# Factors Associated with Lung Function Decline in Asthma

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Asthma is a heterogeneous disease that shows various phenotypes with different etiologies, natural clinical courses and treatment responses. Chronic airway inflammation in asthma contribute to the development of airway hyperresponsiveness (AHR), airway remodeling, and the progression of airflow limitation. As a result of inhaled corticosteroids (ICS), the mainstay of asthma treatment, airway inflammation and AHR have been well controlled, which then prevents the progression of irreversible airflow limitations. However, some patients with asthma still develop fixed airflow limitations in spite of ICS treatment. A recent longitudinal study of lung function trajectory in never-smoking adult asthmatics in Korea showed that persistent airflow obstruction was related to non-atopy, a low IgE level, and older age accompanied by neutrophilic inflammation and low baseline $FEV_1$ levels.

Pulmonary function reaches a maximum in the early twenties and starts to decline from around the age 25. The earlier studies on the contributing factors for a decline in pulmonary function demonstrated that the recent onset of asthma, longer duration of asthma, persistent asthma symptoms and severe exacerbations, AHR, initial increased airway reversibility to short-acting beta2-agonists, long-term treatment with oral corticosteroids and smoking history could be risk factors for the lung function decline.

Markers of eosinophilic airway inflammation such as blood and sputum eosinophilia, fractional exhaled nitric oxide (FeNO), and serum eosinophil cationic protein (ECP) were related with the accelerated decline in lung function in asthmaics. In addition, genetic variants in candidate genes such as *ADAM33* (A disintegrin and metalloproteinase domain 33), *ESR1* (estrogen receptor $\alpha$), *PLAUR* (plasminogen activator receptor) were associated with lung function decline in asthmatics.

Recently, Kanemitsu et al. investigated blood granulocyte counts, serum periostin, serum high-sensitivity C-reactive protein, and serum ECP in association with annual decline in $FEV_1$. High serum periostin levels (≥95 ng/mL) were solely associated with a greater annual decline in $FEV_1$. In line with this result, a polymorphism of *POSTN* (periostin) was significantly associated with lung function decline. Thus, serum periostin levels could be a

useful biomarker of lung function decline in asthmatics.

Goal of asthma management includes the maintenance of normal pulmonary function and the control of risk factors such as acute exacerbation and persistent airway obstruction. Thus, we need to understand risk factors for lung function decline in asthma, and we should make an effort to control the risk factors and prevent progressive airflow limitation when the patients have reversible factors.

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