Dilemmas of the Intracardiac Mass

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Identifying the cause of an intracardiac mass can be challenging and pose management dilemmas. Clinical features alongside investigations provide a key role in differential diagnosis.

Case 1

68-year-old man with hepatocellular carcinoma:
- Two months of dyspnoea, worsening over three days
- ABG: respiratory alkalosis and type 1 respiratory failure (O₂ saturations 84% on 10L)
- ECG: S1QT3 pattern
- CTPA: small non-occlusive pulmonary embolism and a large filling defect in right atrium and vena cava (Fig. 1). Differential diagnosis: tumour or thrombus?
- Given clinical picture, thrombus deemed most likely diagnosis and thrombolysis considered.
- Prior to thrombolysis, Cardiac magnetic resonance (CMR) was performed (Fig. 2) which showed the mass enhanced with contrast, consistent with blood flow within a tumour.
- He was kept comfortable and transferred to a hospice, where he died three days later.

Case 2

19-year-old woman with acute lymphoblastic leukaemia undergoing chemotherapy:
- ECG: sinus tachycardia rate 110
- Echo: right atrial mass 3cm x 2.4cm. Differential diagnosis: tumour, thrombus or vegetation?
- CMR: non-enhancing mass (Fig. 3) suggestive of thrombus, anticoagulation commenced.
- Second CMR (after 7 days): no significant interval change, and unusual central enhancement.
- Differential diagnosis:
  - atypical thrombus
  - incidental cardiac tumour or metastasis
  - inflammatory mass secondary to chemotherapy
- Cardiac CT: soft tissue mass with vascular features rather than typical thrombus appearance.
- Low-molecular weight heparin continued pending surgical review.
- Third CMR (after 60 days): reduced size of the mass
- Fourth CMR: complete resolution of mass (Fig. 4) seven months later, final diagnosis thrombus.

Causes of Intracardiac Masses

<table>
<thead>
<tr>
<th>Primary tumours</th>
<th>Secondary tumours</th>
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<tbody>
<tr>
<td>1. Atrial myxoma</td>
<td>Direct tumour extension</td>
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<tr>
<td>2. Benign non-myxoma</td>
<td>- Thymus</td>
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<tr>
<td>3. Malignant tumour (sarcoma &amp; lymphoma)</td>
<td>- Bronchus</td>
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<tr>
<td>4. Malignant tumour</td>
<td>- Breast</td>
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<tr>
<td>5. Non-occlusive thrombus</td>
<td>- Oesophagus</td>
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Dilemmas of the Intracardiac Mass

Cardiac CT

+ Short acquisition times
+ Can confirm the presence of fatty content or calcification
+ Aids identification of intralobesal blood flow (tumours)
- Better soft tissue contrast than echocardiography
- Radiation dose and the necessity of iodinated contrast

Key Features:
- Tumour – Calcification, enhancement due to intralobesal vascularity.
- Thrombus – Intralobesal enhancement atypial.

Echocardiography

+ Low cost and easily available
+ Assessment of shape, size, attachment and mobility
+ Optimum views for small masses that arise from valves

Cardiac MR

+ Modality of choice, ability for tissue characterisation
+ Wide field of view, high contrast, and multiplanar imaging
+ Allows planning for resection and chamber reconstruction
- Longer study time, higher cost and limited availability
- Unable to demonstrate calcification, small and valvular masses

Key Features:
- Tumour – Gadolinium-based contrast enhancement.
- Thrombus – Absence of contrast enhancement. Peripheral enhancement can be seen in chronic (organised) thrombus.

Other symptoms and signs

- Murmurs
- Systolic – Mass affecting closure of the atrioventricular valves or outflow tract
- Diastolic – Mass obstructing filling of ventricle
- Arrhythmias – infiltration of conduction tissue, or irritation of myocardiump

Constitutional – (tumours) fever, fatigue, rash, arthralgia, myalgia & weight loss

Learning Points

1. Dedicated cardiac imaging is required to distinguish between intracardiac tumours, thrombus and vegetations. Multi-modality imaging is frequently required.
2. The key imaging feature is contrast enhancement, which is seen in tumours and not in thrombi, although peripheral enhancement can be seen in an organised thrombus.
3. Distinction is critical for prognosis and to ensure appropriate therapy.
4. Where there is diagnostic uncertainty, full anticoagulation and antibiotic cover may be required and serial imaging can be used to assess for evidence of resolution or further growth.

References