Neutrophil to lymphocyte ratio as a prognostic marker in glioblastoma multiforme: a systematic review and meta-analysis

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INTRODUCTION

Glioblastoma multiforem (GBM) is the most common primary malignant brain tumor in adults and it is important to identify biomarkers that can predict its prognosis. The aim of this study was to systematically review the prognostic value of neutrophil-to-lymphocyte ratio (NLR) in patients with GBM.

METHODS

PubMed, Scopus and EMBASE databases were searched from the beginning until February 2017 using the following search strategy: neutrophil* AND lymphocyte* AND (glioma OR glioblastoma OR astrocytoma). No language or time limit was applied.

Two authors independently reviewed the retrieved articles. All studies that evaluated the prognostic value of NLR in glioblastoma patients were included. Case reports, letters to editor, review articles and animal studies were excluded.

Data extraction for the included studies was performed and quality of studies was assessed using Oxford Center for Evidence-Based Medicine checklist for prognostic studies.

Studies using Cox proportional hazards model to compare overall survival (OS) in patients with low and high values of NLR were included in the meta-analysis. Comprehensive Meta Analysis 2.2 was used to perform a random effects model meta-analysis on univariate and multivariate hazard ratios. Heterogeneity between studies was assessed using I^2 index and Cochrane Q test.

RESULTS

Six studies (827 patients) were included.
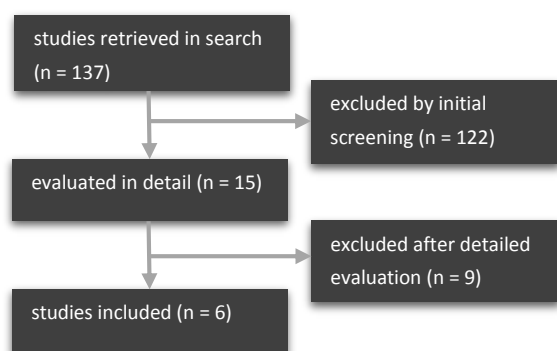
Progression-free survival (PFS) was the primary outcome in two studies. One study identified lower values of NLR as a significant predictor of better PFS, but the other one showed the opposite effect. Performing a meta-analysis was not possible on these two studies.

The primary outcome in six studies was OS, five of which reported NLR as a significant prognostic marker. Pooled univariate hazard ratios (HRs) of three studies for predicting OS was 1.699 (95% CI: 1.423-2.028) and pooled multivariate HRs of four studies for predicting OS was 1.564 (95% CI: 1.208-2.024). Negligible heterogeneity was observed between studies.

	Alexiou 2013	Bambury 2013	De Campos Silva 2013*	Han 2015	Lopes 2016*	Mason 2014*
number of patients	51	84	29	152	117	394
prospective	✓	✗	✗	✗	✗	✗
result (how survival changes with ↑ NLR; ✗ = not sig.) PFS	↑				↓	
OS	↓	↓	✗	↓	↓	↓

* conference abstract
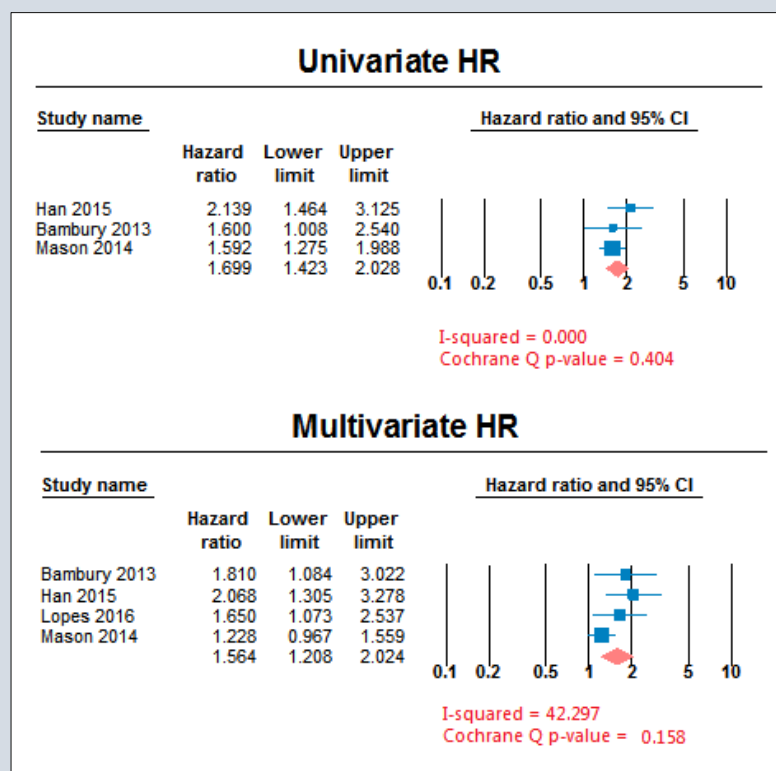
CONLUSIONS

NLR is an easy to use and inexpensive marker that can be used as a predictor of overall survival in GBM with a moderate performance, but its role as a predictive marker of PFS is uncertain. Since NLR is not a strong prognostic marker we recommend studying its combination with other prognostic markers to increase their prognostic performance.

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