

**CARDIAC ASTHMA IN PATIENTS WITH HEART FAILURE:
MECHANISMS AND CLINICAL MANAGEMENT**

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ABSTRACT: Cardiac asthma is a clinical condition characterized by paroxysmal episodes of wheezing, dyspnea, and cough that occur as a consequence of acute or chronic heart failure, particularly left ventricular dysfunction. Despite its name, it is not related to bronchial asthma but rather reflects pulmonary congestion and interstitial edema resulting from elevated left-sided cardiac filling pressures. This condition is frequently misdiagnosed as primary respiratory asthma, leading to delays in appropriate cardiovascular management. The present article reviews the underlying mechanisms, clinical manifestations, diagnostic approach, and modern management strategies of cardiac asthma in patients with heart failure. Emphasis is placed on early recognition and differentiation from bronchial asthma, as timely treatment of the underlying cardiac dysfunction significantly improves patient outcomes.

Keywords: cardiac asthma, heart failure, left ventricular failure, pulmonary edema, dyspnea, wheezing, differential diagnosis, acute heart failure, pulmonary congestion.

Introduction

Heart failure remains a major global health problem associated with high morbidity and mortality. Among its clinical manifestations, respiratory symptoms such as dyspnea, cough, and wheezing are commonly observed. One of the less frequently understood but clinically significant presentations is cardiac asthma. Cardiac asthma refers to episodic wheezing and shortness of breath caused by pulmonary congestion secondary to left ventricular dysfunction. The condition is not a true asthma but rather a manifestation of acute decompensated heart failure. It occurs when increased left atrial pressure leads to pulmonary venous hypertension, interstitial edema, and

narrowing of small airways, resulting in bronchospasm-like symptoms. Clinically, cardiac asthma is often misinterpreted as bronchial asthma, especially in emergency settings, which may result in inappropriate treatment with bronchodilators alone while the underlying cardiac pathology remains unaddressed. Therefore, accurate differentiation between cardiac and bronchial asthma is essential for effective management. Understanding the pathophysiological mechanisms, recognizing key clinical features, and applying appropriate diagnostic tools are crucial for early identification and optimal treatment of cardiac asthma in patients with heart failure.

Materials and methods

This study was conducted as a narrative and structured literature review focusing on cardiac asthma in patients with heart failure. Relevant scientific literature was retrieved from electronic databases including PubMed, Google Scholar, Scopus, and Web of Science. The search strategy included keywords such as “cardiac asthma,” “heart failure,” “left ventricular dysfunction,” “pulmonary edema,” and “wheezing in heart failure.” Peer-reviewed original research articles, clinical guidelines, systematic reviews, and cardiology textbooks published in English were included in the analysis. Priority was given to publications from the last 15 years, while classical foundational studies were also considered to ensure a comprehensive understanding of the topic. Inclusion criteria comprised studies addressing pathophysiology, clinical presentation, diagnosis, or management of cardiac asthma or heart failure-related respiratory symptoms. Exclusion criteria included non-peer-reviewed sources, case reports with insufficient clinical data, and studies unrelated to cardiovascular or pulmonary interactions. The selected literature was critically analyzed, and data were extracted regarding disease mechanisms, clinical manifestations, differential diagnosis, and therapeutic approaches. The findings were synthesized thematically to provide an integrated overview of cardiac asthma in the context of heart failure.

Results

The reviewed literature indicates that cardiac asthma is primarily a manifestation of acute or chronic left-sided heart failure rather than a primary respiratory disorder. It is most commonly associated with elevated left ventricular end-diastolic pressure, leading to pulmonary venous congestion and interstitial edema. This pathophysiological process results in airway narrowing, reduced lung compliance, and reflex bronchoconstriction, which clinically mimics bronchial asthma. Common symptoms include paroxysmal nocturnal dyspnea, orthopnea, cough, and expiratory wheezing. Studies demonstrate that misdiagnosis of cardiac asthma as bronchial asthma is frequent, particularly in emergency settings, which may delay appropriate

cardiovascular treatment. Diagnostic differentiation relies on clinical history, physical examination, chest radiography, echocardiography, brain natriuretic peptide (BNP) levels, and response to therapy. Management data show that treatment focused on reducing cardiac preload and afterload significantly improves symptoms. Diuretics, vasodilators, oxygen therapy, and management of underlying heart failure are the main therapeutic approaches. In contrast, bronchodilators alone are insufficient and may not address the primary pathology.

Discussion

Cardiac asthma represents an important clinical challenge due to its similarity to bronchial asthma. The key distinction lies in its cardiovascular origin. Failure to recognize this difference may result in inappropriate treatment and worsening of the underlying heart failure. The pathophysiology involves increased hydrostatic pressure in the pulmonary circulation, leading to fluid leakage into interstitial spaces and airway compression. This mechanism explains the wheezing and dyspnea observed in affected patients. Modern diagnostic tools such as echocardiography and BNP measurement have improved the ability to distinguish cardiac asthma from respiratory causes of wheezing. However, clinical judgment remains essential, particularly in acute care settings. Effective management requires a multidisciplinary approach focusing on stabilization of cardiac function. Early administration of diuretics and vasodilators, along with oxygen support, can rapidly improve symptoms. Long-term management includes optimization of heart failure therapy and control of underlying cardiovascular risk factors.

Conclusion

Cardiac asthma is a significant but often under-recognized manifestation of heart failure. Its clinical presentation closely resembles bronchial asthma, which may lead to diagnostic confusion. Early recognition and accurate differentiation are crucial for initiating appropriate treatment. Management should focus on treating the underlying heart failure rather than only relieving respiratory symptoms. Improved awareness among clinicians can significantly reduce misdiagnosis and improve patient outcomes.

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