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Is add-on Bevacizumab therapy to Temozolomide and radiotherapy associated with clinical utility for newly diagnosed Glioblastoma? A systematic review and meta-analysis

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Abstract

Bevacizumab, temozolomide (TMZ), and radiotherapy are three therapeutic methods, but the combination of them as a new approach for the treatment of newly diagnosed high-grade gliomas (HGGs) is still under investigation. Therefore, this study aims to evaluate the safety, efficacy, and clinical utility of this treatment approach for patients with glioblastoma (GBM). PubMed/Medline, Scopus, Embase, and Web of Science were systematically reviewed from inception to 24 August 2023. Relevant studies evaluating the therapeutic effect of adding Bevacizumab to TMZ-based chemotherapy and radiation therapy were enrolled. All statistical analysis was performed using the "meta" package of R. A total of 21 studies were included in this study. Our meta-analysis found that adding bevacizumab to standard therapy improved progression-free survival (PFS) in patients with newly diagnosed GBM. The pooled 6-month PFS rate was significantly higher with bevacizumab (79% vs. 56%, odds ratio 3.17). Overall survival (OS) showed modest improvements, with 2-year OS rates of 39% vs. 20% favoring bevacizumab. Radiological response rates varied, with a pooled overall response rate of 44% for bevacizumab-treated patients. The complete response rate was 16%, partial response 32%, and progressive disease 25%. Adverse events occurred in 62% of bevacizumab-treated patients. Common complications included fatigue, thrombocytopenia, and thromboembolic events. When added to standard therapy, bevacizumab demonstrates modest improvements in PFS and OS for newly diagnosed GBM. While it shows promise in short-term outcomes and radiological responses, long-term survival benefits remain limited. The risk of adverse events, particularly CNS hemorrhage, necessitates careful patient selection. These findings suggest that bevacizumab may have a role in treating high-grade gliomas, but its use should be individualized based on patient characteristics and risk-benefit assessment.

Keywords: Bevacizumab; Glioma; High-grade glioma; Newly diagnosed; Radiotherapy; Temozolomide.

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