

# Respiratory failure and wheeze secondary to an atrial myxoma: a case report

Abdel Younes Ibrahim<sup>1\*</sup>, David Walker<sup>2</sup>, Andy Ball<sup>3</sup>

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## ABSTRACT

**Background:** Atrial myxomas are the rare slow-growing tumors of the heart and are often found in the left atrium; they most commonly present with symptoms of thromboembolic disease and have rarely been associated with respiratory symptoms.

**Case Presentation:** We present the case of a 71-year-old woman who attended the emergency department with a 72-hour history of shortness of breath, a cough, and wheeze. She had been diagnosed with chronic obstructive pulmonary disease in the community recently but had never had any spirometry testing. She was treated for an exacerbation of airways disease with nebulized bronchodilators, steroids, and antibiotics. She deteriorated after 24 hours to the point of requiring intubation and ventilation, despite escalating her to extensive bronchodilator therapy she did not improve and the wheeze was persistent. Subsequently, an echocardiogram was performed at the bedside which revealed a large left atrial mass which led to discussion with local cardiologists and cardiothoracic surgeons. The mass was resected and confirmed to be an atrial myxoma on histology. The patient had a good recovery and, when seen in the follow-up clinic, reported that her breathing had returned to normal, with no wheeze present.

**Conclusion:** This case highlights the dangers of making a premature diagnostic judgment when a patient presents with a pre-existing diagnosis, as in our case it was considering an alternative pathology that led to the final diagnosis. It also demonstrates the importance of considering cardiac disease as a differential for wheeze and using echocardiography in the assessment of the patient with respiratory failure.

**Keywords:** Myxoma, bronchospasm, wheeze, echocardiography, case report, respiratory failure.

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Correspondence to: Abdel Younes Ibrahim

\*Anesthetics, University Hospitals Dorset, Poole, UK.

Email: [aziz.r.younes@gmail.com](mailto:aziz.r.younes@gmail.com)

Full list of author information is available at the end of the article.

## Background

Cardiac tumors are rare with an estimated prevalence of 0.02% in the general population from autopsy studies [1]. Myxomas are the most common subtype, and these are most common in the left atrium [2]. Atrial myxomas often present late with a variety of symptoms relating to valvular obstruction or embolic phenomena. There are very few case reports of atrial myxoma presenting as refractory wheeze [3–5]. These tumors typically manifest with embolic phenomena (such as stroke) and symptoms of heart failure. Management is often surgical, with resection required to prevent the development of cardiac failure secondary to valvular obstruction [2]. They are commonly diagnosed by transthoracic echocardiography, which is an important investigation in the assessment of respiratory failure as a variety of cardiac pathology can present with respiratory symptoms such as wheeze and shortness of breath. This case presents a diagnostic challenge stemming from a common presentation, in a 71-year-old woman with respiratory failure and marked wheeze

thought to be secondary to an exacerbation of chronic obstructive pulmonary disease (COPD). She failed to improve after extensive bronchodilator therapy which led to further evaluation.

## Case Presentation

A 71-year-old woman was brought to the emergency department by ambulance with shortness of breath and wheeze worsening over 72 hours. She had a cough productive of white sputum, subjective fever, and some pain below both ribs which she attributed to the coughing. She had been diagnosed with COPD, by her General Practitioner (GP) 2 years before, after an episode of pneumonia. She was on regular umeclidinium inhaler therapy but had never been seen by a respiratory physician nor had spirometry performed. She lived at home independently and was an active smoker with a 25-pack-year history. Examination revealed bilateral wheeze and an increased work of breathing, and she was struggling to complete

sentences; there were no signs of peripheral edema or raised jugular venous pressure. Arterial blood gas analysis on room air revealed type 1 respiratory failure ( $\text{PaO}_2 < 8.0$  kPa). A chest radiograph did not reveal any focal consolidation or interstitial infiltrates.

The differential diagnosis considered was as follows: bacterial pneumonia, viral respiratory tract infection, and non-infective exacerbation of COPD, but cardiac disease was not considered at this point. The patient was treated for a potential infective exacerbation of COPD with oxygen, nebulized bronchodilators (salbutamol and ipratropium), oral doxycycline, and oral prednisolone. After 24 hours, she deteriorated on the ward and was in respiratory distress with marked agitation. Arterial blood gas analysis on oxygen revealed a marked hypercapnic ( $\text{PaCO}_2 > 6.0$  kPa) respiratory failure. She would not tolerate noninvasive ventilation due to her impaired cognitive state and was intubated. Ventilation was difficult with high inflation pressures and marked gas trapping. She was ventilated with a degree of permissive hypercapnia to a pH of 7.25 to minimize her ventilation pressures. Her treatment was escalated to almost continuous nebulized bronchodilator therapy, intravenous co-amoxiclav, clarithromycin, and infusions of hydrocortisone and magnesium sulfate. After intubation, the chest radiograph did not reveal any evidence of consolidation, interstitial infiltrates, or pneumothorax. The wheeze was persistent despite further escalation to infusions of aminophylline, salbutamol, and ketamine. Blood cultures, beta-d-glucan, and viral polymerase chain reaction swabs were negative.

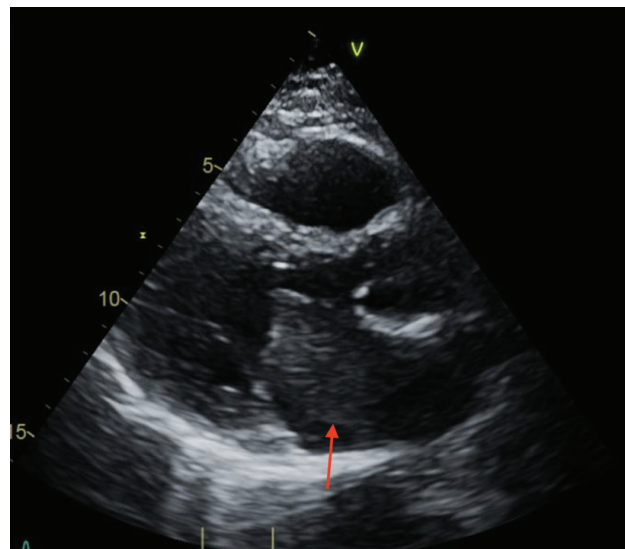
After 72 hours, she had not improved, and a point-of-care bedside transthoracic echocardiogram was performed, revealing a large left atrial mass (Figure 1) almost completely abutting the mitral valve during diastole. Her left ventricular systolic function was preserved and there did not appear to be any evidence of pulmonary hypertension. Her wheeze had not resolved, and after a discussion with local cardiologists, apixaban was started to minimize the risk of stroke, and aggressive blood pressure management and diuresis were started. Further evaluation of the mass was undertaken with Computed Tomography (CT) imaging (Figure 2), and consultation with cardiothoracic surgery led to a transfer of the patient to a cardiothoracic center. There she underwent surgical removal of the mass (which was subsequently confirmed to be a myxoma on histology). She had a good postoperative recovery in cardiac intensive care with a resolution of her wheeze and was discharged home 15 days later, a summary of her presentation timeline can be seen in Figure 3.

A review postoperatively at her follow-up clinic was notable for a marked improvement in respiratory function, with the patient reporting her breathing as “the best it had been for a long time” with no evidence of wheeze on examination. She stated that she had never really thought

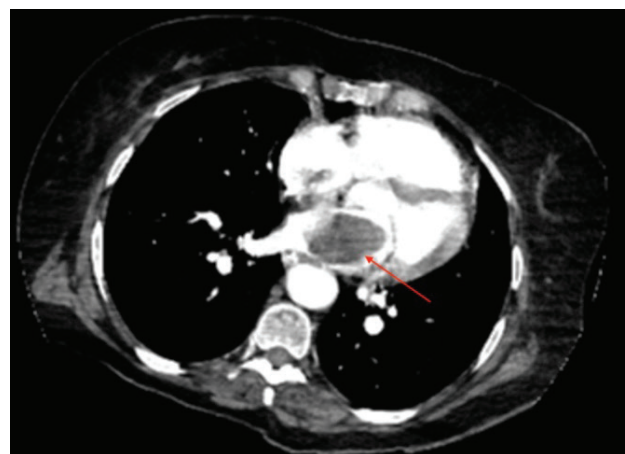
that she had COPD and that inhalers had not helped her shortness of breath.

## Discussion

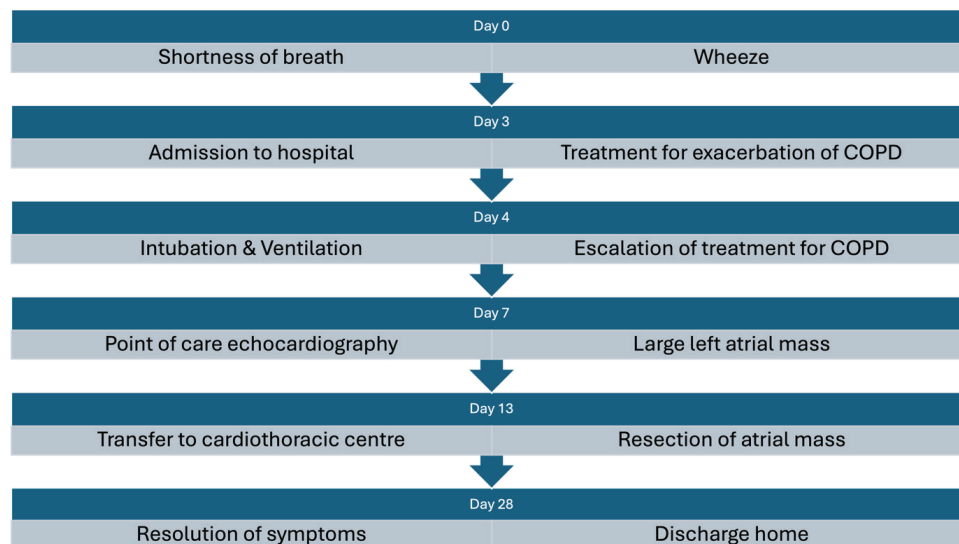
Acute exacerbations of COPD make up one in eight presentations to emergency departments in the United Kingdom [6]. Many of these patients will have some clinically detectable bronchospasm (wheeze) on presentation, and this is attributed to expiratory airflow limitation primarily in small airways [7]. Treatment for this disorder is supportive with antibiotics and bronchodilators which are targeted at reducing smooth muscle inflammation and hyperreactivity with ventilatory support as required [7]. Treatment targeted purely at smooth muscle relaxation is unlikely to benefit patients who have an alternative etiology for their wheeze. The differential diagnosis of wheeze covers primary respiratory disorders (asthma, COPD), infections, inflammatory disorders, neoplasm, cardiac



**Figure 1.** Transthoracic echocardiogram in the parasternal long axis view, demonstrating a mass in the left atrium of 2.4 x 4.8 cm.



**Figure 2.** Axial computed tomography imaging of the chest with contrast enhancement demonstrating a non-enhancing mass in the left atrium of 3.3 x 4.4 cm.



**Figure 3.** A timeline of our patient's presentation and journey through the hospital.

disease, and anatomical abnormalities. The significantly higher prevalence of COPD as compared with atrial myxomas is a significant contributor to the initial misdiagnosis in our case. There are far more patients who will present with a wheeze that will have exacerbations of airways disease than who will present with a rare cardiac tumor. Clinicians must balance what is the most probable diagnosis in their differential while considering other factors which warrant further investigation, even into less likely diagnoses as in our case.

The trajectory of our case highlights some of the potential red flags, which warrant further diagnostic consideration. The patient was older at the time of diagnosis of COPD, and her presentation did not respond to traditional therapy aimed at bronchodilation. Furthermore, the diagnosis of COPD had been presumptive with no spirometry testing performed in the community, and the patient had no previous exacerbations requiring treatment nor any functional limitation from this before admission. The other factors that are not present in our case but which should raise suspicion of an alternative pathology include patients who are non-smokers and those with a significant cardiovascular disease history, as other cardiac diseases that lead to impairment of the left ventricle can lead to a similar phenomenon.

The underlying mechanism could have been interstitial congestion leading to small airway narrowing which is a recognized phenomenon that leads to cardiac wheeze [8]. This would be because of venous dilatation and pulmonary venous hypertension due to diastolic flow limitation across the mitral valve from the myxoma. The examination of fluid overload in intubated patients is difficult as positive pressure ventilation makes examining the jugular venous pressure unreliable and patients can develop dependent edema from a lack of mobilization. Furthermore, fluid is offloaded from the interstitial compartment of the lungs

by the positive pressure (hence its use in cardiac failure leading to hypoxemia) which is likely why the post-intubation radiograph did not reveal any infiltrates. The delay between intubation and the echocardiogram in our case (72 hours) could have meant that the left ventricle had been sufficiently offloaded by the positive pressure ventilation and potentially masked any initial impairment of left ventricular function. An earlier echocardiogram would have led to a reduced time to diagnosis and earlier intervention, and there is increasing evidence for the use of point-of-care echocardiography to improve diagnostic accuracy in assessing patients with both respiratory and cardiac failure [9].

Atrial myxomas are typically slow-growing tumors and, therefore, can be indolent for many years, causing sub-clinical pathology [2]. The protrusion of the tumor into the atrium promotes stasis of blood and subsequent thromboembolism. The physical obstruction of the mitral valve can impair diastolic filling of the left ventricle, which can manifest as left-sided (congestive) cardiac failure with subsequent pulmonary hypertension. The diagnosis is usually based on imaging in the form of transthoracic echocardiography; however, advanced imaging is often undertaken, which includes transesophageal echocardiography, contrast-enhanced ECG-gated CT, and cardiac MRI [2,3,10]. The only unique physical examination finding is a mid-diastolic “plop” sound which is thought to be the myxoma descending onto the mitral valve in diastole [2]. Prompt discussion with both cardiology and cardiothoracic surgeons is important as ultimately most need to be surgically resected [10].

## Conclusion

In conclusion, we would consider this case, as a reminder of the dangers of making premature diagnostic judgments and the importance of reevaluating the patient from the

beginning if they are failing to progress as expected. We recognize that there are overwhelmingly more patients suffering from airways disease than atrial myxomas; however, we would advocate for the consideration of cardiac disease in the evaluation of a patient with wheeze or respiratory failure that is not responding to treatment and for the early use of echocardiography in the assessment of such patients, particularly if there any risk factors for cardiovascular disease or there is an atypical history.

**What is new?**

Remember that the patient’s past medical history should not tempt you to make premature diagnostic assumptions about their presentation without considering other diagnoses. Consider the possibility of cardiac disease in treating acute or chronic wheeze and recognize the utility of echocardiography in the assessment of acute respiratory failure.

**List of Abbreviations**

- COPD Chronic obstructive pulmonary disease
- CT Computed tomography
- ECG Electrocardiogram
- MRI Magnetic resonance imaging

**Conflict of interests**

The authors declare that there is no conflict of interest regarding the publication of this article.

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**Consent for publication**

Written informed consent was obtained from the patient for the writing and publication of this case report.

**Ethical approval**

Ethical approval is not required at our institution to publish an anonymous case report.

**Author details**

- Abdel Younes Ibrahim<sup>1</sup>, David Walker<sup>1</sup>, Andy Ball<sup>2</sup>
- 1. Anesthetics, University Hospitals Dorset, Poole, UK
  - 2. Anesthetics, Dorset County Hospital, Dorchester, UK

**Summary of case**

1	Patient (gender, age)	71, female
2	Final diagnosis	Atrial myxoma
3	Symptoms	Breathlessness, wheeze
4	Medications	Salbutamol, ipratropium, hydrocortisone, Magnesium sulfate, aminophylline, ketamine, amoxicillin with clavulanic acid, clarithromycin, furosemide, and ramipril.
5	Clinical procedure	Median sternotomy and resection of atrial mass
6	Specialty	Cardiology

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