

AbstractID: 1674 Title: Accurate stereotaxis with the BrainLAB ExacTrac System

Purpose: Approximately 170 extra-cranial stereotactic radiotherapy patients have been treated with the ExacTrac system at the University of Rochester. Most patients did exhale breath hold during treatment. The clinical experience gained with this cohort of thoracic and abdominal irradiations lead to techniques that optimize the dose delivery to the tumor and to approaches of intra-treatment evaluation of the dose delivery. The ExacTrac system relies on an external set of fiducial markers known as the Body Marker Array (BMA). The configuration of the Body Marker Array relative to the tumor position has a significant impact on the accuracy of the dose delivery and on the magnitude of the treatment field margins.

Methods: The ExacTrac system utilizes the position information of the body marker array to position the target at isocenter. Configuration of the BMA and the target location are analyzed by an algorithm developed to estimate the target registration error (TRE), which is a function of the BMA configurations. For each patient, 3~5 intra-treatment CT scans were performed to verify the target positions. These CT sets were fused with treatment planning CT by registering the BMA. The TREs were measured by computing the 3D distance between the corresponding target positions in different CT sets.

Results: Ten individual patient plans (totally 40 targets) were analyzed. The mean value and standard deviation of TRE of all the targets were computed from the measurements from different intra-treatment CT sets. TREs estimated from the BMA configuration were compared to the measurement.