



## REAL TIME DOSIMETRY

Quality assurance in real time during prostate brachytherapy

### The Core Technology

The real time dosimetry technology allows quality assurance in real-time and can be used to control dose in real-time in vivo. The concept can be applied to the treatment of cancer in any part of the body where treatment involves Low Dose Rate (LDR) or High Dose Rate (HDR) brachytherapy. However, the application that has been developed to the most advanced stage by UOW is the treatment of prostate cancer.

Currently, in LDR prostate brachytherapy, the clinician does not have any accurate real-time feedback on dosage during the procedure. For example, in treating prostate cancer, radioactive seeds are implanted one at a time via a syringe and are positioned within the prostate in a predetermined pattern that is designed to ensure that the seeds irradiate the cancerous region of the prostate but do not (or minimally) irradiate healthy tissue. The procedure is monitored by means of an ultrasound probe located in the rectum, so that the clinician can correctly locate the placement of the seeds. However, this approach is highly subjective and can lead to incorrect dosing by as much as a factor of two and to excessive dosing of healthy tissue (especially in the rectum and urethra). This can lead to severe complications, such as impotence and urinary incontinence, which arise from overdosing of the neuro-vascular bundle and urethra.

The need to minimize the risk of complications has been the stimulus for UOW's development of the real time dosimetry concept. The technology, consists of an instrument that provides

radiation dose rate and the dose read out from a specially designed probe located at an appropriate site, typically the urethra.

### Advantages

One of the major side effects with impact on patient quality of life is radiation toxicity affecting the urethra and the rectum. The reason for these side effects relate to several factors:

- inaccurate imaging;
- inaccurate planning;
- inaccurate placement; and
- seed displacement.

Because of these factors, real time planning (at a rudimentary level) has become more widely used, whereby the plan is formulated during the actual procedure and can be adjusted, rather than working from a pre-determined plan.

Whilst current planning software can map out distribution as seeds are placed during real time planning procedures, the seed location is based on calculated/ modelled parameters, thus relying entirely on the quality of ultrasonic/x-ray imaging. Furthermore, there is no immediate feedback that would indicate an unfavourable seed location and/or quantify the true dose and dose rate in the urethra or the rectum.

Consequently the value proposition for the real time dosimetry system is in:

- providing a means to close the data feedback loop as an adjunct to real time planning systems (i.e. closed loop)

thus optimizing the seed placement and overcoming any shortfall in the quality of the imaging and/or predictive model to give optimal therapy;

- providing a safety measure to complement pre-planned systems to assist in overcoming any major deficiencies in the predicted plan as a direct consequence of performing the seed placement procedure; and
- improving the procedure outcome for the patients by identifying situations which may give rise to toxicity, and preventing them from arising.

### Market

All LDR and HDR brachytherapy patients are prospective candidates for having a procedure performed where real time dosimetry is incorporated.

### IP Position

The broad concept has patents pending in the USA, Europe and Canada. The IP was co-developed with Memorial Sloane-Kettering Cancer Care Clinic (MSKCC) in New York. UOW has an exclusive right to sub-licence the technology.

### Commercialisation Strategy

UOW has plans to form a spin-out company to commercialise the real-time dosimetry technology and is seeking potential investors.

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