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Background

Medulloblastoma (MB) is the most common malignant brain tumor in children, whereas its incidence in adolescents and young adults (AYA) is low, posing unique diagnostic and therapeutic challenges. Craniospinal irradiation (CSI) remains a fundamental component of multimodal treatment, yet outcome data in AYA patients are limited.

This study assesses survival outcomes, disease control, and treatment tolerance in AYA patients with MB treated with CSI at a single institution.

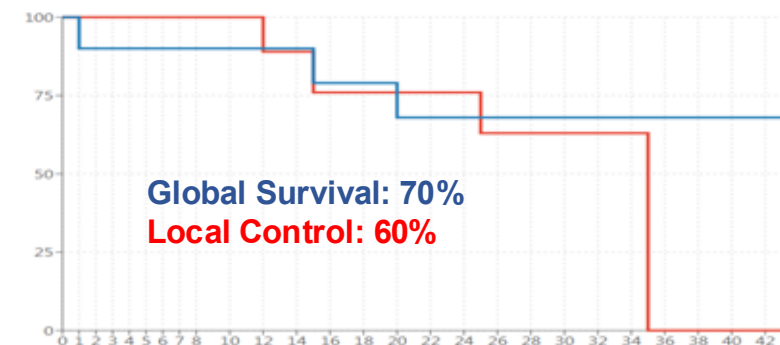
Methods

A retrospective analysis was conducted of AYA patients treated with surgery, chemotherapy (CT), and CSI using volumetric-modulated arc therapy (VMAT) from August 2016 to August 2024 at the Deán Funes Radiotherapy Center (Córdoba, Argentina). Demographic, clinical, treatment, and toxicity data were collected. CSI was delivered with daily fractions of 2 Gy to a total dose of 36 Gy to the craniospinal axis, followed by a boost to 54 Gy. Outcomes included overall survival (OS), progression-free survival (PFS), and acute toxicity.



Results

Ten patients were analyzed, with a mean age of 26 years (range 15–39) and ECOG performance status 0–2. Histologies included classic and desmoplastic variants. Sixty percent had localized disease (M0), and 70% received concurrent CT during CSI. After a median follow-up of 27 months, 70% of patients were alive and 60% remained progression-free. The mean irradiated craniospinal volume was 2200 cc (range 1763–2400). Grade 1 toxicity occurred in 70% of patients, predominantly nausea. Two patients (28%) who received concurrent CSI and CT developed thrombocytopenia requiring transfusion support. No treatment interruptions occurred.



Conclusion

This series demonstrates that CSI in AYA patients with MB achieves OS, PFS, and tolerance outcomes comparable to international reports. Particular attention is warranted in patients receiving concurrent CT due to the risk of hematologic toxicity, as portions of irradiated bone contain active marrow reserves. These findings emphasize the importance of multidisciplinary management and vigilant supportive care in this population.