

AbstractID: 7077 Title: Conformal avoidance and helical tomotherapy: utility in craniospinal radiation

**Purpose:** Craniospinal irradiation (CSI) is used for malignancies with a propensity for CSF spread or known CSF involvement. Traditional CSI has inherent dosimetric variations and is prone to patient set up error. Helical tomotherapy (HT) is a novel image-guided treatment allowing for precise target sculpting while limiting dose to critical normal tissues. Here, we perform a dosimetric comparison of traditional CSI to that delivered by HT and present an example of utilizing HT for conformal avoidance.

**Method and Materials:** A patient with previously-treated glioneural neoplasm (60 Gy) recurred with leptomeningeal spread and due to her previous radiation was not a candidate for traditional CSI. Treatment planning CT images were used to generate a 36 Gy CSI plan using HT, using the 80% isodose line from the previous treatment plan as an absolute avoidance structure. Three additional patients were planned for HT-CSI and compared to traditional planning. Dosimetry to the PTV and critical normal tissues was performed for both the traditional and HT plans.

**Results:** Traditional CSI fields contain a cold spot representing less than 50% of prescribed dose at the lower spinal junction, where no gaps were necessary using HT. Tomotherapy resulted in a more highly conformal dose delivery to the PTV with conformal avoidance to previously-treated region. Dose inhomogeneity (90% - 10% volume) to the PTV for HT was 1-3%, compared to > 10% for the traditional CSI setup.

**Conclusions:** HT-CSI results in superior dosimetry to the PTV, with a higher minimum dose delivered more conformally, while maximum doses to critical normal tissues are lower compared to traditional LINAC-based CSI. HT requires no junctions with gaps to be calculated and shifts to be made, and it is not subject to critical underdosing as seen in the traditional CSI plan. Conformal avoidance can be easily achieved with HT-CSI.