Comparative Study Childs Nerv Syst. 2025 Jan 7;41(1):85. doi: 10.1007/s00381-024-06700-5.

Survival and toxicity outcomes of hypofractionated conformal radiotherapy compared to conventionally fractionated radiotherapy in the treatment of diffuse intrinsic pontine gliomas

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PMID: 39774994 DOI: 10.1007/s00381-024-06700-5

Abstract

Introduction: Diffuse intrinsic pontine gliomas are associated with dismal survival outcomes. Conventional fractionation radiation to a dose of 60 Gy is the standard of treatment. This retrospective review aims to compare survival and toxicity outcomes of patients treated with conventional fractionation (CF) and hypofractionation (HF) radiotherapy.

Materials and methods: Treatment-naïve diffuse intrinsic pontine glioma patients undergoing radical radiation were analyzed. CF was delivered to a dose of 50-60 Gy in 25-30 fractions, while HF was delivered as 38-40 Gy in 12-15 fractions. All patients were planned via the volumetric modulated arc therapy (VMAT) technique.

Results: A total of 64 patients were eligible for analysis. The median age of presentation was 10 years. Motor deficit was the most common presenting complaint in 51.6% of the patients, with a median symptom duration of 2 months. The pons was the most frequent site of disease epicenter in 71.8% of the patients. After a median follow-up of 9.45 months (range 0.23-72.63 months), 23 patients died, and 28 patients experienced disease progression. The unadjusted hazard ratio (HR) for death in patients treated with HF as compared to CF was 1.330 (95% CI 0.522-3.386) (p-value 0.550, by Cox regression analysis). The median OS for the entire cohort was 13.9 months, while it was 9.7 months (95% CI 5.65-13.74) and 15.1 months (95% CI 9.02-21.18) (p-value = 0.547) with CF and HF, respectively. On multivariate analysis, disease epicenter in the pons was the only significant factor associated with PFS. Hypofractionation was associated with a significantly higher aspiration rate and Ryle's tube requirement (p-value 0.027).

Conclusion: Hypofractionated radiation can be considered for diffuse intrinsic pontine glioma with optimum supportive care.

Keywords: Compliance; Conformal; Conventional; Hypofractionated; Radiotherapy; diffuse intrinsic pontine glioma.