Pediatr Blood Cancer. 2025 Feb 4:e31587. doi: 10.1002/pbc.31587. Online ahead of print.

Re-Irradiation for the Progressive Pediatric Diffuse Intrinsic Pontine Glioma: A Report on 109 Children From a Single Center

Mohamed Saad Zaghloul [1 2], Mai K Bishr [3], Amal Refaat [4 5], Ahmed El Hemaly [6 7], Moatssem Al Ayadi [6 7], Soha Ahmed [8], Eslam Maher [9], Engy S Todary [2]

Affiliations

PMID: 39905588 DOI: 10.1002/pbc.31587

Abstract

Background: Diffuse intrinsic pontine glioma (DIPG) is a challenging pediatric tumor that frequently progresses within the first year following local radiotherapy. However, several small studies have suggested that re-irradiation may improve quality of life and extend overall survival.

Patients and methods: This retrospective study included 109 children who experienced disease progression ≥3 months after their initial radiotherapy, and subsequently received re-irradiation at a single institution. These patients were compared with a cohort of 60 children, meeting the same criteria, who were treated before adopting the re-irradiation policy and received only the best supportive care (BSC). Most of the re-irradiated children (94%) received first radiation dose as hypofractionation (39 Gy/13 fractions).

Results: The re-irradiation group demonstrated significantly higher overall survival (OS) rates after the first progression, with a 6-month OS of 42% (95% CI: 34%-53%) compared to 16% (95% CI: 8.9%-32%) in the BSC group ($p < 0.001$). Re-irradiation reduced the hazard of death by more than half (HR = 0.45, $p < 0.001$). Clinical response ($p < 0.001$) and radiological response ($p = 0.016$) were significant predictors of improved survival. While the time from initial radiotherapy to progression ($p = 0.059$) and higher re-irradiation doses ($p = 0.074$) were associated with improved OS, these factors did not reach statistical significance but may represent potential prognostic indicators.

Conclusion: Re-irradiation improved the OS in children with progression of DIPG and alleviated their signs and symptoms.

Keywords: DIPG; diffuse intrinsic pontine glioma; overall survival; prognostic factors; re-irradiation; tumor progression.