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MINIMALLY INVASIVE APPROACH TO LV MASS-A CASE REPORT.

Cardiovascular Surgery

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ABSTRACT

Cardiac masses are rare tumors. Myxomas are the 2nd most common tumours found in heart. Most of cardiac myxomas originate in left atrium, while left ventricle myxomas account for 3-4% cases. Once diagnosed, excision is the first line of management. Case summary: A 30-year-old female was admitted to this centre with complains of breathlessness of two months' duration. Evaluation by transthoracic echocardiography revealed a large hyper-echogenic mass attached to the posteromedial papillary muscle and the mid-anterior wall (size 29x16mm). She also had moderate mitral valve regurgitation with a posterior-directed jet. The patient underwent excision of left ventricular mass via a minimally invasive right thoracotomy approach. Following surgery, patient had an uneventful recovery. The histopathology examination diagnosed it as a myxoma. Discussion – This case report highlights the importance of utilizing various imaging modalities for diagnosis. In addition, the surgery was performed by right mini thoracotomy approach thus ensuring a shorter hospital stay, lesser pain and better cosmetic results.

KEYWORDS

Cardiac Myxomas, Cardiac Tumours, Fibromyxoid Stroma, Papillary Fibroelastoma

INTRODUCTION:

Cardiac tumours are rare neoplasms. They may arise in any cardiac structure, from the myocardium, endocardium, pericardium or the valves. They include a very wide range of neoplasia, from primary benign and primary malignant lesions to secondary metastasis. Primary tumours are less common than secondary metastases. Also, the primary benign tumours of the cardia are more common than primary malignant tumours. They may be asymptomatic and incidentally diagnosed, or present with heart failure, arrhythmias or even sudden cardiac death. Initially diagnosed on echocardiography; MRI, CT scan, and FDG-PET give crucial information regarding the staging, composition and localization of these masses, which help in the appropriate management of these lesions.

Cardiac myxomas are the 2nd most common primary cardiac tumours (50% of cases). They are benign in nature and can occur anywhere in the heart, with the majority (about 75%) occurring in the left atrium. The right atrium accounts for 15-20% of cases, while ventricular myxomas are rare [1]. They are often asymptomatic, but they can also manifest with syncope, fatigue, dyspnea and arrhythmias, rarely sudden death. Usually, they have a gelatinous consistency with a tendency to break and disseminate, leading to stroke or peripheral embolic events. Histologically, they are constituted of scattered stellate or polygonal cells in eosinophilic cytoplasm, with oval or round nuclei arranged singly, in chords, or around a vascular lumen into a myxoid stroma [2]. Other common benign left ventricular tumors are papillary fibroelastomas and fibromas.

Case Presentation:

The patient was a 30-year-old female who presented to the outpatient department with the chief complaint of breathlessness on exertion for the last 2 months. She had no history of palpitations, angina or syncope. The patient did not have history of TIA or thromboembolic phenomena. On examination, she was a thin built female with a normal pulse rate and blood pressure. On examination, the cardiac apex was felt in the left 5th intercostal space in the midclavicular line. On auscultation, the patient had a grade 3 pansystolic murmur radiating to the left axilla. Transthoracic echocardiography identified a large hyper-echogenic mass attached to the posteromedial papillary muscle and the mid-anterior wall (size 29x16mm) (Figure 1). She also had moderate mitral valve regurgitation with a posterior-directed jet. The Left atrium was 48x40 mm in size, and the LV ejection fraction was 55%.

The cardiac MRI (plain and Gadolinium contrast) revealed a highly mobile intracavitary lesion attached to the basal anterior wall of the left ventricle via a short stalk measuring 20.5x 17mm and no significant enhancement on late gadolinium enhancement images.

With the findings of left ventricular mass and moderate mitral regurgitation, the patient was prepared for surgery. Written and informed consent was taken from the patient for excision of tumor with mitral valve repair/replacement by a right anterolateral thoracotomy approach thus avoiding the sternotomy. The patient was taken to the operating room and placed in supine position. A towel roll was tucked under the right scapula to lift up the right thoracic cage. The patient was intubated using a double-lumen tube and induction of anesthesia was done. Trans-esophageal echocardiography was performed, which confirmed the mass to be in the left ventricle along with severe mitral regurgitation. A 5cm long curvilinear inframammary incision was placed in the right fourth intercostal space. With the help of single lung ventilation, the right lung was retracted to gain access to the pericardium. The right femoral artery and vein were cannulated to go on mild hypothermic cardiopulmonary bypass. After aortic clamping and root cardioplegia were administered, an incision was made on the left atrium, and the left atrium was retracted. The mitral valve was inspected and stay sutures were taken on the anterior mitral valve leaflet to retract it to examine the left ventricle. A 3 cm polypoid gelatinous mass was seen attached to the posteromedial papillary muscle. By meticulous sharp dissection, the lesion was successfully separated from the papillary muscle and removed en bloc without any residual remnant of the mass (Figure 2). The left ventricle was thoroughly irrigated to remove any free debris. The stay sutures on the mitral valve were removed and the mitral valve was tested using a saline jet. The mitral regurgitation was severe. Using Prolene 5-0 interrupted sutures, postero-medial commissuroplasty and A2-A3 cleft repair was performed. After the repair, repeat saline jet test confirmed regurgitation to be mild. The left atrium was closed in 2 layers. After deairing the LV vent was removed. After rewarming, the aortic cross clamp was removed. Post op TEE confirmed complete removal of mass with mild mitral regurgitation. A right pleural drain was placed. The patient was gradually weaned off cardio pulmonary bypass followed by decannulation and closure of incision. The patient was shifted to post op recovery room with inotropic support of milrinone (0.5mcg/kg/min) and adrenaline (0.1mcg/kg/min) infusion. The cross clamp time and cardiopulmonary bypass time was 67 minutes and 107 minutes respectively.

Post-surgery, the patient was extubated on post op day 01 and the inotropic support was gradually tapered over the next 48 hours. She had no cerebrovascular event in post op period. The post op echocardiography revealed mild MR with good LV function and mild RV dysfunction. The patient was discharged from the hospital on 5th day.

The patient was advised to follow up after 10 days with the histopathology report. The patient's incision was healing well, and she did not have any cerebrovascular event at home. Histopathology report confirmed the lesion as "numerous stellate cells interspersed in fibromyxoid stroma, suggestive of myxoma (Figure 3).

DISCUSSION:

Primary cardiac tumours are rare, with a reported prevalence of about 0.03% in the general population and an annual incidence of 0.5-1% per million individuals [3]. The primary benign tumours are more common than their malignant counterparts. Among the cardiac benign tumours, the commonest lesions are the papillary fibroelastoma (PFE), closely followed by the cardiac myxomas [4]. Approximately 75% of cardiac myxomas originate from the left atrium; only 3-4% are found in the left ventricle. They are found more frequently in the 3rd to 6th decade of life and are twice as common in women as men. Our patient was a young female of 30 years. About 5-10% of cardiac myxomas have a familial pattern of inheritance. They may, on rare occasions, be a part of genetic diseases such as Carney complex, in which case they tend to present early in life, around the 2nd to early 3rd decade. Left ventricular myxomas are often discovered incidentally, as compared to atrial myxomas, which generally present with symptoms. In our patient too, the presenting complaint was breathlessness. Hence, clinicians need to maintain a high degree of suspicion and utilize available resources in the diagnosis of cardiac myxomas, especially those located outside the atria [1]. The tumour is thought to arise from the primitive mesenchymal cells. Cardiac myxomas are seen as solitary pedunculated lesions attaching to the atrial septum by a stalk. They consist of polygonal cells scattered across a proteoglycan and glycoprotein-rich matrix. Patients with undetected cardiac myxomas are at a significant risk of tumour embolism since the lesions are soft and fragile in nature, and high intracardiac blood flow may lead to fragmentation. They carry a high risk of complications such as embolism, heart failure and sudden death. Our patient did not give any history of any thromboembolic event.

The gold standard method for confirming the diagnosis of myxoma is pathological evaluation. The best method for early detection is echocardiography, which is non-invasive and reliable, and allows evaluation of morphology, extent, site of attachment and functional obstruction to flow. Myxomas should undergo complete surgical excision as soon as the diagnosis is established. However, multimodal imaging is essential in cases of tumours in atypical locations, and it may aid in deciding on the extent of resection [5]. Left ventricular tumours have been excised by standard median sternotomy as well as by minimally invasive thoracotomy, thoracoscopic [6] and robotic approaches. A low rate of recurrence and a high rate of long-term survival has been established in myxomas as per published literature. The mini thoracotomy approach leads to earlier extubation, reduced ICU stay, less post op pain, early return to work, avoidance of sternum related complications and better aesthetic results. However, this approach also has few limitations. It is difficult to perform in obese individuals, people with previous thoracic surgery and those with severe chest wall abnormalities. Our patient was a thin built female with no previous history of thoracic surgery or chest wall deformity. This approach has a steep learning curve demanding a high level of expertise and accuracy. We managed to successfully operate on the patient via a minimally invasive approach, remove the lesion completely and repair the mitral valve.

CONCLUSION:

Cardiac myxomas are the 2nd most common primary tumour of the heart. Most commonly encountered in the left atrium, left ventricular myxomas are uncommon. Patients may be completely asymptomatic or present with a thromboembolic episode, failure or sudden death. Echocardiography can easily identify the lesion and aid in early diagnosis. Surgical excision should be offered early to the patient, and the pathological examination is essential for confirmation of the diagnosis. They can be operated by a minimally invasive surgical approach, which aids faster recovery and early discharge from the hospital.

Conflict interest:

All authors declare that they have no conflict of interest and do not receive any research grants from any company, have not received a speaker honorarium from any company, do not own any stock in any company and are not members of a committee.

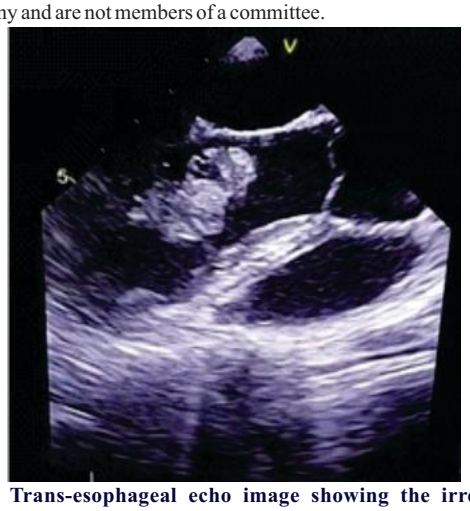

Fig 1. Trans-esophageal echo image showing the irregular polypoid mass located in left ventricle.

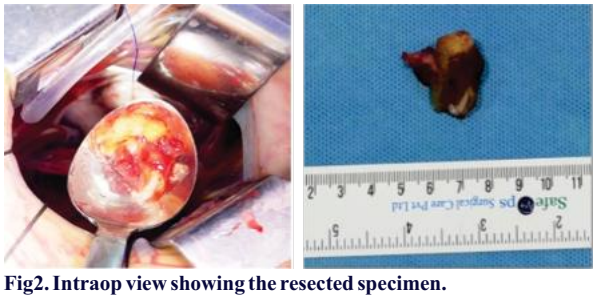

Fig2. Intraop view showing the resected specimen.

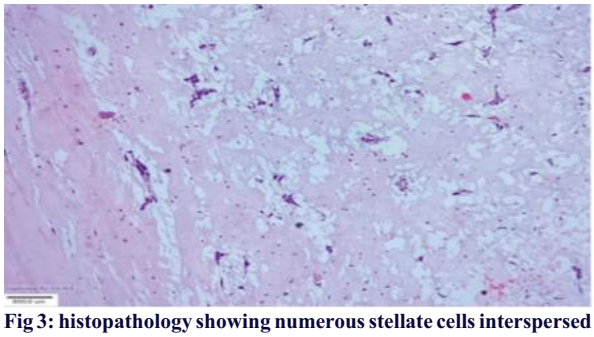

Fig 3: histopathology showing numerous stellate cells interspersed in fibromyxoid stroma.

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