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A high preoperative prognostic nutritional index is associated with improved overall survival in patients undergoing brain tumor resection

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Abstract

Objective: Brain tumors, particularly malignant types, are associated with high mortality despite advances in multimodal treatment. The prognostic nutritional index (PNI) has been identified as a predictor of outcomes in various diseases. Despite these advances, prior investigations have predominantly targeted malignant brain tumors, leaving prognostic utility of PNI across the full spectrum of brain neoplasms largely unexplored. This study performed to evaluate the association between preoperative PNI and overall survival in patients undergoing brain tumor resection, including both benign and malignant tumors.

Methods: Demographic, laboratory, and clinical data of 3,263 patients were retrospectively analyzed. The PNI was calculated using serum albumin level and lymphocyte count. Based on the optimal cutoff value of preoperative PNI, the patients were stratified into high-PNI (n = 2092) and low-PNI (n = 1171) groups. To reduce confounding from demographic and preoperative variables while preserving the original sample size, stabilized inverse probability weighting (IPW) was performed. Kaplan-Meier survival curves and multivariable logistic regression were used to assess the association between the preoperative PNI and 5-year mortality.

Results: Five-year mortality was significantly lower in the high-PNI group (16.9 %) than in the low-PNI group (34.2 %), with higher cumulative survival in the high-PNI group ($P < 0.001$). After adjustment for confounders using IPW, the preoperative PNI remained a significant predictor of 5-year mortality (odds ratio, 0.95; 95 % confidence interval, 0.94-0.97; $P < 0.001$).

Conclusion: A higher preoperative PNI was independently associated with improved 5-year overall survival in patients undergoing brain tumor resection, including both benign and malignant tumors.

Keywords: Brain tumor; Mortality; Prognostic nutritional index.