CASE REPORT

Pulmonary vein mass with extension to the left atrium diagnosed by echocardiography

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SUMMARY

We report a case of a man aged 65 years presenting with chronic cough, haemoptysis and intermittent atrial tachyarrhythmias on ECG. On 2D transthoracic echocardiography, an incidental left atrial mass was seen, initially thought to be a thrombus predisposed by intermittent atrial fibrillation. Transoesophageal echocardiography confirmed that this left atrial mass originated from a fixed, non-homogenous, right superior pulmonary vein mass with an extracardiac extension. Because of this finding, a thorough search for a primary focus lead to the discovery of a contiguous posterior mediastinal mass, which was a round cell neoplasm on histology. Management was deemed palliative. Although rare, left-sided cardiac masses should prompt the physician to search for a malignancy in the lung in high-risk patients, as haematogenous spread via the pulmonary vein is a potential mechanism for spread.

BACKGROUND

Metastatic invasion to the heart via the pulmonary vein is rare, and data are culled from case reports. Metastatic tumours were either diagnosed by a thromboembolic event or an obstruction of the vessel. MRI and a transoesophageal echocardiogram (TEE) are useful in differentiating tumours of the great vessels from a thrombus or adjacent pulmonary tumours.¹ We describe the role of echocardiography in the diagnosis and work-up of cardiac masses with an atypical location.

CASE PRESENTATION

We present a case of a man aged 65 years, heavy smoker, diagnosed laryngeal carcinoma s/p supra-cricoid laryngectomy and tracheostomy last 2007, with histopathology revealing squamous cell cancer with margins of resection free of disease. He came into our institution due to a history of prolonged cough with associated weight loss and bouts of blood-streaked sputum. His blood pressure was 100–120/60–80 mm Hg on all extremities with a heart rate of 80–90 bpm. He had a normal rate and regular rhythm, and there were no murmurs appreciated. He had occasional crackles on the right lung base. No lymphadenopathies were noted. Pulses were full and equal, no clubbing was noted and an O₂ saturation of 96–98% on all extremities.

INVESTIGATIONS

Laboratory examination revealed white cell counts of $6.17 \times 10^9/L$, haemoglobin of 113 g/L and normal blood chemistry. Prothrombin and activated

partial thromboplastin times were within acceptable limits. Sputum gram stain revealed normal respiratory flora and acid-fast bacilli negative. Chest X-ray revealed at the right lung base mass versus consolidation with normal cardiac shadow (figure 1A). ECG revealed regular sinus rhythm, normal axis and non-specific ST–T wave changes (figure 1B). Intermittent atrial tachyarrhythmias (eg, atrial fibrillation and atrial flutter) were also noted on cardiac monitor during his hospital stay.

Transthoracic echocardiography was performed to further evaluate possible cardiac cause of dyspnoea. Incidentally, an irregularly bordered heterogeneous left atrial mass was seen (figure 2). On further interrogation of the mass on short axis, the mass was fixed and attached to the posterior wall of the left atrium, which makes myxoma as the identity of the left atrial mass less likely (figure 3).

A TEE (figure 4) was performed to better characterise the mass and determine its attachment points. There was note of a fixed non-homogenous, irregularly shaped mass which seemed to be extracardiac in location (posterior to the heart). On minimal flexion of the probe at the midesophageal level at 0°, this extracardiac mass seems to be extending into the left atrium via the right superior pulmonary vein. Complete obstruction of the right superior pulmonary vein was deduced as there was

Figure 1 (A) Chest radiograph showing normal cardiac borders with the right lower lung lobe mass versus consolidation (arrow). (B) ECG showing regular sinus rhythm, normal axis, non-specific ST–T wave changes.

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Figure 2 Left atrial mass on 2D transthoracic echocardiography: a left atrial mass (arrow) measuring 15×18 mm was seen on the parasternal long-axis view. It was circumscribed with irregular borders, non-homogenous, and fixed. Attachment at this point was not ascertained. (LA, left atrium; LV, left ventricle; RV, right ventricle; Ao, aorta.)

Figure 3 The same left atrial mass (arrow) was seen on the short-axis view, measuring 14×18 mm. It was fixed and attached to the posterior wall of the left atrium. The features mentioned make a myxoma less likely. (RVOT, right ventricular outflow tract; AV, aortic valve; LA, left atrium.)

no flow appreciated on colour flow Doppler (figure 4). The fixed mass in the right upper pulmonary vein was fixed and non-homogenous, with the distal end protruding into the left atrium. The mass measures 18×36 mm, measured from the pulmonary vein into the left atrium (figure 5).

During the TEE procedure, the patient had documented cardiac dysrhythmia (atrial fibrillation in rapid ventricular response, figure 6), yet was haemodynamically stable and no desaturations were noted. He was given intravenous digoxin and amiodarone drip, which eventually resolved the transient arrhythmia.

Consequently, the patient underwent chest CT with contrast which showed posterior mediastinal mass, with intracardiac extension. CT-guided aspiration biopsy of the mediastinal mass was performed (figure 7A), which eventually revealed a round cell neoplasm on histopathology (figure 7B).

DIFFERENTIAL DIAGNOSIS

The incidental left atrial mass seen on transthoracic echocardiogram was thought to be a thrombus or a myxoma. However, it

Figure 4 (A) Transoesophageal echocardiography showing the mass in the pulmonary vein at the midesophageal level, 0°. (LA, left atrium; RA, right atrium.) (B) Colour flow Doppler on the right superior pulmonary vein showing the absence of flow, suggesting complete obstruction of this pulmonary vein. (LA, left atrium; RA, right atrium.)

Figure 5 Right superior pulmonary vein mass (arrow) extending to the left atrium, measuring 18×36 mm.

Figure 6 ECG showing acute atrial fibrillation with rapid ventricular response.

Figure 7 (A) Chest CT with contrast revealing posterior mediastinal mass with intracardiac extension (blue arrow). (LA, left atrium.) (B) Histopathology of the biopsied mass showed round/oval cells with minimal cytoplasm, salt and pepper chromatin without prominent clumps, hyperchromatic, indistinct nucleoli and frequent mitotic figures consistent with round cell carcinoma.

was non-homogenous and fixed, circumscribed with irregular borders and the attachment was not ascertained. The features mentioned make a myxoma and thrombus less likely. Likewise, the left atrial mass could have been mistaken for a coumadin ridge, which is a normal anatomical variant, or that of cor triatriatum sinistrum, resulting from minimal incorporation of the common pulmonary vein into the left atrium during embryogenesis. However, the latter two structures are commonly found between the left atrial appendage and left superior pulmonary vein, in contrast to our patient's case where the mass was actually an extension from a contiguous right superior pulmonary vein mass.²

TREATMENT

It can be deduced that the left atrial mass initially seen in transthoracic echocardiogram was a metastatic tumour, most probably from a new primary lung malignancy, which penetrated through the right superior pulmonary vein. Given that our patient had a preceding laryngeal squamous cell carcinoma 8 years prior, a new primary site of cancer rendered this patient a poor candidate for surgery and only palliative care can be offered at this point of management.

OUTCOME AND FOLLOW-UP

The patient did not consent for palliative chemotherapy, and unfortunately succumbed a month after, he was discharged.

DISCUSSION

Patients with cardiac tumours may present with cardiovascular-related or constitutional symptoms, but more often than not a

cardiac mass is discovered incidentally during an imaging examination performed for an unrelated indication. These incidental masses usually represent thrombi or vegetations, often occurring in a particular clinical milieu.³ Echocardiography is an accessible, non-invasive and low-cost imaging modality that can be vital in early diagnosis and management of cardiac tumours. It cannot be overemphasised that secondary malignant disease of the heart and pericardium is considerably more common than primary cardiac malignancy, with some estimates at 30–1000 times more common.⁴

Our patient was a man aged 65 years, with incidental finding of a left atrial mass on transthoracic echocardiography. On further non-invasive testing, for which in our case TEE was performed, the left atrial mass echocardiographic features were similar to the subsequent pulmonary vein mass seen and the biopsied posterior mediastinal mass (round cell neoplasm). The transient arrhythmia that occurred during the TEE was possibly due to the mass effect of the pulmonary vein mass, increasing the irritability of the sinus node.

Learning points

- ▶ Non-invasive imaging techniques such as echocardiography are a vital tool in detecting potential cardiac masses which could impact management and subsequently, prognosis in some patients.
- ▶ When you find an intracardiac mass, exhaust all efforts to determine its attachment.
- ▶ You must always ensure that when you see a left atrial mass or thrombus in a patient with strong risk factors, where pulmonary veins can also be visualised, especially through transoesophageal echocardiography, think of a spread from a primary lung malignancy, despite its rare mechanistic extension to the left side of the heart.

Contributors JLT (corresponding author), an adult cardiology fellow-in-training, was the fellow-in-charge, who, together with his consultant EOS, thoroughly thought of how to decipher the patient's clinical presentation and eventually provided optimum care for the patient. JAMA, an interventional cardiology fellow-in-training and research expert, was vital in providing constructive comments and revisions in the writing of this case report's manuscript. JDM, cardiology consultant and a level 3 echocardiographer, was an inspiration as well as a technical expert in the field of echocardiography, who spearheaded the diagnostic echocardiography which shed light to the proper management in the patient. EOS, cardiology consultant and an interventional cardiologist, was one of the attending physicians of the patient who guided the fellow-in-charge in managing the patient and who was kind enough to have given permission to have this case written and eventually published for contribution in the field of cardiovascular medicine.

Competing interests None declared.

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