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CASE REPORT

# Robotic-Assisted Resection of Rare Mitral Valve Hemangioma

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## Abstract

Cardiac hemangiomas are extremely rare tumors accounting for only 1.5%-2.5% of all cardiac tumors. According to most recent literature, only 13 mitral valve hemangiomas have been reported. A 78-year-old man was undergoing routine transthoracic echocardiography monitoring for an ascending aortic dilation when a vegetation on the mitral leaflet was incidentally detected. This lesion presented as a 0.5- × 0.6-cm mobile mass arising from the medial aspect of the A2 cusp. Despite the asymptomatic nature of the aforementioned lesion, resection was pursued given presumed diagnosis of papillary fibroelastoma and concern for risk of stroke. The mass was resected using minimally invasive robotic approach, and final pathology was consistent with hemangioma.

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Cardiac hemangiomas are extremely rare tumors accounting for only 1.5%-2.5% of all cardiac tumors. According to most recent literature, only 13 mitral valve hemangiomas have been reported.[1]

In this report, we present an incidental capillary hemangioma located in the mitral valve. This lesion was excised using a minimally invasive robotic approach with the assistance of an IntraClude balloon aortic occlusion.

## CASE REPORT

A 78-year-old man was undergoing routine transthoracic echocardiography monitoring for an ascending aortic dilation when a vegetation on the mitral leaflet was incidentally detected. Medical history included known ascending aortic dilation (45 mm) in the setting of tricuspid aortic valve, nonobstructive coronary artery disease, hypertension, hyperlipidemia, stage 3A chronic kidney disease, secondary polycythemia erythrocytosis, obstructive sleep apnea, benign prostatic hyperplasia, gout, and a remote history of sarcoidosis.

Surgical history included bilateral knee arthroplasties, bilateral cataract extractions, and distant history of inguinal hernia repair. Cardiac medications included metoprolol 25 mg, lisinopril 20 mg, and chlorthalidone 25 mg; aspirin 81 mg; ezetimibe-simvastatin 10-40 mg; and omega-3-dha-epa fish oil 1000 mg. Additional medications included allopurinol 300 mg and albuterol 90 μg/actuation both as needed, as well as weekly testosterone cypionate 50 mg. Patient was a former smoker and drank 3-4 alcoholic beverages per week. Preoperative electrocardiogram demonstrated sinus rhythm.

Transthoracic echocardiography demonstrated a mobile mass on the atrial surface of the anterior mitral valve leaflet measuring 0.5 cm × 0.6 cm. Concomitant trivial mitral regurgitation was noted. In addition, ascending aortic dilation continued to be stable at 46 mm (upper limit of normal 44 mm), sclerosis of the aortic valve was present without stenosis or regurgitation, and ejection fraction was within normal limits at 62% as calculated by 2-dimensional biplane volumetric left ventricular ejection fraction. Transesophageal echocardiography was performed to further evaluate the mass and demonstrated a 0.5- × 0.5-$cm^2$ homogenous, mobile mass attached by a stalk to the atrial side of the middle body of the anterior mitral leaflet. Specifically, the mass seemed to arise from the medial aspect of the A2 cusp (Figures 1 and 2).

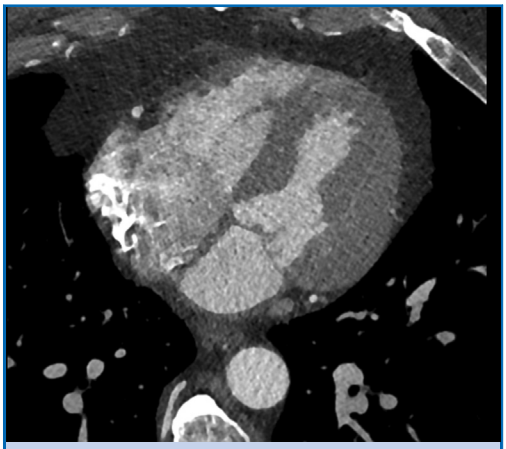

**FIGURE 1.** Computed tomography cardiac angiogram; nodular thickening identified at anterior mitral leaflet.

Differential for the mass included papillary fibroelastoma. Less likely alternatives included myxoma, thrombus, or vegetation.

Although the patient was asymptomatic, shared decision making with patient and family resulted in a plan to remove the mass owing to increased stroke risk attributed to the patient's previous testosterone therapy. A minimally invasive robotic approach was selected with the use of an IntraClude balloon. Despite the patient's dilated ascending aorta, we elected to proceed with the aforementioned device given overall anatomy and procedure to be undertaken.

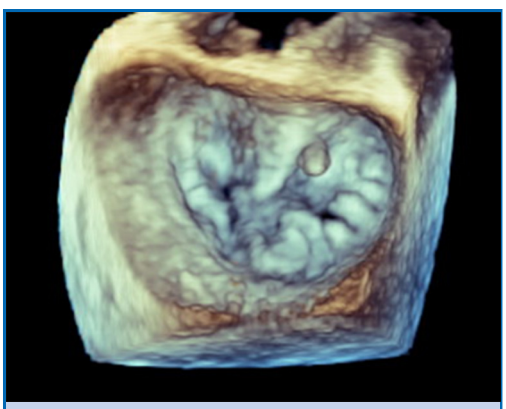

**FIGURE 2.** Transesophageal echocardiogram of mitral valve lesion, located on the medial aspect of A2 cusp.

After induction of general anesthesia and placement of a double-lumen endotracheal tube, the right femoral artery and vein were exposed through a groin incision. A right lateral thoracotomy was performed entering the fourth intercostal space. The pericardium was opened longitudinally. A 23-F IntraClude balloon cannula was placed in the right femoral artery (Edwards Life Sciences Research Medical), and a 25-F venous cannula (Edwards Life Sciences Research Medical) was placed in the right femoral vein along with a 16-F venous cannula (Edwards Life Sciences Research Medical) in the right internal jugular vein. Once robot ports were positioned, cardiopulmonary bypass was commenced, and the patient was cooled to 34 °C. After adequate sealing of the ascending aorta with the endo balloon, 1 L of cold blood Del Nido cardioplegia was administered into the aortic root. The left atrium was opened parallel to the interatrial groove. The mass was identified on the atrial surface of the anterior mitral leaflet and resected using sharp dissection (Figure 3). Low-voltage electrocautery was applied to the base to prevent recurrence. The rest of the valve was inspected and no other pathology identified. The left atriotomy was closed allowing the heart to fill with blood as the suture line was completed. The endo balloon was deflated after 21 minutes of aortic occlusion (clamp) time. A spontaneous sinus rhythm developed as the patient was warmed to 37 °C. Cardiopulmonary bypass was discontinued with satisfactory hemodynamics. Transesophageal echocardiographic evaluation demonstrated no residual

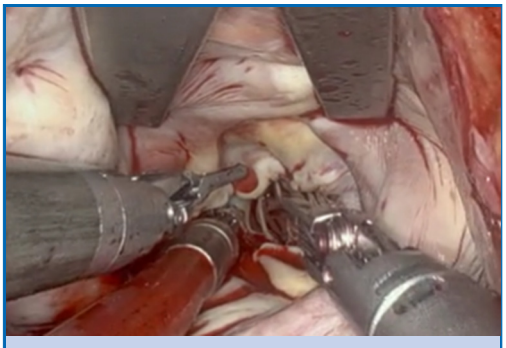

**FIGURE 3.** Intraoperative assessment of mitral valve lesion.



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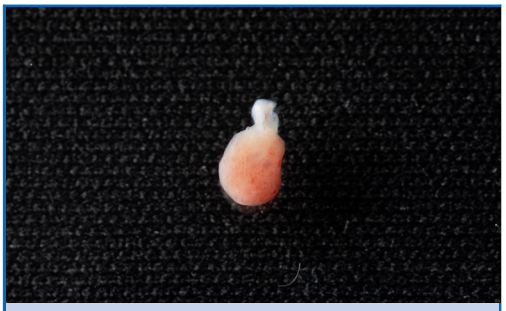

**FIGURE 4.** Resected specimen.

mass, no change in valvular disease, good biventricular function, and no regional wall motion abnormalities. The balloon and cannulas were removed in a standard fashion. The pericardium was closed with interrupted silk sutures, and drains were placed.

Surgical specimen (Figure 4) was sent for pathology and was determined to be capillary hemangioma. After surgery, the patient was extubated in the operating room and had an uneventful recovery. Aspirin 81 mg was resumed during hospitalization, and apixaban 5 mg was initiated for a 6-week course after hemangioma removal.

The addition of apixaban to the mentioned regimen was based on attending preference. No relevant changes to his electrocardiogram were noted. His hospital stay was 3 days. On follow-up, he was doing well with no signs of recurrence.

## DISCUSSION

Primary benign tumors account for around 80% of cardiac tumors. Myxomas are most frequently observed, followed by papillary fibroelastoma, lipoma, fibroma, and rhabdomyomas.[2]

Cardiac hemangiomas are extremely rare tumors accounting for only 1.5%-2.5% of all cardiac tumors. They can be classified as capillary, cavernous, mixed, and arteriovenous based on histology. According to most recent literature, only 13 mitral valve hemangiomas have been reported. Mean age of diagnosis is 43 years with no apparent difference in prevalence between males and females.[1]

Often asymptomatic as noted in our patient, these lesions can also manifest with dyspnea, chest pain, syncope, or other heart failure symptoms. Standard preoperative workup for candidates of cardiac surgery including electrocardiograms, echocardiography, coronary angiography, and computed tomography help to determine the dimension and location of the lesion.

Most often located in the right ventricle,[3] cardiac hemangiomas that have been described are usually between 1 and 3 cm in size and pedunculated. Operative intervention is often chosen for these lesions owing to their unpredictable development: indeed, lesions can not only involute but also grow indefinitely. Nonoperative management has been described only in select case reports in patients with high-risk anatomy or extensive comorbidities. In our specific case, diagnosis was not certain: thus, resection had both diagnostic and therapeutic intentions. Resection seems to be curative based on a mean follow-up of 9 months; however, given cases of recurrence that have occurred after 10 years,[4] continued monitoring is warranted.

## CONCLUSION

A robotic approach with IntraClude balloon aortic occlusion was used to excise a cardiac hemangioma located on the atrial aspect of the mitral valve. Hemangiomas are rare—1.5%-2.5% of primary heart tumors, and are most often located in the right ventricle. Only 13 cases of mitral valve hemangiomas have been reported. Continued follow-up after resection is warranted given reports of delayed recurrence.

## POTENTIAL COMPETING INTERESTS

The authors report no competing interests.

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## REFERENCES

1. Van-Bernal JF, Teran-Villagra N, Garcia-Diego O, Sarralde JA. Lymphocyte-rich capillary-cavernous hemangioma of the mitral valve: a case report and review of the literature. *Cardiovasc Pathol*. 2017;28:59-63. https://doi.org/10.1016/j.carpath.2017.03.003.

2. Sakai K, Tanigawa K, Odate T, et al. A cardiac hemangioma treated by a right minithoracotomy approach with thoracoscopic assistance. *Gen Thorac Cardiovasc Surg*. 2016;64(1):34-37. https://doi.org/10.1007/s11748-013-0356-8.
3. Kojima S, Sumiyoshi M, Suwa S, et al. Cardiac hemangioma: a report of two cases and review of the literature. *Heart Vessels*. 2003;18(3):153-156. https://doi.org/10.1007/s00380-003-0699-7.
4. Colli A, Budillon AM, DeCicco G, et al. Recurrence of a right ventricular hemangioma. *J Thorac Cardiovasc Surg*. 2003;126(3):881-883. https://doi.org/10.1016/S0022-5223(03)00720-7.