ABSTRAK

Pendahuluan : *Coronavirus Disease 2019* (COVID-19) merupakan penyakit yang menyerang pernapasan yang disebabkan oleh coronavirus. *Neutrophil-lymphocyte ratio* (NLR) adalah cerminan dari keseimbangan antara respons imun bawaan (neutrofil) dan imunitas adaptif (limfosit).[1] Feritin adalah reaktan fase akut. Kadar feritin pada *Acute Respiratory Distress Syndrome* (ARDS) COVID 19 ditemukan lebih tinggi dibanding *Non*-ARDS.[2,3] Kadar D-dimer dan hiperkoagulabilitas yang lebih tinggi pada COVID-19. Pasien kondisi kritis terjadi oleh karena keadaan hipoksia dan cedera paru yang lebih parah. Pasien COVID-19 yang parah dan kritis memiliki kadar *Plasminogen Activator Inhibitor 1* (PAI-1) tinggi yang menyebabkan gangguan sistem fibrinolitik dan trombolisis.[4]

Tujuan : Mengetahui hubungan antara NLR, kadar feritin, dan D Dimer dengan derajat keparahan ARDS pneumonia COVID – 19

Metode : Penelitian ini merupakan penelitian *observasional* dengan desain *cross sectional*. Kriteria inklusi adalah pasien dengan usia diatas 17 tahun terkonfirmasi COVID 19 melalui pemeriksaan *Real time polymerase chain reaction (*RT PCR), sedangkan kriteria eksklusi adalah ibu hamil, pasien dengan gagguan imunitas, autoimun, keganasan, pasien sedang kemoterapi. Variabel bebas penelitian ini adalah Nilai NLR, Feritin, dan D dimer. Variabel terikat adalah derajat keparahan ARDS Pneumonia COVID 19.

Hasil: Analisis statistik pada 160 subjek penelitian didominasi laki – laki 94 subjek (58,8%), Perempuan 66 subjek (41,3%). Komorbid terbanyak Hipertensi 61 subjek (38,1%) selanjutnya diabetes melitus tipe II 47 subjek (29,4%). Nilai NLR berhubungan dengan kejadian ARDS derajat berat pneumonia COVID 19, rata – rata Nilai NLR pada ARDS berat 14,34 % dan ARDS tidak berat 7,76 % (p :0,0001), Kadar Feritin berhubungan dengan kejadian ARDS derajat berat pneumonia COVID 19, rata – rata kadar feritin pada ARDS berat 1405,56 ng/mL, dan ARDS tidak berat 977,26 (p : 0,007). Kadar D dimer berhubungan dengan kejadian ARDS derajat berat pneumonia COVID 19, rata – rata kadar feritin pada ARDS berat 9159 ug/L, dan ARDS tidak berat 3013 ug/L (p : 0,0001). Nilai prediktif masing – masing NLR $\geq$ 6,44 %, Feritin $\geq$ 537,1 ng/mL, D dimer $\geq$ 1270 berhubungan dengan kejadian ARDS berat pneumonia COVID 19, masing – masing p 0,0001, RP : 5,959 (CI 95 % 2,402 – 14,780), p : 0,003, RP 4,846 (CI 95 % 1,538 – 15,270), dan p : 0,0001, RP 10,0 (CI 95 % 2,48 – 40,89)

Kesimpulan : Terdapat hubungan signifikan secara statistik antara nilai NLR $\geq$ 6,44 %, Feritin $\geq$ 537,1 ng/mL, D dimer $\geq$ 1270 dengan kejadian ARDS berat pneumonia COVID 19, dengan p 0,0001, p : 0,003, dan p : 0,0001. Sehingga dapat disimpulkan NLR $\geq$ 6,44 %, Feritin $\geq$ 537,1 ng/mL, D dimer $\geq$ 1270 merupakan faktor untuk terjadinya ARDS berat pneumonia COVID 19

Kata Kunci : NLR, Feritin, D Dimer, ARDS, COVID 19

ABSTRACT

Introduction: *Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by coronavirus. Neutrophil-lymphocyte ratio (NLR) is a reflection of the balance between innate immune response (neutrophils) and adaptive immunity (lymphocytes).[1] Ferritin is an acute phase reactant. Ferritin levels in Acute Respiratory Distress Syndrome (ARDS) COVID 19 were found to be higher than non-ARDS.[2,3] D-dimer levels and hypercoagulability were higher in COVID-19. The patient's critical condition occurs due to hypoxia and more severe lung injury. Severe and critical COVID-19 patients have high levels of Plasminogen Activator Inhibitor 1 (PAI-1) which causes disruption of the fibrinolytic and thrombolysis systems.[4]*

Objective: *To determine the relationship between NLR, ferritin levels, and D Dimer with the severity of COVID-19 ARDS pneumonia*

Method: *This research is an observational study with a cross sectional design. The inclusion criteria are patients over 17 years of age who have confirmed COVID 19 through Real time polymerase chain reaction (RT PCR) examination, while the exclusion criteria are pregnant women, patients with immune disorders, autoimmune disorders, malignancies, patients undergoing chemotherapy. The independent variables of this research are NLR, ferritin and D dimer values. The dependent variable is the severity of ARDS Pneumonia COVID 19.*

Results: *Statistical analysis of 160 research subjects was dominated by men, 94 subjects (58.8%), women, 66 subjects (41.3%). The most common comorbidity was hypertension in 61 subjects (38.1%) followed by type II diabetes mellitus in 47 subjects (29.4%). The NLR value is related to the incidence of severe ARDS with COVID 19 pneumonia, the average NLR value in severe ARDS is 14.34% and non-severe ARDS is 7.76% (p: 0.0001), Ferritin levels are associated with the incidence of severe ARDS with COVID pneumonia 19, the average ferritin level in severe ARDS was 1405.56 ng/mL, and non-severe ARDS was 977.26 (p: 0.007). D dimer levels were associated with the incidence of severe ARDS with COVID 19 pneumonia, the average ferritin level in severe ARDS was 9159 ug/L, and non-severe ARDS 3013 ug/L (p: 0.0001). The predictive value of each NLR > 6.44%, Ferritin > 537.1 ng/mL, D dimer > 1270 is associated with the incidence of severe ARDS COVID 19 pneumonia, each p 0.0001, RP : 5.959 (CI 95% 2.402 – 14.780), p : 0.003, RP 4.846 (CI 95 % 1.538 – 15.270), and p : 0.0001, RP 10.0 (CI 95 % 2.48 – 40.89)*

Conclusion: *There is a statistically significant relationship between NLR values > 6.44%, ferritin > 537.1 ng/mL, D dimer > 1270 and the incidence of severe ARDS with COVID 19 pneumonia, with p 0.0001, p : 0.003, and p : 0.0001. So it can be concluded that NLR > 6.44%, Ferritin > 537.1 ng/mL, D dimer > 1270 are factors for the occurrence of severe ARDS with COVID 19 pneumonia*

Keywords: NLR, Ferritin, D Dimer, ARDS, COVID 19