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Clinical outcomes of stereotactic biopsy on children with pontine diffuse midline glioma

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Abstract

Introduction: Diffuse midline glioma (DMG) of the pons occurs in pediatric patients and carries a dismal prognosis. Biopsy is not necessary for diagnosis but provides information, particularly H3K27M status, with prognostic implications. Additionally, biopsy information may open therapeutic options such as clinical trials that require mutation status. Therefore, we sought to assess the safety of surgical biopsy in DMG patients as well as its potential impact on clinical course.

Methods: Retrospective analysis of patients who were radiographically and clinically diagnosed with pontine DMG in the last 5 years was performed. We assessed demographic, clinical, radiographic, surgical, and follow-up data.

Results: 25 patients were included; 18 (72%) underwent biopsy while 7 (28%) declined. 12 biopsies (67%) were performed with robotic arm and 5 (27%) with frameless stereotaxy. Three biopsied patients (17%) experienced new post-operative neurologic deficits (1 facial palsy, 1 VI nerve palsy and 1 ataxia) that all resolved at 2-week follow-up. All biopsies yielded diagnostic tissue. Fourteen patients (78%) had H3K27M mutation. Median OS for H3K27M patients was 10 months compared to 11 months in the wild-type patients ($p = 0.30$, log-rank test). Median OS for patients enrolled in clinical trials was 12 months compared to 8 months for non-trial patients ($p = 0.076$).

Conclusion: In our series, stereotactic pontine DMG biopsies did not carry any permanent deficit or complication and yielded diagnostic tissue in all patients. Similar post-operative course was observed in both robot-assisted and frameless stereotactic approaches. There was no significant difference in survival based on mutation status or clinical trial enrollment.

Keywords: Diffuse midline glioma; Pediatric; Pons.