The Role of Hypofractionation Radiotherapy for Diffuse Intrinsic Brainstem Glioma in Children: a Pilot Study

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Purpose
Most children with a diffuse intrinsic brainstem glioma will die within 1 year after diagnosis. To reduce patient burden, we investigated the feasibility of a radical hypofractionation radiotherapy schedule, given over 3 weeks, as an alternative to the standard regimen (30 fractions over 6 weeks).

Methods and Materials
Nine children, ages 3–13, were treated by 13 fractions of 3 Gy (n = 8) or 6 fractions of 5.5 Gy (n = 1) given over 3 weeks. All patients had symptoms for ≤3 months and ≥2 signs of the neurologic triad (long tract signs, ataxia, cranial nerve deficit). Bilateral involvement of the pons (n = 8), encasement of the basilar artery (n = 7) and extension into the cerebellar peduncle (n = 6) was visible on magnetic resonance imaging.

Results
Symptom improvement occurred in all patients within 2 weeks after start of radiotherapy. At a mean follow-up time of 15 months, 7 patients have died. Median time to progression and overall survival was 4.9 and 8.6 months, respectively. Median time to death after progression was 3.6 months. No Grade 3 or 4 toxicity was observed. In a recently published review of clinical trials, median time to progression, overall survival, and time between progression and death ranged from 5.0–8.8, 7.0–16, and 1.0–4.5 months, respectively, with more aggressive regimens.

Conclusion
This radical hypofractionation radiotherapy regimen for children with diffuse intrinsic brainstem glioma is feasible and associated with no Grade 3 or 4 toxicities. With a minimal overall treatment time, it offers quick symptom relief and outcome results within the range of published data.

Hypofractionation, Radiotherapy, Brainstem Glioma

Conflict of interest: none.