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Ependymal invasion in High-Grade Glioma. Impact on surgical, functional outcomes, and survival rates. Experience in a Latin-American center

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Abstract

Objective: Analyze the impact of ependymal invasion in high-grade gliomas (HGG) on surgical, functional outcomes, and survival rates.

Materials and methods: Retrospective, single-center, analytical study of a cohort of adult patients who underwent surgery for HGG at an Argentine center between 2013 and 2023. Patients with Grade IV supratentorial gliomas, with at least 3 months of follow-up and pre-/postoperative volumetric MRI were evaluated for the presence of ependymal invasion and its impact on prognosis.

Results: Out of 591 patients undergoing HGG surgery, 263 met the inclusion criteria, with a mean follow-up of 24.8 months (range 5-141). The mean age was 58.5 years with a predominance of male patients (63%). Glioblastomas accounted for 80% of cases, with frontal (28.5%) and temporal (21.6%) lobes as the most frequent tumor locations. Mean preoperative volume was 27.2 cm^3, and the mean KPS at surgery was 82. Ependymal invasion was identified in 83 patients (31.5%) and was associated with significantly worse progression-free survival (PFS) and overall survival (OS). These patients had an increased risk of and earlier onset of multicentricity and leptomeningeal spread. Ependymal invasion also negatively impacted the extent of resection, increasing subtotal resections, and it was also associated with a higher risk of complications such as hydrocephalus and CSF leaks.

Conclusion: Ependymal invasion significantly and independently impacts prognosis of patients with HGG. These findings underscore the importance of recognizing ependymal invasion as a key prognostic factor to guide the management and treatment strategies for affected patients.

Keywords: Complications; Ependimary invasion; Extent of resection; High-Grade glioma; Prognosis; Recurrence; Surgery.