

SECTION 2 DISEASES OF THE RESPIRATORY SYSTEM

309 Asthma

Peter J. Barnes

Asthma is a syndrome characterized by airflow obstruction that varies markedly, both spontaneously and with treatment. Asthmatics harbor a special type of inflammation in the airways that makes them more responsive than nonasthmatics to a wide range of triggers, leading to excessive narrowing with consequent reduced airflow and symptomatic wheezing and dyspnea. Narrowing of the airways is usually reversible, but in some patients with chronic asthma there may be an element of irreversible airflow obstruction. The increasing global prevalence of asthma, the large burden it now imposes on patients, and the high health care costs have led to extensive research into its mechanisms and treatment.

PREVALENCE

Asthma is one of the most common chronic diseases globally and currently affects approximately 300 million people worldwide. The prevalence of asthma has risen in affluent countries over the last 30 years but now appears to have stabilized, with approximately 10–12% of adults and 15% of children affected by the disease. In developing countries where the prevalence of asthma had been much lower, there is a rising prevalence, which is associated with increased urbanization. The prevalence of atopy and other allergic diseases has also increased over the same time, suggesting that the reasons for the increase are likely to be systemic rather than confined to the lungs. Most patients with asthma in affluent countries are atopic, with allergic sensitization to the house dust mite *Dermatophagoides pteronyssinus* and other environmental allergens, such as animal fur and pollens.

Asthma can present at any age, with a peak age of 3 years. In childhood, twice as many males as females are asthmatic, but by adulthood the sex ratio has equalized. Long-term studies that have followed children until they reach the age of 40 years suggest that many with asthma

become asymptomatic during adolescence but that asthma returns in some during adult life, particularly in those with persistent symptoms and severe asthma. Adults with asthma, including those with onset during adulthood, rarely become permanently asymptomatic. The severity of asthma does not vary significantly within a given patient; those with mild asthma rarely progress to more severe disease, whereas those with severe asthma usually have severe disease at the onset.

Deaths from asthma are uncommon, and in many affluent countries have been steadily declining over the last decade. A rise in asthma mortality seen in several countries during the 1960s was associated with increased use of short-acting inhaled β_2 -adrenergic agonists (as rescue therapy), but there is now compelling evidence that the more widespread use of inhaled corticosteroids (ICS) in patients with persistent asthma is responsible for the decrease in mortality in recent years. Major risk factors for asthma deaths are poorly controlled disease with frequent use of bronchodilator inhalers, lack of or poor compliance with ICS therapy, and previous admissions to hospital with near-fatal asthma.

It has proved difficult to agree on a definition of asthma, but there is good agreement on the description of the clinical syndrome and disease pathology. Until the etiologic mechanisms of the disease are better understood, it will be difficult to provide an accurate definition.

RISK FACTORS AND TRIGGERS

Asthma is a heterogeneous disease with interplay between genetic and environmental factors. Several risk factors that predispose to asthma have been identified (**Table 309-1**). These should be distinguished from triggers, which are environmental factors that worsen asthma in a patient with established disease.

Atopy Atopy is the major risk factor for asthma, and nonatopic individuals have a very low risk of developing asthma. Patients with asthma commonly suffer from other atopic diseases, particularly allergic rhinitis, which may be found in over 80% of asthmatic patients, and atopic dermatitis (eczema). Atopy may be found in 40–50% of the population in affluent countries, with only a proportion of atopic