

## Quality Assurance Improves Outcome in Permanent Prostate Brachytherapy

John H L Matthews D Rothwell, L Dakers, J Boulton, M Rice,  
Prostate Implants New Zealand Ltd

Southern Cross Brightside Hospital, Auckland, NEW ZEALAND

**Introduction:** When we introduced permanent prostate brachytherapy into New Zealand in 1999 we wanted to achieve a standard of excellence with our implant program. With today's evidence based philosophy this meant that we had to collect the detailed data to show that we had achieved that. We found that the process of collecting and regularly analysing the data had the great advantage of helping us to refine our technique in subtle ways and therefore helped us to achieve our goal.

**Our Quality Assurance Programme:** We set in place a detailed prospective audit from day one. This consisted of: 1. Individual patient audits including post implant CT dosimetry at day 30, toxicity and cancer outcome; 2. External peer review of both preplanning and post planning, after ~20 and ~70 implants and; 3. planned technical audits and toxicity audits initially 6 monthly and more recently 12 monthly.

### Examples of QA Review Impacting on Outcome

- Early post implant dosimetry was generally good which reassured us with respect to our basic training and mentoring. However after ~40 cases we noticed a trend towards lower V100 and D90 which was corrected by generally increasing the total activity in the pre plans of the implants.
- Subsequent dosimetric audits performed on the next 245 cases showed improved V100 but still some case to case variation and sporadic implants with V100 <80%, or rectal doses with VR140Gy > 2cc. Audit of our implants showed that the major contributing factors to the variations in dosimetry were due to variation in depth of needle insertion and posterior displacement of the lower rows. This led to a review of our technique.
- We subsequently made two key refinements in technique, firstly the increased use of sagittal imaging to improve accuracy of depth of needle and seed insertion, and secondly the insertion of all needles in a row before dropping the seeds to improve uniformity across the gland. This resulted in implants that were consistently more uniform at the base and apex. It essentially eliminated haematuria or clots in the bladder and led to us discontinuing cystoscopy and instead performing an in/out with a soft 16 gauge Foley catheter. Caudal anaesthesia was also discontinued.
- Dosimetric audit of ~100 cases after the refinements in technique confirmed a further improvement in quality. V100 and D90 improved and there were only a very few implants with V100 < 90%. There was also a reduction in dose to the rectum and subapical areas while the dose at the apex of the prostate was unchanged.
- The regular clinical audit enabled us able to confirm the high quality of our implants with respect to toxicity and cancer control. Analysis of the initial 285 patients showed a low rate of acute and late toxicity that will be detailed in the presentation. The actuarial 5 year biochemical relapse free survival rate in this cohort of patients was 94% (95% CI 91-97%).

**Conclusions:** Although we undertook standard training and used standard techniques we have benefited greatly from our detailed QA program with regular audit and analysis. We know what our results actually are and that we know our implant quality is high and outcomes good. It has also led to the ongoing refinement of our technique and confirmed the subsequent improvements.

We believe that a comprehensive QA program can be practical and effective and should be routine practice. We recommend the audit should be of all patients from day one and include:

1. Post implant dosimetry including V100, D90, V150, as well as a recognised measure of rectal, urethral and subapical doses.
2. In addition to reviewing each individual's dosimetry the overall results and trends should be reviewed quarterly and outliers specifically examined.
3. Clinical audits with DRE, IPSS and QOL scores and recording of any grade 3 late urinary toxicity and any grade  $\geq 2$  late bowel toxicity.
4. PSA assessed at least 6 monthly for the first two years and yearly thereafter with overall biochemical control assessed annually.