

AbstractID: 3303 Title: A comparison between BAT and Tomotherapy MVCT on inter-fractional prostate localization

Purpose: To compare the clinical utilities of two image-guided target localization systems in fractionated external beam radiotherapy: BATTM ultra-sound system and TomoTherapyTM mega-voltage computed tomography (MVCT) system

Method and Materials: Daily prostate setup verification data is obtained for 40 patients undergoing prostate external beam radiotherapy at University of California – Davis cancer center, using the ultra-sound based target localization system (BATTM, North American Scientific, Chatsworth, CA). This set of data contains translation (superior-inferior, lateral and anterior-posterior) setup errors. At the University of Arkansas for Medical Sciences, 12 prostate patients undergoing helical tomotherapy (TomoTherapy Inc., Madison, WI) are helped with onboard MVCT to guide inter-fractional prostate setups. The obtained MVCT data contain both translation and rotational (pitch, yaw and roll) setup errors. Statistics analysis using Microsoft Excel is done for both data sets.

Results: BATTM and MVCT reported similar magnitude of inter-fractional prostate setup errors in this study. This result agrees with another direct daily CT and BATTM comparison study reported by Lattanzi *et al.* (1999). However, our data show a larger range of distribution due to different groups of patients at different institutions being used in this study (more detailed data analysis result and discussion is reported with the attached supporting document).

Conclusion: Both BATTM and Tomotherapy MVCT can be applied to image-guided inter-fractional prostate setup procedures. These techniques are principally more accurate than conventional skin tattoo based setups in clinical practice.