

AbstractID: 1383 Title: Positional Stability and Implant Experience of AC Magnetic Beacon™ Transponders Used to Localize Patients for External Beam Radiation Therapy

The Calypso™ 4D localization system (Calypso Medical Technologies, Seattle), consisting of implanted Beacon™ transponders and a non-contact AC magnetic array, has been developed to locate the transponders and register target isocenter within 2mm, continuously, during external beam radiation therapy. The study objectives were to evaluate positional stability and implant experience with implanted transponders. **Methods:** Three transponders (8mm x 1.85mm dia.) were implanted under ultrasound guidance in the prostate of 20 patients using a transrectal approach. To evaluate stability of the transponder geometry in the prostate, a CT scan or a pair of diagnostic x-rays were acquired at 13 time points from the day of implant to 14 weeks post-implant, and 3D coordinates of each transponder were established. The distance between any two transponders was calculated from the coordinates and examined over time. **Results:** In the first 12 patients, the implant procedure took less than 10 minutes and was well tolerated. Adverse events were consistent with prostate biopsy and standard gold marker insertion. Preliminary results show inter-transponder distances were typically stable shortly after implant but at the latest by day 14 (simulation). The mean standard deviation of inter-transponder distances from day 14 through fraction 20 in the first six patients was 0.9mm. The inter-transponder distances showed a similar trend as observed in a previous study (Pouliot 2003) using implanted gold markers. These results support the use of transponders as AC magnetic fiducials in the prostate. Complete data analysis on 20 patients will be presented.

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