

Future Oncol. 2025 Jul;21(17):2237-2249. doi: 10.1080/14796694.2025.2516408. Epub 2025 Jun 18.

Effects and safety of TMZ plus RT combined with other drugs in the treatment of glioblastoma: a network meta-analysis

Simin Wang ¹, Jiyong Wu ¹, Wenfei Zhang ², Jing Nie ¹

Affiliations

PMID: 40528440 PMCID: PMC12239791 (available on 2026-06-18)

DOI: [10.1080/14796694.2025.2516408](https://doi.org/10.1080/14796694.2025.2516408)

Abstract

Introduction: Temozolomide combined with radiotherapy has been widely recognized as the first-line treatment for glioblastoma. However, a standard treatment regimen for recurrent glioblastoma after treatment with temozolomide plus radiotherapy is lacking at present. This network meta-analysis aimed to assess and rank the therapeutic efficacy and safety of temozolomide plus radiotherapy combined with 11 other anti-cancer treatments in glioblastoma so as to provide valuable evidence for appropriate clinical decision-making.

Methods: Eligible studies investigating the efficacy and safety of temozolomide plus radiotherapy (standard treatment) compared to combination therapies were obtained by searching PubMed, Cochrane Library, and EMBASE. Outcomes included progression-free survival, overall survival, and grade 3-5 adverse events.

Results: A total of 16 studies were included in this meta-analysis. Except for autologous lymphoid effector cells specific against tumor, galunisertib, and interferon- β , other anti-cancer treatments used in combination with standard treatment resulted in a survival advantage over standard treatment alone. The combination of nimustine with standard treatment performed best in improving overall survival and progression-free survival and exhibited a favorable safety profile, making it the optimal treatment option for recurrent glioblastoma.

Conclusion: After a comprehensive safety analysis, nimustine and lomustine were identified as effective drugs that could be combined with standard treatment.

Protocol registration: www.crd.york.ac.uk/prospero identifier is CRD420251004329.

Keywords: Temozolomide plus radiotherapy; adverse events; combination therapy; glioblastoma; network meta-analysis; overall survival; progression-free survival.

Plain language summary

This study looks at different ways to treat a serious brain cancer called glioblastoma. Doctors usually use a combination of a drug called temozolomide and radiation therapy as the first treatment. However, when this cancer comes back, there isn't a clear best way to treat it again. We did a special

kind of study called a network meta-analysis to compare how well different treatments work and how safe they are. We looked at 16 different studies that tested adding 11 other treatments to the usual temozolomide and radiation therapy. We found that most of these extra treatments helped people live longer and stopped the cancer from growing better than just using temozolomide and radiation alone. One treatment, called nimustine, worked the best. It helped people live longer and had fewer bad side effects. This study helps doctors know which treatments might be best for people with this kind of brain cancer. More big studies are needed to be sure, but our results give doctors good ideas for treating glioblastoma.

[PubMed Disclaimer](#)