



PUBLIC HOSPITAL BRACHYTHERAPY AVAILABLE AT PROSTATE CANCER INSTITUTE



Brachytherapy has found a renewed application in the treatment of prostate cancer with the use of modern computer and ultrasound technology. This is an exciting development in the treatment of many prostate cancers as it provides the ability to escalate doses of radiation to the prostate in an accurate and safe manner. It should now be considered an alternative treatment option for many patients with prostate cancer. The full range of prostate brachytherapy services are now offered at St George Hospital Cancer Care Centre together with conventional external beam radiotherapy treatment. Permanent Prostate Seed Brachytherapy and Temporary Prostate Brachytherapy Implantation (HDR) are now part of a comprehensive program available at the Centre. The St George Hospital Cancer Care Centre has formed a capable multidisciplinary team under the auspices of the **Prostate Cancer Institute** to deliver a high quality brachytherapy service to prostate cancer patients. Experience has been shown to be a critical factor in determining the quality of prostate seed implantation. As a result Dr Joseph Bucci has recently completed a 12-month overseas fellowship at the British Columbia Cancer Agency in Vancouver and attained formal accreditation from the Agency. Other members of the team have also spent extended periods at the Agency obtaining supervision and formal training in the procedure. The British Columbia Cancer Agency in Vancouver boasts the largest prostate brachytherapy program in Canada and has already completed over 1000 prostate brachytherapy implants with excellent results. The St George Hospital Cancer Care Centre is the **first and only public program to offer a fully funded prostate seed brachytherapy** service to patients in NSW. This is currently a pilot program but we hope to gain formal recurrent funding. The two main types of prostate brachytherapy are:

1. Permanent Prostate Seed Brachytherapy (used in low risk early detected disease)

- Prostate Seed Brachytherapy is internal radiation treatment using small radioactive seeds permanently implanted into the prostate and the cancer. The seeds (Titanium encapsulated radioactive Iodine-125) treat the cancer over the following months.
- The type of Radiation emitted from the seeds is very localised and poses no significant risks to the general public. For example, A member of the public would need to stay at 1 metre from the patient for more than 1400 hours (58 days) in order to reach the annual radiation exposure limits recommended for a member of the public.
- Seed radiation penetrates only a small distance so that little radiation reaches adjacent normal organs, but it gives one and a half times the dose to the cancer than that which is given by external beam radiotherapy
- The implant procedure does not require a surgical incision.
- Advantages include: A "one off" procedure that is minimally invasive; an outpatient procedure taking ~ 1 hr to perform under a very light anaesthetic; patients usually return to usual activities within a few days; risk of urinary incontinence is rare; there is a low risk of bowel problems, less than those who have external beam radiotherapy; and a lower risk of impotence than patients having radical surgery.
- The Brachytherapy procedure is easier to withstand than radical surgery and more convenient than external radiation. Thus younger patients are usually back to their usual activities and work within a few days. However, because the procedure is well tolerated it is also suitable for older men.

- **Patient Eligibility for Prostate Seed Brachytherapy:**

- *Biopsy proven prostate cancer*
- *Clinical stages T1c-T2bNX or N0M0 (UICC 1997)*
- *Gleason score $\leq 3+3=6$ and pre-treatment PSA ≤ 10*
- *Prostate volume $< 40 \text{ cm}^3$. If implant volume is $> 40 \text{ cm}^3$ at initial planning ultrasound, then the patient is treated for 3 months with hormone therapy after which another ultrasound volume study is undertaken. If still outside the volume restrictions, the patient is not eligible.*
- *No history of TURP (Trans-Urethral Resection of the Prostate)*
- *No use of anticoagulants (except aspirin) or history of bleeding disorders*
- *No hip replacements*
- *Suitable for general or spinal anaesthesia*
- *Life expectancy of ≥ 5 years*
- *Available for follow-up at the St. George Hospital Cancer Care Centre.*

- 2. **Temporary Prostate Brachytherapy Implantation HDR (used in higher risk disease)**

- **A temporary brachytherapy implant** uses a multiple hollow plastic needles that act as a conduit for a more active radiation source to be placed directly into the prostate temporarily. Treatment is delivered over many minutes on three separate sessions over 36 hrs.
- The temporary implant has similar advantages to the seed brachytherapy; however, it is used in combination with moderate doses of external beam radiation. This enables the high doses of radiation to be delivered internally sparing surrounding normal tissues from doses that may cause permanent injury.

- **Eligibility criteria**

- *Histological-proven prostate adenocarcinoma*
- *Intermediate risk patients*
- *High risk patient may only have one high risk feature present*
 - *i.e. PSA $\geq 20 \text{ ng/mL}$ or Gleason ≥ 8 or Stage T3a*
- *No evidence of nodal (N0) or distant metastases (M0) on*
 - *Physical exam*
 - *Chest x-ray*
 - *CT pelvis*
 - *Bone Scan*
- *Pre-intervention PSA must be ≤ 30 .*
- *No history of TURP (Trans-Urethral Resection of the Prostate)*
- *No use of anticoagulants (except aspirin) or history of bleeding disorders*
- *No hip replacements*
- *Suitable for general or spinal anaesthesia*
- *Life expectancy of ≥ 5 years*
- *Available for follow-up at the St. George Hospital Cancer Care Centre.*

St George Hospital Cancer Care Centre Brachytherapy team includes Dr Joseph Bucci (Radiation Oncologist), Dr David Malouf (Urologist), Ese Enari, Robert Chambers and Rashmi Gupta (Physicists), Linda Bateman, Annette Brazell and Kristine Schreiber (Radiation therapists), Lenore Nicholas and Patrice Thomas (Nursing).

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Image 1: X-ray appearance of a seed implant at completion



Image 2: Post-implant computer reconstruction of the seeds demonstrating limited dose to surrounding structures

