

AbstractID: 11455 Title: A comparison of Calypso based localization for post prostatectomy patient in the presence of high geometric residual (GR) Beacon error: Comparison/correlation with ultrasound alignment

Purpose: For Calypso-guided treatment of post-prostatectomy patients, the geometric residual (GR) error of beacon positions can increase due to local tissue deformations second to healing. We evaluated the Calypso localization inaccuracy resulting from beacon positional errors in such circumstances, using ultrasound (US) image guidance. We report the difference of these two image guidance methods and measure degree of correlation of US shifts with the GR value.

Method and Materials: The Calypso system calculates a GR value prior to each treatment, and warns against using the system if the value is greater than 0.2 cm. For a post prostatectomy patient under treatment in our clinic we used US guidance to determine shifts on days when Calypso GR was out of tolerance. We compared US-derived shifts with Calypso derived shifts both on days when GR was acceptable, and on days when it was not. We calculated degree of correlation between high GR and large US-derived shifts.

Results: On days with large GR value (e.g. 0.33 cm), the Calypso and BAT did not agree well, with A/P differences as large as 0.55 cm, thus suggesting potential shifting of the Calypso transponders. We found a correlation ($R^2=0.798$) between Calypso localization inaccuracy, characterized by large US shifts, and high GR values. When GR values were less than 0.15 cm, Calypso agreed well with US alignment.

Conclusion: When using Calypso for post-prostatectomy patient alignment, special attention should be paid when geometrical residual limit is exceeded, as GR value is a strong indication of the Calypso localization inaccuracy.