

Encouraging early outcomes with image guided pencil beam proton therapy for cranio-spinal irradiation and unique considerations for paediatric population – First report from India

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Abstract

Background: To report our experience with image guided pencil beam proton beam therapy (PBT) for craniospinal irradiation (CSI). Materials and Methods: Between January 2019 to Dec 2021, we carried out a detailed audit of the first forty patients treated with PBT. We had recorded acute toxicities, reporting early outcomes and discuss limitations of current contouring guidelines during CSI PBT planning. Results: Median age of the patient cohort was 8 years, and histologies include 20 medulloblastoma, 7 recurrent ependymoma, 3 pineoblastoma, 3 were germ cell tumors and remaining 7 constituted other diagnoses. Forty percent patients received concurrent chemotherapy. Median CSI dose was 23.4 GyE (Gray Equivalent; range 21.6 - 35). Thirty-five patients (87.5%) completed their CSI without interruption, 5 required hospital admission. No patient had grade 2/> weight loss during the treatment. Forty-five percent (18) developed grade 1 haematological toxicities and 20% (8) developed grade 2 or 3 toxicities; none had grade 4 toxicities. At median follow up of 12 months, 90 % patients are alive of whom 88.9 % are having local control. Special consideration with modification in standard contouring used at our institute helped in limiting acute toxicities in paediatric CSI patients. Conclusion: Our preliminary experience with modern contemporary PBT using pencil beam technology and daily image guidance in a range of tumours suitable for CSI is encouraging. Patients tolerated the treatment well with acceptable acute toxicity and expected short-term survival outcome. In paediatric CSI patients, modification in standard contouring guidelines required to achieve better results with PBT.

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