CASE REPORT

Progressive wheeze: atrial myxoma masquerading as chronic obstructive pulmonary disease

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Accepted 8 July 2015

SUMMARY

Atrial myxoma, the commonest primary cardiac neoplasm, presents with symptoms of heart failure, embolic phenomena or constitutional upset. We present an atypical case, with wheeze and symptomatic exacerbations typical of chronic obstructive pulmonary disease. With no early clinical evidence of heart failure, the patient was managed with inhaled steroids and bronchodilators, with little relief. Only when the patient was in extremis requiring intubation, due to respiratory failure, did clinical evidence of left heart failure become apparent, with echocardiography demonstrating a massive left atrial myxoma obstructing the mitral valve annulus. Following successful surgical resection, the patient's symptoms fully abated. This case highlights the importance of considering cardiac wheeze in those initially managed as obstructive airway disease not responding in a typical fashion to initial bronchodilator therapy, and particularly in those with rapidly progressive symptoms. Such patients should be referred early for cardiac imaging. The excellent prognosis and quick recovery after timely surgical resection of a myxoma are also highlighted.

BACKGROUND

Myxoma is the commonest primary cardiac neoplasm, with an annual incidence of 0.5 per million.[1 2] Its clinical manifestation mostly depends on tumour size, location and mobility, with patients presenting with features of the classical Goodwin's triad of constitutional upset, cardiac failure or embolic phenomena.[3] Prognosis is excellent, with resection being curative in most cases.[4] Therefore, clinical suspicion and prudent interventions are essential for timely surgery, which is the key to avoid long-term morbidity and permanent damage to the mitral valve and associated apparatus.[5–7] Non-specific constitutional symptoms, biochemical abnormalities and mild cardiac symptoms may be overlooked in the absence of any history of cardiac disease, and cardiac investigations might not be performed. This would delay the diagnosis of this uncommon condition until the onset of more significant disease.

We report an atypical case of atrial myxoma, initially presenting with bronchoconstriction and wheeze, but no evidence of cardiac failure. Wheeze is an extremely common symptom of obstructive airway disease, such as chronic obstructive pulmonary disease (COPD) or asthma. However, non-resolution of symptoms on optimal bronchodilator therapy should prompt the clinician to consider alternative diagnoses, such as cardiac failure.

CASE PRESENTATION

A 58-year-old lifelong non-smoker attended the emergency department with acute dyspnoea; she had a known medical history of COPD diagnosed 2 years prior to the present admission, and was being managed with corticosteroids, long and short-acting β-2 agonists, and anticholinergic inhalers. Within the past year, she had been admitted four times with acute COPD exacerbations, with each episode requiring progressively longer inpatient stays; a history of significant weight loss was also elicited. CT of the chest had been carried out on several occasions over a 3-year period due to a previously noted right basal pulmonary nodule; scans had shown no increase in nodule size during this time frame and there were no changes typical of COPD. The patient's most recent discharge was accompanied with a prescription for home nebulisers. Initial examination, during the present admission, revealed respiratory distress with a respiratory rate of 32 breaths per minute and a harsh wheeze auscultated throughout the chest. Heart sounds were normal, venous pressure was not elevated and there was no peripheral oedema. ECG demonstrated sinus tachycardia, arterial gas analysis showed type 2 respiratory failure (defined by a PaO_2 of <8 kPa and a $PaCO_2$ of >6 kPa[8]) and a chest film showed clear lung fields (figure 1). Blood results revealed anaemia with haemoglobin of 10.3 g/dL, mean corpuscular volume 81.9 fL per cell, white cell count 10.9×10^9/L and C reactive protein of 13 mg/L. Based on a provisional diagnosis of another non-infective exacerbation of COPD, initial treatment

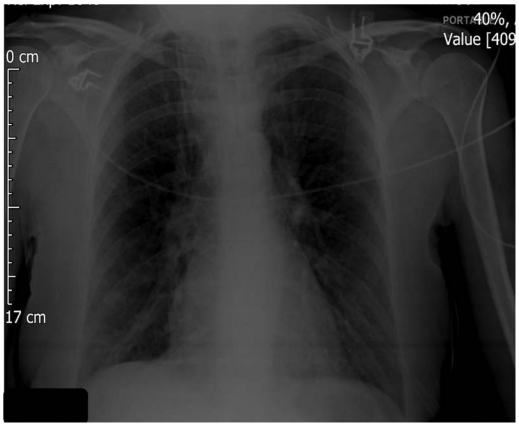

Figure 1 Admission chest film demonstrating hyperinflated lung fields but no pulmonary oedema or focal consolidation.

To cite: Sinha A, Apps A, Liong WC, *et al*. *BMJ Case Rep* Published online: [*please include* Day Month Year] doi:10.1136/bcr-2015-210751

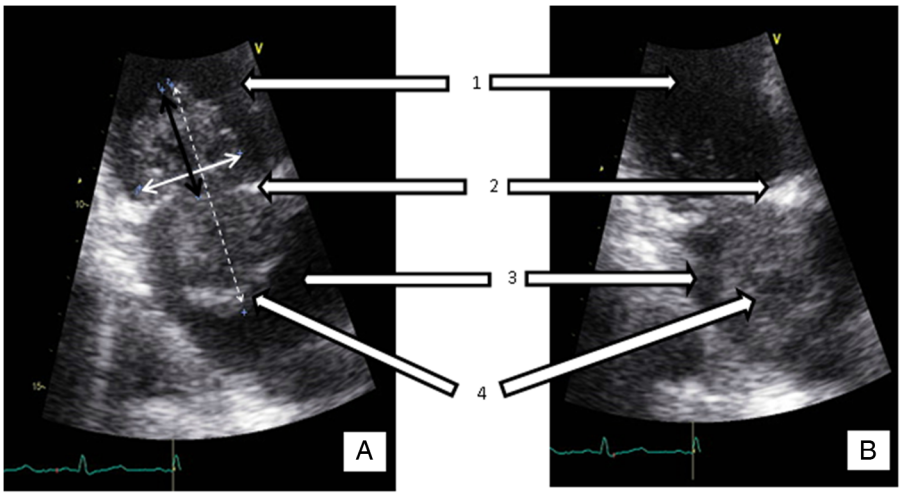

Figure 2 Apical two-chamber view transthoracic echocardiography zoomed in on mitral annulus demonstrating a hypermobile structure (myxoma) prolapsing 3 cm across the mitral valve annulus in diastole (black arrow), measuring 3.4 cm in diameter (solid white arrow) and 6.4 cm from interatrial attachment to tip of the tumour (dashed white arrow) (A). The same structure is contained within the left atrium during systole (B). Left ventricular cavity, mitral valve annulus, left atrium and myxoma are demonstrated by arrows 1, 2, 3 and 4, respectively.

with nebulisers and systemic steroids was instituted as per National Institute for Health and Care Excellence (NICE) guidelines.[9]

Although this management plan relieved her symptoms initially, the patient started to deteriorate after a short while, developing severe type 2 respiratory failure with poor respiratory effort. She was intubated after a failed trial of non-invasive ventilation. There was now clinical evidence of pulmonary oedema with crepitations and raised venous pressure. Transthoracic echocardiography (TTE) revealed a large left atrial mass, likely myxoma, prolapsing across the mitral valve in diastole (figure 2). Doppler interrogation of mitral valve inflow revealed evidence of consequent severe functional mitral valve obstruction with a mean pressure drop of 11.38 mm Hg (figure 3A); the mitral valve leaflets were normal.

The patient had an ECG-gated contrast-enhanced CT study of the heart to define the dimensions and attachments of the tumour (figure 4). Following this, she underwent surgical resection of the tumour, which was histologically confirmed to be a myxoma. She was reviewed at her respiratory clinic 8 weeks post discharge, her ambulant respiratory symptoms of dyspnoea and wheeze had completely abated; her daily inhalers were discontinued. Follow-up TTE revealed transmitral pressure gradient had normalised to 2.32 mm Hg (figure 3B), consistent with resolution of mitral valve obstruction.

DISCUSSION

Atrial myxomas are the commonest primary cardiac tumours (found exclusively within the heart) with an annual incidence of 0.5 per million.[1 2] The majority occur in the left atrium adhered to the fossa ovalis. Therefore, symptoms are most often of left-sided heart failure reflecting obstruction of the mitral valve, with 75% of patients presenting with pulmonary oedema.[10–12] Such symptoms are characteristically positional. Valvular obstruction may also lead to syncope or even sudden death. Other common presentations include embolic phenomenon in the systemic circulation (causing cerebrovascular accident) or constitutional symptoms, such as weight loss, fever or arthralgia, which is often ascribed to tumour production of the inflammatory cytokine interleukin 6 (IL–6),[13] which can be a useful marker of recurrence postsurgery. Clinical signs of atrial myxoma may include those of heart failure, including pulmonary congestion and a raised jugular venous pressure (a prominent A wave is seen in those remaining in sinus rhythm), a loud S_1 due to delay in mitral valve closure as a result of prolapse of the tumour into the mitral valve orifice, or an early diastolic 'plop' due to the myxoma impacting against the endocardial wall.

Our patient uniquely presented with wheeze and dyspnoea, initially with no clinical evidence of heart failure, and managed as a non-infective COPD exacerbation, with multiple similar presentations recently. On review, however, without typical CT appearances and formal pulmonary function testing, there was little evidence to support this diagnosis. Our patient's progressive respiratory symptomatology and weight loss may have been due to increasing tumour production of IL-6, given that tumour size has been shown to correlate with circulating interleukins and constitutional symptoms are shown to arise when IL-6 exceeds a certain threshold.[14] Furthermore, her recurrent symptoms of dyspnoea, wheeze and constitutional upset had started 2 years prior to her present admission. This is likely when the tumour mass became significant in size, given the growth rate of atrial myxoma approximates to 0.24–1.6 cm/year.[15] Alternatively, although possibly less plausible given resolution of symptoms was not necessarily accompanied by diuretic therapy, our patient's paroxysmal symptoms over the previous 2 years may

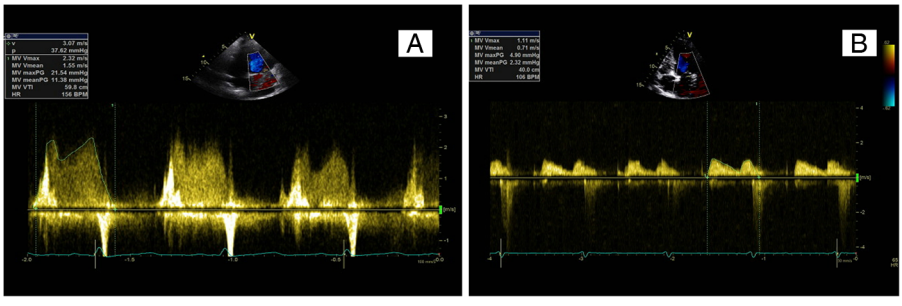

Figure 3 Pre (A) and postoperative (B) continuous wave Doppler interrogation of the mitral valve inflow, demonstrating severe functional mitral valve obstruction with a mean pressure drop of 11.4 mm Hg (A) normalising to 2.3 mm Hg (B) post-surgery.

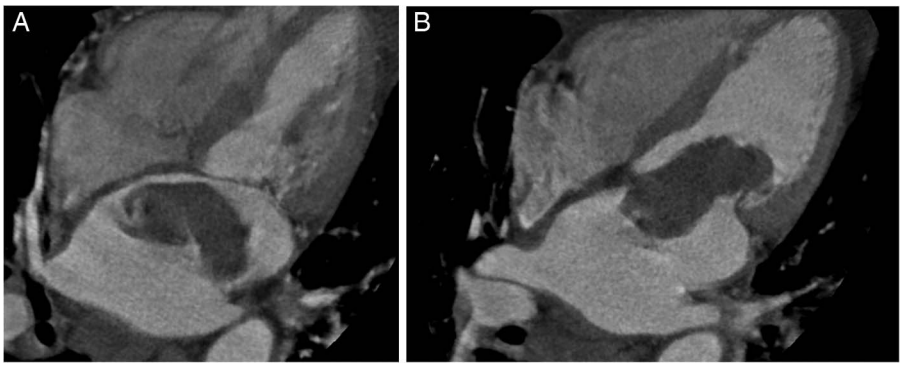

Figure 4 Four-chamber images from an ECG-gated contrast-enhanced CT study of the heart in systole (A) showed a large hypodense pedunculated mass lesion in the left atrium, which arises from the interatrial septum. The lesion prolapses through the mitral valve into the left ventricle in diastole (B). The features are typical of a left atrial myxoma.

have reflected intermittent high-grade mitral valve obstruction as the tumour grew in size. Stable heart failure presenting as wheeze is known as cardiac asthma,[16 17] and is often a precursor to frank left-sided heart failure. Here, elevated pulmonary venous pressures likely lead to bronchoconstriction[17 18] and mucosal swelling,[18] although the exact mechanism remains unclear. The inflammatory milieu associated with myxoma may have compounded bronchoconstriction in our case, causing pronounced early wheeze, initially responsive to bronchodilator therapy. Despite the uncertainty regarding the mechanism of our patient's recurrent presentations with wheeze and dyspnoea, cardiovascular deterioration prior to intubation during the present admission was unequivocally due to mitral orifice occlusion (figure 3A).

As was the case here, TTE is usually sufficient to diagnose atrial myxoma[4] and assess its size, location, attachment and mobility. Echocardiography was offered to our patient once pulmonary oedema had developed. Clearly, TTE cannot be offered to all patients presenting with new wheeze, but cardiac asthma should be considered in those patients presenting with breathlessness and wheeze who fail to adequately respond to initial bronchodilator therapy, who have rapidly progressive symptoms or in whom COPD would be unlikely (non-smokers). Transoesophageal echocardiography (TOE) is considered the gold standard for diagnosis of atrial myxoma due to its higher sensitivity, especially for smaller tumours compared to TTE.[4] The technique allows differentiation from intracardiac thrombus, accurate anatomical assessment of associated valvular structures, which may be destroyed as the tumour grows, and functional Doppler assessment for grading of stenotic or regurgitant valvular lesions. Such information is essential for surgical planning. Cardiac MRI[19] and cardiac CT[20] can be considered complementary to TOE in refining the differential diagnosis and delineating the anatomy prior to definitive management.

Early surgical resection after diagnosis is advised to reduce the likelihood of complications secondary to the myxoma.[4] Recurrence rates are 1–5% for sporadic cases and up to 20% for familial cases (10% of myxomas are inherited in an autosomal dominant manner).[21] Follow-up involves biannual echocardiography to detect any further growth.[21]

Learning points

- Cardiac wheeze should be considered in patients presenting with wheeze and dyspnoea who (1) do not improve with initial therapy of bronchodilators, (2) have rapidly progressive symptoms or (3) are unlikely to have obstructive airway disease such as chronic obstructive pulmonary disease (non-smokers).
- Transthoracic echocardiography should be performed on patients who fall in the above category. Such imaging may reveal cardiomyopathy or, as was in this case, a cardiac mass obstructing the mitral valve amenable to treatment.
- Atrial myxoma is the commonest primary cardiac neoplasm. This benign tumour commonly presents with heart failure, cerebrovascular accident or non-specific constitutional symptoms due to cytokine overproduction. Myxoma is easily recognisable on echocardiography and has an excellent prognosis after early resection, reducing the likelihood of complications and valvular destruction.

Acknowledgements The authors would like to thank our patient for her consent for this case report. The authors would like to thank the radiology departments at Wycombe Hospital and Harefield Hospital for providing us with the radiological images for this case report. The authors would also like to thank the echocardiography team at Wycombe hospital for their help.

Contributors AS and AA contributed to the drafting of the case report and carrying out revisions. SF contributed to expert advice regarding echocardiography in atrial myxomas. WCL contributed to expert advice regarding radiological imaging in atrial myxomas.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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