Pengaruh Nilai Cycle Threshold SARS COV-2 dan Parameter Inflamasi Pejamu Terhadap Derajat Penyakit COVID-19 Pasien Rawat Inap = The effect of CT Value and Host Inflammatory Parameters on COVID-19 Severity in Hospitalized Patient

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Abstrak

Latar belakang: Infeksi SARS-CoV-2 menyebabkan disregulasi sistem imun sehingga memperberat klinis pasien. Penilaian CT dan parameter inflamasi pejamu (neutrofil, limfosit, CRP dan feritin) saat admisi diharapkan membantu klinisi memberi tatalaksana efektif bagi pasien berisiko perburukan.

Tujuan: Mengetahui pengaruh nilai CT dan parameter inflamasi pejamu saat admisi terhadap derajat penyakit COVID-19 dalam 14 hari sejak onset gejala.

Metode: Studi kohort retrospektif dengan menelusuri rekam medis pasien COVID-19 berusia >18 tahun yang dirawat di RSCM dan RS Medistra pada Juni 2020-Februari 2021. Dilakukan analisis bivariat antara nilai CT, neutrofil, limfosit, CRP, feritin saat admisi dengan keparahan COVID-19, dilanjutkan analisis ROC untuk mendapatkan titik potong optimal. Setelahnya, dilakukan analisis multivariat dan membuat model klinis terbaik menilai kemungkinan keparahan COVID-19.

Hasil: Dari 336 subjek didapatkan COVID-19 berat-kritis sejumlah 75,3%. Tidak terdapat hubungan antara nilai CT rendah-sedang dan CT rendah-tinggi terhadap keparahan COVID-19 dengan nilai p masing-masing 0129 dan 0,913, sementara itu terdapat hubungan signifikan antara neutrofil, limfosit, CRP dan feritin terhadap keparahan COVID-19 dengan masing-masing nilai p<0,001. Dari analisis ROC, didapat titik potong optimal neutrofil (>71,5%), limfosit (<18,5%), CRP (>17,2 mg/dL), feritin (270 ng/mL) terhadap terjadinya COVID-19 berat-kritis dalam 14 hari sejak onset gejala. Hasil analisis multivariat menujukkan faktor yang mempengaruhi COVID-19 berat-kritis antara lain neutrofil (aRR 1,850 [IK 95% 1,482-2,311]), limfosit (aRR 1,877 [IK 95% 1,501 – 2,348]), CRP (aRR 2,068 [IK 95% 1,593 – 2,685]), dan feritin (aRR 1,841 [IK 95% 1,438 – 2,357]). Model klinis kombinasi neutrofil, limfosit, CPR dan feritin terhadap COVID-19 berat-kritis memiliki nilai AUC 0,933 (IK 95% 0,902 – 0,963).

Kesimpulan: nilai CT tidak mempengaruhi COVID-19 tidak berat dan berat-kritis. Neutrofil, limfosit, CRP, dan feritin saat admisi mempengaruhi terjadinya COVID-19 tidak berat dan berat-kritis Kombinasi neutrofil, limfosit, CRP dan feritin merupakan model klinis terbaik menilai kemungkinan keparahan COVID-19 dalam 14 hari sejak onset gejala.
.....Background: SARS-CoV-2 infection leads to immune dysregulation and hyperinflammation, thus potentially exacerbating clinical outcomes. Assessing CT value and host inflammatory parameters such as neutrophils, lymphocytes, CRP, and feritin upon admission may assist clinicians in providing effective management, especially for patient at risk of severe-critical condition.

Objective: To analyze the effect of CT values and host inflammatory parameters upon admission on the severity of COVID-19 within 14 days of symptom onset.

Methods: A retrospective cohort study tracing COVID-19 patient's medical records aged >18 years admitted to RSUPN Ciptomangunkusumo and RS Medistra from June 2020 to February 2021. Bivariate analysis was conducted between CT values, neutrophils, lymphocytes, CRP, feritin on admission with COVID-19 severity, then ROC analysis to determine the optimal cut off points. Multivariate analysis was performed to control confounding factors. The best clinical model was analyzed for severe-critical outcome within 14 days of symptom onset.

Results: Out of 336 subjects, 75,3% had severe-critical COVID-19. There was no association between low-moderate CT value and low-high CT value with COVID-19 severity, with p value 0,129 and 0,913 respectively. However, there was significant association between neutrophils, lymphocytes, CRP, and feritins with COVID-19 severity, each with $p<0.001$. ROC analysis determined optimal cut off for neutrophils (>71.5%), lymphocytes (<18.5%), CRP (>17.2 mg/dL), and feritin (270 ng/mL) for the occurrence of severe-critical COVDI-19 within 14 days symptom onset. Multivariate analysis revealed factors influencing severe-critical COVID-19 including neutrophils (aRR 1.850 [95% CI 1.482-2.311]), lymphocytes (aRR 1.877 [95% CI 1.501 – 2.348]), CRP (aRR 2.068 [95% CI 1.593 – 2.685]), and feritin (aRR 1.841 [95% CI 1.438 – 2.357]). Combination of neutrophil, lymphocytes, CRP, and feritin was the best clinical model for severe-critical COVID-19 with AUC value 0.933 (95% CI 0.902 – 0.963).

Conclusion: Neutrophils, lymphocytes, CRP, and feritin value upon admission effect COVID-19 severity within 14 days of symptom onset