



This is an open access article distributed in accordance with the Creative Commons Attribution (CC BY 4.0) license: <https://creativecommons.org/licenses/by/4.0/> which permits any use, Share — copy and redistribute the material in any medium or format, Adapt — remix, transform, and build upon the material for any purpose, as long as the authors and the original source are properly cited. © The Author(s) 2025

2 Respiratory failure and wheeze 3 secondary to an atrial myxoma: 4 a case report

5 Abdel Younes Ibrahim^{1*}, David Walker², Andy Ball³

6 ABSTRACT

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

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

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

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

23 **Received:** 07 January 2025 **Accepted:** 30 January 2025 **Type of Article:** CASE REPORT **Specialty:** Cardiology

24 **Correspondence to:** Abdel Younes Ibrahim

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

26 **Email:** aziz.r.younes@gmail.com

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

29 Background

30 Cardiac tumors are rare with an estimated prevalence of
31 0.02% in the general population from autopsy studies [1].
32 Myxomas are the most common subtype, and these are
33 most common in the left atrium [2]. Atrial myxomas often
34 present late with a variety of symptoms relating to val-
35 vular obstruction or embolic phenomena. There are very
36 few case reports of atrial myxoma presenting as refrac-
37 tory wheeze [3–5]. These tumors typically manifest with
38 embolic phenomena (such as stroke) and symptoms of
39 heart failure. Management is often surgical, with resec-
40 tion required to prevent the development of cardiac failure
41 secondary to valvular obstruction [2]. They are commonly
42 diagnosed by transthoracic echocardiography, which is
43 an important investigation in the assessment of respira-
44 tory failure as a variety of cardiac pathology can present
45 with respiratory symptoms such as wheeze and short-
46 ness of breath. This case presents a diagnostic challenge
47 stemming from a common presentation, in a 71-year-
48 old woman with respiratory failure and marked wheeze

thought to be secondary to an exacerbation of chronic
49 obstructive pulmonary disease (COPD). She failed to
50 improve after extensive bronchodilator therapy which led
51 to further evaluation. 52

53 Case Presentation

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

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

72 The differential diagnosis considered was as follows:
73 bacterial pneumonia, viral respiratory tract infection, and
74 non-infective exacerbation of COPD, but cardiac disease
75 was not considered at this point. The patient was treated
76 for a potential infective exacerbation of COPD with oxy-
77 gen, nebulized bronchodilators (salbutamol and ipratro-
78 pium), oral doxycycline, and oral prednisolone. After 24
79 hours, she deteriorated on the ward and was in respiratory
80 distress with marked agitation. Arterial blood gas analysis
81 on oxygen revealed a marked hypercapnic ($\text{PaCO}_2 > 6.0$
82 kPa) respiratory failure. She would not tolerate noninva-
83 sive ventilation due to her impaired cognitive state and
84 was intubated. Ventilation was difficult with high infla-
85 tion pressures and marked gas trapping. She was venti-
86 lated with a degree of permissive hypercapnia to a pH of
87 7.25 to minimize her ventilation pressures. Her treatment
88 was escalated to almost continuous nebulized bronchodi-
89 lator therapy, intravenous co-amoxiclav, clarithromycin,
90 and infusions of hydrocortisone and magnesium sulfate.
91 After intubation, the chest radiograph did not reveal any
92 evidence of consolidation, interstitial infiltrates, or pneu-
93 mothorax. The wheeze was persistent despite further
94 escalation to infusions of aminophylline, salbutamol, and
95 ketamine. Blood cultures, beta-d-glucan, and viral poly-
96 merase chain reaction swabs were negative.

97 After 72 hours, she had not improved, and a point-of-care
98 bedside transthoracic echocardiogram was performed,
99 revealing a large left atrial mass (Figure 1) almost com-
100 pletely abutting the mitral valve during diastole. Her left
101 ventricular systolic function was preserved and there did
102 not appear to be any evidence of pulmonary hypertension.
103 Her wheeze had not resolved, and after a discussion with
104 local cardiologists, apixaban was started to minimize the
105 risk of stroke, and aggressive blood pressure manage-
106 ment and diuresis were started. Further evaluation of the
107 mass was undertaken with Computed Tomography (CT)
108 imaging (Figure 2), and consultation with cardiothoracic
109 surgery led to a transfer of the patient to a cardiothoracic
110 center. There she underwent surgical removal of the mass
111 (which was subsequently confirmed to be a myxoma on
112 histology). She had a good postoperative recovery in car-
113 diac intensive care with a resolution of her wheeze and
114 was discharged home 15 days later, a summary of her
115 presentation timeline can be seen in Figure 3.

116 A review postoperatively at her follow-up clinic was nota-
117 ble for a marked improvement in respiratory function,
118 with the patient reporting her breathing as “the best it
119 had been for a long time” with no evidence of wheeze on
120 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 clin-
ically detectable bronchospasm (wheeze) on presentation,
and this is attributed to expiratory airflow limitation pri-
marily 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 etiolo-
gy for their wheeze. The differential diagnosis of wheeze
covers primary respiratory disorders (asthma, COPD),
infections, inflammatory disorders, neoplasm, cardiac

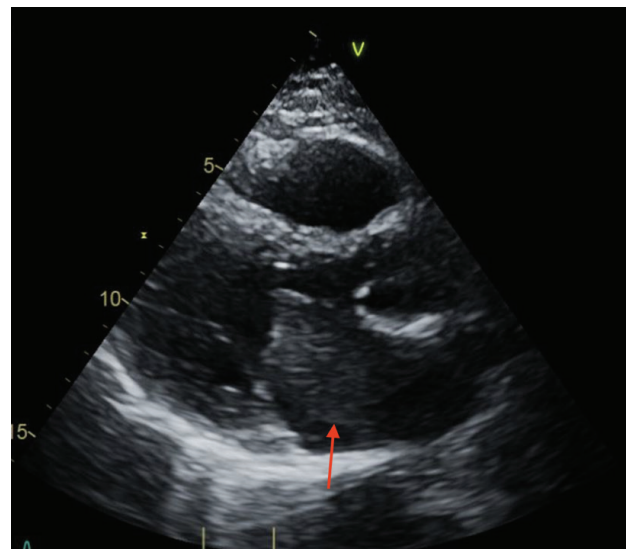


Figure 1. Transthoracic echocardiogram in the parasternal long axis view, demonstrating a mass in the left atrium of 2.4 x 4.8 cm.

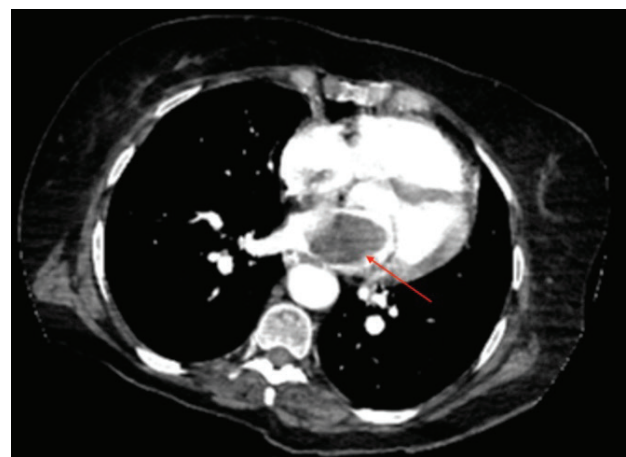


Figure 2. Axial computed tomography imaging of the chest with contrast enhancement demonstrating a non-enhancing mass in the left atrium of 3.3 x 4.4 cm.

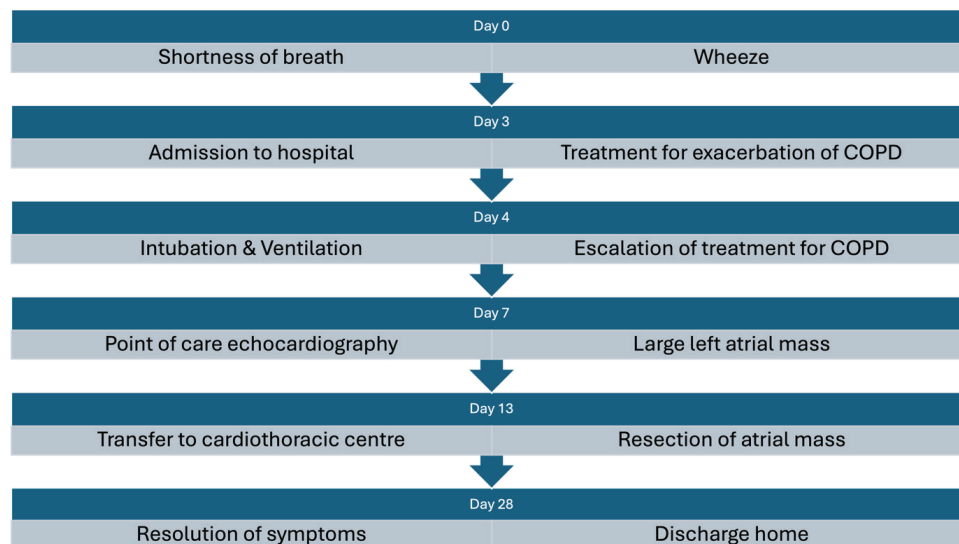


Figure 3. A timeline of our patient's presentation and journey through the hospital.

145
146

147 disease, and anatomical abnormalities. The significantly
148 higher prevalence of COPD as compared with atrial myx-
149 omas is a significant contributor to the initial misdiagnosis
150 in our case. There are far more patients who will present
151 with a wheeze that will have exacerbations of airways
152 disease than who will present with a rare cardiac tumor.
153 Clinicians must balance what is the most probable diag-
154 nosis in their differential while considering other factors
155 which warrant further investigation, even into less likely
156 diagnoses as in our case.

157 The trajectory of our case highlights some of the potential
158 red flags, which warrant further diagnostic consideration.
159 The patient was older at the time of diagnosis of COPD,
160 and her presentation did not respond to traditional therapy
161 aimed at bronchodilation. Furthermore, the diagnosis of
162 COPD had been presumptive with no spirometry testing
163 performed in the community, and the patient had no previ-
164 ous exacerbations requiring treatment nor any functional
165 limitation from this before admission. The other factors
166 that are not present in our case but which should raise sus-
167 picion of an alternative pathology include patients who
168 are non-smokers and those with a significant cardiovas-
169 cular disease history, as other cardiac diseases that lead
170 to impairment of the left ventricle can lead to a similar
171 phenomenon.

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

183 by the positive pressure (hence its use in cardiac failure 183
184 leading to hypoxemia) which is likely why the post-in- 184
185 tubation radiograph did not reveal any infiltrates. The 185
186 delay between intubation and the echocardiogram in our 186
187 case (72 hours) could have meant that the left ventricle 187
188 had been sufficiently offloaded by the positive pressure 188
189 ventilation and potentially masked any initial impairment 189
190 of left ventricular function. An earlier echocardiogram 190
191 would have led to a reduced time to diagnosis and earlier 191
192 intervention, and there is increasing evidence for the use 192
193 of point-of-care echocardiography to improve diagnostic 193
194 accuracy in assessing patients with both respiratory and 194
195 cardiac failure [9]. 195

196 Atrial myxomas are typically slow-growing tumors 196
197 and, therefore, can be indolent for many years, causing 197
198 sub-clinical pathology [2]. The protrusion of the tumor 198
199 into the atrium promotes stasis of blood and subsequent 199
200 thromboembolism. The physical obstruction of the mitral 200
201 valve can impair diastolic filling of the left ventricle, 201
202 which can manifest as left-sided (congestive) cardiac 202
203 failure with subsequent pulmonary hypertension. The 203
204 diagnosis is usually based on imaging in the form of tran- 204
205 sthoracic echocardiography; however, advanced imaging 205
206 is often undertaken, which includes transesophageal echo- 206
207 cardiography, contrast-enhanced ECG-gated CT, and car- 207
208 diac MRI [2,3,10]. The only unique physical examination 208
209 finding is a mid-diastolic “plop“ sound which is thought 209
210 to be the myxoma descending onto the mitral valve in 210
211 diastole [2]. Prompt discussion with both cardiology and 211
212 cardiothoracic surgeons is important as ultimately most 212
213 need to be surgically resected [10]. 213

Conclusion 214

215 In conclusion, we would consider this case, as a reminder 215
216 of the dangers of making premature diagnostic judgments 216
217 and the importance of reevaluating the patient from the 217

218 beginning if they are failing to progress as expected. We
 219 recognize that there are overwhelmingly more patients
 220 suffering from airways disease than atrial myxomas; how-
 221 ever, we would advocate for the consideration of cardiac
 222 disease in the evaluation of a patient with wheeze or res-
 223 piratory failure that is not responding to treatment and for
 224 the early use of echocardiography in the assessment of
 225 such patients, particularly if there any risk factors for car-
 226 diovascular 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

- 235 COPD Chronic obstructive pulmonary disease
- 236 CT Computed tomography
- 237 ECG Electrocardiogram
- 238 MRI Magnetic resonance imaging

Conflict of interests

240 The authors declare that there is no conflict of interest regard-
 241 ing the publication of this article.

Funding

243 None.

Consent for publication

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

Ethical approval

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

Author details

- 251 Abdel Younes Ibrahim¹, David Walker¹, Andy Ball²
- 252 1. Anesthetics, University Hospitals Dorset, Poole, UK
- 253 2. Anesthetics, Dorset County Hospital, Dorchester, UK

Summary of case

309	1	Patient (gender, age)	71, female
310	2	Final diagnosis	Atrial myxoma
311	3	Symptoms	Breathlessness, wheeze
312	4	Medications	Salbutamol, ipratropium, hydrocortisone, Magnesium sulfate, aminophylline, ketamine, amoxicillin with clavulanic acid, clarithromycin, furosemide, and ramipril.
313	5	Clinical procedure	Median sternotomy and resection of atrial mass
314	6	Specialty	Cardiology

References

254
 255
 256
 257
 258
 259
 260
 261
 262
 263
 264
 265
 266
 267
 268
 269
 270
 271
 272
 273
 274
 275
 276
 277
 278
 279
 280
 281
 282
 283
 284
 285
 286
 287
 288
 289
 290
 291
 292
 293
 294
 295
 296
 297
 298
 299

1. Reynen K. Frequency of primary tumors of the heart. *Am J Cardiol*. 1996;77(1):107. [https://doi.org/10.1016/S0002-9149\(97\)89149-7](https://doi.org/10.1016/S0002-9149(97)89149-7)
2. Shapiro LM. Cardiac tumours: diagnosis and management. *Heart*. 2001;85(2):218–22. <https://doi.org/10.1136/heart.85.2.218>
3. Jaravaza D, Lalla U, Zaharie S, de Jager L. Unusual presentation of atrial myxoma: a case report and review of the literature. *Am J Case Rep*. 2021 22; e931437-1–8. <https://doi.org/10.12659/AJCR.931437>
4. Sinha A, Apps A, Liang WC, Firoozan S. Progressive wheeze: atrial myxoma masquerading as chronic obstructive pulmonary disease. *BMJ Case Rep*. 2015;2015:bcr2015210751. <https://doi.org/10.1136/bcr-2015-210751>
5. Ramesh V, Acharya V, Pai N, Krishnan A. An unusual case of refractory wheeze. *BMJ Case Rep*. 2015;2015:bcr2014206963. <https://doi.org/10.1136/bcr-2014-206963>
6. NHS England. Digital service to manage high-risk chronic obstructive pulmonary disease (COPD) patients. [cited 2025 Jan 02]. Available from: <https://transform.england.nhs.uk/key-tools-and-info/digital-playbooks/respiratory-digital-playbook/digital-service-to-manage-high-risk-chronic-obstructive-pulmonary-disease-copd-patients/>
7. Ritchie AI, Wedzicha JA. Definition, causes, pathogenesis, and consequences of chronic obstructive pulmonary disease exacerbations. *Clin Chest Med*. 2020;41(3):421–38. <https://doi.org/10.1016/j.ccm.2020.06.007>
8. Nakamura Y, Tamaoki J, Nagase H, Yamaguchi M, Horiguchi T, Hozawa S, et al.; Japanese Society of Allergology. Japanese guidelines for adult asthma 2020. *Allergol Int*. 2020;69(4):519–48. <https://doi.org/10.1016/j.alit.2020.08.001>
9. Riishede M, Lassen AT, Baatrup G, Pietersen PI, Jacobsen N, Jeschke KN, et al. Point-of-care ultrasound of the heart and lungs in patients with respiratory failure: a pragmatic randomized controlled multicenter trial. *Scand J Trauma Resusc Emerg Med*. 2021;29(1):60. <https://doi.org/10.1186/s13049-021-00872-8>
10. Hoffmeier A, Sindermann J, Scheld H, Martens S. Cardiac tumours - diagnosis and surgical treatment 2014. *Dtsch Arztebl Int*. 111:205–11. <https://doi.org/10.3238/arztebl.2014.0205>