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IMRT for Craniospinal Irradiation: A Dosimetric Comparison

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Purpose

This work tests the possibility of using IMRT to promote organ sparing for the treatment of CSI. The traditional CSI technique uses opposed lateral fields to treat the brain and posterior fields to treat the spine. Published manuscripts focusing on the possibility of IMRT for CSI have only looked at pediatric cases. Here, we will plan IMRT for CSI on adult patients to quantify the dosimetric gains when compared to traditional techniques.

Method and Materials

Four patients treated at our institution were chosen and a traditional 3D plan along with an IMRT plan was computed for each patient. The planned dose was 10 Gy and only the spine fields were optimized. The traditional plan used a cervical and thoracic spine field at 100 SSD while the IMRT plan split these two fields into five isocentric fields. OAR and target volumes receiving certain doses were calculated for each plan.

Results

IMRT resulted in greater target coverage, lower overall dose, and reduced OAR although the low dose was more spread out. The best target coverage was obtained on the single patient treated supine. For almost every OAR at each point, IMRT reduced the dose.

Conclusion

IMRT for CSI has a dosimetric advantage in both target coverage and OAR sparing over traditional beam arrangements. To further this study, we plan on repeating this process for six more patients and we also want to examine if there is a benefit to optimize the cranial fields in the IMRT plan along with the spine fields. Although it results in a more time consuming process, we have shown that there is evidence to pursue IMRT for adult CSI.