Biopsy Versus Subtotal Versus Gross Total Resection in Patients With Low-Grade Glioma: A Systematic Review and Meta-Analysis.


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BACKGROUND: The role of extent of surgical resection (EOR) on clinical outcomes in patients with low-grade glioma requires further examination. The goal of this study is to evaluate the association between variable degrees of EOR and clinical outcomes amongst patients with low-grade glioma.

METHODS: We conducted a systematic review and meta-analysis and searched literature databases for reports about low-grade glioma EOR. Eligible studies compared patient outcomes including at least two categories of EOR (biopsy, resection of any extent, subtotal resection [STR], or gross total resection [GTR]). Treatment effects as pooled estimates, mean differences (MDs), or risk ratios (RRs) with corresponding 95% confidence intervals (CIs) were determined using random effects modeling.

RESULTS: Our literature search yielded 60 studies including 13,289 patients. Pooled estimates of overall survival showed an increase from 3.79 years in the biopsy group to 6.68 years in STR to 10.65 years in GTR. Overall survival was favorable with resection of any extent in comparison to biopsy (MD, 3.24; 95% CI, 0.64-5.84; P=0.015). Pooled estimates of seizure control showed an improvement from 47.8% with biopsy to 54.2% with STR to 81.0% with GTR. Compared to STR, GTR delayed malignant transformation (RR, 0.43; 95% CI, 0.20-0.93; P=0.032), without increasing postoperative mortality (RR, 0.38; 95% CI, 0.07-1.97; P=0.250) or morbidity (RR, 1.22; 95% CI, 0.65-2.28; P=0.540).

CONCLUSION: Among patients with low grade gliomas, higher degrees of safe EOR were associated with longer survival and progression-free survival, better seizure control, and delayed malignant transformation, without increased mortality or morbidity.