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# Dendritic cell vaccine for glioblastoma: an updated meta-analysis and trial sequential analysis

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## Abstract

**Background:** Dendritic cell (DC) vaccine is an emerging immunotherapy that could potentially improve glioblastoma survival. The first phase III clinical trial of DC vaccine was recently published. This meta-analysis aims to update and reappraise existing evidence on the efficacy of DC vaccine in patients with glioblastoma.

**Methods:** We searched PubMed, Embase, and Cochrane Library for clinical trials of DC vaccine for glioblastoma. The quality of the studies was assessed using the RoB 2.0 and ROBINS-I tools. The results of overall survival (OS) and progression-free survival (PFS) were pooled using hazard ratios (HRs) with corresponding 95% confidence intervals (CI). Summary effects were evaluated using random effects models. Trial sequential analysis (TSA) was performed.

**Results:** Seven clinical trials involving 3,619 patients were included. DC vaccine plus standard care was associated with significantly improved OS (HR = 0.71; 95% CI, 0.57 - 0.88) and PFS (HR = 0.65; 95% CI, 0.43 - 0.98). In the subgroup of newly diagnosed glioblastoma, DC vaccine was associated with improved PFS (HR = 0.59; 95% CI, 0.39 - 0.90). TSA of OS showed that the cumulative z-score line for the DC vaccine crossed the benefit boundary and reached the required sample size. TSA of PFS and subgroup analysis of newly diagnosed glioblastoma showed that the required sample size was not reached.

**Conclusions:** This updated meta-analysis, which included the first phase III trial of a DC vaccine for glioblastoma, demonstrated that the DC vaccine was associated with improved OS. Moreover, TSA showed that the required sample size was reached, indicating a true-positive result. Future studies are required for patient subgroups with newly diagnosed and recurrent glioblastoma.

**Keywords:** Dendritic cell vaccine; Glioblastoma; Immunotherapy; Meta-analysis; Trial sequential analysis.

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