CASE REPORT

A cardiac haemangioma: the contribution of myocardial contrast echocardiography in the diagnosis

Kyriacos Papadopoulos,¹ Constantinos Andreas Makrides,² Eleutherios Eleutheriou³

¹Medical Check-Up Centre, Nicosia, Cyprus

²Limassol Cardiology Centre, Limassol, Cyprus

³Hospital of Kyperounta, Limassol, Cyprus

Correspondence to

Dr Kyriacos Papadopoulos, kyriacospap@hotmail.com

Accepted 16 June 2015

SUMMARY

Cardiac haemangiomas are extremely rare and account for approximately 2% of all primary resected cardiac tumours. They can occur in any chamber and at any level, from pericardium to endocardium. Myocardial contrast echocardiography is an imaging tool for the assessment of myocardial microcirculation. It can also be used for the evaluation of the relative perfusion of a cardiac mass. We report a case of a 17-year-old male patient who was referred for cardiological evaluation because of a 2/6 systolic murmur. Transthoracic echocardiography revealed a mass in the left ventricle. Using myocardial perfusion contrast echocardiography, the mass was rapidly filled with contrast greater than the adjacent myocardium, suggesting intense vascularisation. The mass was successfully resected and the subsequent histopathological examination showed a cardiac haemangioma. Therefore, myocardial perfusion contrast echocardiography appears to be a valuable diagnostic tool in differentiating the different types of cardiac masses.

BACKGROUND

Primary cardiac tumours are considered to be among the rarest findings in cardiology and cardiac surgery. While their prevalence is estimated to be between 0.002% and 0.3% at autopsy,¹ 75% of these are benign and 25% are malignant.^{2–3} Cardiac haemangioma constitutes only 2.8% of primary cardiac tumours³ and can occur in any chamber and at any level, from pericardium to endocardium.

Until recently, it was difficult to make a definite diagnosis of cardiac tumours without autopsy. With advances in imaging techniques, the frequency of positive diagnosis of cardiac tumours has increased.

We present a case of a left ventricular (LV) haemangioma that was found during a transthoracic echocardiogram and was successfully resected.

We also used myocardial perfusion contrast echocardiography to evaluate the degree of cardiac mass vascularity. This technique appears to be a valuable tool in differentiating the different types of cardiac masses based on their vascular type analysis.

CASE PRESENTATION

A 17-year-old male patient presented to the emergency department of a private clinic with fever of 5 days duration. His medical history was unremarkable.

On physical examination, he had a temperature of 37.8°C, blood pressure of 132/90 mm Hg and a heart rate of 76 bpm.

Cardiac auscultation revealed normal first and second heart sounds and a systolic murmur of 2/6, best heard along the cardiac apex.

His ECG showed normal sinus rhythm, normal axis and no ST segment or T wave changes. Routine laboratory tests were within normal range. Chest radiography was normal.

The patient was diagnosed with viral infection and was referred to a cardiologist for further investigation of the systolic murmur.

INVESTIGATIONS

A transthoracic echocardiogram was performed, which showed a normal LV ejection fraction and a rounded echodense mass in the left ventricle. The mass appeared to be located on the lateral wall of the left ventricle, attached to the anterolateral papillary muscle (figures 1 and 2 and videos 1–3). Mild mitral regurgitation was also present, explaining the origin of the systolic murmur.

For the purpose of vascularisation evaluation, myocardial perfusion contrast echocardiography was performed during intravenous perfusion of Sonovue (Bracco) 0.2 mL. A high energy ultrasound pulse (flash) was used to destroy contrast, followed by the analysis of time-dependent mass refilling by the microbubbles. The mass was rapidly filled with contrast greater than the adjacent myocardium, suggesting an intense vascularisation (figure 3A–C and video 4).

TREATMENT

The patient was subsequently referred for elective excision of the cardiac mass because of its potential for embolisation and possible malignancy.

Figure 1 Transthoracic echocardiography (apical 4 chamber view) showing a rounded hyperechoic mass in the left ventricle.

CrossMark

To cite: Papadopoulos K, Makrides CA, Eleutheriou E. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-210075

Figure 2 Modified parasternal long-axis view of the echocardiogram showing an echogenic mass in the left ventricle.

A median sternotomy procedure was completed under general anaesthesia. Using cardiopulmonary bypass support and under cardioplegic rest with cooling, the LV tumour was totally removed. The resected material was sent for anatomopathological study.

OUTCOME AND FOLLOW-UP

The postoperative course was uneventful and without complications.

The final report from pathology confirmed the cardiac mass to be a haemangioma.

In postsurgery follow-up, the patient was in good condition with no recurrences on echocardiographic evaluation.

DISCUSSION

Haemangiomas are common benign congenital lesions; they most often occur in the skin but are occasionally found in internal organs.

Haemangiomas of the heart are rare tumours, accounting for only 2–3% of all benign cardiac neoplasms.³ They can occur at any age. In reported surgical series there is a predominance in male patients (around 65%).

They are made up of a proliferation of endothelial cells and classified histologically, according to the size of their vascular channels, into three types: capillary, cavernous and arteriovenous. Cavernous and capillary haemangiomas are the most frequently reported forms, however, a combination of all three features is also commonly seen, as well as those with fibrous and fatty components.⁴

Cardiac haemangiomas have been reported to occur in variable locations of the heart involving any cardiac layer, namely endocardium, myocardium or pericardium. The left atrium has

previously been suggested as the predominant location for cardiac tumours. However, recent evidence has shown no chamber predilection.

Although most haemangiomas are asymptomatic, they can present with arrhythmias, pericardial effusion, coronary insufficiency, left or right ventricular outflow tract obstruction, embolisation or congestive heart failure.^{5 6} Sudden cardiac death due to conduction disturbances as well as to cardiac rupture and pericardial tamponade, has been reported.⁵

Cardiac haemangiomas can occur in the clinical setting of Kasabach-Merritt syndrome, which is characterised by multiple systemic haemangiomas associated with recurrent thrombocytopaenia and consumptive coagulopathy.

Diagnosis is usually made by echocardiography, MRI and CT.

Echocardiography is a sensitive non-invasive method for detecting the tumour, with the cardiac haemangioma appearing typically as a hyperechoic lesion.

CT and MRI are complementary methods in the diagnostic work up of cardiac tumours. Cardiac haemangiomas appear heterogeneous on unenhanced chest CT scan, and, in most cases, intensely enhanced on CT performed after contrast material administration. Foci of calcification may also be seen.⁷ Cardiac haemangiomas typically demonstrate intermediate-to-high signal on T1-weighted images because of slow flow. On T2-weighted images, a diffusely high signal is seen. Contrast enhancement is heterogeneous, intense and prolonged, except in low-flow lesions.⁸

Coronary angiography will typically be an essential part of the preoperative assessment of the cardiac tumours to exclude obstructive coronary artery disease and also to evaluate the feeding arteries arising from the coronary vessels.

The natural history of cardiac haemangiomas is unpredictable. Patients with a resectable tumour usually have a good prognosis,

Video 1 Transthoracic echocardiography (apical 4 chamber view) showing a rounded hyperechoic mass in the left ventricle.

Video 2 Modified parasternal long-axis view of the echocardiogram showing an echogenic mass in the left ventricle.

Video 3 Modified parasternal long-axis view of the echocardiogram showing an echogenic mass in the left ventricle.

but those with an unresectable tumour may have a poor prognosis because of ventricular tachycardia, sudden cardiac death, local progression or systematic dissemination of the malignant tumour.⁹

Since the natural course of cardiac haemangiomas is variable, total resection is a favoured treatment.⁷

Haemangiomas of the heart, even when recognised preoperatively, are not always amenable to surgery. Successful resection can be performed only when the haemangioma is well

Video 4 Using myocardial perfusion contrast echocardiography, the mass demonstrating greater contrast enhancement than the adjacent myocardium, identifying its vascular nature: (A) baseline; (B) flash destruction of contrast microbubbles and (C) contrast replenishment.

circumscribed and small. Surgical resectability is evaluated with CT, MRI or coronary angiography.⁷

A variety of surgical approaches have been suggested. Median sternotomy with cardiopulmonary bypass is generally necessary for intracardiac tumours. While right-sided tumours can be approached by a right atriotomy, a left ventriculotomy for LV tumours is the best way to avoid postoperative LV dysfunction and arrhythmia.⁴

Myocardial perfusion contrast echocardiography is used for the assessment of myocardial microcirculation. Patients receive an injection of a 'contrast agent' directly through a vein into the blood stream. The contrast agent is made of minute microbubbles, smaller than red blood cells. The echocardiogram can detect these microbubbles in the small blood vessels of the heart muscle and allows us to find areas of the heart receiving less blood flow than others.

This report illustrates the use of myocardial contrast echocardiography in evaluating the degree of cardiac mass vascularity. In our patient, myocardial perfusion contrast echocardiography demonstrated greater contrast enhancement of the mass than the adjacent myocardium, identifying its vascular nature.

In conclusion, echocardiography is the imaging method typically used to identify the cardiac haemangioma initially; further characterisation of the tumour can be made using myocardial contrast echocardiography, which can demonstrate the vascularity of the cardiac mass. By differentiating vascular tumours or the neovascularisation of malignancy from the avascularity of thrombi and the sparse vascularity of benign stromal tumours, myocardial contrast echocardiography may aid in the early identification and appropriate treatment of cardiac masses.

Figure 3 Using myocardial perfusion contrast echocardiography, the mass demonstrating greater contrast enhancement than the adjacent myocardium, identifying its vascular nature: (A) baseline; (B) flash destruction of contrast microbubbles and (C) contrast replenishment.

Learning points

- ▶ Echocardiography is a sensitive non-invasive method for initial detection of a cardiac haemangioma.
- ▶ Further characterisation of the tumour can be made using myocardial contrast echocardiography, which can demonstrate the vascularity of the mass.
- ▶ Myocardial perfusion contrast echocardiography appears to be a valuable diagnostic tool in differentiating the different types of cardiac masses.
- ▶ Since the natural course of cardiac haemangiomas is variable, total resection is a favoured treatment.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Burke A, Virmani R. Tumors of the heart and great vessels. In: *Atlas of tumor pathology, 3rd Series, Fascicle 16*. Washington, DC: Armed Forces Institute of Pathology, 1996:1–98.
- 2 Van Trigt P III, Sabiston DC Jr. Tumors of the heart. In: Sabiston DC Jr, Spencer FC, eds. *Surgery of the chest*. Vol 2. 6th edn. Philadelphia: WB Saunders, 1995:2069–88.
- 3 McAllister HA Jr, Fenoglio JJ. Fascicle 15, 2nd Series: tumors of the cardiovascular system. In: *Atlas of tumor pathology*. Washington: Armed Forces Institute of Pathology, 1978.
- 4 Oueida FM, Lui RC, Al-Refae MA, *et al*. Left ventricular hemangioma. *Asian Cardiovasc Thorac Ann* 2014;22:77–9.
- 5 Huang CL, Feng AN, Chuang YC, *et al*. Malignant presentation of cardiac hemangioma: a rare cause of complete atrioventricular block. *Circ Cardiovasc Imaging* 2008;1:e1–3.
- 6 Esmaeilzadeh M, Jalalian R, Maleki M, *et al*. Cardiac cavernous hemangioma. *Eur J Echocardiogr* 2007;8:487–9.
- 7 Brizard C, Latremouille C, Jebara VA, *et al*. Cardiac hemangiomas. *Ann Thorac Surg* 1993;56:390–4.
- 8 Grebenc ML, Rosado de Christenson ML, Burke AP, *et al*. Primary cardiac and pericardial neoplasms: radiologic-pathologic correlation. *Radiographics* 2000;20:1073–103.
- 9 Tomizawa Y, Endo M, Nishida H, *et al*. Reconstruction of the left ventricle in a patient with cardiac hemangioma at the apex. *Ann Thorac Surg* 2001;71:2032–4.

Copyright 2015 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow