

Diagnostic Roles of Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio for Vertebral Fracture ec Tuberculosis and Malignancy

Iwan Vanca Saragih^{1*}, Agus Priambodo²

¹ *Specialized Residency Training Student, Department of Surgery, Faculty of Medicine, Universitas Diponegoro/Dr. Kariadi General Hospital, Semarang, Indonesia*

² *Lecturer, Department of Orthopedic, Faculty of Medicine, Universitas Diponegoro/Dr. Kariadi General Hospital, Semarang, Indonesia*

ABSTRACT

Background: Vertebral fracture is one of the serious complications that can occur due to various medical conditions, including bone tuberculosis and malignancy (eg, cancer metastasis to the vertebrae). This condition will always cause an increase in the inflammatory process in the body which can be identified through the Neutrophil-to-Lymphocyte Ratio (NLR) and Platelet-to-Lymphocyte Ratio (PLR). This study aims to investigate the differences in NLR and PLR values in patients with vertebral fractures due to TB or malignancy.

Methods: A retrospective observational study was conducted on vertebral fracture patients who operated in the Orthopedic Surgery Department of Dr Kariadi Hospital Semarang between January 1st, 2022, and December 31st, 2023. Data on demographics and laboratory test results were extracted from medical records. Statistical analysis was performed using univariate analysis and presented as percentage and frequency. *T-test or Mann-Whitney test* was used to determine the difference based on their normality distribution. The diagnostic value of NLR and PLR was also analyzed using the receiver operating characteristic (ROC) curve and Youden index.

Results: The study included 54 vertebral fracture patients. The mean age of patients was 41.77 ± 16.00 years and dominated by female patients (68.5%). Neutrophil to Lymphocyte Ratio (NLR) value was significantly higher in vertebral fracture due to malignancy patients than TB (5.5 (IQR 3.92 – 13.39) vs 4.53 (IQR 2.91 – 6.96), $p=0.020$). In contrast, the Platelet to Lymphocyte Ratio (PLR) value was not significantly different ($p>0.05$). The area under the curve for the NLR (0.69, 95% confidence interval [CI], 0.54 – 0.839) was greater than that of PLR (0.408, 95% CI, 0.246 – 0.571).

Conclusion: NLR showed significantly different results in determining the cause of vertebral fractures, either tuberculosis or malignancy.