

## Case Report

# Cardiac asthma or bronchial asthma: a case report

Dewa Ayu Rina Wiana Dewi\*, Ketut Suryana

Wangaya General Hospital, Denpasar, Bali, Indonesia

**Received:** 20 April 2022

**Accepted:** 09 May 2022

**\*Correspondence:**

Dr. Dewa Ayu Rina Wiana Dewi,

E-mail: rinawianadewi@gmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

Wheezing is often found in patients with asthma bronchiale but wheezing may also be found in paroxysmal nocturnal dyspnea and pulmonary edema (cardiac asthma). Cardiac asthma has been used to explain wheezing and airflow obstruction due to heart failure (HF). The respiratory symptoms such as wheezing, shortness of breath and cough. These symptoms normally occur at night and are common in elderly. Both asthma bronchiale and cardiac asthma are important to diagnose because treatments for asthma bronchiale and HF are different. Here we presented a case report of a 59-years old female diagnosed with cardiac asthma due to heart failure. Cardiac asthma defined as congestive heart failure (CHF) associated with wheezing represents one third of CHF in elderly patients. It is often confused with asthma and exercise-induced bronchospasm. These diseases have different therapies. Cardiac asthma using diuretics and asthma using bronchodilator therapy. CHF can lead to pulmonary congestion and pulmonary edema (PE), and this is classically thought to be the primary cause of cardiac asthma. Current management of cardiac asthma focuses on controlling the underlying HF and PE.

**Keywords:** Wheezing, Cardiac asthma, Pulmonary edema, Heart failure

### INTRODUCTION

Heart failure can cause fluid to build up in the lungs (pulmonary edema) and in and around the airways. Hence, cause shortness of breath, coughing and wheezing similar to the signs of asthma. Cardiac asthma is a symptoms of heart failure that is characterized by wheezing, cough with foamy or bloody sputum.<sup>1</sup> The pathogenesis is not asthmatic bronchospasm but reflex bronchospasm as a manifestation of pulmonary congestion due to pulmonary venous hypertension (PVH). Airway obstruction in left ventricular failure may be increased by thickening of the airway wall due to heart failure. Mucosal edema of the airways is also associated with increased bronchial vascular flow or bronchial vascular obstruction.<sup>2</sup> The initial descriptions of cardiac asthma were reported in patients with late-stage systolic failure (HF<sub>rEF</sub>), usually due to ischemic or hypertensive cardiomyopathy or mitral stenosis from rheumatic mitral valve disease (HF<sub>pEF</sub>).

Because its symptoms are similar to those of bronchial asthma, cardiac asthma is often misdiagnosed.<sup>3</sup>

Both bronchial asthma and congestive heart failure (CHF) patients have nocturnal dyspnea and bronchial hyperresponsive. For these patients, pulmonary function with bronchoprovocation testing, and electrocardiography or echocardiography screening for heart failure may help identify underlying airways and cardiac disease. Here we presented a case report of a 59-years old female diagnosed with cardiac asthma due to heart failure.

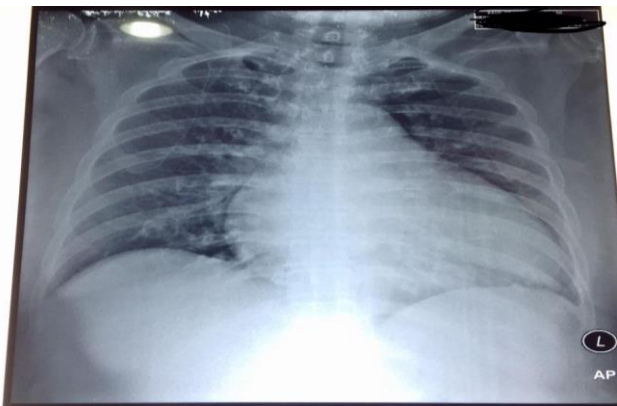
### CASE REPORT

A 59-years old female inpatient with complaints of dyspnea 1 month ago. Dyspnea is felt worse at night. The patient complains of coughing up phlegm, especially at night, that interferes at sleep. The patient also complained of swelling in his legs since the last 1 month. The patient has a history of diabetes and hypertension who do not

regularly take medication. Sometimes she takes metformin 3×500, glimepiride 1×2 mg, lisinopril 1×5 mg. There is no medical history of asthma bronchiale.

Physical examination showed a blood pressure 183/101 mmHg, pulse 120 times per minutes, respiratory rate 26 times per minutes, oxygen saturation 92% on room air, body temperature 36.3°C. Pupil examinations remain normal, isokor, light reflex positive on both sides. Chest examination vesicular sound on both sides, wheezing and rhonchi were found on both sides. Cardiac sound S1 S2 single and regular murmur were found. On extremity examination revealed minimal pitting pedal edema on both sides.

Routine complete blood count revealed normal result (WBC  $9.68 \times 10^3/\text{ul}$  (neutrophil 80.1%, lymphocyte 12.9%, monocyte 6.3%), hemoglobin 11.2 g/dl, HCT 35.6%, and platelet  $152 \times 10^3/\text{ul}$ ). Renal function test showed high (urea 44 mg/dl, and creatinine 1.4 mg/dl). Electrolyte serum test revealed normal results. Blood sugar level was 166 mg/dl. Chest X-ray showed bat's wing pattern and cardiothoracic ratio (CTR) 65%. Echo findings systolic failure with reduced left ventricular ejection fraction was 30%, mild aorta, tricuspid, pulmonary regurgitation (AR, TR, PR) and moderate mitral regurgitation (MR).



**Figure 1: Chest X-ray showed bat's wing pattern and cardiomegaly.**

During hospitalization, the patient was treated with furosemide drip 2.5 mg/hour continuous with furosemide 40 mg intravenous (IV) every 8 hours, injection of methylprednisolone 62.5 mg IV every 12 hours, injection of esomeprazole 40 mg IV every 12 hours. Rapid insulin 8 IU every 8 hours and long-acting insulin 4 IU every 24 hours ramipril 2.5 mg every 24 hours, digoxin 0.4 mg every 24 hours, aspilet 80 mg every 24 hours and atorvastatin 20 mg every 24 hours at night. The patient was discharged from our hospital after 7 days of hospitalization.

## DISCUSSION

The diagnosis of CHF in these patients is made clinically presentation includes severe dyspnea, cough, watery

sputum, and rales, but the most significant symptom indicative of cardiac asthma is wheezing. These symptoms are more prevalent in elderly patients. Cardiac asthma is difficult to diagnose because its symptoms are similar to those of bronchial asthma. But there is no medical history of asthma bronchiale in these patients. Bronchial asthma has nothing to do with fluid in the lungs or heart failure associated with cardiac asthma.

Wheezing is usually present in patients with asthma but wheezing may also be present in paroxysmal nocturnal dyspnea and pulmonary edema (cardiac asthma).<sup>2</sup> In these patients a physical examination revealed wheezing in the lung. Another physical examination is found nocturnal cough with sputum, shortness of breath, and swelling on the both sides of the feet, this indicates the presence of left sided heart failure. It occurs when decreased cardiac output causes fluid to accumulate in the body. The fluid through into the lung (pulmonary edema) can manifest with breathing problems as the airways and tiny air sacs of the lungs begin to fill with fluid.<sup>4</sup> Symptoms of cardiac congestion may be either left sided or right sided or a combination of both. Left heart congestion is manifested as pulmonary edema.

In decompensated or late stages heart disease, the history and physical examination may be adequate to establish the diagnosis of congestive heart failure. Based on Framingham heart failure criteria was found more than 2 major and minor criteria in these patients such as acute pulmonary edema, cardiomegaly, paroxysmal nocturnal dyspnea, pulmonary rales, ankle edema, dyspnea on exertion and nocturnal cough hence the patients diagnosed with congestive heart failure.

Treatments for cardiac asthma and asthma bronchiale are totally different. Cardiac asthma therapies are the same for heart failure and can help improve the symptoms of both heart failure and cardiac asthma. American Heart Association (AHA) provide pharmacological therapy to heart failure patients with severe symptoms and signs of heart failure as well as have complications are diuretics, angiotensin converting enzyme (ACE) inhibitors, B-blockers nitrates, and digitalis.<sup>5</sup> The management of heart failure is directed at the amelioration of symptoms, the improvement of left ventricular function, and live improvement.<sup>3</sup>

The patient was treated with furosemide drip 2.5 mg/hour continuous with furosemide 40 mg IV every 8 hours daily, and after few days given spironolactone 25 mg every 24 hours, injection of methylprednisolone 62.5 mg IV every 12 hours, injection of omeprazole 40 mg IV every 12 hours. Ramipril 2.5 mg once daily, digoxin 0.4 mg once daily, aspilet 80 mg once daily and atorvastatin 20 mg every 24 hours at night, rapid insulin 8 IU three times a day and long-acting insulin 4 IU once daily. Diuretics and bronchodilators may decrease symptoms in some people with cardiac asthma, there is usually an element of fixed airflow obstruction unresponsive to these medications.<sup>2</sup>

But, some studies showed that bronchodilator did not reduce the symptom of cardiac asthma.<sup>6</sup>

Parenteral diuretic was indicated in severe heart failure and acute pulmonary edema. Intravenous diuretics cause venodilation which will improve the symptoms. Spironolactone used as a combination in conjunction with furosemide. Spironolactone is an aldosterone antagonist administered only to prevent electrolyte disturbances. The appropriate dose of furosemide and aldosterone may also significantly improve the motion extent, speed and harmony of the left ventricular wall and is favorable for the treatment of complicated heart failures.<sup>7</sup> Digoxin 1×0.4 mg is useful to treat arrhythmias. Digoxin has recently had a resurgence of use in patients with severe CHF. It does not reduce mortality but has been shown to reduce symptoms and hospitalizations. Aspilet 1×80 mg given to prevent thrombus and embolism in heart. Proton pump inhibitor prevents side effects of aspilet.<sup>5</sup>

## CONCLUSION

We presented a case report of a patient with cardiac asthma due to CHF. Cardiac asthma may be defined as the clinical syndrome induced by acute passive congestion and edema of the lungs. It occurs when the left side of the heart suffers from a sudden disproportion between workload and work capacity. It is often confused with asthma and exercise-induced bronchospasm. These diseases have different therapies. Cardiac asthma using diuretics and asthma using bronchodilator therapy. Cardiac asthma is the consequence of pulmonary edema due to PVH and not due to asthmatic bronchoconstriction. In overt, acute congestive heart failure, the diagnosis may be readily made by history and physical examination and pertinent laboratory and imaging data. Current management of cardiac asthma focuses on controlling the underlying HF and PE.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

## REFERENCES

1. Litzinger MHJ, Aluyen JKN, Cereceres R, Feik AN, Iltis KE, Perez CR, et al. Cardiac Asthma: Not Your Typical Asthma. *US Pharm.* 2013;38(2).
2. Tanabe T, Kanoh S, Moskowitz WB, Rubin BK. Cardiac Asthma Transforming Growth Factor- $\beta$  From the Failing Heart Leads to Squamous Metaplasia in Human Airway Cells and in the Murine Lung. *Chest.* 2012;142(5):1274-83.
3. Buckner K. Cardiac Asthma. *Immunol Allergy. Clin N Am.* 2013;33-44.
4. Chahine J, Alvey H. *Left Ventricular Failure.* Treasure Island, FL: StatPearls Publishing; 2021.
5. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE Jr, Drazner MH, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol.* 2013;62(16):147-239.
6. Interiano B, Hyde RW, Hodges M, Yu PN. Interrelation between alterations in pulmonary mechanics and hemodynamics in acute myocardial infarction. *J Clin Invest.* 1973;52(8):1994-2006.
7. Chen ZH, Jiang YR, Peng JQ, Ding JW, Li S, Yang J, Wu H, Yang J. Clinical effects of combined treatment by optimal dose of furosemide and spironolactone on diastolic heart failure in elderly patients. *Exp Ther Med.* 2016;11(3):890-4.

**Cite this article as:** Dewi DARW, Suryana K. Cardiac asthma or bronchial asthma: a case report. *Int J Adv Med* 2022;9:763-5.