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Cognitive impact of repeated surgical resections for the management of high-grade glioma

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Abstract

Purpose: High-grade gliomas (HGG) are aggressive primary brain tumors associated with substantial neurological and functional morbidity. While previous research has shown no significant differences in self-reported quality of life between patients undergoing first-time resection (FTR) and those undergoing repeat surgical resection (RSR), the impact of repeated surgical resections on objective cognitive outcomes remains unclear. This study compared pre- and postoperative neuropsychological performance in these two patient groups.

Methods: Sixty-seven adults with HGG (FTR: n = 39; RSR: n = 28) completed comprehensive neuropsychological evaluations both pre- and approximately 2 weeks postoperatively. Cognitive domains assessed included attention/working memory, processing speed, executive functioning, language, and learning/memory. Standardized Z-scores were used to compute composite domain scores, and both composite-score and individual-test approaches were applied to classify cognitive impairment and postoperative decline.

Results: There were no group differences in any of the cognitive domains at baseline. Four to 28% of the surgical sample showed single domain cognitive impairment while 33 to 71% showed multidomain impairment depending on the classification method used. Further, no significant differences were seen between the FTR and RSR groups in cognitive outcome or change following surgery. Most patients showed no decline in cognitive performance. Across classification schemes, 18 to 36% declined in a single domain and 4 to 26% declined in multiple domains.

Conclusions: In a carefully selected, high-functioning surgical cohort, repeat surgical resection was not associated with increased risk of early postoperative cognitive decline compared to first-time resection. These findings support the consideration of RSR as a viable treatment option for recurrent HGG when aiming to balance oncologic control with preservation of cognitive function.

Keywords: Cognition; Glioma; Neuropsychology; Onco-functional balance; Repeated surgical resection.

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