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Clinical Reviews

CLINICAL MIMICS: AN EMERGENCY MEDICINE–FOCUSED REVIEW OF ASTHMA MIMICS

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☐ **Abstract—Background: Asthma is a common diagnosis or preexisting condition, and many patients with acute asthma exacerbation may present to the emergency department with wheezing and respiratory distress. However, many conditions may mimic this presentation. Objectives: This review provides an overview of common asthma mimics and an approach to evaluation and management. Discussion: Asthma is characterized by an obstructive pulmonary disease with recurrent exacerbations. The disease may present with a variety of symptoms, including wheezing, chest tightness, shortness of breath, and even respiratory failure. Mimics include anaphylaxis, angioedema, central airway obstruction, heart failure, allergic reaction, foreign body aspiration, pulmonary embolism, and vocal cord dysfunction. The approach to evaluation and management of these patients includes assessment for life-threatening conditions while treatment and resuscitation is underway. Providers should assess for red flags, including no history of asthma, lack of severe asthma, and no improvement with standard treatments. Focused assessment with history, physical examination, chest imaging, electrocardiogram, and laboratory studies may provide benefit. Through consideration of these mimics and treatment, providers can provide rapid management. Conclusions: While asthma is a common disease, many asthma mimics exist. Through consideration of other diseases with wheezing and assessing for red flags, such as patients presenting without a history of asthma or patients with a history of only mild asthma presenting with severe symptoms, emergency providers may decrease the chance of early diagnostic closure and anchoring while improving the care of these patients.**

☐ **Keywords—asthma; mimic; respiratory distress; respiratory failure; stridor; wheeze**

CASE REPORT

A 50-year-old African American woman presented to the emergency department (ED) in respiratory distress. Her blood pressure was 230/150 mm Hg, her heart rate was 140 beats/min, and her oxygen saturation was 85% on room air. She was diaphoretic and spoke in only two-word phrases, and her lung examination was significant for coarse breath sounds throughout all lung fields with an expiratory wheeze. She reported a history of asthma, with no history of intensive care unit (ICU) admission or intubation. Her status did not improve despite continuous nebulized ipratropium and albuterol, intravenous (IV) magnesium, and IV steroids. Noninvasive positive pressure ventilation was applied, with some mild, temporary improvement. Bedside chest radiograph was without focal consolidation. While mild hyperinflation was present, there were also bilateral patchy opacifications. She began to become somnolent and appeared fatigued, and she was intubated for

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respiratory protection. The patient was admitted to the ICU for additional management. Repeat chest radiography after intubation revealed significantly increased basilar opacifications that were suspicious for pulmonary edema. In the ICU, echocardiography revealed heart failure, though no inciting cardiac ischemia or valve abnormality was identified. She was eventually weaned off the ventilator and was discharged approximately a week later.

INTRODUCTION

Asthma is a common complaint in the ED, accounting for 1.8 million ED visits per year and 439,000 admissions per year in the United States (1). It affects 1 in 11 U.S. children and 1 in 12 U.S. adults (1). Unfortunately, despite being such a common disease, asthma lacks a clear definition. Per the Global Initiative for Asthma, it is "a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness, and cough that vary over time and in intensity, together with variable expiratory airflow limitation" (2). Asthma exacerbation commonly presents with prolonged expiration, and while there may be wheezes on inspiration, these magnify on expiration. Severe asthmatics may present in the tripod position, leaning forward, and the most dangerous lung sound in an asthmatic is no sound at all: a silent chest indicates critically low air movement caused by severe bronchoconstriction or patient exhaustion.

Many conditions may mimic asthma, specifically in the presence or report of a wheeze, and some patients with asthma may not present with a wheeze at all. For example, in a study of 169 patients with cardiopulmonary disorders, 92% of asthmatics reported feeling some sensation of obstruction, such as wheezing (3). However, 76% of patients with chronic obstructive pulmonary disease (COPD) and nearly 30% of patients found to have a cardiac cause for their symptoms experienced similar symptoms (3). Wheezing is caused by turbulent airflow in the smaller airways, much like a bruit becomes audible because of turbulent blood flow. The airways can be narrowed through many mechanisms, including swelling, compression, and intrinsic obstruction, such as fluid. Emergency providers must remain alert and vigilant to avoid misdiagnosis and therefore mistreatment of asthma mimics. Conditions that may mimic asthma are shown in Table 1. Several sounds may be heard on lung auscultation, which are shown in Table 2 with explanations.

Table 1. Common Asthma Mimics

Anaphylaxis
Angioedema
Central airway obstruction
Chronic obstructive pulmonary disease
Congestive heart failure
Drug reaction
Foreign body aspiration
Gastroesophageal reflux disease
Pulmonary embolism
Vocal cord dysfunction

DISCUSSION

Asthma Mimics

This review will discuss some of the disease processes that, in their acute presentation, may mimic asthma, with a focus on their differentiating historical and examination findings and a brief review of their treatments.

Anaphylaxis. A vital emergency medicine diagnosis, anaphylaxis shares similar pathophysiology with asthma in its involvement of hyperactive immune response. It is thought to account for approximately 1% of ED visits in the U.S. (4). However, in the case of anaphylaxis, symptoms are usually more acute in onset than asthma, with a history of exposure to a potential allergen. This deadly disease must be considered with involvement of two organ systems (e.g., dermal, gastrointestinal, respiratory, or hemodynamic) or known allergen exposure with hypotension. A physical examination may reveal urticaria, although ≤20% of patients do not have cutaneous manifestations, and there may be a history of nausea, vomiting, or diarrhea, indicating multisystem involvement (4). Distributive shock may be present, and patients require immediate resuscitation with epinephrine, steroids, IV fluids, and histamine antagonists. Any concern for anaphylaxis warrants intramuscular epinephrine.

COPD. Classically, it was taught that asthma involves reversible airway constriction and was related to allergic diseases, while COPD was irreversible and related to tobacco abuse. However, there has been debate about the distinction in the pulmonary community for decades, and recently the COPD History Assessment in Spain study described Asthma-COPD Overlap Syndrome (ACO or ACOS). According to this study, 15% of patients with diagnosed COPD have features of asthma (5). Conversely, about 15% of patients with asthma will also have features of COPD (6). Asthma is now considered a disease with chronic airway changes. Diagnosis, especially in the case of ACO, is usually left to the