Case Report Article

Unveiling the Unforeseen: Left Ventricular Fibroma Recurrence or Rare Complication? A Multimodality Imaging Revelation

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Citation: Asl Fallah S, Sahebjam M, Abbasi K, Shahbazi N; Shahi S, Shirzad S. Unveiling the Unforeseen: Left Ventricular Fibroma Recurrence or Rare Complication? A Multimodality Imaging Revelation. Res Heart Yield Transl Med 2025; 20(2): 154-158.

https://doi.org/10.18502/jthc.v20i2.19710

Highlights

- Postoperative intramyocardial abscess may present with echocardiographic features indistinguishable from tumor recurrence.Cardiac magnetic resonance (CMR) with late gadolinium enhancement is critical for accurate differentiation and diagnosis.
- The surgical technique of using two dissimilar xenopericardial patches can create a potential dead space, serving as a nidus for infection and subsequent abscess formation despite an initially uncomplicated postoperative course.
- CMR findings of a T2-hyperintense core without early enhancement, surrounded by an enhancing rim, are characteristic of a contained hematoma or abscess.This signature pattern effectively rules out true neoplastic recurrence.

Article info:

Received: 03 Jun. 2024
Revised: 09 Aug. 2024
Accepted: 25 Nov. 2024

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ABSTRACT

Cardiac fibroma is a sporadic primary cardiac tumor that is more prevalent in children but accounts for approximately 1% of cardiac tumors in the adult population. It is a benign tumor consisting of fibroblasts and connective tissues, typically associated with a favorable prognosis. Nonetheless, large fibromas may have a poorer prognosis due to the increased risk of arrhythmias and sudden cardiac death.

In this case report, we describe a 38-year-old woman who experienced chest discomfort and shortness of breath roughly 3 months following the total resection of a left ventricular fibroma. The initial suspicion was the recurrence of fibroma, but upon further investigation, an intriguing scenario unfolded: the formation of a hematoma and abscess at the previous surgical site. Ultimately, the patient underwent redo-cardiac surgery.

Keywords: Fibroma/Diagnostic Imaging; Pericardium/Surgery; Abscess; Hematoma; Histopathology

RHYTHM
Research in Heart Yield and Translational Medicine

Introduction

Cardiac fibromas are the second most common primary intracardiac tumors in children, although they can rarely occur in the adult population as well.[1,2] These tumors are often asymptomatic or can present with nonspecific signs and symptoms such as dyspnea, chest pain, syncope, cardiac murmurs, fatal arrhythmia, and even sudden cardiac death.[3-6] The free wall of the left ventricle (LV) is the most common location for cardiac fibroma, but it can also involve the interventricular septum, any other cardiac chamber, and the pulmonary artery.[7]

Transthoracic echocardiography (TTE) is the most readily available initial and noninvasive diagnostic imaging modality for evaluating cardiac fibroma. Nevertheless, supplementary modalities such as multi-slice computed tomography scan and cardiac magnetic resonance (CMR) imaging can provide a more comprehensive assessment of the tumor.[8,9]

The preferred treatment for large cardiac fibromas is generally complete resection. Conversely, small asymptomatic fibromas can be managed medically with long-term follow-up.[10] Long-term outcomes following complete surgical resection are typically favorable, and there is a low likelihood of tumor recurrence post-resection.[11,12]

Case Presentation

A 38-year-old woman presenting with chest discomfort and exertional dyspnea was referred to our advanced echocardiography clinic for follow-up TTE. She had a history of open cardiac surgery approximately 5 months prior at Tehran Heart Center for a huge LV fibroma, which was diagnosed using echocardiography and CMR (Figure 1, Video 1).

Consequently, she underwent on-pump en-bloc excision of a well-defined but non-encapsulated, large LV mass located in the anterior-apical LV wall without entering the LV cavity. The LV wall defect was repaired using two layers of xeno-pericardium: equine pericardium adjacent to the subendocardial myocardium and bovine pericardium covering the epicardial surface of the heart. (Pericardial patches of the same source were unavailable.) A small dead space between these two layers was filled with fibrin glue.

The patient was successfully weaned from the cardiopulmonary bypass machine. Intraoperative transesophageal echocardiography (TEE) following weaning demonstrated good expansion of the LV cavity, good ventricular contraction, and a left ventricular ejection fraction (LVEF) of approximately 50-55% with no residual mass, mild mitral regurgitation, and no space between patches. Color Doppler studies showed no apparent shunt flow, indicating no residual ventricular septal defects or LV free wall rupture.

The postoperative course was uneventful in the main, and the patient was discharged 6 days later without complications. Histopathologic and immunohistochemical examinations of the LV mass confirmed the diagnosis of a giant ovoid cardiac fibroma (Figures 2 & 3).

The patient remained asymptomatic for approximately 2 months following the primary surgery. However, she gradually started experiencing shortness of breath and chest discomfort.

Upon arrival at the emergency department, the patient did not exhibit fever, weight loss, or other constitutional symptoms. Physical examination revealed no significant findings, except for a grade 2 systolic murmur at the left sternal border. Laboratory results showed a hemoglobin level of 10.8 g/dL without leukocytosis, a mildly elevated erythrocyte sedimentation rate of 47 mm/h, and unremarkable cardiac biomarkers and serum electrolytes.

ECG indicated a normal sinus rhythm with T-wave inversion in the inferior and V3-V6 leads (Figure 4).

TTE revealed a large LV apical mass (72×52 mm) with increased echogenicity at the periphery, suggesting a possible recurrence of the primary tumor or the formation of a large clot at the site of

the previous surgery (Figure 5, Videos 2 & 3). The LV size appeared normal with mild systolic dysfunction (LVEF=50%), while the left atrium showed mild enlargement and moderately severe mitral regurgitation, likely due to displacement of the anterolateral papillary muscle. Moderate tricuspid regurgitation was also observed, with an estimated systolic pulmonary artery pressure of 32 mm Hg. Subsequently, a CMR was recommended for further characterization of the cardiac mass, and a surgical consultation was requested.

CMR imaging identified an encapsulated intramyocardial mass-like lesion measuring 89×69×57 mm in the mid to apical lateral wall of the LV. The lesion exhibited an isointense signal in T1 and a hyperintense signal in T2 without fat suppression or early or late enhancement, suggesting a subacute hematoma formation. The encapsulated lesion displayed late gadolinium enhancement (LGE), probably due to the previous repair with a pericardial patch. In addition, a thick septum within the hematoma exhibited an 8 mm disruption. Collectively, these findings were consistent with an intramyocardial subacute hematoma secondary to a disrupted previous pericardial patch (Figure 6, Video 4)

Based on the findings from TTE and CMR, the heart team decided to perform a reoperation. After the release of adhesions and initiation of cardiac balloon pumping, the dissection of the previous operation site on the LV led to the drainage of a significant amount of pus. Careful dissection revealed a healed, integrated outer layer of bovine pericardium covering a large intramyocardial abscess. The equine pericardium was found non-integrated and within the abscess cavity. Both pericardial patches were excised. Following complete debridement of the cavity, copious irrigation with normal saline, and local application of rifampin, the intramural defect was primarily closed using 4-0 PROLENE sutures in two rows. Postoperative TEE demonstrated a reduction in mitral regurgitation and adequate expansion of the LV cavity.

The patient was administered intravenous antibiotics for approximately 6 weeks, followed by oral antibiotics under the guidance of an infectious disease specialist. Postoperative recovery progressed smoothly, and the patient was discharged without complications after approximately 45 days.

Subsequent echocardiograms were favorable, showing no signs of abscess recurrence or other localized complications.

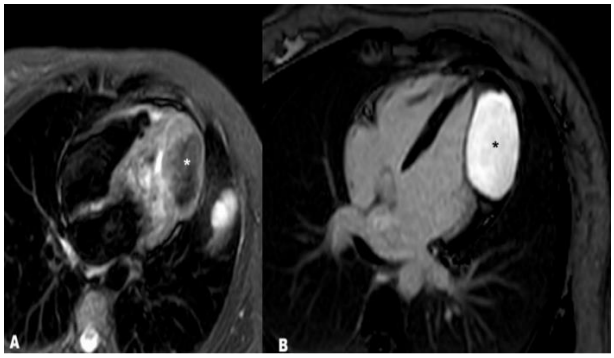

Figure 1. Preoperative cardiac magnetic resonance (CMR) imaging. (A) Short tau inversion recovery (STIR) sequence (four-chamber view) shows low signal intensity on T2-weighted imaging (white asterisk). (B) Phase-sensitive inversion recovery (PSIR) sequence (four-chamber view) demonstrates avid, homogenous late gadolinium enhancement of intramyocardial mass (black asterisk), consistent with fibroma.

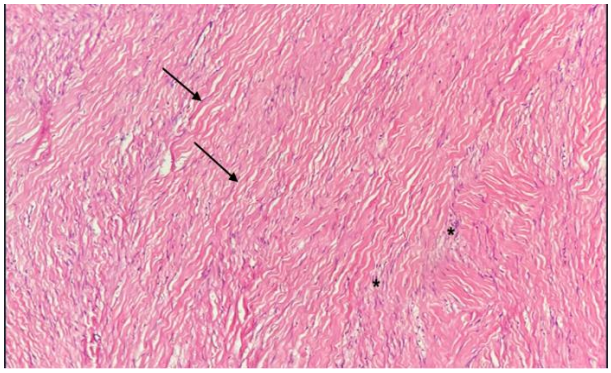

Figure 2. Bland spindle cell proliferation (asterisk) with abundant collagen bundles (arrowhead), characteristic of cardiac fibroma (H&E staining, 10×).

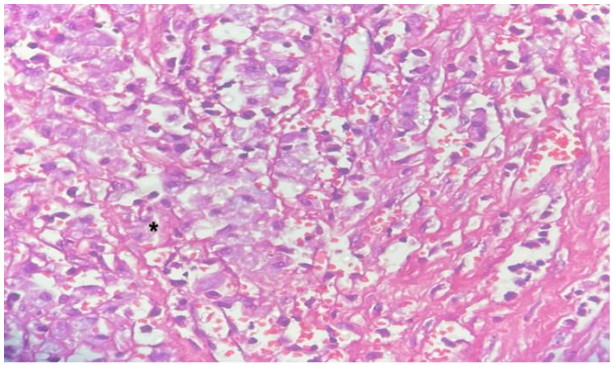

Figure 3. Fibrotic tissue collection (asterisk) infiltrated and partially lined by macrophages and scattered lymphocytes (H&E staining, 40×).

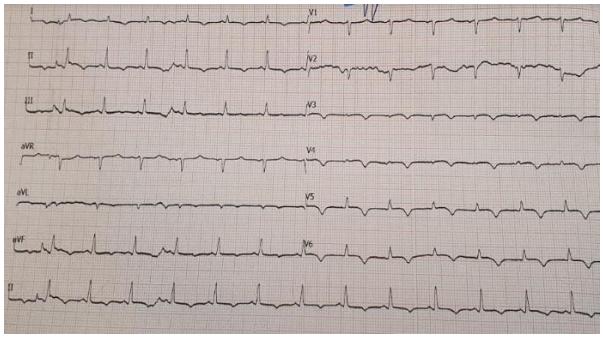

Figure 4. ECG on emergency department arrival shows normal sinus rhythm with T-wave inversion in inferior and V3–V6 leads.

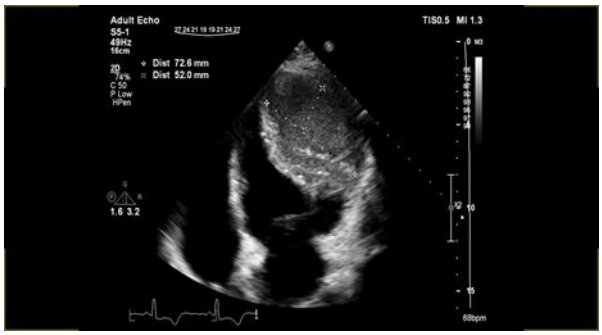

Figure 5. Transthoracic echocardiography (apical 4-chamber view) reveals a large left ventricular (LV) apical mass at the prior surgical site.

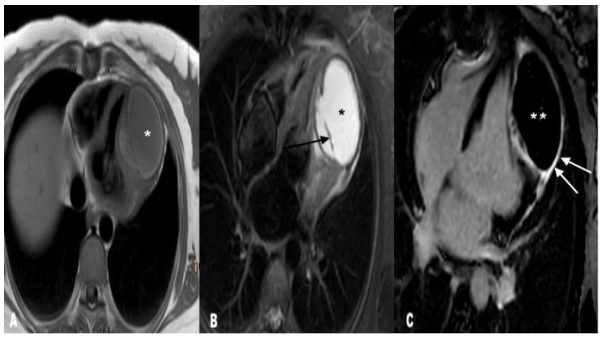

Figure 6. Postoperative cardiac magnetic resonance (CMR) image. (A) The T1-weighted image shows low signal intensity (white asterisk). (B) Short tau inversion recovery (STIR) sequence (T2-weighted) reveals high signal intensity of the intramyocardial lesion (black asterisk) with internal septations (black arrowhead). (C) Phase-sensitive inversion recovery (PSIR) sequence (four-chamber view) demonstrates no late gadolinium enhancement within the lesion (double asterisk) and peripheral enhancement of surrounding tissue (white arrowhead).

Discussion

Cardiac fibroma is a rare occurrence in adults and is characterized as a benign intramural primary cardiac tumor originating from fibroblasts. Although considered benign, cardiac fibroma has been linked to arrhythmias, heart failure, and even sudden cardiac death.[13,14] Rapid growth of these tumors can result in compression or involvement of surrounding tissues. Involvement or distortion of papillary muscles may cause valvular regurgitation, both before and after surgery, as observed in our patient's case.

The presenting symptoms and signs of cardiac fibroma may vary depending on the tumor's size and location, ranging from asymptomatic cases to potentially fatal arrhythmias, particularly when the interventricular septum and conduction system are affected.[6,15]

TTE is often the initial diagnostic tool used to evaluate cardiac tumors, providing valuable information about the tumor's location, size, position relative to valves, and the presence of calcification.[16]

CMR imaging can further enhance tissue characterization. On MRI, fibromas typically appear as well-marginated tumors with no invasion of surrounding tissues, exhibiting low signal intensity on T1 and T2-weighted images, subtle homogenous early LGE, and characteristically avid homogenous LGE.

Surgical resection is generally recommended, particularly in symptomatic patients. Complete resection is the preferred approach when feasible, but partial resection can be considered if complete removal is not possible. In cases where the tumor is too extensive for complete excision, cardiac transplantation may be an alternative treatment option.[17]

In our patient's case, the displacement of the anterolateral papillary muscle led to moderate mitral regurgitation. Still, the presence of purulent fluid and an abscess in the surgical field made mitral valve repair or replacement unsuitable treatment options. Thus, the medical team decided to manage the valvular heart disease through continued medical treatment.

Recurrence of cardiac fibroma is exceedingly rare, and the long-term survival rate following complete tumor resection is generally positive.[18] Although tumor recurrence was initially suspected in our patient, CMR findings pointed towards hematoma formation at the previous surgical site.

Conclusion

Understanding potential complications associated with any procedure is crucial. Hematoma formation and infections are known

complications of cardiac surgery. CMR imaging proves to be a valuable tool in such situations, providing valuable information for tissue characterization and aiding in the accurate diagnosis of cardiac masses.

Declarations:

Ethical Approval

The Ethics Committee of Tehran University of Medical Science

Funding

According to the authors, this article has no financial support.

Conflict of Interest

The authors report no conflict of interest.

Acknowledgment

The authors have no acknowledgement to disclose.

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