

Surgical Resection of Primary Cardiac Cavernous Hemangioma: A Case Report

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ABSTRACT

Cardiac tumors are rare. They were found in only 0.001%–0.300% of cases in a relatively recently reported autopsy series. Among cardiac tumors, primary hemangioma accounted for approximately 2.8% of all primary resected tumors, indicating this is a particularly rare benign neoplasm. We present a patient with a 5×3×2 cm cavernous hemangioma, arising from the right atrial roof and occupying the atrial septum and inseparable from the aortic root. We successfully accomplished a complete surgical resection of a cardiac cavernous hemangioma and reconstructed the cardiac atrium by a bovine pericardial patch.

INTRODUCTION

Cardiac tumors are so rare that only 0.001%–0.300% of cases were reported in a recently reported autopsy series [Jain 2010]. Among cardiac tumors, primary hemangioma accounted for approximately 2.8% of all primary resected tumors [Thomas 2004], indicating this is a particularly rare benign neoplasm. A cardiac hemangioma can present with one or more symptom, including chest distress and shortness of breath, outflow tract obstruction, congestive heart failure, coronary insufficiency, and even sudden death. Here, we present a patient with a 5×3×2 cm cavernous hemangioma, arising from the right atrial roof and occupying the atrial septum and inseparable from the aortic root. Consent was obtained from the patient for the publication of this report. Surgical resection was accomplished under open heart surgery with cardiopulmonary bypass.

CASE PRESENTATION

A 53-year-old male patient presented to the hospital with 6-year duration of fatigue. These symptoms had worsened over the last 2 months and were accompanied by shortness of breath and chest pain. His past medical history reflected alcohol abuse and alcoholic liver cirrhosis for 15 years. Echocardiography (ECHO) revealed a well-defined ovoid mass (33 mm×33 mm) in the interatrial septum. The lower edge of the mass was adjacent to the endocardial cushion (Figure 1A). (Figure 1) Computed tomography showed that a circular soft tissue density mass was seen in the middle of the atrial septum, and the lesion margin was regular. The tumor was closely related to the coronary sinus and inferior vena cava and the adjacent surrounding tissue structures, such as the aortic root, were compressed and deformed (Figure 1B). Fluorodeoxyglucose positron emission tomography revealed a soft tissue mass in the interatrial septum with slightly higher metabolism than the mediastinal blood pool. Benign or low-grade malignant lesions were considered. There was no clear abnormal increase of metabolism in other parts.

Cardiopulmonary bypass was established through ascending aortic cannulation and bicaval drainage (superior and inferior vena cava), and the heart was arrested. To our surprise, an oval mass was visible on the surface of the right atrial roof (Figure 2A, 2B). (Figure 2) The mass measuring 5×3×2 cm originating from the right atrial roof invaded the atrial septum but not through it. The mass adhered to the aortic root, resulting in moderate compression and deformation, and it also was closely related to the entrance of the superior vena cava and non-coronary sinus. We performed complete resection of the solid tumor and most of the right atrium and atrial septum. After incision, a large bovine pericardial patch then was sutured to the remaining biological tissue to reconstruct the atrial septum and right atrium. The operation successfully was finished, and the tumor was brought to the pathology department for further pathological diagnosis (Figure 2C, 2D). The cardiopulmonary bypass, cross-clamping times were 77 minutes and 54 minutes, respectively.

Histopathological examinations accord with the characteristic feature of cavernous cardiac hemangioma: dilated vascular spaces lined by a flat endothelium containing red blood cells (Figure 3A, 3B). (Figure 3) Postoperative transthoracic echocardiography revealed no tumor and a well-reorganized right atrium and atrial septum. The patient smoothly recovered and was discharged after 8 days, with

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plans of Warfarin anticoagulation treatment for 6 months. Half a year later, the patient underwent transthoracic echocardiography and no abnormalities were revealed.

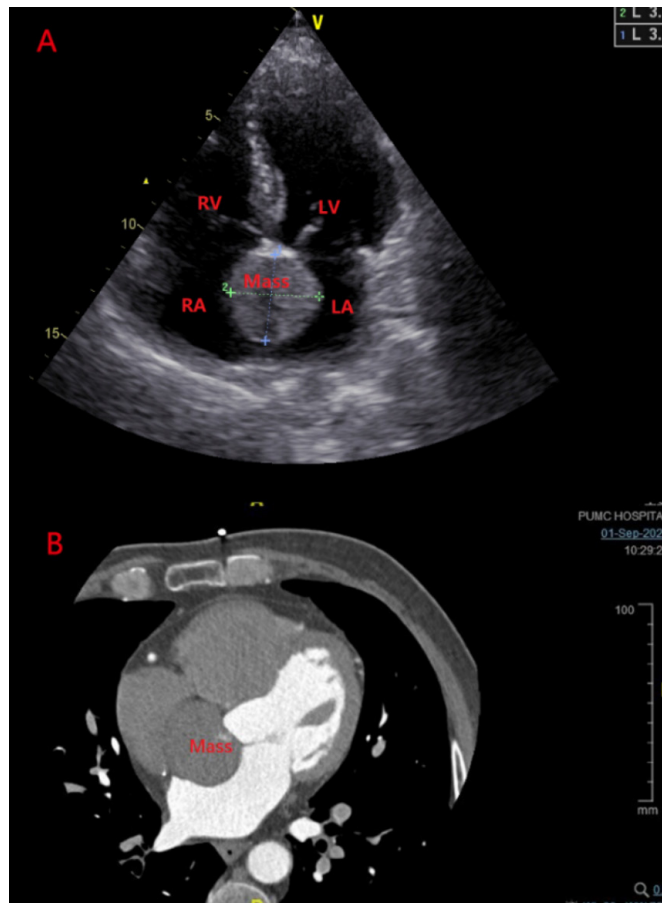


Figure 1. A) Transthoracic echocardiography image revealing a large mass (3.32*3.24cm) on the atrial septum. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle. B) Computed tomography showed that a circular soft tissue density mass was seen in the middle of the atrial septum.

DISCUSSION

Primary cardiac tumor (PCT) is a rare disease, and incidence data of PCTs are much lacking. Most literature data comes from autoptic studies or echocardiographic registries. One population study on PCT shows an incidence rate of 1.38 new cases per 100,000 residents per year [Cresti 2016]. Eighty percent of primary cardiac tumors are benign, while the other 20% are malignant [Grebenc 2000]. Myxoma is the most common benign primary cardiac neoplasm, as it accounts for approximately half of all cases. Other benign primary tumors include papillary fibroelastomas, rhabdomyoma, fibroma, hemangioma, and lipoma. Cavernous cardiac hemangioma, first described in 1893 [Esmailzadeh 2007], is rare and represents only 5% to 10% of benign cardiac tumors. To date, less than 100 cases have been reported in literature.

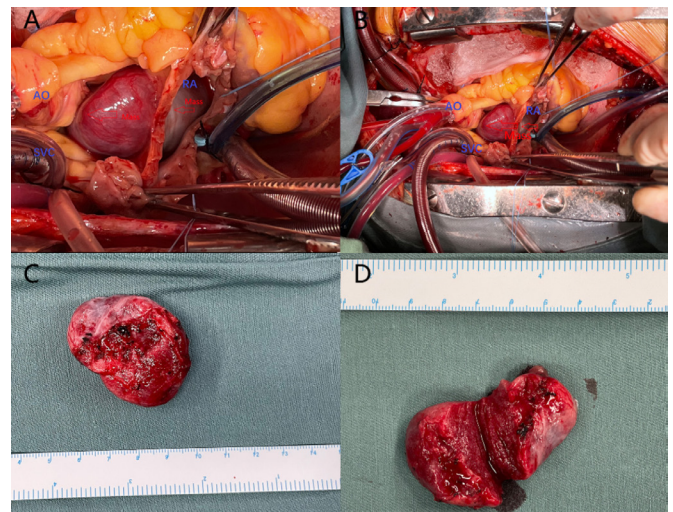


Figure 2. A and B) An oval mass was visible on the surface of right atrial roof, adjacent to the aortic root. It extended into the middle of atrial septum and was approximately 5*3*2cm in size. SVC, superior vena cava; AO, aorta; RA, right atrium. C and D) Gross view of resected mass.

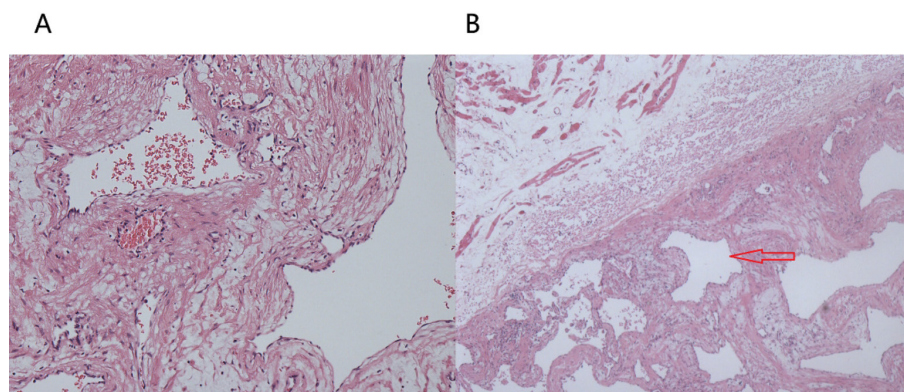


Figure 3. Histopathological examination showing endothelial cells and communicating dilated vascular channels (Hematoxylin-eosin, original magnification×100 A original magnification×40 B).

According to our patient's past medical history of liver cirrhosis, we first ruled out malignant tumor metastasis. We did a liver ultrasound and found there was nothing abnormal, with the exception of cirrhosis change. In addition, a blood test showed everything was normal in tumor marker examination. Fluorodeoxyglucose positron emission tomography revealed there was no clear abnormal increase of metabolism in other parts.

Cardiac hemangiomas can arise from any chamber of the heart and affect all layers of the cardiac wall. The epicardium is the most common location [Botha 2010]. One previous review [Kojima 2003] of 56 cardiac hemangioma cases showed 19 tumors were located in the left ventricle (33.9%), 20 in the right ventricle (37.5%), 13 in the right atrium (23.2%), 6 in the interatrial septum (10.7%), 6 in the interventricular septum (10.7%), and 4 in the left atrium (7.1%). Echocardiography, which is the imaging modality of choice, showed the initial identification of cardiac tumors. CT scan further helped us to define the important adjacent relationship of this solid mass. In our patient, based on preoperative scanning, the mass was assumed to be an intra-cardiac mass that arose from the atrial septum, and closely adhered to the aortic root. Surgery found it arose from the right atrial roof and occupied the atrial septum. Any cardiac mass, regardless of the location, can cause compression and obstruction effects, which are a significant concern. The patient's tumor occupied most of the atrium, compressed the aortic root, and had signs of palpitation and fatigue. Therefore, we performed tumor resection as soon as possible to avoid fatal cardiac events.

Previous reports have described cases of using a bovine pericardial patch to reconstruct the left ventricle in a patient with a cardiac hemangioma at the apex. In our case, we

believed it was necessary to re-organize the right atrium to avoid narrowing the lumen. So, we used the pericardial patch to reconstruct the right atrium and atrial septum. Finally, postoperative cardiac ultrasound showed the operation was satisfactory.

In conclusion, we finally performed complete surgical tumor resection for a huge cavernous cardiac hemangioma filling the cardiac atrium, using a bovine pericardial patch to successfully reconstruct the right atrium and atrial septum. Urgent surgery relieved the patient's symptoms, improving his life quality without serious complication.

REFERENCES

- Botha J, et al. 2010. A giant cavernous hemangioma of the heart. *Ann Thorac Surg.* 90(1): p. 293-5.
- Cresti A, et al. 2016. Incidence rate of primary cardiac tumors: a 14-year population study. *J Cardiovasc Med (Hagerstown).* 17(1): p. 37-43.
- Esmailzadeh M, et al. 2007. Cardiac cavernous hemangioma. *Eur J Echocardiogr.* 8(6): p. 487-9.
- Grebenc ML, et al. 2000. Primary cardiac and pericardial neoplasms: radiologic-pathologic correlation. *Radiographics.* 20(4): p. 1073-103; quiz 1110-1, 1112.
- Jain D, Maleszewski JJ, Halushka MK. 2010. Benign cardiac tumors and tumorlike conditions. *Ann Diagn Pathol.* 14(3): p. 215-30.
- Kojima S, et al. 2003. Cardiac hemangioma: a report of two cases and review of the literature. *Heart Vessels.* 18(3): p. 153-6.
- Thomas JE, et al. 2004. Asymptomatic right atrial cavernous hemangioma: a case report and review of the literature. *Cardiovasc Pathol.* 13(6): p. 341-4.