

Purpose

To assess the effect of concurrent hormone therapy on the positional stability of transponders implanted in the prostate during external beam radiation therapy of prostate cancer.

Methods and Materials

- 12 patients who had hormone therapy concurrently with radiation were selected in comparison to a control group of 10 patients with no hormone therapy.
- Inter-transponder distances (ITD) between transponders APX, LmB and RmB as shown in Fig. 1 were measured from CT scans or by the Calypso® System.
- Changes in ITDs measured at each radiation treatment were used to assess the positional stability of transponders in the prostate.

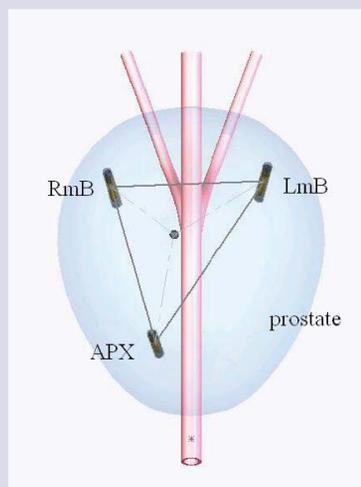


Fig.1 Typical locations of three electro-magnetic transponders implanted in the patient's prostate gland.

Results

- Changes in ITD relative to Day 0 (i.e. the day transponders were implanted) demonstrated a trend of ITD reduction over time in both patient groups. The substantial reductions however occurred in the first 14 days post implantation. They were as large as 0.8 cm and were most likely attributed to resolving from prostate swelling. (Fig. 2).
- To eliminate the swelling influence, changes in ITD relative to Day 14 were re-plotted (Fig. 3). Data showed that the ITD reduction magnitudes generally dropped down to a range of 0 to 0.3 cm with few exceptions.
- The average ITD reductions in patients with concurrent hormone therapy seemed to be larger than those in patients with no hormone therapy by a maximum of 0.1 cm. However, t-tests on the differences of average ITD reduction between the two groups showed no statistical significance ($p > 0.05$). (Fig. 4).

Conclusions

The hormone therapy that patients may take concurrently with radiation treatment appears to have no significant effect on the positional stability of transponders implanted in the prostate.

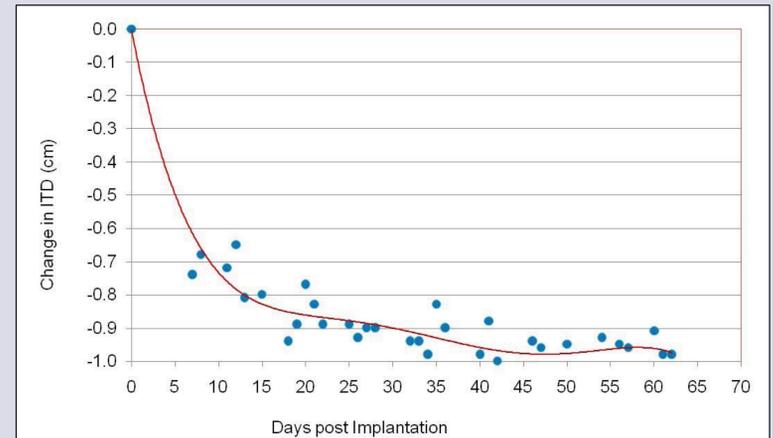


Fig. 2 Changes in the distance between RmB and LmB transponders relative to Day 0 (4.9 cm) of a patient with no concurrent hormone therapy. The solid line is the polynomial trend line of measurement data.

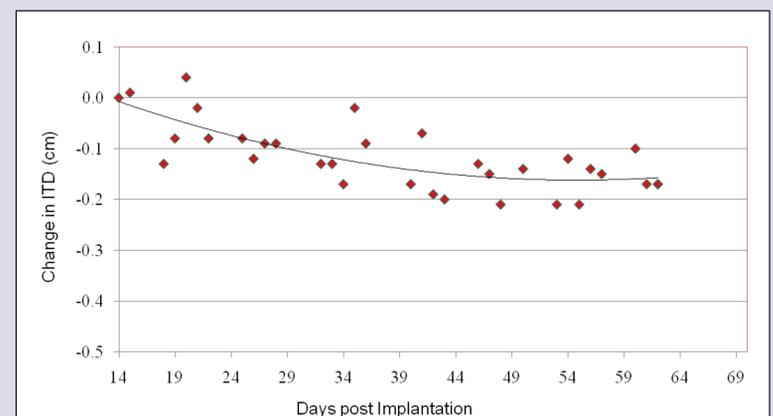


Fig. 3 Changes in the distance between RmB and LmB transponders relative to Day 14 (4.1 cm) of the same patient above after the prostate swelling (if any) was given 14 days to settle down. Since then, the maximum ITD reduction was about 0.2 cm. The solid line is the trend line of measurement data.

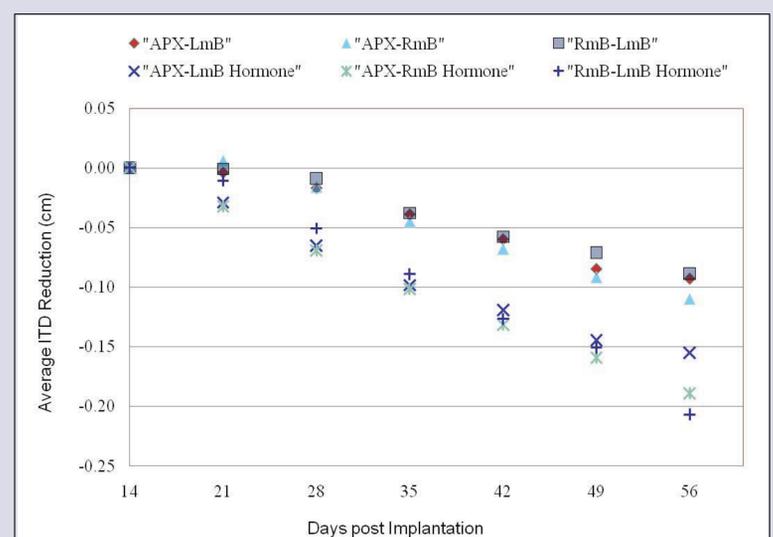


Fig. 4 The average ITD reductions relative to Day 14 in patients with concurrent hormone therapy appeared to be larger than those in patients with no hormone therapy, however the differences were of no statistical significance.