

## High dose rate (HDR) brachytherapy

High dose rate brachytherapy involves the temporary placement of a very intense radiation source directly into the prostate. This requires insertion of up to 18 thin plastic catheters through the perineum into the prostate under a general anaesthetic, computer planning and then temporary radioactive source placement. This is used as a high dose radiation boost to a shortened course of image guided external beam radiotherapy, aiming to deliver in total a higher radiation dose with reduced side-effects to treat higher risk prostate cancer. Denby Steele commenced this treatment in Adelaide at the Royal Adelaide Hospital (RAH) in 2006 after mentoring by Dr Alvaro Martinez, Chairman of the Department of Radiation Oncology at Beaumont Hospital, Royal Oak, Michigan and a world leader in HDR brachytherapy.

HDR brachytherapy as a boost to image guided external beam radiotherapy (IGEBRT) may be recommended in men with higher grade more clinically advanced disease but still apparently localised disease. Eligibility criteria include a prostate volume of 15 – 60 cc and a peak urinary flow rate equal of at least 13 ml/sec. A preliminary flexible cystoscopy is performed to exclude coincident bladder pathology and assess the prostate anatomy.

Preparation for IGEBRT involves insertion of gold seed prostate fiducial markers and then CT and MRI scans. In addition to this, for the HDR brachytherapy, an appointment with the RAH Pre-Operative Assessment Clinic is required regarding the anaesthetic for the brachytherapy.

On the day of HDR brachytherapy, patients present to the surgical admissions suite (SAS) before being transferred to the brachytherapy suite to be reviewed by the Anaesthetist. Once anaesthetised, a urinary catheter is inserted and a trans-rectal ultrasound performed to guide the plastic catheters into the prostate and then the computerised dose planning begins.

Once planning is completed the catheters are connected via cables to the HDR machine and treatment is performed over 10 - 20 minutes, when the radioactive Iridium source is moved from one position to another within each catheter.

The whole procedure takes about 4 hours, the perineal and urethral catheters are removed, patients are transferred to recovery and once voiding are able to be discharged. No radioactive source is left in patients and so they are not radioactive.



The HDR brachytherapy boost does not usually add much to the common side effects of image guided external beam radiotherapy but the following side effects can be seen:

General side effects include tiredness with a very small risk of a deep vein thrombosis.

Some mild temporary perineal discomfort is expected and it is common for the stream to slow for a while but only about 5% of men are unable to void after the treatment and need the urethral catheter replaced. Prazosin or flomaxtra, drugs to relax the bladder neck muscles are given to improve voiding in the early post treatment period and simple analgesia such as panadol or panadeine can be taken. Urinary frequency and some burning when voiding is common after IGEBRT and the HDR brachytherapy boost, feeling like an infection with only the occasional true urinary tract infection. Drinking plenty of water can help relieve these urinary symptoms. Acidic fluids, caffeine and alcohol may worsen bladder irritability and if so, may need to be limited.

Bowel side effects are common with IGEBRT, mostly increased frequency of bowel actions but occasionally constipation and rectal bleeding but these are not usually worse after a HDR brachytherapy boost and often less as the IGEBRT duration is reduced.

Erectile dysfunction is common but not inevitable. The ejaculate will be blood stained and ejaculation initially uncomfortable.