

ABSTRACT NO:06
RESEARCH ARTICLE**Peripheral Inflammatory Biomarkers and Their Relationship with Histopathological and Molecular Features in Glioma: A Single-Centre Interim Analysis from Pakistan**Alyna Hafeez¹, Kabir Jitender Kumar Uderani², Shahzadi Sundas³, Yasmin Abdul Rashid⁴, Adeeba Zaki⁵**Abstract**

Objective: Gliomas are the most common primary malignant brain tumours in adults. Their prognosis is determined by both histopathological grade and molecular alterations. Peripheral blood inflammatory biomarkers, including neutrophil-to-lymphocyte ratio (NLR), derived NLR (dNLR), and platelet-to-lymphocyte ratio (PLR), have emerged as inexpensive prognostic markers, although their relationship with tumour biology remains incompletely defined. Evidence suggests that patients with higher NLR, dNLR and PLR are more likely to exhibit rapid tumour progression. Thus, this study aims to determine the association of inflammatory biomarkers (NLR, PLR, and dNLR) with defined histopathological and molecular features in glioma patients.

Methods: Forty histologically confirmed glioma patients were enrolled at Aga Khan University Hospital, Karachi from July 2025 to April 2026. Histopathological and molecular data were obtained from surgical pathology reports. Pre-operative complete blood counts were used to calculate NLR, dNLR, and PLR, which were categorized using pre-specified cut-offs of >4 , >1.3 , and >200 respectively. Because biomarker distributions were non-normal, analyses were performed using Chi-square, Fisher's exact tests and Spearman correlation.

Results: Forty patients were enrolled, of whom 25 (62.5%) had WHO grade IV tumours. Median (IQR) NLR, dNLR and PLR were 6.25 (2.76–13.64), 3.44 (1.88–8.41) and 180.9 (110.5–288.6), respectively. WHO grade correlated strongly with IDH status ($r_s=0.754$, $p<0.001$). Elevated dNLR (>1.3) was significantly associated with WHO grade ($\chi^2=7.86$, $p=0.020$), whereas NLR and PLR were not. Higher PLR was more frequent among ATRX-loss tumours {23 (57%) vs 14(35%)}, and IDH wild-type tumours demonstrated higher NLR and PLR, although these differences did not reach statistical significance.

Conclusion: Elevated preoperative dNLR demonstrated a significant association with WHO tumour grade, supporting its potential as an inexpensive biomarker of glioma biology. Although associations between NLR, PLR and molecular markers did not reach statistical significance in this interim analysis, the observed trends warrant validation in the completed cohort. Therefore, these inexpensive biomarkers may assist risk stratification in resource-limited settings while awaiting molecular profiling.

Keywords: Glioma, Neutrophil-to-lymphocyte ratio, risk stratification

DOI: <https://doi.org/10.47391/JPMA-7ANOS-ABS-7>

(JPMA 76:S8(Supple-1); 2026)

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