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Excision of a Left Atrial Myxoma Using a Minimally Invasive Approach -Now Become a Possible Standard Procedure: A Case Report

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ABSTRACT

The most common primary cardiac tumor is myxoma. Approximately more than 75% of myxomas originate in the left atrium, either at the fossa ovalis border of the interatrial septum or at the mitral annulus. Myxoma is the most common benign tumor accounting for 50-70% of all primary benign tumors of the heart.

Transthoracic echocardiography is the diagnostic tool for cardiac myxoma. Surgical excision or resection is the mainstay of treatment because of high risk of systemic embolization and pulmonary edema due to mitral valve (MV) obstruction. Traditionally, median sternotomy is the standard procedure but in the recent era, removal of cardiac myxoma via minimally invasive approach has shown to be a safe and feasible technique with some advantages, including less bleeding, minimum postoperative pain, less scar, faster recovery and improved postoperative quality of life.

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KEYWORDS:

Minimally invasive cardiac surgery, Cardiac myxoma, Right mini thoracotomy.

INTRODUCTION

The most common primary cardiac tumor is myxoma. Myxoma is the most common benign tumor. Approximately more than 75% of myxomas originate in the left atrium [1], either at the fossa ovalis border of the interatrial septum or at the mitral annulus.

Prior to the development of cardiac angiography in 1952, it was impossible to antemortem diagnosis of heart tumors. Until that time, all diagnoses were made retrospectively using autopsies [2]. The clinical manifestations of cardiac myxomas can vary. Most of the patients are asymptomatic, and those who have symptoms present with vague constitutional symptoms. Early detection is imperative since cardiac myxomas can cause lifethreatening complications.

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Transthoracic echocardiography (TTE) is the most widely used imaging technique for diagnosis of cardiac myxoma.

Multi-modality imaging techniques, including transthoracic echocardiography (TTE), transesophageal echocardiography (TOE), cardiac computed tomography (CT) scan, and cardiac magnetic resonance imaging (MRI), are also necessary for evaluation of cardiac myxoma. Surgical resection or excision of a cardiac tumor is the mainstay of treatment. Conventionally, resection of cardiac myxoma is made through a standard median sternotomy approach. Nevertheless, poor cosmetic results, risk of sternal infection, and other possible complications are associated with this approach [3]. Recently, the minimally invasive cardiac surgery approach (MICS) has gained popularity and is now becoming a routine practice in many cases, like atrial septal defect closure, ventricular septal defect closure, valve surgery (either repair or replacement), and coronary artery bypass surgery, due to advances in surgical instruments, increased surgeon's experience and expertise, modern heart-lung machines, well developed anesthetic

setups. Additionally, minimally invasive cardiac surgery techniques have
many advantages, such as less incisional length, less bleeding, less postoperative pain, improved cosmetic results, shorter hospital stays, faster recovery, improved postoperative quality of life, and more patient satisfaction over the median sternotomy approach. Herein, we present a case of left atrial myxoma that was excised via right mini thoracotomy, a minimally invasive cardiac surgery approach (MICS).

CASE REPORT

A 74 -year-old male got admitted to our hospital through the outpatient department with the complaints of exertional chest discomfort, vertigo & sweating for the last 3-4 months. He had a history of hypertension and diabetes since 2015. He also had a history of admission to a local hospital with the above-mentioned complaints about one month prior to admission to our hospital and he was diagnosed as a case of suspected left atrial myxoma with atrial fibrillation and referred to the cardiac center for further management. He had no previous history of nausea, vomiting, presyncope or syncopal attack, TIA or stroke.

On physical examination, he was well looking and his vital signs were stable. His heart rate was normal and rhythmic. SpO2 was of 97% at room air. No abnormal sound or murmur was detected. All biochemical reports showed in normal range. Electrocardiogram showed normal sinus rhythm. Chest x-ray P/A view showed cardiomegaly.

Fig 1: Chest x-ray P/A view showed cardiomegaly.

Preoperative transthoracic echocardiography revealed a left atrial mass, measuring about (4.15 x 3.33 cm), attached to the interatrial septum (IAS), not protruding into the LV-suggestive of LA myxoma. The ejection fraction (EF) was 55%. Mild mitral regurgitation was detected along with a dilated left atrium. There was no evidence of thrombus in the left atrium. No pericardial pathology was seen.

Fig 2: Preoperative transthoracic echocardiography (Apical 4- chamber view) showed large left atrial mass, attached to the interatrial septum.

Coronary angiography was done, which revealed normal coronary artery anatomy with no abnormal pathological findings.

Then the patient was scheduled for surgical excision after evaluation using a minimally invasive method. Written informed consent was obtained from the patient. Using a minimally invasive technique, surgery was carried out with endotracheal intubation using a double- lumen tube to achieve single- lung ventilation under general anesthesia.

Transesophageal echocardiography monitoring and defibrillator pads were also set up.

The patient was positioned supine with the right side of the chest slightly elevated at 30°angle using a sandbag. A right mini-thoracotomy was made in the 4th intercostal space through a 5 cm peri-areolar incision.

Fig 1: Right mini thoracotomy.

Heparin was given. After achieving
ACT, peripheral cardiopulmonary bypass was established via right femoral artery and femoral vein cannulation using the Seldinger technique and under the guidance of transesophageal echocardiography (TOE).

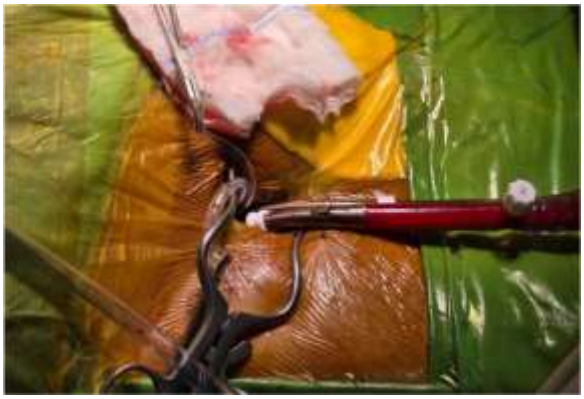

Fig 2: Peripheral cardiopulmonary bypass was established in MICS.

After opening the pericardium, it was incised 2 cm in front of the right phrenic nerve. In the pericardium, stay sutures were placed to help with exposure. Cardioplegia cannulation was done.
An aortic cross clamp (CYGNET Flexible Clamp) was applied. Cold blood cardioplegia was delivered to arrest the heart at diastole. The left atrium was opened. An oval-shaped, soft, gelatinous, reddish-brown mass was found attached to the interatrial septum.

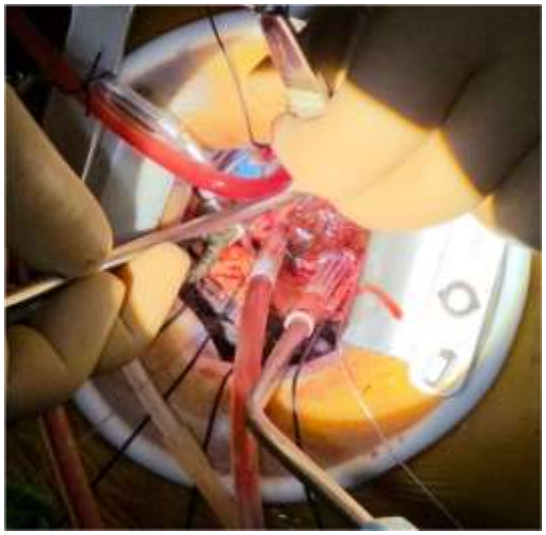

Fig 3: Using MICS approach, after left atriotomy LA Myxoma was exposed.

The mass was then excised and resected with its pseudo capsule and sent for histopathological examination.

Fig 4: Excised LA Myxoma with its pseudo capsule.

After removing the myxoma, the mitral valve was then inspected and assessed to be competent, the feeding vessel were also checked.
The left atriotomy was closed with double-layer continuous prolene 3/0 running sutures. The aortic crossclamp was released after proper deairing. The heart was weaned from cardiopulmonary bypass at normal sinus rhythm.

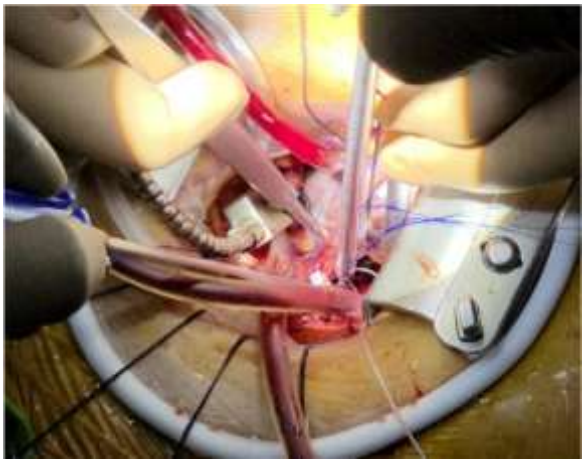

Fig 5: Left atriotomy closure before releasing cross clamp.

After decannulation, protamine was given and hemostasis was achieved. The total bypass time and ischemic time were 65 and 28 minutes, respectively.
Following weaning from CPB, we routinely did the intraoperative transesophageal echocardiographyshowed normal ventricular function with no residual shunts or residual masses.
After that, the thoracotomy incision was closed in the standard fashion.
The postoperative period was uneventful and he was discharged from the hospital on the eighth postoperative day with stable condition.

The histopathological examination confirmed the diagnosis of cardiac myxoma with degenerative change.

Follow UP

At the one-month and three-month follow-up periods, the patient recovered well, and a transthoracic color Doppler echocardiogram revealed there was no evidence of residual mass or interatrial shunt.

DISCUSSION

The most prevalent benign cardiac tumor is myxoma. It can be round, oval, polypoid, pedunculated, or sessile and arises from multipotent mesenchymal cells in the endocardium [4]. They are more common in women than in men and usually appear in middle age. Approximately more than 75% of myxomas originate in the left atrium [1], either at the fossa ovalis border of the interatrial septum by a stalk or at the mitral annulus. The majority of the patients are asymptomatic and diagnosed incidentally using other imaging techniques, and those who have symptoms (about 80% of myxomas) typically present with cardiac symptoms (67%), including dyspnea, orthopnea, paroxysmal nocturnal dyspnea, chest pain , arrhythmias, and heart blocks; embolic (29%) mostly left-sided; and systemic (34%) manifestations such as fever, anorexia, weight loss, fatigue, arthralgia, myalgia, and Raynaud's phenomenon[5,6]. Transthoracic echocardiography is a simple and non-invasive screening technique that can identify 95% of cardiac masses [7].

Due to its limitations, twodimensional echocardiography may overlook small, tiny tumors. Transesophageal echocardiography (TEE), real-time three-dimensional echocardiography, magnetic resonance imaging, and computed tomography provide additional information, such as tissue characteristics, exact location, and its extent, and thus resect ability.

Median sternotomy is the conventional approach for excision of LA Myxoma. In 1954, the first successful excision of an LA myxoma was performed by Crafoord the Swedish pioneer surgeon, using CPB.

The first myxoma excision via right mini thoracotomy was reported by KO et al. in 1998 [8,9]. Due to advancements in technology and surgical technique, minimally invasive techniques have been used for a variety of cardiac surgeries since the 1990s. However, minimally invasive cardiac surgery (MICS) has recently emerged as a promising alternative technique.

A right mini-thoracotomy, a minimally invasive procedure, has been suggested in recent years.

From partial hemi sternotomy to mini thoracotomy to fully endoscopic access, the use of minimally invasive techniques is now being increased in all fields of cardiac surgery. There are three types of incisions are used for removal of LA myxoma: (1) Right atrial incision (2) Left atrial incision (3) Biatrial incision/ Dubost incision. Dubost incision all reported as incision in myxoma with good exposure and complete excision [10]. The right mini thoracotomy approach is an excellent minimally invasive method for accessing the interatrial cavity as well as the right and left atrium and aortic root. The use of minimally invasive approach precludes in dense pleural adhesion, previous right thoracotomy, peripheral vascular diseases, or severely decreased lung function. Furthermore, minimally invasive surgery is not recommended if the tumor diameter is too large (> 5 cm),

if a metastatic or malignant tumor is highly suspected, unless the tumor is isolated and less than 3 cm in diameter, which is expected to be completely resected. Also, cardiac tumors arising from ventricle or atypically within the left atrium might not be suitable for right mini thoracotomy approach [11]. Right mini thoracotomy is a minimally invasive surgical approach that has been applied gradually to resect cardiac tumors with good results, as compared to the traditional median sternotomy approach. This approach is also feasible for resection of complex tumors requiring reconstructions of the atrial septum or mitral valve [12]. The right mini thoracotomy approach shows promise as an effective alternative approach to conventional standard median sternotomy for the excision of isolated left atrial myxoma. This approach provides many advantages such as reduced surgical trauma, a lower risk of postoperative mediastinitis, less bleeding, less pain, a shorter hospital stays, rapid postoperative recovery as well as increased patient satisfaction because of the cosmetic results.

Also, the primary considerations in selecting this approach are the surgeon's experience, advancements in anesthetic procedures as well as the willingness of the patient. Herein, we present a case of left atrial myxoma, measuring about (4.15 x 3.33 cm), attached to the interatrial septum that was excised successfully via right mini thoracotomy, a minimally invasive cardiac surgery approach (MICS).

CONCLUSION

In appropriately selected patients, right mini thoracotomy, a minimally invasive approach can be considered a preferred surgical strategy for excision of left atrial myxoma. Further research with a large number of patients and an extended followup period is required for evaluation of long-term results.

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Not Applicable

Conflicts of interest

The authors declare that there are no conflicts of interest.

Funding None **Ethics**

Written informed consent was obtained from the patient. **Consent to Participate**

The work was approved by all the authors for participation.

Consent to Publications

The work was approved by all the authors for participation.

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