Inflammatory Mediators in Eosinophilic COPD Phenotype and Asthma with Fixed-airflow Obstruction

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Background: COPD and asthma are characterized by systemic and airway inflammation. Eosinophils and neutrophils play crucial roles in pathogenesis, severity, and treatment responsiveness. Chemoattractant and mediators have been promising treatment targets. However, eosinophilic and neutrophilic chemoattractant in asthma and COPD phenotypes have never been investigated.

Objective: To investigate roles of eosinophilic and neutrophilic chemoattractant in asthma with and without fixed airflow obstruction (FAO) and COPD with and without blood eosinophilia (BE).

Methods: Asthma, COPD patients and healthy subjects were recruited in chest clinic from 2016 to 2017. Spirometry and bronchodilator reversibility were performed. Symptoms were assessed using asthma control test (ACT), modified MRC, and COPD assessment test (CAT). Blood samples were obtained during the absence of exacerbation and infection. Eosinophils were counted. Serum total IgE was measured. Eosinophilic (IL-5) and neutrophilic (CXCL8 and IL-17) chemoattractant were measured using ELISA. The variable differences between groups were tested.

Results: A total of 100 participants were classified to 5 groups: asthma without FAO (post-BD FEV\textsubscript{1}/FVC ratio > 0.7), asthma with FAO (post-BD FEV\textsubscript{1}/FVC < 0.7), COPD without BE (blood eosinophils < 2%), COPD with BE (blood eosinophils > 2 %), and healthy subjects. Patient characteristics were shown in Table 1. Comparison analysis between groups revealed that IL-5 in asthma without FAO and COPD groups regardless of eosinophilia were not different from healthy subjects. However, increased IL-5 was noted in asthma with FAO (p =0.001). There was an increased CXCL-8 in asthma with FAO (p=0.0045) and both COPD groups, compared to healthy subjects (p=0.015 and 0.04). Increased IL-17 was noted in asthma with FAO (p=0.000), COPD without BE (0.0001) and with BE (0.003), compared to healthy subjects. IL-17 was significantly increased in asthma with FAO, compared to asthma without FAO (p=0.04). Blood neutrophil counts were moderately correlated with serum IL-17 in asthma with FAO (R=0.46).

Conclusion: In Eosinophilic chemoattractant, IL-5 is not associated with COPD regardless of eosinophilia. Whilst, in neutrophilic chemoattractant, IL-8 and IL-17 are related to asthma with FAO and COPD. This study emphasizes potential roles of inflammatory mediators involving in asthma and COPD phenotypes. However, translation to clinical practice for targeted treatment requires further studies.

Keywords: Inflammatory mediators, Asthma, Asthma with fixed-airflow obstruction, COPD, Eosinophilia, Phenotype