

AbstractID: 11284 Title: Dose reconstruction of intracranial hypofractionated helical tomotherapy treatments for adaptive planning.

**Purpose:** To evaluate the dosimetry of delivered hypofractionated image guided helical tomotherapy treatments for adaptive planning. **Method and Materials:** Twelve patients with intracranial lesions received hypofractionated radiation treatments using helical tomotherapy. Image guidance MVCTs are merged with the planning kVCT images. The treatment deliveries then are calculated with a fine dose grid over the associated merged images. The summation dosimetry of the delivered treatments to the targets are analyzed using TomoTherapy adaptive planning software (TomoTherapy, Madison, WI) to determine if tuning the current plan to the patient's daily treatment position would have been desirable. **Results:** On average, the difference between the planned treatments and delivered treatments in the coverage of the GTVs (n=33) by the prescription dose for all patients is  $4.6\% \pm 13.1\%$ . When selecting 99% of the prescription dose, the difference of mean GTV coverage between planned and delivered treatments reduces to  $0.1\% \pm 0.4\%$ . For the PTVs (n =33), the mean variation in coverage from the planned to delivered treatments by the prescription dose is  $5.2\% \pm 10.0\%$ . The average difference between planned versus delivered treatment coverage of the PTVs reduces to  $0.5\% \pm 1.0\%$  at 99% of the prescription dose. **Conclusion:** Due to the short course and high dose per delivery of hypofractionated radiation treatments, the importance of evaluating and if necessary adapting the planned treatment is pronounced for intracranial patients. As these IMRT plans create a sharp dose gradient there is notable incongruence between the planned and delivered coverage of the targets encompassed by the prescription dose. While changing the treatment plan to perform adaptive therapy seems to be the best solution, however, revision of the treated plans in this study would not be necessary as there is excellent agreement of target coverage between the planned and the delivered image guided helical tomotherapy treatments by the selected 99% of the prescription dose.