

Asthma Could be Several Diseases Masquerading as One

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DENVER —

Age at Onset and Inflammatory Cells Define Patient Subsets, Guide Treatment

People who develop asthma as children may have a different disease than those who develop it as an adult. A study in the January issue of *The Journal of Allergy and Clinical Immunology* adds to the growing body of evidence that asthma is not a single disease, but a group of syndromes with different origins and biological characteristics. The research team, led by Sally Wenzel, MD, a pulmonologist at National Jewish Medical and Research Center, also found that the absence or presence of inflammatory cells, called eosinophils, helped distinguish differences among asthma patients.

"We found that patients whose asthma began in childhood were more frequently allergic than those whose asthma began as adults, while adult-onset asthma was associated with more rapid loss of lung function," said Wenzel. "We were surprised to find that many patients showed no signs of inflammation, generally considered a hallmark of the asthma, yet they still had severe airflow limitation and many asthma symptoms."

The study represents the first time that a research team has combined information from a detailed questionnaire with extensive biological data to define subsets of asthma patients. This data should help physicians better diagnose and treat their asthma patients and make better predictions about the course of their disease. The data may also help guide the search for genetic causes of the disease.

The researchers studied 80 patients with severe asthma who had been referred to National Jewish Medical and Research Center because high doses of [inhaled or oral steroids](#) had failed to control their [symptoms](#). Patients were divided into those whose asthma developed before 12 years of age and those whose asthma developed later. The early-onset group developed asthma at the mean age of 2.6 years, while the late-onset group developed asthma at the mean age of 27. They were evaluated for differences in allergic responses, symptoms, lung function and pathology.

More than 75% of patients who developed asthma before the age of 12 reported that they wheezed "most or all of the time" when exposed to dust or pollens, while less than 40% of patients whose asthma developed after 12 did so. Patients with early-onset asthma were also more likely to respond positively to allergens in a skin test and to have had eczema, an allergic skin disease.

Although early-onset patients had had the disease, on average, almost twice as long as the late-onset patients, lung function was slightly worse in the late-onset group. That suggests that patients with late-onset disease suffer a more rapid loss of lung function.

The pattern of inflammation also differed depending upon the age of onset. Late-onset patients were more likely than early-onset patients to have inflammatory cells known as eosinophils in their airways, in spite of treatment with powerful oral steroids. Early-onset patients also showed a pattern of inflammation more frequently associated with allergies than did late-onset patients.

"Asthma has traditionally been very broadly defined in terms of symptoms rather than underlying biological processes," said Wenzel. "Our research helped us divide these severe asthma patients into four subsets, based on age of onset and presence or absence of eosinophils. We believe these subsets represent different biological processes and mechanisms of steroid resistance."

The definition of these subsets could help guide diagnosis, treatment and future research. For example, since early-

onset patients were more often allergic than late-onset patients, treatments would be more likely to include an anti-allergy component. Late-onset patients without eosinophils, may well have a completely different disease associated with infection or gastroesophageal reflux.

These subsets might also help guide a search for genes associated with asthma, which has, so far, proven difficult. Different phenotypes could be influenced by different genes, said Wenzel. If so, then searches focusing on specific patient subsets might uncover stronger genetic influences in asthma.

National Jewish Health is the leading respiratory hospital in the nation. Founded 121 years ago as a nonprofit hospital, National Jewish Health today is the only facility in the world dedicated exclusively to groundbreaking medical research and treatment of patients with respiratory, cardiac, immune and related disorders. Patients and families come to National Jewish Health from around the world to receive cutting-edge, comprehensive, coordinated care. To learn more, visit the media resources page.

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