

Mitral valve blood cyst occlusion of the aortic valve leading to syncope: detection by transthoracic and contrast echocardiography

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Abstract

Blood cysts of the mitral valve are rare in adults. These blood cysts are often asymptomatic. Blood cysts resulting in severe left ventricular outflow tract obstruction leading to syncope have not been previously report. We report an adult who developed frequent syncope due to mitral valve blood cysts occluding the aortic orifice. This condition was detected by transthoracic and contrast echocardiography. The blood cysts were successfully removed. A pathological examination confirmed the diagnosis of blood cysts. Contrast echocardiography is a useful diagnostic modality for assessing cardiac blood cysts. This technique can play the same role as magnetic resonance imaging (MRI) in hospitals without MRI or in cases where MRI is not acceptable in an emergency.

Keywords

Blood cyst, echocardiography, contrast echocardiography, syncope, aortic orifice, mitral valve

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Introduction

Cardiac blood cysts are common congenital malformations in infants, and these gradually regress within the first few months of life in most cases.¹ Presentation of cardiac blood cysts in adulthood is rare. Moreover, a few of these cases occasionally develop

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complications, such as valvular dysfunction, embolic stroke, and ventricular outflow system obstruction.^{1,2} We report a case of an adult male patient who developed frequent syncope due to mitral valve blood cysts occluding the aortic orifice. This condition was detected by transthoracic and contrast echocardiography.

Case report

This study was approved by the Institutional Review Board of Wuhan Asia Heart Hospital and was conducted in compliance with the Health Insurance Portability and Accountability Act regulations and the Declaration of Helsinki. The Institutional Review Board waived the requirement for individual patient consent. A 32-year-old man visited a clinic because of frequent syncope and systolic murmurs. Transthoracic echocardiography (Figure 1a, b) showed a petal-like, movable, echolucent cystic mass (4.6×2.6 cm) that was attached to the chordae tendineae and papillary muscles of the anterior mitral valve (A2–A3). The mass was partly adhered to the wall of anterior mitral valve leaflet, and separation was seen in the mass. During systole, the cysts moved and obstructed the aortic orifice, leading to severe stenosis of the left ventricular outflow tract (Figure 1c). Contrast echocardiography was performed by using an intravenous administration contrast agent (SonoVue, sulfur hexafluoride $8 \mu\text{L}/\text{mL}$; Bracco Suisse SA, Geneva, Switzerland) with 7.5 mL saline and 1.5 mL SonoVue that were mixed for the first injection of 3 mL, followed by 1 mL every 10 seconds until the end of the procedure. Contrast perfusion imaging showed the absence of perfusion in the mass (Figure 1d, e). Findings in this case indicated the fundamental role of echocardiography for evaluating intracardiac masses because it supplied adequate information about size and attachment. Furthermore, contrast echocardiography was a necessary

supplement for diagnosis. After hospitalization, the patient had obvious symptoms and recurrent episodes. However, this patient failed to have scheduled magnetic resonance imaging (MRI) because of the frequent syncope. There were indications for emergency surgery and the blood cysts were successfully removed. Intraoperative transesophageal echocardiography and surgical exploration confirmed the preoperative ultrasound diagnosis (Figure 1f, g). A pathological examination confirmed the diagnosis of blood cysts.

Discussion

Cardiac blood cysts are congenital malformations that are commonly observed during infancy, but presentation of this condition in adulthood is rare. The pathophysiology and embryonic development of such cysts are still unclear. Several scholars have proposed various hypotheses. One hypothesis includes blood cyst formation during development of the valves as a result of passing and trapping blood in crevices that are later sealed. Another hypothesis is hematoma formation in the subvalvular apparatus, leading to occlusion of small branches of endarteritis. Cardiac blood cysts have been detected anywhere in the heart¹ since Hauser first used echocardiography to diagnosis cardiac blood cysts.³ Cardiac blood cysts have typical ultrasound features, including an echoless core and a thin wall with clear boundaries.² Some positions are fixed, but large cysts can move along with the cardiac cycle. Contrast echocardiography can accurately show the nature of the lesion, attachment, and blood perfusion of the mass. This technique can also be used to differentiate and diagnose infectious abscesses, solid masses, and vegetations in the heart chamber.

Surgery is often performed in symptomatic cases of cardiac blood cysts. However, a conservative approach can be used in

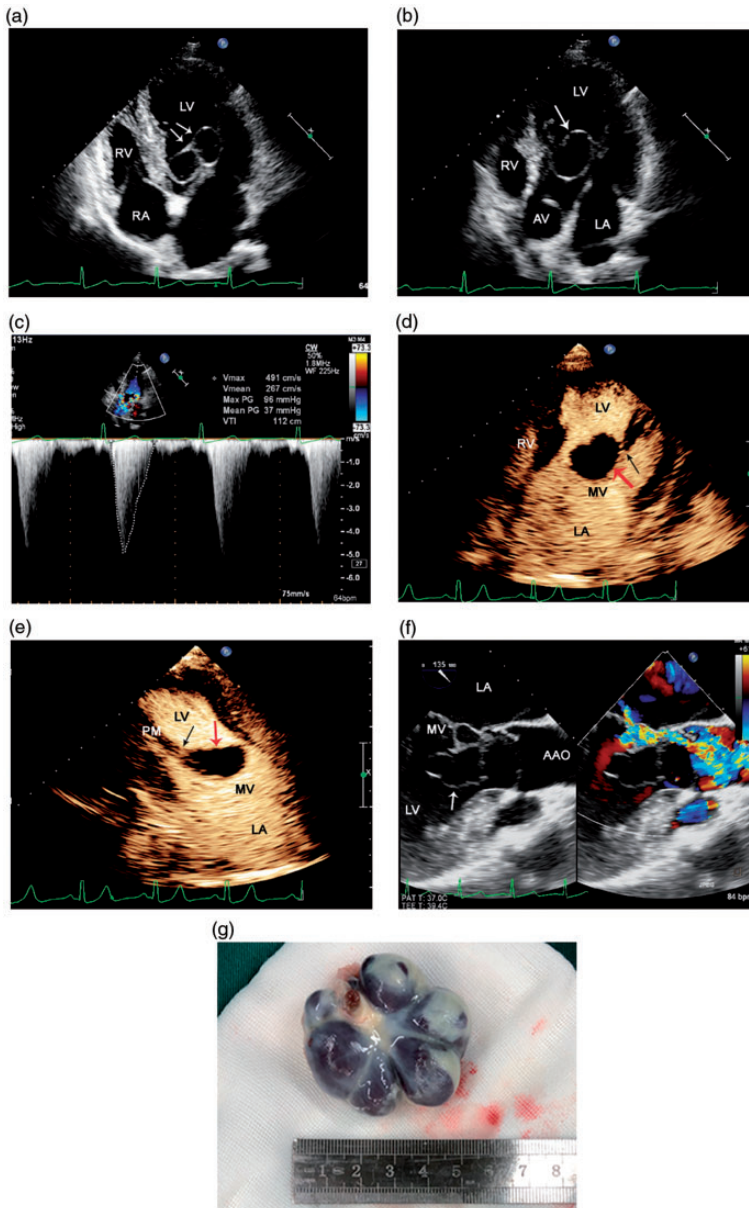


Figure 1. Transthoracic echocardiography in the apical four-chamber view (a) shows there is a cyst with multiple septae attached to the anterior leaflet of the mitral valve on the side of the left ventricle. The five-chamber view (b) shows obstruction in the left ventricular outflow tract. Accelerated blood velocity of the left ventricular outflow tract was estimated using continuous-wave Doppler (c). The absence of perfusion (d, red arrow) and its relationship with papillary muscle (e, black arrow) was detected by contrast echocardiography. The long-axis view of transesophageal echocardiography also shows blockage of the left ventricular outflow tract (f, white arrow). A gross surgical specimen (g) verified the previous ultrasound diagnosis. RA: right atrium; RV: right ventricle; LV: left ventricle; LA: left atrium; AV: aortic valve; MV: mitral valve; PM: papillary muscle; AAO: ascending aorta

asymptomatic patients with a small cyst or without valvular dysfunction, and echocardiographic follow-up is suggested.⁴ The frequent syncope in our case was caused by blood cysts blocking the aortic valve.

Transthoracic echocardiography is considered as the most useful imaging modality to assess intracardiac masses.⁵ Although pathological diagnosis is still essential, early rapid imaging for diagnosis and differentiation are important to further diagnosis and treatment. Contrast echocardiography for evaluating the tumor's perfusion is a useful tool for further assessment of cardiac tumors.⁶

To the best of our knowledge, we report the first case of giant mitral valve blood cysts that occluded the aortic valve and led to syncope as detected by transthoracic and contrast echocardiography. This diagnosis was confirmed by surgical and pathological examinations. Contrast echocardiography is a useful diagnostic modality for assessing cardiac blood cysts.⁷ This technique can play the same role as MRI in hospitals without MRI or in cases where MRI is not acceptable in an emergency.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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References

1. Dencker M, Jexmark T, Hansen F, et al. Bileaflet blood cysts on the mitral valve in an adult. *J Am Soc Echocardiogr* 2009; 22: 1085.e5-8.
2. Jacob JJ, Jose J, John B. Intracardiac blood-filled cysts of the heart: a rare cause of embolic stroke. *Singapore Med J* 2007; 48:e125-e126.
3. Hauser AM, Rathod K, McGill J, et al. Blood cyst of the papillary muscle. Clinical, echocardiographic and anatomic observations. *Am J Cardiol* 1983; 51: 612-613.
4. Yamamoto H, Nakatani S, Niwaya K, et al. Images in cardiovascular medicine. Giant blood cyst of the mitral valve: echocardiographic and intraoperative images. *Circulation*. 2005; 112:e341. doi: 10.1161/CIRCULATIONAHA.105.546390.
5. Meng Q, Lai H, Lima J, et al. Echocardiographic and pathologic characteristics of primary cardiac tumors: a study of 149 cases. *Int J Cardiol* 2002; 84: 69-75.
6. Kirkpatrick JS, Wong T, Bednarz JE, et al. Differential diagnosis of cardiac masses using contrast echocardiographic perfusion imaging. *J Am Coll Cardiol* 2004; 43: 1412-1419.
7. Haverkamp MC, Scholte AJ, Holman ER, et al. Contrast echocardiography as a useful additional diagnostic tool in evaluating a primary cardiac tumor. *Eur J Echocardiogr* 2005; 6: 388-391.