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THE ASSOCIATION BETWEEN BACTERIAL COLONIZATION AND INTERLEUKIN-8 (IL-8) LEVELS IN COPD EXACERBATIONS

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In recent years, interleukins have emerged as significant targets in research, diagnostics, and therapeutic strategies. Interleukins are a group of cytokines produced by immune cells to regulate inflammation. They interact with other immune components to elicit an effective inflammatory response. Consequently, interleukins can either stimulate or suppress inflammation, depending on the context and the timing of their production. Dysregulation of interleukin activity in the lungs is implicated in the chronic inflammation characteristic of chronic obstructive pulmonary disease (COPD). In COPD, an inflammatory lung disease, elevated levels of interleukins underline their potential role in disease pathogenesis. Moreover, bacterial infections in patients with COPD are associated with increased levels of pro-inflammatory cytokines, particularly interleukin-8 (IL-8), which plays a crucial role in neutrophil recruitment to infection sites and the amplification of the inflammatory response.

Objective

The objective of this study was to investigate the relationship between bacterial colonization and interleukin-8 (IL-8) levels during exacerbations of COPD.

Materials and Methods

This study was conducted from 2020 to 2023 and included 250 participants, comprising 140 patients diagnosed with chronic obstructive pulmonary disease (COPD) and 110 healthy individuals as a control group. COPD patients were recruited from the Khorezm branch of the RSCEMA, with diagnoses confirmed in accordance with the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines, based on clinical symptoms and pulmonary function tests. The control group was composed of age- and sex-matched individuals without any known pulmonary or systemic diseases.

Serum IL-8 levels were measured using enzyme-linked immunosorbent assay (ELISA) kits, following the manufacturer's protocol. The relationship between IL-8 levels and bacterial load was analyzed using regression analysis.

Results

The data revealed a positive linear correlation between IL-8 levels and bacterial load in COPD patients, with a determination coefficient (R^2) of 0.59. This finding suggests that higher IL-8 levels are associated with greater bacterial colonization. Patients with more severe airflow obstruction (FEV1 < 35%, indicated by black dots) tended to have

both elevated IL-8 levels and higher bacterial loads compared to those with FEV1 > 35% (indicated by red dots).

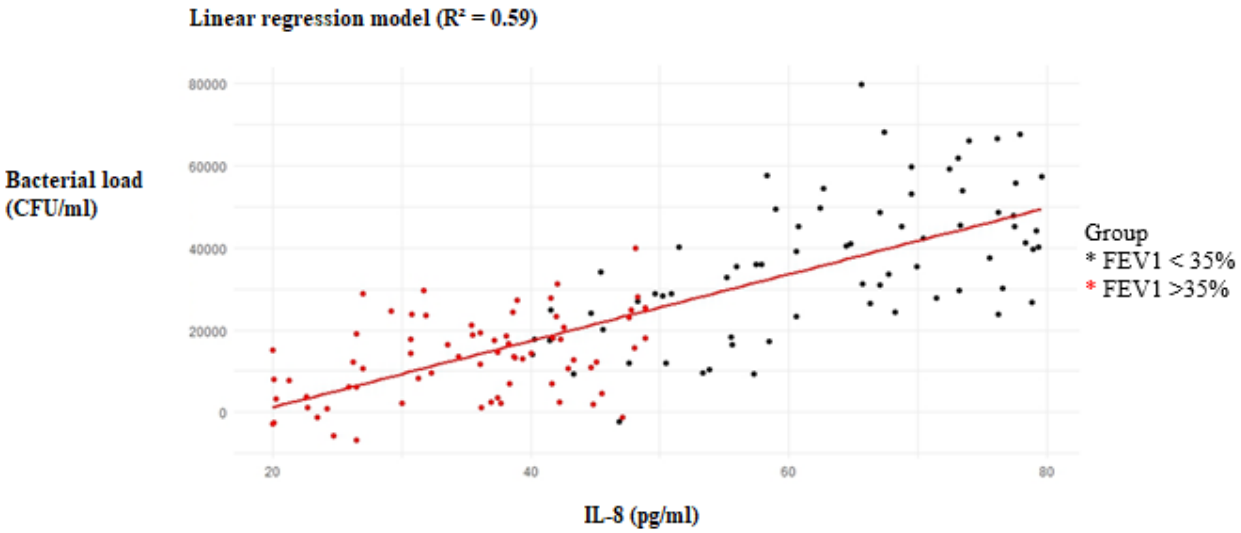

Figure 1. Correlation between IL-8 levels and bacterial load in COPD patients

Cluster analysis indicates that patients with more severe lung function impairment are more likely to exhibit increased bacterial colonization, which may be linked to an intensified inflammatory response, as evidenced by elevated IL-8 levels. This pattern was observed across both patient groups, though the correlation was particularly pronounced in the group with more significant lung impairment.

Conclusion

These findings suggest that bacterial colonization and elevated inflammatory markers, particularly IL-8, contribute to the deterioration of lung function and disease progression in COPD patients. Additionally, the significantly higher proportion of patients without bacterial infections in the group with better-preserved lung function underscores the importance of early interventions aimed at preventing exacerbations.