ABSTRACT

Background: Coronavirus Disease 2019 (Covid-19) is a systemic infection that can trigger excessive inflammation and immune dysfunction. The derived neutrophil-to-lymphocyte ratio (d-NLR) is a simple hematological biomarker that reflects this imbalance and has been proposed as a predictor of poor outcomes. However, its role as a prognostic biomarker in severe and critical Covid-19 patients remains incompletely established.

Objective: The objective of this study is to evaluate d-NLR as a prognostic biomarker of mortality in patients with severe and critical Covid-19.

Method: A retrospective cohort study was conducted on 222 patients with severe and critical Covid-19 admitted to RSUP Dr. Sardjito from March to December 2021. Clinical and laboratory data were extracted from medical records. The optimal d-NLR cut-off was determined using ROC curve analysis. Bivariate associations were assessed using chi-square tests.

Result: There was a significant association between d-NLR and mortality in severe and critical Covid-19 patients. A d-NLR value >8.49 was associated with higher mortality and increased odds of death (OR = 3.066; 95% CI: 1.420–6.622; p = 0.003). Age ≥60 years was also significantly associated with mortality (OR = 2.511; 95% CI: 1.162–5.427; p = 0.017). Diabetes mellitus showed a statistically significant association (OR = 0.496; 95% CI: 0.250–0.983; p = 0.042), while other variables did not demonstrate significant associations (p > 0.05).

Conclusion: There is an association between derived neutrophil-to-lymphocyte ratio (d-NLR) and mortality in severe and critical Covid-19 patients. A d-NLR value >8.49 was associated with increased odds of mortality (OR = 3.066).

Keywords: Covid-19, d-NLR, mortality, biomarker

INTISARI

Latar Belakang: Coronavirus Disease 2019 (Covid-19) merupakan infeksi sistemik yang dapat memicu respons inflamasi berlebihan dan disfungsi imun. Salah satu biomarker hematologis yang sederhana dan mencerminkan ketidakseimbangan imun tersebut adalah derived neutrophil-to-lymphocyte ratio (d-NLR). Meskipun d-NLR telah dikaitkan dengan luaran klinis yang buruk pada pasien Covid-19, peran spesifiknya sebagai biomarker prognosis pada pasien dengan derajat penyakit berat dan kritis masih belum sepenuhnya diketahui.

Tujuan: Tujuan penelitian ini adalah untuk menilai peran d-NLR sebagai biomarker prognostik terhadap mortalitas pasien dengan Covid-19 derajat berat dan kritis.

Metode: Penelitian ini merupakan studi kohort retrospektif yang melibatkan 222 pasien Covid-19 berat dan kritis yang dirawat di RSUP Dr. Sardjito pada periode Maret hingga Desember 2021. Data klinis dan laboratorium diperoleh dari rekam medis pasien. Nilai ambang optimal d-NLR ditentukan melalui analisis kurva ROC. Uji chi-square digunakan untuk analisis bivariat.

Hasil: Terdapat hubungan yang bermakna antara d-NLR dan mortalitas pada pasien Covid-19 derajat berat dan kritis. Nilai d-NLR >8,49 berhubungan dengan angka kematian yang lebih tinggi serta peningkatan odds kematian (OR = 3,066; 95% CI: 1,420–6,622; p = 0,003). Usia ≥60 tahun juga berhubungan secara signifikan dengan mortalitas (OR = 2,511; 95% CI: 1,162–5,427; p = 0,017). Diabetes melitus menunjukkan hubungan yang bermakna secara statistik (OR = 0,496; 95% CI: 0,250–0,983; p = 0,042), sedangkan variabel lainnya tidak menunjukkan hubungan yang signifikan (p > 0,05).

Kesimpulan: Terdapat hubungan antara derived neutrophil-to-lymphocyte ratio (d-NLR) dan mortalitas pada pasien Covid-19 derajat berat dan kritis. Nilai d-NLR >8,49 berhubungan dengan peningkatan odds mortalitas (OR = 3,066).

Kata Kunci: Covid-19, d-NLR, mortality, biomarker