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Awake craniotomy in pediatric low-grade glioma: barriers and future directions

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Abstract

Introduction: The goal of surgical management in pediatric low-grade gliomas (pLGGs) is gross total resection (GTR), as it is considered curative with favorable long-term outcomes. Achieving GTR can be challenging in the setting of eloquent-region gliomas, in which resection may increase risk of neurological deficits. Awake craniotomy (AC) with intraoperative neurofunctional mapping (IONM) offers a promising approach to achieve maximal resection while preserving neurological function. However, its adoption in pediatric cases has been hindered, and barriers to its adoption have not previously been elucidated.

Findings: This review includes two complementary investigations. First, a survey study was conducted querying pediatric neurosurgeons on their perceived barriers to the procedure in children with pLGG. Next, these critical barriers were analyzed in the context of existing literature. These barriers included the lack of standardized IONM techniques for children, inadequate surgical and anesthesia experience, concerns regarding increased complication risks, doubts about children's ability to tolerate the procedure, and perceived non-indications due to alternative monitoring tools.

Conclusion: Efforts to overcome these barriers include standardizing IONM protocols, refining anesthesia management, enhancing patient preparation strategies, and challenging entrenched beliefs about pediatric AC. Collaborative interdisciplinary efforts and further studies are needed to establish safety guidelines and broaden the application of AC, ultimately improving outcomes for children with pLGG.

Keywords: Awake craniotomy; Brain tumor; Glioma; Mapping; Neuromonitoring; Outcomes; Pediatrics; Resection; Safety.

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