

AbstractID: 2038 Title: Intrafraction Motion in Noninvasive Image-Guided Stereotactic Radiosurgery using Helical Tomotherapy

Stereotactic Radiosurgery (SRS) demands a high degree of positional accuracy during the treatment procedure because of the small target size and high doses that are delivered. Traditionally, SRS is performed using an invasive head frame to allow positional accuracy on the order of 1mm to 3mm. With the advent of image-guided radiation delivery systems, much effort has been put forth in investigating the use of thermoplastic mask (TPM) as a non-invasive alternative. In addition to being more comfortable to the patients, TPM could reduce the SRS procedure time. The goal of this work was to determine if a thermoplastic mask can be used in fractionated SRS on a helical tomotherapy system. Five patients were CT imaged after immobilization with a thermoplastic mask. CT image sets were acquired every 10 minutes on the same date. Four CT image sets were acquired for each patient, regardless of the waiting period to take the CT set. The image sets were transferred to a TomoTherapy, Inc. image fusion research station. The images were automatically fused with a reference image set to determine the amount of intrafraction motion. Results show that the motion inside the mask is much less than 1 millimeter and 0.5 degrees. Generally, the lateral motion and patient roll were the greatest sources of motion.

This work was supported by TomoTherapy, Inc.