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## Can Neutrophil/Lymphocyte Ratio, C-Reactive Protein (CRP) and Procalcitonin Predict the Hospitalization Time in Patients with Lower Tract Respiratory Infections?

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**Objectives:** Lower Respiratory Tract Infections (LRTI) are the major hospitalization reason in chest diseases clinics. Hospitalization time directly affects hospitalization costs. At hospital admission some inflammatory markers like C-Reactive Protein (CRP), Procalcitonin (PCT) and Neutrophil/Lymphocyte Ratio (NLR) were studied on patient mortality and hospitalization time in Intensive Care Unit (ICU) and COPD exacerbations. In this study, we investigated the predictor role of CRP, PCT and NLR on the hospitalization time in patients with LRTI in a chest diseases clinic.

**Methods:** In this observational, cross-sectional and retrospective study, we evaluated the patients who were hospitalized in our chest disease clinic between 2016 and 2018. Patients with lung cancer, immunodeficiency syndromes, tuberculosis, pulmonary embolism, neutropenia, pneumothorax and lack of demographic data/laboratory information were excluded. We included 1153 patients who were diagnosed with pneumonia, COPD exacerbation, exacerbation of bronchiectasis, acute bronchitis, parapneumonic effusion, and empyema according to ICD-10 criteria.

**Results:** Of 1153 patients, 700(60.72%) patients were male, 453(39.28%) patients were female and the mean age was  $62\pm17$ . Median hospitalization time was 7 (Interquartile Range(IQR):5-11). Median leucocyte number was  $11.75\times10^3$ /mm<sup>3</sup>(IQR: 8.65-16.18), the median neutrophil number was  $8.88\times10^3$ /mm<sup>3</sup> (IQR: 6-12.94), median lymphocyte number was  $1.34\times10^3$ /mm<sup>3</sup> (IQR:0.86-1.92), median NLR was 6.45 (3.78-11.71), median CRP number was 88 mg/L (IQR:27.9-185.6 mg/L), and median PCT number was 0.26 ng/mL (IQR:0.09-0.61ng/ml). 587(50.91%) patients have NLR≥6.45 and median hospitalization time was 8(IQR:6-11) days. 566 (49.09%) patients have NLR<6.45 and hospitalization time was 7 (IQR:5-10) days. There was a significant difference between two groups (p<0.001). 580(50.31\%) patients have CRP≥88mg/L and median hospitalization time was 8(IQR:6-12) days. 573(49.69%) patients have CRP<88 mg/L and hospitalization time was 6(IQR:4-9) days. There was a significant difference between the two groups (p<0.001). 966(83.79\%) patients have PCT≥0.26 ng/ml and median hospitalization time was 7(IQR:5-11)days. 187(16.21%) patients have PCT<0.26 ng/ml and hospitalization time was 6(IQR:4-8) days. There was no significant difference between two groups (p<0.005).

**Conclusion:** We found that CRP and NLR were significant to predict hospitalization time in the patients with LRTI in the chest clinic. However, PCT did not give significant information to predict the hospitalization time. Patients who have high PCT consisted of 75% of the patients. Patients with elevated CRP and NLR included 50% of the cases. We think that PCT is a useful inflammatory marker for hospitalization, but not to predict the hospitalization time, while CRP and NLR might be helpful to an inflammatory marker to predict the hospitalization time.

Keywords: LTRI, procalcitonin, CRP, NLR