

peer reviewed **CASE REPORT**

## A case report of cardiac metastases following diagnosis of melanoma

**Marliese Bredenhann** ND Rad: D; B Rad: D

Senior radiographer, Drs Bergman, Ross and Partners, Cape Town

### Abstract

Primary tumours of the heart are rare, but metastases of the heart and pericardium are more prevalent. The highest percentage of cardiac metastases are found in patients with a primary melanoma; with the heart or pericardium being the most affected. Computed tomography (CT) is one of the preferred imaging modalities for staging of malignant tumours. This case report describes cardiac metastases following diagnosis of melanoma in an elderly male patient.

**Keywords** pericardium, cardiac tumours

### Case report

An elderly male patient presented to a cardiologist with chest pain, fatigue and tachycardia. His cardiac examination included an echocardiogram (ECHO) that showed several masses within the heart, but could not accurately define the extent and number. The ECHO report also noted pleural effusions; no signs of myocardial infarction (MI) or acute ischemia. He had been diagnosed with a malignant melanoma on his left leg four years ago, and at that time his treatment was radiation, chemotherapy and immune booster therapy. He was referred for a computed tomography (CT) heart anatomy and function scan. This allowed for further evaluation of the cardiac masses, cardiac function and the presence of coronary artery disease.

Prior to the start of the enhanced CT examination, a light sedative (Azor 0.5 mg), and beta blockers (Lopressor 100 mg), were administered to reduce his heart rate to between 50 and 70 beats per minute (bpm). He was linked to an electrocardiogram (ECG) triggering monitor which allowed the CT data collection to correspond with the RR-peak. A helical dose reduction retrospective reconstruction scan was performed.

The CT images demonstrated an extensive septal mass extending into both atria and through the roof of the left atrium into the pericardium (Figures 1 and 2). A second lesion was seen at the right tricuspid valve region. A moderate sized pericardial effusion and bilateral pleural effusions were present as shown on Figures 1 and 2. In addition significant stenosis of the right coronary and the left

anterior descending artery, was identified as well as calcified plaque.

In view of his history, the intra-cardiac masses were thought to be consistent with metastases from the malignant melanoma. After the CT scan he was admitted to the intensive care unit for treatment of his symptoms. His prognosis was poor; the tumours were inoperable. Palliative treatment included emotional support, nutritional changes (low salt diet), relaxation techniques and other therapies. A multi-disciplinary approach was followed for his continued management.

### Discussion

Cardiac tumours are rare and mostly asymptomatic, making the diagnosis difficult. They are often identified as an incidental finding. Due to their position, biopsy for tumour identification is difficult.<sup>[1,2]</sup> Therefore, diagnosis often relies on radiological imaging and clinical history.<sup>[2]</sup>

There are several radiological CT features that can help differentiate between a malignant and benign cardiac mass. These include border, size, location, calcification and pericardial effusion.<sup>[2,3]</sup> Malignant cardiac tumours tend to be more lobular and ill-defined. Invasion of the pericardium, myocardium and adjacent cardiac structures can occur. Benign tumours are smaller; some have a thin pedicle attaching them to the myocardium whereas malignant tumours are usually broad based.<sup>[2,3]</sup> A cardiac mass should be considered suspicious for malignancy if a pericardial effusion is present and when the right atrial wall is involved.<sup>[3]</sup> In this case the patient's cardiac mass was

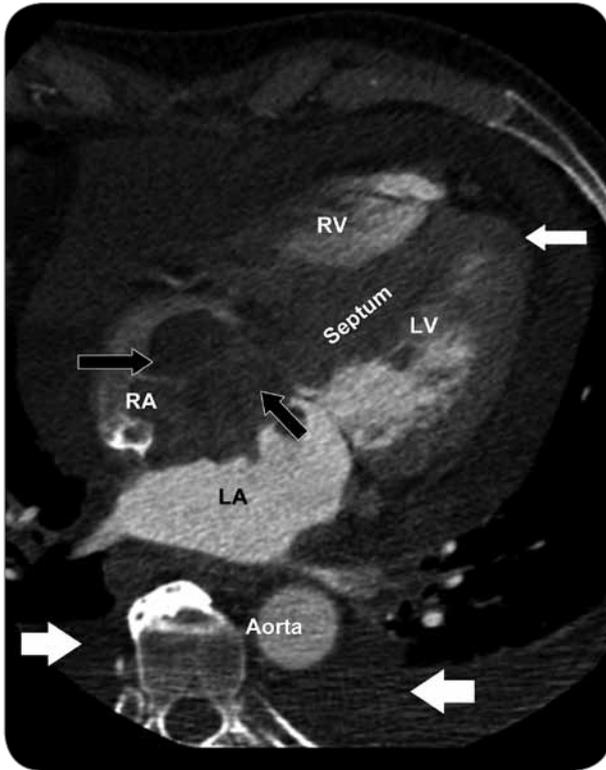
identified initially as an incidental finding on his ECHO during a routine cardiac work-up for chest pain.

The cardiac CT showed a number of malignant features. The mass was large (+/- 5 x 7 cm), lobular with ill-defined borders. It appeared to have a broad base; no pedicle was seen. No calcification was present. There was a moderate pericardial effusion. The position of this tumour was on the right atrial wall. These radiological CT features were highly suggestive of a malignant cardiac tumour.

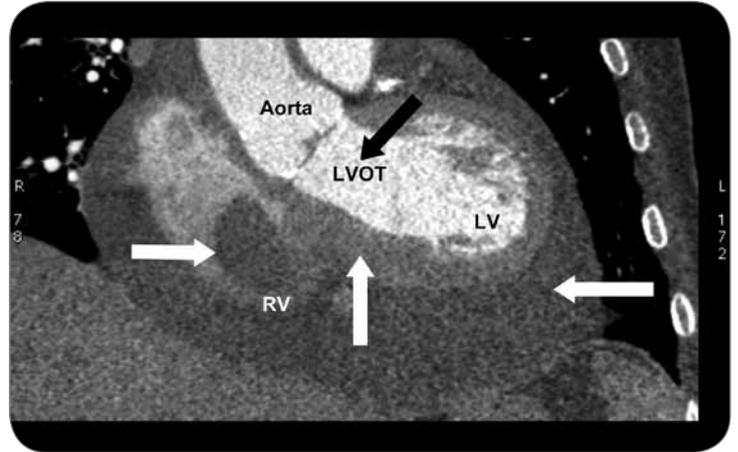
Cardiac tumours are rare with an estimated prevalence of 0.002% - 0.3%. Most primary cardiac tumours are benign.<sup>[4]</sup> Cardiac metastases are far more common than primary tumours with an estimated ratio of 30:1.<sup>[5]</sup> In the presence of a malignant primary tumour, cardiac metastases are found in 9.7% - 10.7% of cases.<sup>[6,5]</sup> The most common metastatic sites for a melanoma are: lungs, brain, liver, bones, and the heart (commonly on the right side of the heart).<sup>[5]</sup> Metastatic involvement arises frequently in the myocardium with a rate of 98%, in the epicardium and endocardium with frequency of 78% and 73%, respectively.<sup>[1]</sup>

Metastases can spread to the heart and pericardium by one of four ways.<sup>[4]</sup> These include retrograde lymphatic extension, haematogenous spread, direct contiguous extension, or trans-venous extension.<sup>[7,6]</sup> Haematogenous metastases in the heart and pericardium are usually accompanied by evidence of metastases in other organs, e.g. pulmonary metastases.<sup>[8]</sup>

The clinical symptoms of cardiac metastases and other cardiac diseases are simi-



**Figure 1 (left).** A contrast enhanced four-chamber view of the heart on abdomen window illustrating a lobular, ill-defined interatrial/interventricular septum mass involving both atria (see black arrows). Figure 1 also illustrates a large pericardial effusion (see top white arrow) and bilateral pleural effusions (see bottom white arrows). RA: right atrium; RV: right ventricle; LA: left atrium; LV: left ventricle.



**Figure 2 (above).** A contrast enhanced coronal oblique view through the left ventricular outflow tract (LVOT) on abdomen window. The left ventricular outflow tract is non-obstructed (see black arrow). The white arrow on the left demonstrates the inta-ventricular mass with diffuse involvement of the septum (see white vertical arrow). A large pericardial effusion is noted (see white arrow on the right). RV: right ventricle; LV: left ventricle.

lar. Both clinical presentations can include dyspnoea, chest pain, fatigue, cough, superior vena cava syndrome, congestive heart failure, arrhythmias, pleural effusions, obstructed right ventricular inflow/outflow and temporary ischemic attack.<sup>[6,9]</sup> This patient presented with chest pain, fatigue and an arrhythmia.

The heart can be visualised using CT, magnetic resonance imaging (MRI), echocardiography and ultrasound. Echocardiography is most frequently used to examine the heart, but CT, together with MRI, play a very important role in diagnosing metastatic disease.<sup>[6]</sup> Due to the practicalities of MRI (e.g. presence of pacemakers, need to remain supine for

long periods of time) cardiac CT has an important diagnostic role to play. It provides high quality spatial resolution and makes it possible to identify direct tumour extension from nearby mediastinal structures.<sup>[5]</sup> Another of its advantages is the ability to image bone, soft tissue and blood vessels at the same time.<sup>[4]</sup>

### Conclusion

Cardiac metastatic deposits are more common than primary cardiac tumours such as angiosarcomas.<sup>[7]</sup> In the presence of cardiac metastases, typically a patient will have other metastatic deposits before it spreads to the heart.<sup>[4]</sup> This patient had metastases in his colon, stomach and

lung. In the absence of tissue for a diagnosis, radiological features play an important role to help differentiate between a benign and malignant mass.

### Acknowledgement

Ethics permission to write this case report was obtained from the head of department of a private radiological practice, the patient and his doctors.

### Competing interests

The author has no financial or personal relationships which may have inappropriately influenced her in writing this case report.

### References

- Ozyuncu N, Sahin M, Altin T, Karaoguz R, Guldal M & Akyurek O. Cardiac metastasis of malignant melanoma: a rare cause of complete atrioventricular block. *Europace*, 2006; 8 (7): 545-548.
- Catalano O, Caracò C, Mozzillo N & Siani A. Locoregional spread of cutaneous melanoma: sonography findings. *AJR*, 2010; 194 (3): 735-745.
- O'Donnell DH, Abbara S, Chaithirapahan V, Yared K, Killeen RP, Cury RC & Dodd JD. Cardiac tumors: optimal cardiac MR sequences and spectrum of imaging appearances. *AJR*, 2009; 193 (2): 377-387.
- Goldberg AD, Blankstein R & Padera RF. Tumors metastatic to the heart. *American Heart Association*, 2013; 128 (16): 1790-1794.
- Wang ZJ, Reddy GP, Gotway MB, Yeh BM, Hettis SW & Higgins CB. CT and MRI imaging of pericardial disease. *RadioGraphics*, 2003; 23 (1): S167-S180.
- Chiles C, Woodard PK, Gutierrez FR & Link KM. Metastatic involvement of the heart and pericardium: CT and MRI imaging. *Radiographics*, 2001; 21 (2): 439-449.
- Villa A, Eshja E, Dallavalle S, Bassi EM & Turco A. Cardiac metastases of melanoma as first manifestation of the disease. *Journal of Radiography*, 2014; 8 (4): 8-14.
- Tesolin M, Lapierre C, Oligny L, Bigras J & Champagne M. Cardiac metastases from melanoma. *RadioGraphics*, 2005; 25 (1): 249-253.
- Cheruvu B, Cheruvu P & Boyars M. An unusual case of metastasis to the left side of the heart: a case report. *Journal of Medical Case Report*, 2011; 5 (23) 1-4.