

## AbstractID: 13903 Title: Motion Pattern of Electromagnetic Transponders Implanted in the Prostate Gland

**Purpose:** To investigate inter-transponder motions over the period from implantation to the last treatment. **Method and Materials:** The inter-transponder motions were assessed by the changes in the inter-transponder distances (ITD). ITDs were obtained from simulation CTs, CBCTs and/or the Calypso System. Total 8 patients who were CT-scanned on the same day of implantation were studied. ITDs obtained from initial CT scans were used as reference to evaluate the changes in ITDs measured at subsequent treatments. ITD variations relative to the day of implantation were plotted versus the number of days post implantation. **Results:** Over the 8 to 9 weeks long treatment course, most observed ITD variations were negative in values indicating reduction in the ITDs since implantation. Some patients had minimal ITD reductions ( $< 0.2$  cm) over the entire course while some were found to be as large as 1.0 cm. The most rapid and substantial reduction in ITDs, if any, occurred during the first 2 weeks post implantation with a magnitude as large as 0.8 cm. From then on, the ITDs continued to decrease over time in most patients, but the reduction rate appeared to slow down with time. The ITDs eventually varied within a narrow range of  $\pm 0.1$  cm for the rest of course. This stability, however, was not seen in one patient, where the ITD between RmB and LmB transponders continued to decrease to the last treatment day with no sign of stopping. **Conclusion:** The ITDs tend to reduce continuously throughout the entire course of treatment but appear to stabilize over time in most patients with few exceptions. The most rapid and substantial changes in ITD occur in the first two weeks post implantation. CT on patients for treatment planning use is preferred at least two weeks post implantation to reduce uncertainties in target delineation and localization.