

Publication

Lung function fluctuation patterns unveil asthma and COPD phenotypes unrelated to type 2 inflammation

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In all chronic airway diseases, the dynamics of airway function are influenced by underlying airway inflammation and bronchial hyperresponsiveness along with limitations in reversibility, due to airway and lung remodeling as well as mucous plugging. The relative contribution of each component translates into specific clinical patterns of symptoms, quality of life, exacerbation risk, and treatment success.; We aimed to evaluate whether subgrouping of patients with obstructive airway diseases according to patterns of lung function fluctuation allows identification of specific phenotypes with distinct clinical characteristics.; We applied the novel method of fluctuation-based clustering (FBC) to the twice-daily FEV₁; measurements recorded over a one-year period in a mixed group of 134 adults with mild-to-moderate asthma, severe asthma, or COPD from the European BIOAIR cohort.; Independent of clinical diagnosis, FBC divided patients into 4 fluctuation-based clusters with progressively increasing lung functional alterations that corresponded with patterns of increasing clinical severity, risk of exacerbation and lower quality of life. Clusters of patients with airway disease were identified with significantly elevated biomarkers relating to remodeling (osteonectin) and cellular senescence (plasminogen activator inhibitor-1), accompanied by a loss of airway reversibility, pulmonary hyperinflation and loss of diffusion capacity. The 4 clusters generated were stable over time and revealed no differences in markers of type 2 inflammation (blood eosinophils and periostin).; FBC-based phenotyping provides another level of information, complementary to clinical diagnosis, and unrelated to eosinophilic inflammation, that could identify patients who may benefit from specific treatment strategies or closer monitoring.

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