

J Clin Neurosci. 2024 Dec 3;132:110938. doi: 10.1016/j.jocn.2024.110938. Online ahead of print.

Clinical and functional outcome for gliomas located in the primary and supplementary motor area. Surgical series and systematic Literature review

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PMID: 39631114 DOI: [10.1016/j.jocn.2024.110938](https://doi.org/10.1016/j.jocn.2024.110938)

Abstract

Introduction: This retrospective study and review aim to investigate diffuse adult gliomas in the motor cortex (primary motor area, M1, and secondary motor area, M2, which includes the supplementary motor area and premotor cortex). It explores the relationships between the histologic and molecular profiles of the lesions, their location, and the type of resection performed, and correlates them with patients' outcomes post-surgery.

Material and methods: An Institutional retrospective review was conducted on a consecutive series of 200 selected patients with histologically confirmed Glioblastomas (GBM) treated surgically between September 2018 and February 2022. These patients were categorized into three subgroups: Group A (lesions contacting CST and/or M1), Group B (lesions related to SMA and pre-SMA), and Group C (lesions outside and distal to the Motor Pathways). The study examined the relationships between the histologic and molecular profiles of the gliomas, their locations, and the types of resections performed, correlating these data with patients' postoperative prognoses.

Results: The findings indicate that the three subgroups did not exhibit significant deterioration in clinical and functional status. Lesions in M1/CST and SMA locations were not inherently associated with poorer outcomes. Notably, lesions involving SMA had a higher preoperative volume compared to those in other areas (Group A: $24.5 \pm 24.3 \text{ cm}^3$; Group B: $30.1 \pm 22.7 \text{ cm}^3$; Group C: $19.91 \pm 15.8 \text{ cm}^3$; $p = 0.025$).

Conclusions: These results align with existing literature, suggesting that although transient motor worsening is expected post-surgery, gliomas in motor areas do not significantly impact survival or functional status. Additionally, the molecular patterns of these tumors do not differ from those of lesions in other brain regions.

Keywords: Extent of resection; Functional outcome; High-grade glioma; Low-grade glioma; Primary motor area; Supplementary motor area.

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