, please contact: _____	
Phone: _____	
Signature: _____ Date: _____	
This card is not valid after: _____	

Example of a Patient Implant Carrying Card

Implants may trigger sensitive equipment that measures radiation. This equipment is installed at international border crossings. When you go to another country, you will need to show a card issued by LRCP that shows the type of radiation that is in your implant. This card will be given to you after your implant procedure. You will need to keep it for at least one year.

Clarifications

- Body fluids (urine, stool, sperm, sweat, saliva) are not radioactive.
- The objects you touch do not become radioactive.
- Metal detectors generally pose no problem (airport).
- Magnetic resonance imaging (MRI) poses no problem.
- Allergy to iodine poses no problem (external titanium capsule).
- There is generally no danger to colleagues at work.
- There is generally no special diet to follow.
- There is generally no danger to pets.

Note: These recommendations are general and applicable to all patients. If you think that your case is unique, please consult your physician for more specific advice.

Notes:

References

- 1 Permanent prostate seed implant brachytherapy : Report of the American Association of Physicists in Medicine Task Group No. 64, Med. Phys. 26 (10), pp. 2054-2076, 1999.
- 2 American Brachytherapy Society (ABS) recommendations for transperineal permanent brachytherapy of prostate cancer, Int. J. Radiation Oncology Biol. Phys. 44 (4) pp. 789-799, 1999.
- 3 The Canadian Cancer Society

For further information on LDR
Brachytherapy, please contact:



Prostate Cancer Centre

London Regional Cancer Program

A Partnership of London Health Sciences Centre and
St. Joseph's Health Care London

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www.lhsc.on.ca/About_Us/LRCP

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