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The prognostic utility of the neutrophil to lymphocyte ratio in paediatric brain tumours: a retrospective case control study

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Abstract

Introduction: Paediatric brain tumours (PBT) are the most common cause of death among all childhood cancers. The neutrophil to lymphocyte ratio (NLR) has been shown to prognosticate many adult cancers. There is a paucity of literature on the NLR in PBTs. This study aims to study the link between PBTs and the NLR by comparing the preoperative serum NLR in children under 16 with brain tumours with their outcome in terms of grade of brain tumour and overall survival.

Methods: This is a retrospective case control study. The NLRs were compared between patients with benign or malignant PBTs and patients who were alive or dead. Receiver-operating characteristic (ROC) curve analyses were performed and Youden indexes were calculated to evaluate the predictive potential of the NLR. A cut-off point of NLR > 4 was selected for the calculation of odds ratios.

Results: A total of 515 patients were included in this study. 53.8% were male. 66.2% had benign PBTs. 81.0% were alive at the time of the study. Patients with malignant PBTs had a higher NLR compared to patients with benign PBTs (p = 0.0066**). There was no difference in the NLR between patients who were dead compared to those who were alive (p = 0.1682 ns). The NLR had a Youden's index of 0.1567 to predict malignant PBTs and 0.1285 to predict survival.

Conclusion: A high NLR was associated with an increased odds of having a malignant PBT but a reliable cut-off point was not identified and the underlying mechanisms for this remain unknown. The NLR is a poor diagnostic biomarker due to its poor overall sensitivity and specificity. More research is required to further study the role of immunity in PBTs.

Keywords: MeSH; brain neoplasms; children; lymphocytes; neutrophils; prognosis.