ABSTRACT

Diagnostic Performance of Dynamic Susceptibility Contrast-Enhanced Perfusion-Weighted Imaging in Differentiating Recurrence From Radiation Injury in Postoperative Glioma: A Meta-analysis.

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PURPOSE: It is important to differentiate between radiation injury (RI) and tumor recurrence (TR) in patients with glioma after surgery and radiotherapy. Our objective was to evaluate the use of dynamic susceptibility contrast-enhanced perfusion-weighted imaging to distinguish between TR and RI in patients with glioma.

METHODS: Relevant studies published until October 2021 were identified in the PubMed, Embase, and Cochrane Library databases. Stata v12.0 and RevMan 5.3 were used for meta-analysis.

RESULTS: In total, the meta-analysis incorporated 13 retrospective studies that included 513 patients with 522 lesions. Among the 522 lesions, 329 lesions were TRs and 193 lesions were RIs. The pooled relative cerebral blood volume value was significantly greater in the TR group ($P < 0.00001$) with significant heterogeneity ($I2 = 88\%$). The pooled sensitivity, specificity, positive likelihood ratio (PLR), and negative likelihood ratio (NLR) were 83% (95 confidence interval [CI], 77%-88%), 85% (95 CI, 77%-91%), 5.60 (95 CI, 3.61-8.70), and 0.20 (95% CI, 0.14-0.27), respectively. The heterogeneity of sensitivity ($I2 = 33.18\%$), specificity ($I2 = 24.01\%$), PLR ($I2 = 0.00\%$), and NLR ($I2 = 6.68\%$) is not significant. The area under the receiver operating characteristic curve was 0.91 (95% CI, 0.88-0.93). The 3.0 T magnetic resonance imaging, high-grade glioma, and Europe/America patient subgroups showed PLR greater than 5 and NLR less than 0.2. There was no significant indication of publication bias in the analysis ($P = 0.496$).

CONCLUSIONS: It is concluded that dynamic susceptibility contrast-enhanced perfusion-weighted imaging is effective for the diagnostic differentiation between TR and RI in patients with glioma.

Conflict of interest statement: The authors declare no conflict of interest.