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Do COPD Patients Admitted to the Emergency Service Due to Acute Respiratory Failure with Eosinophilic Endotype Had Better Non-Invasive Mechanical Ventilation Response than Neutrophilic Endotype?

Abdurrahman Yılmaz, Sinem Güngör, Eylem Tunçay, Elif Yılmaz, Esra Usta Bülbül, Birsen Ocaklı, Armağan Hazar, Zuhale Karakurt

Health Sciences University Süreyyapasa Chest Diseases and Thoracic Surgery Training and Research Hospital, İstanbul, Turkey

Objectives: Our study was conducted to investigate whether COPD patients with eosinophilic endotype predicts the response to noninvasive mechanical ventilation. Thus which eosinophil cut off ($\geq 2\%$, ≥ 0.34 cell/liter) was more effective for predicting non-invasive mechanical ventilation (NIMV) response in acute exacerbation of COPD presenting with acute respiratory failure.

Methods: Patients who were admitted to the emergency department due to COPD exacerbation presenting with acute respiratory failure was evaluated. COPD patients with acute respiratory failure whom NIMV was applied were investigated retrospectively. 1142 patients were included in the study. Patient data were obtained from electronic data management system and emergency service triage. Patients were divided into two groups as NIMV success and NIMV failure. Patients who were intubated, died, and hospitalized in the intensive care unit were accepted as NIMV failure. Patients who were discharged from the emergency department or admitted to the ward were accepted as NIMV success. Two groups were compared according to demographic features, peripheral blood eosinophil counts, arterial blood gas values and platelet counts.

Results: Of the 1142 patients included in the study, 816 (71%) were male and the mean age was 66 (40-80). While 932 (81.6%) of the patients were in the NIMV success group, 210 (18.4%) patients were in the NIMV failure group. The ratio of eosinophilic endotypes with 2% cut off was 33% in NIMV success and 25% in NIMV failure group ($p < 0.05$). Absolute peripheral blood eosinophil counts of 0.34 cells/liter and above was detected in 12.9% ($n = 120$) of the NIMV-successful patients and 9% ($n = 19$) of the NIMV failure patients ($p > 0.05$). In COPD exacerbations the number of platelets 100.000 and below, the pH value of the arterial blood gas 7.30 and below, and the PaCO₂ value 70 and above were found to increase NIMV failure 3.20, 2.84 and 1.71 times respectively.

Conclusion: In the present study, we determined that NIMV success was higher in COPD exacerbation when the eosinophil cut off value was accepted as 2%. We believe that this is due to the fact that the exacerbations in the eosinophilic endotype are milder and respond better to the corticosteroid therapy.

Keywords: COPD, endotype, eosinophilic, neutrophilic, acute respiratory failure, NIMV