Pediatric Medulloblastoma

- Acute Toxicities of Proton Craniospinal Irradiation in Pediatric Medulloblastoma: A Pediatric Proton/Photon Consortium Registry (PPCR) Study
- lncRNAs and circRNAs: Emerging Players in Pediatric Medulloblastoma Pathology
- Impact of radiation response on survival in pediatric medulloblastoma with residual or disseminated disease
- ROCK2 Downregulation in Pediatric Medulloblastoma Increases Migration and Predicts the Involvement of SHH Non-canonical Signaling
- Application of Radiomics in Predicting the Prognosis of Medulloblastoma in Children
- miR-512-3p as a Potential Biomarker of Poor Outcome in Pediatric Medulloblastoma
- Immunomodulatory role of exosome-derived content in pediatric medulloblastoma: a molecular subgroup perspective
- Perivascular space imaging during therapy for medulloblastoma

Despite the optimal treatment given to children with medulloblastoma, many relapses are seen after combining treatments. Re-irradiation is part of salvage therapy for children who relapse and might provide long-term disease control. Nevertheless, it is challenging because there is a concern about exceeding radiation tolerances and late treatment toxicities. Re-irradiation is an option for many brain tumors, including medulloblastoma in children. This study presents a case of recurrent medulloblastoma treated with re-irradiation. A systematic review of the literature provided up-to-date data on the re-irradiation of medulloblastoma in children [1].

Case series

identified pediatric patients with MB treated with protons between 2002 and 2016 and who had recurrent disease. To estimate the risk of peri-hippocampal recurrence, three hippocampal zones (HZs) were delineated corresponding to ≤5 mm (HZ-1), 6 to 10 mm (HZ-2), and >10 mm (HZ-3) distance of the recurrence from the contoured hippocampi. To determine the feasibility of HA, three standard-risk patients with MB were planned using either volumetric-modulated arc therapy (VMAT) or intensity-modulated proton therapy (IMPT) plans.

Results: Thirty-eight patients developed a recurrence at a median of 1.6 years. Of the 25 patients who had magnetic resonance imaging of the recurrence, no patients failed within the hippocampus and only two patients failed within HZ-1. The crude incidence of peri-hippocampal failure was 8%. Both HA-VMAT and HA-IMPT plans were associated with significantly reduced mean dose to the hippocampi ($p < .05$). HA-VMAT and HA-IMPT plans were associated with decreased percentage of the third and lateral ventricles receiving the prescription craniospinal dose of 23.4 Gy.

Conclusions: Peri-hippocampal failures are uncommon in pediatric patients with MB. Hippocampal avoidance should be evaluated in a prospective cohort of pediatric patients with MB.

Plain language summary: In this study, the patterns of disease recurrence in patients with a pediatric brain tumor known as medulloblastoma treated with proton radiotherapy were examined. The majority of failures occur outside of an important structure related to memory formation called the hippocampus. Hippocampal sparing radiation plans using proton radiotherapy were generated and showed that dose to the hippocampus was able to be significantly reduced. The study provides the rationale to explore hippocampal sparing in pediatric medulloblastoma in a prospective clinical trial [2]

1)
Giakoumettis G, Mantzavinou A, Moschos G, Giakoumettis D, Capizzello A. Re-irradiation of Pediatric Medulloblastoma: A Case Report and Systematic Review. Cureus. 2022 Nov 16;14(11):e31585. doi: 10.7759/cureus.31585. PMID: 36540431; PMCID: PMC9757891.
2)
Baliga S, Adams JA, Bajaj BVM, Van Benthuysen L, Daartz J, Gallotto SL, Lewy JR, DeNunzio N, Weyman EA, Lawell MP, Palmer JD, Yeap BY, Ebb DH, Huang MS, Perry AF, MacDonald SM, Jones RM, Tarbell NJ, Yock TI. Patterns of failure in pediatric medulloblastoma and implications for hippocampal sparing. Cancer. 2022 Dec 11. doi: 10.1002/cncr.34574. Epub ahead of print. PMID: 36504293.