ABSTRACT

Neuro Oncol. 2022 Mar 21:noac070. doi: 10.1093/neuonc/noac070. Online ahead of print.

Prognostic significance of therapy-induced myelosuppression in newly diagnosed glioblastoma.

Le Rhun E(1), Oppong FB(2), Vanlancker M(2), Stupp R(3), Nabors B(4), Chinot O(5), Wick W(6), Preusser M(7), Gorlia T(2), Weller M(8).

Author information:
(1)Department of Neurosurgery and Neurology & Brain Tumor Center, University Hospital and University of Zurich, Zurich, Switzerland.
(2)EORTC Headquarters, Brussels, Belgium.
(3)Centre Hospitalier Universitaire Vaudois and University of Lausanne, Lausanne, Switzerland and Malnati Brain Tumor Center of the Lurie Comprehensive Cancer Center and Department of Neursurgery and Neurology, Northwestern University Feinberg School of Medicine, Chicago, IL, USA.
(4)University of Alabama at Birmingham, Department of Neurology, Division of Neuro-Oncology, Birmingham, AL, USA.
(5)Aix-Marseille University, AP-HM, Service de Neuro-Oncologie, CHU Timone, Marseille, France.
(6)Department of Neurology and Neurooncology Programm at the National Center for Tumor Diseases, University Hospital Heidelberg and German Cancer Research Center, Heidelberg, Germany.
(7)Department of Medicine I, Division of Oncology, Medical University of Vienna, Vienna, Austria.
(8)Department of Neurology & Brain Tumor Center, University Hospital and University of Zurich, Zurich, Switzerland.

BACKGROUND: Myelosuppression is the major toxicity encountered during temozolomide chemoradiotherapy for newly diagnosed glioblastoma.

METHODS: We assessed the association of myelosuppression (neutropenia, thrombocytopenia, anemia, lymphopenia) during temozolomide chemoradiotherapy alone or in combination with experimental agents with progression-free survival (PFS) or overall survival (OS) in 2073 patients with newly diagnosed glioblastoma enrolled into five clinical trials: CENTRIC, CORE, EORTC 26082, AVAglio, and EORTC 26981. A landmark Cox model was used. For each primary association analysis, a significance level of 1.7% was used.

RESULTS: Lower neutrophil counts at baseline were associated with better PFS ($p=0.011$) and OS ($p<0.001$), independently of steroid intake. Females experienced uniformly more myelotoxicity than males. Lymphopenia during concomitant chemoradiotherapy was associated with OS ($p=0.009$): low-grade (1-2) lymphopenia might be associated with superior OS (HR 0.78, 98.3% CI 0.58-1.06) whereas high-grade (3-4) lymphopenia might be associated with inferior OS (HR 1.08, 98.3% CI 0.75-1.54). There were no associations of altered hematological parameters during concomitant chemoradiotherapy with PFS. During maintenance chemoradiotherapy, no significant association was found between any parameter of myelosuppression and PFS or OS, although exploratory analysis at 5% significance level indicated that either mild-to-moderate (HR 0.76, 95% CI 0.62-0.93) or high-grade lymphopenia (HR 0.65, 95% CI 0.46-0.92) were associated with superior OS ($p=0.013$), but not PFS.

CONCLUSIONS: The association of higher neutrophil counts at baseline with inferior PFS and OS requires further prospective evaluation. The link of therapy-induced lymphopenia to better outcome may guide the design for immunotherapy trials in newly diagnosed glioblastoma.

DOI: 10.1093/neuonc/noac070
PMID: 35312789