

## AbstractID: 11118 Title: Evaluation of ultrasound image guidance accuracy for prostate by comparison to Calypso body GPS data

**Purpose:** Ultrasound image guidance accuracy for prostate is evaluated by comparison to Calypso body GPS data

**Method and Materials:** The Calypso localization system is a real time monitoring system with a precision of better than 0.5mm. Twenty (20) patients with a total of 661 fractions are included in this comparative evaluation of the accuracy of US alignment of prostate using the Calypso Body GPS as the gold standard. The sequence of the localization is as following. 1) patient is aligned to a setup isocenter based on skin tattoos. 2) BAT alignment is performed and the treatment couch is shifted accordingly. 3) Calypso localization is then used to align the patient. Thus, the shifts reported by Calypso can be interpreted to represent the residual uncertainty of the BAT alignment.

**Results:** For the 661 fractions evaluated here, BAT residual uncertainty had mean  $\pm$  standard deviation (SD) of  $-1.1 \pm 2.7$  mm (L/R),  $0.3 \pm 3.6$  mm (I/S),  $1.5 \pm 4.5$  mm (A/P). Our results agree well with a recent study published from Heidelberg University. 3D scatter plot of mean BAT residual uncertainty for each of the 20 patients studied here shows the majority of patients clustering within a bounding box of roughly  $\sim 3$  mm or less as compared to Calypso alignment position. We note that data from alignments presented here was performed by relatively new US operators with (initially) limited and widely ranging US training experience, early in the clinical training and implementation process.

**Conclusion:** The BAT residual uncertainty averaged over 661 fractions is less than 2 mm in all three directions when evaluated using Calypso as a gold standard and it has the largest standard deviation in the A/P direction.