Wheezing

Asthma, Chronic Obstructive Pulmonary Disease, and More

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KEYWORDS

• Asthma • COPD • Exacerbation • Hospitalization • Wheezing • Bronchospasm

HOSPITAL MEDICINE CLINICS CHECKLIST

1. Wheezing can be caused by a variety of conditions. In hospitalized adults, primary considerations include asthma, chronic obstructive pulmonary disease (COPD), and acute bronchospasm related to an allergic reaction.
2. The treatment of acute exacerbations of asthma and COPD are similar, with some key differences:
   a. There is no evidence to support continuing anticholinergics beyond the emergency department in asthmatics, whereas long-acting anticholinergics are part of the long-term management of COPD.
   b. Antibiotics are recommended routinely in exacerbations of COPD, but not in asthma.
3. Patients with COPD are at high risk of readmission, and hospitals see a reduction in reimbursement for excessive readmissions.
4. Strategies for reducing readmissions in patients with asthma and COPD include:
   a. Promoting medication adherence
   b. Smoking cessation
   c. Action plan/self-management development
   d. Vaccination

DEFINITION

What is wheezing?

Wheezing is a continuous, high-pitched, whistling or musical sound during breathing. One of the cardinal adventitious lung sounds, wheezing is distinguished from rhonchi,

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which are lower in pitch,[1] and rales (or crackles), which are intermittent, short, nonmusical sounds.[2] Wheezing must also be distinguished from stridor, a sound caused by turbulent airflow in the upper airway (often related to airway occlusion), which is frequently misattributed to lower airway disease.[3]

Wheezing generally indicates turbulent airflow in the lower pulmonary airways. Normal flow through the airways is laminar, and fairly quiet. When air is forced through narrowed airways, its velocity increases and turbulent flow occurs. This turbulence causes resonant oscillation in the airway structures that is transmitted audibly across the thoracic wall.[4] Although classically associated with narrowed airways, wheezing can be found in healthy airways during forced exhalation, which also increases air velocity and results in turbulent airflow.[5]

CAUSES

What are the causes of wheezing?

Any condition that leads to airway narrowing can cause wheezing. Soft tissue within or adjacent to an airway can lead to fixed obstruction and wheezing. Secretions within airways can lead to variable or dynamic obstruction. Dynamic airway obstruction is also frequently associated with bronchospasm (an acute narrowing of airways caused by smooth muscle constriction).

Although commonly caused by diseases such as asthma or chronic obstructive pulmonary disease (COPD), wheezing can also be caused by a variety of other conditions, as listed in **Table 1**. Wheezing may be subjectively reported by patients, and is commonly self-reported even in the absence of a diagnosis of reactive or obstructive lung disease.[6]

EPIDEMIOLOGY

What is the prevalence of admission to the hospital for asthma and COPD?

In the United States, asthma affects as many as 9.5% of children and 7.7% of adults. It is more common in women and in people of lower socioeconomic status. In the United States in 2009, asthma accounted for 2.1 million emergency department visits (697 per 100,000 population) and 479,300 hospitalizations (154 per 100,000 population).[7] Although hospitalization rates for adults have remained stable, rates for children have decreased.[8]

An estimated 6.5% of US adults have been diagnosed with COPD,[9] although worldwide prevalence varies substantially by country.[10] In the United States, COPD accounted for 1.5 million emergency department visits and 699,000 hospitalizations in 2010, with an age-adjusted hospitalization rate of 322 per 100,000 population.[9]

What is the morbidity and mortality associated with these conditions?

The overall mortality of patients with asthma is twice that of age-matched nonasthmatic controls.[11,12] Approximately one-third of asthma deaths are associated with hospitalization. The mortality associated with hospitalization for asthma is 0.5%, with most deaths (79%) occurring in patients 35 years of age or older.[13]

COPD is the third-leading cause of death in the United States[14] and worldwide.[15] COPD mortality varies significantly by degree of airflow restriction; mild airflow restriction is associated with approximately a 2-fold increase in mortality, and severe airflow restriction confers an almost 8-fold increase, compared with normal controls.[16] COPD increases the likelihood not only of death from respiratory causes but also from nonrespiratory causes, including cardiovascular disease.[17]