Robot-Assisted Management of Spontaneous Intramural Left Atrial Hematoma Mimicking an Atrial Mass

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Abstract

Spontaneous Intramural left atrial hematoma that mimics a primary or metastatic cardiac tumor is a very rare entity. We report a case of a 60-year-old man suffering from chronic myeloid leukemia, who was admitted for prolonged chest pain and fatigue. Transthoracic echocardiography revealed a left atrial mass in close proximity to the posterior mitral annulus and failed to provide an ethiological diagnosis. Surgical management was utilized to outrule the atrial neoplasm and to prevent emboli, obstruction and mitral valve insufficiency. This is the first case in the literature in which robot-assisted minimally invasive surgery was adopted to manage such a rare entity.

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Short Running Title: Robotic Management of Atrial Mass

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Key-words: robot-assisted, left atrial mass, leukemia, minimally invasive

ABSTRACT

Spontaneous Intramural left atrial hematoma that mimics a primary or metastatic cardiac tumor is a very rare entity. We report a case of a 60-year-old man suffering from chronic myeloid leukemia, who was admitted for prolonged chest pain and fatigue. Transthoracic echocardiography revealed a left atrial mass in close proximity to the posterior mitral annulus and failed to provide an ethiological diagnosis. Surgical management was utilized to outrule the atrial neoplasm and to prevent emboli, obstruction and mitral valve insufficiency. This is the first case in the literature in which robot-assisted minimally invasive surgery was adopted to manage such a rare entity.

Key words: intramural left atrial hematoma, robot-assisted, minimally invasive

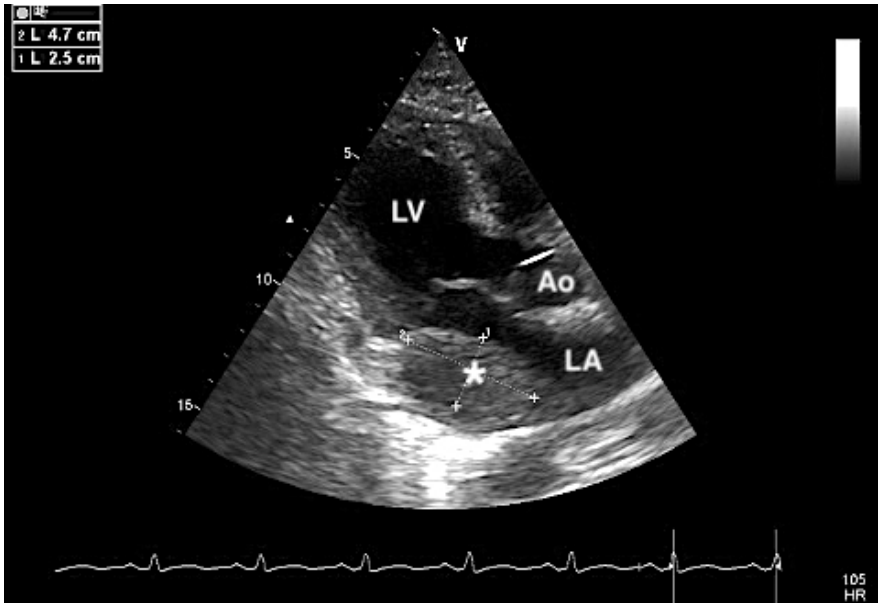
INTRODUCTION

Left atrial intramural hematoma (LAIH) is a rare occurrence that has been documented as associated with percutaneous coronary interventions or surgical cardiac procedures, radiofrequency ablations, mitral annular calcification[3], myocardial infarction, blunt chest trauma and dissecting aneurysm of the aorta[1-5]. The robot-assisted minimally invasive approach, increasingly popular in recent years, was used to surgically manage this case of spontaneous LAIH mimicking a left atrial mass; until now, the literature contains no reports of this approach to managing this rare entity.

CASE REPORT

A 60-year-old man presented to our hospital with prolonged atypical chest pain, progressive shortness of breath and fatigue. At the time of admission, his haemodynamic status was stable and electrocardiogram, chest X-ray findings were normal. Subsequent laboratory tests revealed a white blood cell count of 66,54 K/uL (normal value: 4,23-9,07). Transthoracic echocardiography (TTE) revealed a left atrial mass (4,7 x 2,5 cm) attached to the posterior wall and inter-atrial septum in close proximity to the posterior mitral annulus, and minimal pericardial effusion (Figure 1).

Figure 1: Modified parasternal long-axis transthoracic echocardiogram (preoperative). *Left atrial mass (4,7 x 2,5 cm) attached to the posterior wall and inter-atrial septum. LA, Left Atrium; Ao, Aorta; LV, Left Ventricle.



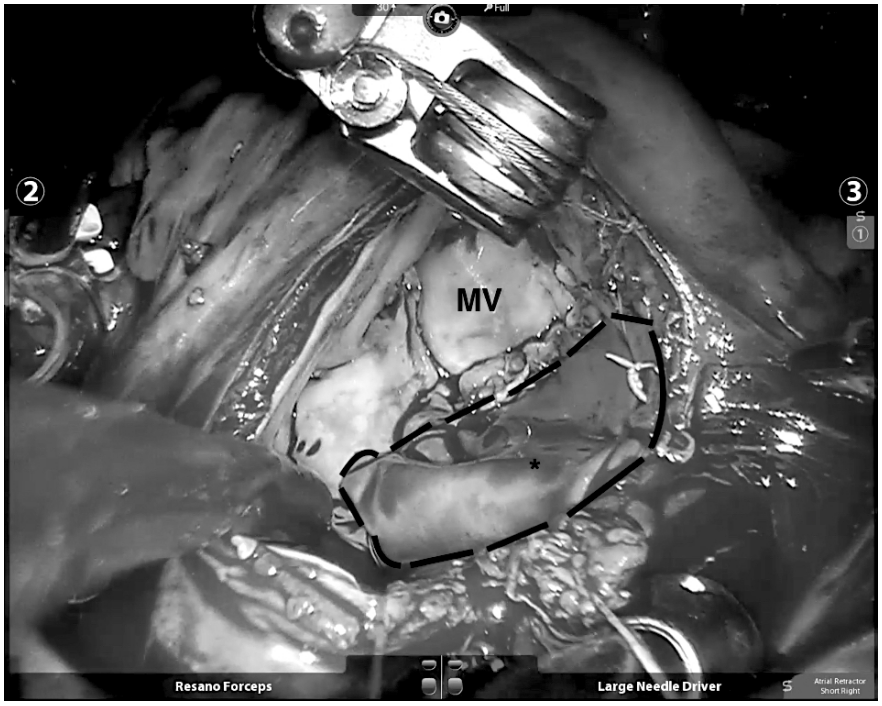
Increased mitral inflow velocity and prolonged pressure halftime on pulsed wave Doppler recordings indicated a blockage of the blood flow to the left ventricle. No color flow was observed through the mass. Bone marrow biopsy, immunohistochemichal evaluation, genetic testing and translocation analysis showed BCR-ABL translocation t(9;22) p210 transcription positive chronic myeloid leukemia. A left atrial neoplasm (primary or metastatic) was the presumptive diagnosis, and surgical exploration was planned. Coronary angiography revealed normal coronary arteries.

After the patient was appropriately positioned, the right lung was deflated. A 3- to 4-cm right inframammary thoracotomy lateral to the nipple was made and the pleural cavity was entered through the 4^{th} intercostal space (ICS). Trocars were placed in the third and fifth ICS. A working port and camera trocar were placed through the incision. Considering that a dynamic mitral retractor might be necessary during the operation, another trocar was inserted through the submammary 4^{th} ICS. Femoral arterial and venous cannulation was made to establish perfusion. An additional second venous drainage cannula was inserted percutaneously in the SVC via right internal jugular vein. Cardiopulmonary bypass was established and pericardial entry and suture retractions were made. External inspection of the mediastinium showed no evidence of infiltrating mass or pericardial adhesions. Antegrade cardioplegia needle placement in the ascending aorta was followed by introduction of a transthoracic aortic cross clamp (Chitwood clamp) through the transverse sinus in the 2^{nd} ICS in the posterior axillary line and deployed. Myocardial protection was provided by systemic cooling (28°C) and cold-blood cardioplegia. Left atriotomy was made and an intramural mass was observed in the posterior wall of the LA bulging into the cavity. No infiltration in and outside of the LA wall was found. The endocardium was incised and several pieces of yellow-cream colored elastic tissue were excised from a non-encapsulated cavity (Figure 2).

Figure 2: Intraoperative image. MV, Mitral Valve; *, yellow-cream colored elastic tissue localized in the posterior left atrial wall; dotted line, left atrial wall.

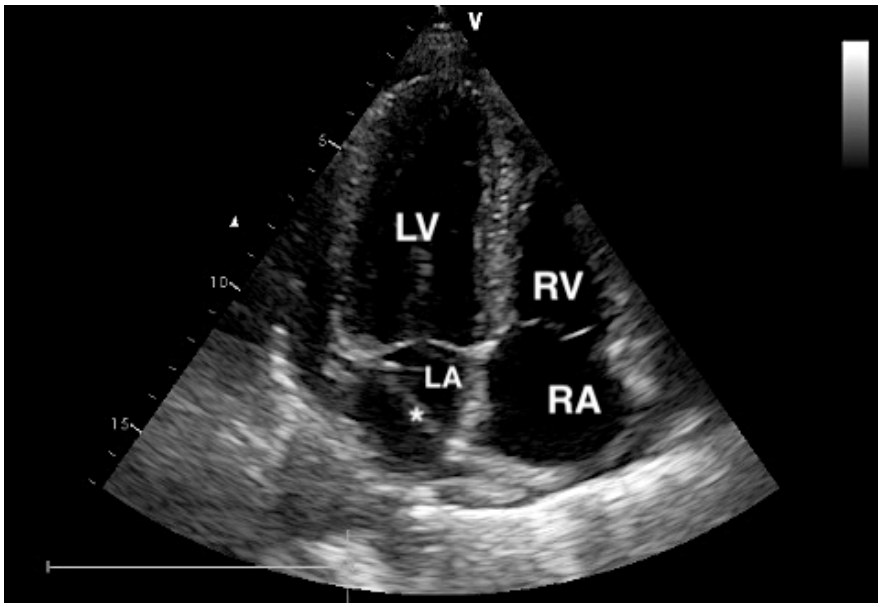
Association of the mass with the posterior wall resulted in a cavity because of the seperation of the endocardium and epicardium. The posterior wall was repaired with bovine pericardial patch (Figure 3).

Figure 3: Intraoperative image. *, bovine pericardial patch; MV, Mitral Valve



Histopathological examination of the surgical specimens confirmed fragments of organized thrombus and adjacent normal myocardial wall. There was no evidence of active inflammation, hydaditosis, endocarditis, amyloidosis, tumor, vascular malformation and cultures of the specimen were negative for bacteria and fungus. Postoperative course was uneventful. Predischarge TTE showed no residual hematoma and an intact- patched LA wall with no mitral insufficency (Figure 4).

Figure 4: Apical four-chamber transthoracic echocardiogram, postoperative. *intact bovine pericardial patch; LA, Left Atrium; RA, Right Atrium; RV, Right Ventricle; LV, Left Ventricle.



DISCUSSION

Since spontaneous LAIH is a very rare entity, its true incidence is unknown. Even the best imaging techniques sometimes fail to differentiate the diagnosis, and as in the present case, histological confirmation via surgical exploration is required.

Generally the literature concerning LA hematoma includes only case reports. LA hematoma can occur very rarely spontaneously, as in our case, as well as secondary to complications in cardiac surgery or percutaneous interventions and ablation of atrial tachyarrhythmias[2,6-8]. It has also been associated with amyloidosis, blunt chest trauma, mitral annular calcification, mitral annular abscess, dissecting aortic aneurysm[2,6-8]. LAIH generally originates from posterior LA wall due to the lower quantitiy of fibrous tissue and because the posterior leaflet of the mitral valve is more prone to calcification[2]. Altough the position of the LAIH in our case is consistent with the literature, no patient or procedural factors was found. TTE remain as the first-line study in differential diagnosis[9].

Due to lack of previous experience and established protocols management of this entity is challenging in terms of timing and approach. In this case, presumptive diagnosis was left atrial neoplasm. As TTE indicated blocked blood flow to the left ventricle and potential hemodynamic instability, surgical intervention was chosen as the best management option.

The most common intracardiac tumor to have been successfully excised using robotic technology has been the left atrial myxoma[10]. Robotic system affords excellent exposure, magnification and flexibility. The operative technique mimics that of a mitral valve procedure. Improved surgical exposure, reduced postoperative pain, shorter hospitalization, lower mortaliy and perioperative complication rates have been reported as major

advantages of robotic approach[11]. Our case is the first case of spontaneous LAIH that was managed via robot-assisted minimally invasive surgical intervention.

REFERENCES

1. Trappe HJ, Daniel WG, Hetzer R, Döhring W, Lichtlen PR. Intramural right atrial hematoma following coronary artery bypass surgery. Am Heart J 1985;109:917-8.

2. Giudicatti L, King B, Lee F, Lam K, Stamp N, et al. Left Atrial Intramural Hematoma Post-Ablation of Supraventricular Tachycardia: A Rare Complication Treated Successfully. JACC Case Rep 2020 Feb 5;2(2):223-226.

3. Capllonch FG, Arce J, Serés L, Vallejo N, Ferrer E, et al. Left atrial intramural haematoma associated with mitral annular calcification. Eur J Echocardiogr. 2010 Jun;11(5):E18.

4. Schecter SO, Fyfe B, Pou R, Goldman ME. Intramural left atrial hematoma complicating mitral annular calcification. Am Heart J 1996;132: 455–457.

5. Roynard JL, Fosse JP, Cohen Y, Artigou JY, Hoa'ng P. Left atrial contusion with intramyocardial hematoma after a blunt chest trauma. Intensive Care Med 1995;21:384–385.

6. Shaikh N, Rehman NU, Salazar MF, Grodman RS. Spontaneous Intramural Atrial Hematoma Presenting as a Left Atrial Mass. J Am Soc Echocardiogr 1999;12:1101-3.

7. Jothidasan A, Attaran S, Hunter D, de Souza AC . Management of a left atrial intramural hematoma after percutaneous intervention. Ann Thorac Surg. 2014 Jun;97(6):2196-7.

8. Vadgaonkar V, Yousif N, Sabde S , Slais S, Darwish A, et al. Spontaneous left atrial multiseptated intramural dissecting hematoma. Echocardiography. 2020 Oct;37(10):1682-1686.

9. Franks RJ, de Souza A, di Mario C. Left Atrial Intramural Hematoma After Percutaneous Coronary Intervention. Catheter Cardiovasc Interv. 2015 Sep;86(3):E150-2.

10. Schilling J, Engel AM, Hassan M, et al. Robotic excision of atrial myxoma. J Card Surg 2012;27:423–6.

11. Hemli JM, Patel NC. Robotic Cardiac Surgery. Surg Clin North Am. 2020 Apr;100(2):219-236.