

INTISARI

Latar Belakang: Lepra, infeksi kronis yang disebabkan oleh *Mycobacterium leprae*, merupakan masalah kesehatan global termasuk Indonesia. Dalam perjalanan penyakit lepra dapat timbul episode inflamasi akut yang disebut reaksi lepra, dapat reaksi tipe 1, reaksi tipe-2 atau fenomena *Lucio*. Reaksi lepra tipe-2 (eritema nodosum leprosum/ENL) sering terjadi pada pasien lepra tipe lepromatosa dan dapat menyebabkan morbiditas serta kecacatan yang signifikan. Saat ini, belum ada penanda laboratorium yang spesifik untuk memprediksi timbulnya reaksi ini. Penelitian sebelumnya menunjukkan bahwa rasio neutrofil-limfosit (RNL) dapat berfungsi sebagai indikator inflamasi dan respons imun dalam berbagai kondisi. Bagaimana peran RNL pada ENL belum pernah diteliti di Indonesia.

Tujuan: Menganalisis RNL sebagai faktor prediktif terhadap kejadian ENL di RSUP Dr. Sardjito Yogyakarta.

Metode: Penelitian ini merupakan kohort retrospektif terhadap pasien lepra MB di Poliklinik Kulit dan Kelamin di RS Dr. Sardjito Yogyakarta yang memenuhi kriteria selama periode 2020–2024. Data demografis, klinis, indeks bakteri (IB), serta RNL dihitung dari hasil hematologi sebelum inisiasi MDT, berdasar data rekam medis. Nilai ambang RNL ditentukan melalui analisis kurva ROC, kemudian hubungan antara RNL dan kejadian ENL dianalisis menggunakan analisis bivariat dan Kaplan–Meier.

Hasil: Sebanyak 23 dari 87 pasien (26,4%) mengalami ENL selama masa observasi. Berdasar analisis ROC didapatkan *cut-off* RNL $\geq 3,22$ (AUC = 0,675; $p=0,013$) dengan sensitivitas 73,9% dan spesifisitas 51,6%. Analisis bivariat menunjukkan bahwa pasien dengan RNL $\geq 3,22$ memiliki risiko 3 kali lebih besar mengalami ENL dibandingkan pasien dengan RNL $< 3,22$ (OR = 3,01; 95% CI: 1,05–8,63; $p=0,035$). Analisis Kaplan–Meier menunjukkan bahwa kelompok RNL $\geq 3,22$ mengalami ENL lebih cepat, dengan *mean survival time* 24,2 bulan, dibandingkan kelompok dengan RNL $< 3,22$ yaitu 30,9 bulan ($\chi^2=4,28$; $p=0,038$).

Kesimpulan: Rasio neutrofil-limfosit (RNL) terbukti sebagai faktor prediktif yang signifikan terhadap kejadian ENL. Pasien dengan nilai RNL $\geq 3,22$ memiliki risiko 3 kali lebih besar untuk mengalami ENL dibandingkan pasien dengan RNL $< 3,22$. Analisis survival menunjukkan bahwa kelompok dengan RNL $\geq 3,22$ memiliki waktu bebas ENL yang lebih singkat, dengan *mean survival time* sebesar 25,8 bulan dibandingkan 30,9 bulan pada kelompok RNL $< 3,22$.

Kata kunci: Lepra, Reaksi Tipe-2, Rasio Neutrofil-Limfosit, Prediktif

ABSTRACT

Introduction: Leprosy, a chronic infectious disease caused by *Mycobacterium leprae*, remains a global health problem, including in Indonesia. During the course of leprosy, acute inflammatory episodes known as leprosy reactions may occur, classified as type 1 reaction, type 2 reaction, or Lucio phenomenon. Type 2 reaction (Erythema Nodosum Leprosum, ENL) commonly occurs in patients with lepromatous leprosy and can lead to significant morbidity and disability. To date, there is no specific laboratory marker that can predict the occurrence of this reaction. Previous studies have suggested that the neutrophil-to-lymphocyte ratio (NLR) may serve as an indicator of systemic inflammation and immune response in various conditions. However, the role of NLR in predicting type 2 reaction has not been previously studied in Indonesia.

Aims: This study aims to analyze the neutrophil-to-lymphocyte ratio (NLR) as a predictive factor for the occurrence of Erythema Nodosum Leprosum (ENL) among leprosy patients at Dr. Sardjito General Hospital, Yogyakarta.

Methods: This study was a retrospective cohort involving multibacillary (MB) leprosy patients at the Dermatology and Venereology Clinic of Dr. Sardjito General Hospital, Yogyakarta, who met the eligibility criteria during the period of 2020–2024. Demographic and clinical data, bacteriological index (BI), and neutrophil-to-lymphocyte ratio (NLR) were obtained from medical records. NLR was calculated from hematological results prior to multidrug therapy (MDT) initiation. The NLR cut-off value was determined using receiver operating characteristic (ROC) curve analysis. The association between NLR and the occurrence of ENL was analyzed using bivariate analysis and Kaplan–Meier survival analysis.

Result: A total of 23 out of 87 patients (26.4%) developed ENL during the observation period. ROC analysis identified an NLR cut-off of ≥ 3.22 (AUC = 0.675; $p = 0.013$) with a sensitivity of 73.9% and specificity of 51.6%. Bivariate analysis showed that patients with $NLR \geq 3.22$ had a three-fold higher risk of developing ENL compared to those with $NLR < 3.22$ (OR = 3.01; 95% CI: 1.05–8.63; $p = 0.035$). Kaplan–Meier analysis demonstrated that patients with $NLR \geq 3.22$ developed ENL earlier, with a mean survival time of 24.2 months, compared to 30.9 months in patients with $NLR < 3.22$ ($\chi^2 = 4.28$; $p = 0.038$).

Conclusion: The neutrophil-to-lymphocyte ratio (NLR) is a significant predictive factor for the occurrence of ENL. Patients with $NLR \geq 3.22$ have a three-fold increased risk of developing ENL compared to those with lower NLR values. Survival analysis further confirms that higher NLR is associated with a shorter ENL-free interval, with a mean survival time of 24.2 months versus 30.9 months in the lower-NLR group.

Keywords: Leprosy, Type-2 Reaction, Neutrophil-Lymphocyte Ratio, Predictive