

AbstractID: 4662 Title: Image-Guided Non-invasive Stereotactic Radiosurgery

Purpose: The objective of this study is to demonstrate that the use of image registration and a non-invasive head frame for SRS can achieve the same accuracy as the current invasive head-ring SRS technique. **Method and Materials:** First, a head phantom was used to evaluate the accuracy of this procedure for aiming the target. Then, two SRT patients fixed with the GTC frame were treated with the proposed technique for ten treatments. The five-point GTC alignment device was used to aid the repositioning of the GTC frame with respect of the original setup. This alignment device minimized the misalignment of the GTC frame in AP, lateral, and axial translations and the angular deviations about each of these axes on roll, tilt, and spin. Prior to each treatment, a daily CT scan with a localization device was acquired. Daily CT images were registered with planning CT and MRI images. The 9 rods on the daily CT images were then identified, such that all the target, critical structures, and external contours from the planning images were transferred to the daily stereotactic coordinates. A new plan was generated. **Results:** In the head phantom study, the daily isocenter setup was verified to be within 0.2 mm accuracy based upon the portal images verse the planned DRRs. Optimized the dose distributions for each daily CT images of ten treatments, the mean deviations of the daily isocenter from the planned isocenter are 0.2 ± 0.12 , -0.4 ± 0.24 , and -0.1 ± 0.07 mm in AP-, LAT-, and VERT-direction, respectively. The comparison of dose-volume histograms is clearly revealed the prescribed dose enclosed the PTV for every treatment. **Conclusions:** The image-guided noninvasive frame SRS has the capability of delivering high level accuracy of dose to the lesion without the discomfort from the pins fixed to the patient's skull.