

Surgical Resection of Primary Cardiac Cavernous Hemangioma

Yulin Wen¹, Shuofang Yan¹, Qian Yan², and Guotao Ma¹

¹Department of Cardiac Surgery Peking Union Medical College Hospital Peking Union Medical College Chinese Academy of Medical Science Beijing China

²Department of Extracorporeal Circulation Fuwai Hospital Chinese Academy of Medical Science Shenzhen Shenzhen China

April 15, 2022

Abstract

Cardiac tumors are rare, which 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 that this is a particularly rare benign neoplasm. We presented a patient with a 5×3×2 cm cavernous hemangioma arising from the right atrial roof, occupying the atrial septum and inseparable from the aortic root. We successfully performed complete surgical tumor resection and reconstruction of the right atrium and atrial septum using a bovine pericardial patch for a huge cavernous cardiac hemangioma filling the cardiac atrium.

INTRODUCTION

Cardiac tumors are rare, in a relatively recently reported autopsy series, cardiac tumors were found in only 0.001%–0.300% of cases[1]. Among cardiac tumors, primary hemangioma accounted for approximately 2.8% of all primary resected tumors[2], indicating that this is a particularly rare benign neoplasm. A cardiac hemangioma can cause congestive heart failure, outflow tract obstruction, coronary insufficiency and even sudden death. Here, we presented a patient with a 5×3×2 cm cavernous hemangioma arising from the right atrial roof, occupying the atrial septum and inseparable from the aortic root. Surgical resection was accomplished under open heart surgery with cardiopulmonary bypass.

CASE PRESENTATION

A 53-year-old male presented to the hospital with 6-year duration of palpitation and fatigue. These symptoms had worsened in the past 2 months and were accompanied by shortness of breath and chest pain. His past medical history reflected alcohol abuse and alcoholic liver cirrhosis for 15years. 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). 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 were closely related to coronary sinus and inferior vena cava, the adjacent surrounding tissue structures such as aortic root were compressed and deformed(Figure 1B). Fluorodeoxyglucose positron emission tomography revealed 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 right atrial roof (Figure 2A,2B). The mass measuring 5×3×2 cm originating from the right atrial roof invaded atrial septum but not through it. The mass adhered to the aortic root, resulting in moderate compression

and deformation, and it also closely related to the entrance of superior vena cava and non-coronary sinus. We performed complete resection of the solid tumor and most of the right atrium, atrial septum. After incision, a large bovine pericardial patch was then sutured to the remaining biological tissue to reconstruct the atrial septum and right atrium. The operation was successful and the tumor was sent to the Pathology department for further examination (Figure 2C, 2D). The cardiopulmonary bypass, cross-clamping times were 77 and 54 min, respectively.

Histopathological examinations showed the dilated vascular spaces lined by a flat endothelium containing red blood cells, which is the characteristic feature of cavernous cardiac hemangioma (Figure 3 A,3B). Postoperative transthoracic echocardiography revealed no tumor and well-reorganized right atrium and atrial septum. The patient recovered uneventfully and was discharged on day 8, with plans for 6 months of coumadin.

Comment

Primary cardiac tumors (PCTs) is a rare disease, incidence of PCTs is not known. Literature data derive from autopsic studies or echocardiographic registries. One population study on PCT show an incidence rate of 1.38 new cases per 100,000 residents per year[3]. Of primary cardiac tumors, 80% are benign and 20% are malignant[4]. The most common benign primary cardiac neoplasm is myxoma, which 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[5], is an extremely rare phenomenon which accounts for only 5 to 10% of cardiac benign tumors. To date, less than 100 cases are reported in literature.

According our patient's past medical history of liver cirrhosis, we ruled out the malignant tumor metastasis firstly, we did the liver ultrasound and found there was nothing abnormal occupation except cirrhosis change, and also the 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 anywhere in the heart and can affect all layers of the cardiac wall, the epicardium is the most common location[6]. In a previous review of 56 cases of cardiac hemangiomas, 20 tumors were located in the right ventricle (37.5%), 19 in the left ventricle (33.9%), 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%)[7]. 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 case, based on preoperative scanning, this mass was assumed to be an intra-cardiac mass which arose from the atrial septum, and closely adhered to the aortic root. Whereas it arising from the right atrial roof and occupying the atrial septum in surgical findings. Because of compression and obstruction effects of any cardiac mass regardless of the location was of significant concern. The patient's tumor occupied most of the atriums, 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 left ventricle in a patient with a cardiac hemangioma at the apex. In our case, we believed that it was necessary to re-organized 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 that the operation effect was satisfactory.

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

References

1. Jain, D., J.J. Maleszewski and M.K. Halushka, Benign cardiac tumors and tumorlike conditions. *Ann Diagn Pathol*, 2010. 14(3): p. 215-30.

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

Figure Legends

Figure 1

A, Transthoracic echocardiography image revealing a large mass (3.32*3.24cm) on the atrial septum. LA, left atrium; LV, left ventricular; RA, right atrium; RV, right ventricular.

B, Computed tomography showed that a circular soft tissue density mass was seen in the middle of the atrial septum.

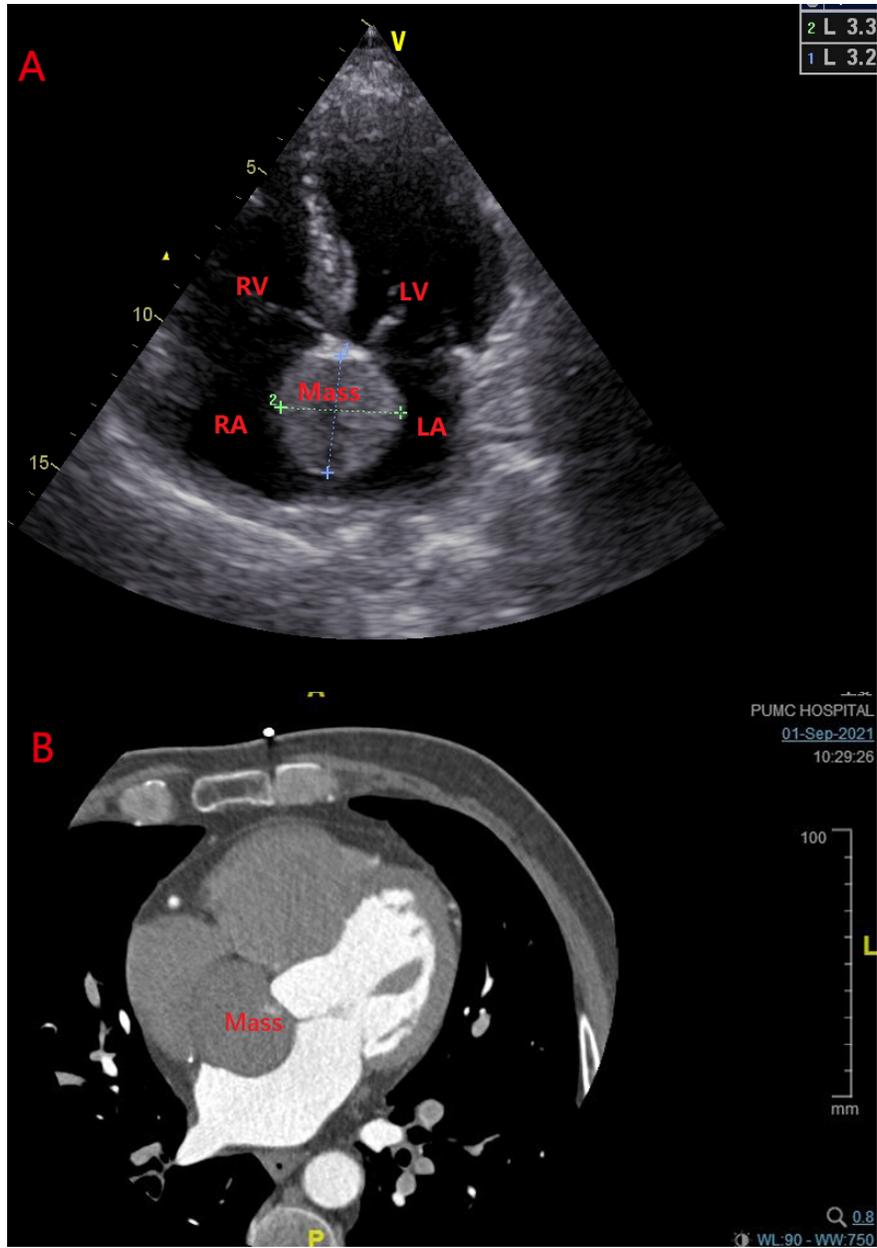
Figure 2

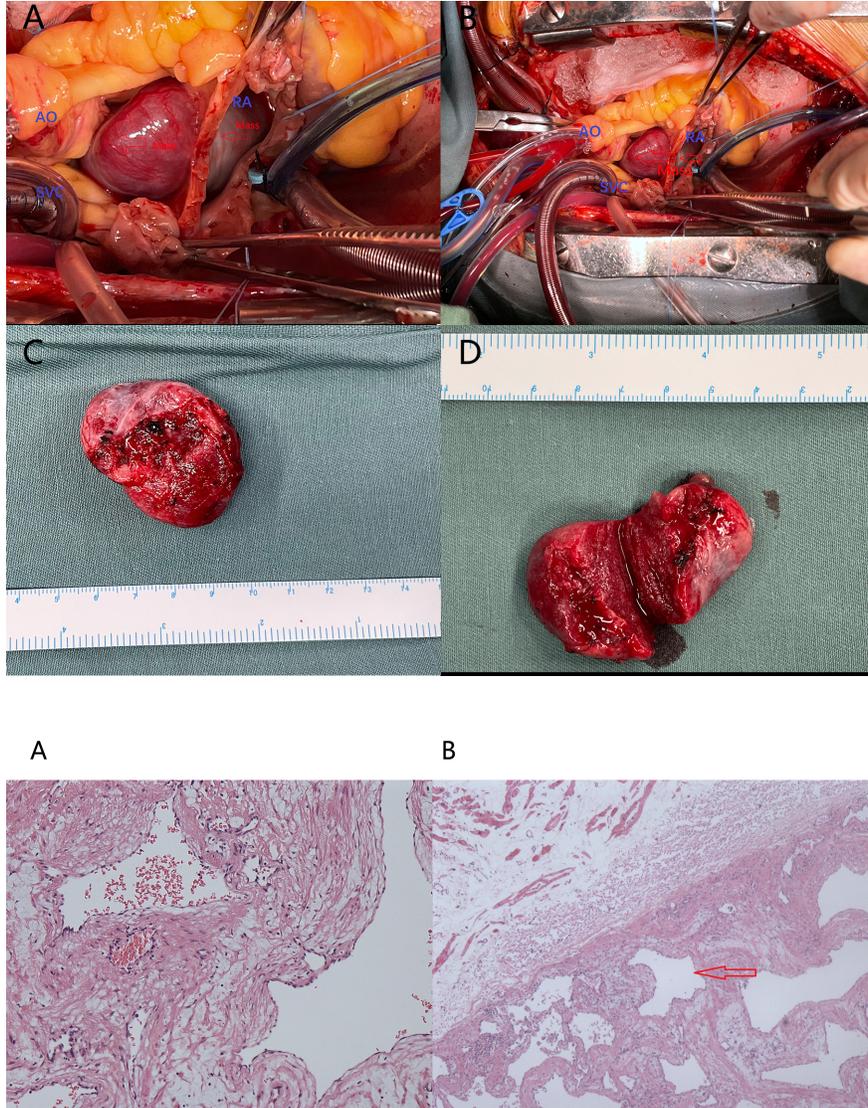
A B, A oval mass was visible on the surface of right atrial roof, adjacent to the aortic root, extended into the middle of atrial septum, It was approximately 5x3x2cm in size. SVC: superior vena cava; AO: aorta; RA: right atrium.

C D, Gross view of resected mass.

Figure 3

Histopathological examination showing endothelial cells and communicating dilated vascular channels. (hematoxylin-eosin, original magnification x100 A, original magnification x40 B)





Hosted file

figure .docx available at <https://authorea.com/users/476506/articles/565427-surgical-resection-of-primary-cardiac-cavernous-hemangioma>