Airway Inflammation in Adult Patients With Symptoms of Asthma or COPD Does Not Distinguish Those With Fixed Airway Obstruction

IO Gordon, JA Krishnan, DK Hogarth, J Charbeneau, A Mazurek, T Krausz, and AN Husain
Department of Pathology, The University of Chicago Medical Center, Chicago, Illinois

Background

- A substantial proportion of patients with asthma and chronic obstructive pulmonary disease (COPD) have incomplete response to available treatment options.
- Many of these patients have fixed airflow obstruction (FAO) despite treatment with inhaled bronchodilators and corticosteroids.
- The objective of this study was to determine if patterns of airway inflammation observed in specimens obtained via bronchoscopy (bronchoalveolar lavage (BAL) and endobronchial biopsy (EBBx)) distinguish patients with and without FAO.

Methods

Using an IRB-approved protocol, we prospectively collected data (2007-2008) at the Asthma and COPD Center at the University of Chicago on adult patients referred for further evaluation of “difficult to control asthma/COPD” despite treatment with inhaled corticosteroids and long-acting bronchodilators. As part of the clinical protocol, all patients underwent bronchoscopy for further evaluation. Spirometry was used to define patients with FAO (Group I; n=10), restriction (Group II; n=5), and normal lung function (Group III; n=6). Smoking history and percentage of eosinophils and neutrophils in BAL were recorded. Formalin-fixed paraffin embedded EBBx specimens were stained with hematoxylin and eosin, and eosinophils and neutrophils were counted in the epithelium and submucosa, and given a corresponding grade. Significant differences were defined as a 2-sided p-value < 0.05 using Kruskall Wallis and Fisher’s Exact Tests on SAS System 9.1.3.

Results

- There were no differences in the number of pack-years smoked in Groups I, II, and III (median: 0 vs. 0.5 vs. 0, p=0.6).

Conclusions

- In patients with poorly controlled symptoms of asthma or COPD despite optimal therapy, patterns of airway inflammation do not distinguish those with or without FAO.
- These findings may help explain why the benefits of treatment intensification with anti-inflammatory agents based on an evaluation of airway inflammation have had inconsistent effects across studies.
- We conclude that a better understanding of differences in airway structure (e.g., epithelium, submucosa, and smooth muscle) is needed to evaluate the pathologic alterations of FAO in patients with inadequate asthma or COPD symptom control.