

AbstractID: 1127 Title: Directional Prevalence of Isocenter Adjustment and Prostate Motion from Ultrasound-based Localization during Delivery of Conformal Radiation Therapy

Directional prevalence of isocenter adjustment and prostate motion is presented from 4154 ultrasound alignment fractions on 130 prostate patients treated with conformal radiotherapy or IMRT at the University of Nebraska Medical Center. Daily fraction was verified with ultrasound scan after laser setup with skin marks and prior to radiation delivery, by the same physician responsible for anatomical delineation during planning. The motion of prostate isocenter relative to its planning position was just opposite to the necessary couch adjustment. Polar histograms in 3 cardinal views show the prevalence of prostate motion in superior-posterior directions. The average direction is about 27° from the superior axis. The average changes of prostate position in SI, AP, LR directions and in radial distance are 0.25, -0.13, 0.03, and 0.92 cm respectively, with positive directions toward superior, anterior, and left. The Pearson linear correlation coefficients for LR-SI, AP-SI, LR-AP directions are 0.027, 0.11, 0.078 respectively. Scatter plots infer slight preponderance along posterior and superior directions. Daily displacement may be due to randomly variable filling of bladder and rectum, or the pressure of the BAT ultrasound probe. The result also suggests more margins in planning target volume on the posterior and superior directions. In conclusion, 4154 alignment fractions from 130 patients of BAT ultrasound localization indicate a prevalence of prostate shift from planning position in the superior-posterior direction, with an average closer to the superior axis. Ultrasound localization is a useful technique in precise delivery of radiotherapy.