

## INTISARI

### **NEUTROPHIL LYMPHOCYTE RATIO (NLR), C- REACTIVE PROTEIN - MEAN PLATELET VOLUME (CRP-MPV) RATIO DAN PROCALCITONIN SEBAGAI PREDIKTOR INFEKSI SEKUNDER BAKTERI PASIEN CORONAVIRUS DISEASE-19 (COVID-19) DI RSUP DR. SARDJITO YOGYAKARTA**

Ollyvia Mariance Kembuan<sup>1</sup>, Rizka Humardewayanti Asdie<sup>2</sup>, Heni Retnowulan<sup>3</sup>

<sup>1</sup>PPDS Ilmu Penyakit Dalam FKKMK UGM

<sup>2</sup>Divisi Penyakit Tropik Infeksi, Departemen Ilmu Penyakit Dalam FKKMK UGM

<sup>3</sup>Divisi Pulmonologi, Departemen Ilmu Penyakit Dalam FKKMK UGM

**Latar Belakang :** *Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)* dapat meningkatkan risiko terjadinya infeksi sekunder bakteri. Data infeksi sekunder bakteri pada penderita COVID-19 masih terbatas, sementara penggunaan antibiotik empiris terus meningkat, sehingga diperlukan *marker* prediktor infeksi sekunder bakteri yang terjadi dalam 7 hari perawatan pada pasien COVID-19. *Marker* inflamasi seperti NLR, CRP-MPV *ratio* dan *Procalcitonin* dapat menjadi prediktor infeksi sekunder bakteri namun belum ada penelitian sebelumnya terkait sensitivitas dan spesifisitas jika *marker* tersebut dikombinasikan.

**Tujuan :** Mengetahui nilai sensitivitas dan spesifisitas NLR, CRP-MPV *ratio* dan *Procalcitonin* serta sensitivitas dan spesifisitas jika *marker* tersebut dikombinasikan sebagai prediktor infeksi sekunder bakteri pada pasien terkonfirmasi COVID-19.

**Metode :** Penelitian *retrospective cross-sectional* pada April 2020 - Maret 2021 dari rekam medis elektronik pasien diagnosis COVID-19 yang memenuhi kriteria inklusi dan eksklusi. Analisis *ROC* untuk mendapatkan *cut off* NLR, CRP-MPV *Ratio* dan *Procalcitonin*. Analisis statistik bivariat menggunakan uji *Chi-Square* dan menghitung OR (*Odds Ratio*) untuk mengetahui besar resiko terhadap infeksi sekunder bakteri dan uji analisis multivariat dengan Regresi Logistik untuk menilai variabel manakah yang paling bermakna secara statistik.

**Hasil Penelitian :** Sebanyak 86 pasien COVID-19 dengan median usia 55 tahun. Didapatkan nilai *cut off* NLR sebesar 5,07, CRP-MPV *ratio* sebesar 9,59 dan *Procalcitonin* sebesar 0,33 dengan nilai sensitivitas yang paling tinggi pada NLR dengan sensitivitas 71,4%,  $p=0,001$ , NRP=54,05% dan LR (+) = 2,44. Nilai spesifisitas yang paling tinggi dan signifikan bermakna didapatkan pada kombinasi *marker* NLR dan CRP/MPV dengan spesifisitas 81%,  $p=0,040$ , NRN=75,81% dan LR(-) = 0,66.

**Kesimpulan :** Nilai NLR yang tinggi dengan *cut off* > 5,07 dan kombinasi *marker* NLR dan CRP/MPV yang tinggi dapat menjadi *marker* prediktor terjadinya infeksi sekunder bakteri dalam 7 hari perawatan pada pasien COVID-19.

**Kata Kunci :** COVID-19, NLR, CRP-MPV *Ratio*, *Procalcitonin*, infeksi sekunder bakteri.

## ABSTRACT

### NEUTROPHIL LYMPHOCYTE RATIO (NLR), C-REACTIVE PROTEIN - MEAN PLATELET VOLUME (CRP-MPV) RATIO AND PROCALCITONIN AS PREDICTORS OF SECONDARY BACTERIAL INFECTIONS IN CORONAVIRUS DISEASE-19 (COVID-19) PATIENTS AT RSUP DR. SARDJITO YOGYAKARTA

Ollyvia Mariance Kembuan<sup>1</sup>, Rizka Humardewayanti Asdie<sup>2</sup>, Heni Retnowulan<sup>3</sup>

<sup>1</sup>Internal Medicine Resident of FKKMK UGM

<sup>2</sup>Division of Infection and Tropical Medicine, Internal Medicine Departemen FKKMK UGM

<sup>3</sup>Division of Pulmonology, Internal Medicine Departemen FKKMK UGM

**Background** : Severe Acute Respiratory Syndrome Coronavirus2 (SARS-CoV-2) can increase the risk of secondary bacterial infections. Data on secondary bacterial infection in patients with COVID-19 are still limited, while the use of empirical antibiotics continues to increase so we need prognostic tool as predictors of secondary bacterial infections in COVID-19 patients hospitalized for up to seven days. Inflammatory markers such as NLR, CRP-MPV Ratio and Procalcitonin can be a predictor of secondary bacterial infection, but there has been no previous research regarding the sensitivity and specificity when these markers are combined.

**Objective** : To determine the sensitivity and specificity of NLR, CRP-MPV ratio, Procalcitonin and the sensitivity and specificity when these markers are combined as predictors of secondary bacterial infection in COVID-19 patients.

**Method** : A cross-sectional retrospective study from electronic medical records of COVID-19 patients hospitalized at Sardjito general hospital in April 2020 until March 2021 who met the inclusion and exclusion criteria. ROC analysis to NLR, CRP-MPV ratio and Procalcitonin cut off. Bivariate statistical analysis used the Chi-Square test and calculated the OR (Odds Ratio) to determine the risk of secondary bacterial infections and multivariate analysis test with Logistic Regression to assess which variable was the most statistically.

**Result** : A total of 86 COVID-19 patients, median age of 55 years. The NLR cut off was 5.07, CRP-MPV ratio cut off was of 9.59 and Procalcitonin cut off was 0.33 with the highest sensitivity was NLR which has a sensitivity of 71.4%,  $p=0,001$ , PPV=54,05% and LR (+) = 2,44. The highest specificity was combination of NLR and CRP/MPV which has specificity of 81%,  $p=0,040$ , NPV=75,81% and LR(-) = 0,66.

**Conclusion** : High NLR with cut off > 5.07 and combination of NLR and CRP/MPV as predictors of secondary bacterial infections in COVID-19 patients hospitalized for up to seven days.

**Keywords** : COVID-19, NLR, CRP-MPV ratio, Procalcitonin, secondary bacterial infection.