Sub-Phenotypes of Aspirin-Exacerbated Respiratory Disease (AERD)

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Aspirin-exacerbated respiratory disease (AERD), formerly known as aspirin-induced asthma (AIA), is a distinct clinical syndrome characterized by a chronic eosinophilic inflammation of both the upper and lower respiratory tract. These symptoms of asthma and rhinitis are exacerbated by the ingestion of aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs), the inhibitors of cyclooxygenase 1. It is generally considered a severe type of asthma which usually begins in between the third and the fourth decade of life. Previous studies have shown that almost 30-50% of patients with AIA require high doses of inhaled corticosteroids and oral steroids. Most patients suffer from nasal polyps and require frequent polypectomies and/or sinus surgery. We have recently collected data from 201 patients with AIA which was confirmed by oral and bronchial challenge tests. To collect the clinical data, we used a specifically structured questionnaire. We also performed spirometry and skin prick tests as well as measured blood eosinophilia and urinary LTE\textsubscript{4}. The latent class analysis was used to identify possible sub-phenotypes in our cohort of AIA patients. We identified four latent classes (sub-phenotypes) within the AIA phenotype: class 1 (asthma with moderate course, intensive upper airways symptoms and blood eosinophilia), class 2 (asthma with mild course, relatively well controlled, with low use of health care resources), class 3 (asthma with severe course, poorly controlled, with severe exacerbations and airway obstruction), class 4 (asthma poorly controlled, with frequent and severe exacerbations in females). Patients with intensive upper airways symptoms had the highest blood eosinophilia, and concentrations of urinary LTE\textsubscript{4}. The class 3 mostly resembled the typical clinical characteristics, severity and treatment of AIA.

In conclusion, the application of a novel, biostatistical methodology allowed us to identify the unique AIA sub-phenotypes which might well be found in regular clinical practice. The results of the present study provide a substantial body of evidence in favour of the heterogeneity of the AIA population. This may in fact prove quite helpful in any future studies on AIA, especially with regard to a better understanding of this disorder and an effective identification of the patients who are potentially at greater risk of adverse outcomes.

The manuscript with detailed methods, statistical analysis, comprehensive results and discussion has been submitted for a peer-reviewed publication.