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Primary Cardiac Chondroma Presenting as a Left Atrial Mass: An Exceptionally Rare Case Report

CASE REPORT

INTRODUCTION

Primary cardiac tumors are rare clinical entities with a prevalence of approximately 0.02% in autopsy studies. Of these, about 75% are benign and 25% are malignant. Benign tumors include myxoma, papillary fibroelastoma, fibroma, lipoma, and hemangioma, whereas angiosarcoma is the most common malignant type. These tumors may remain asymptomatic and be incidentally detected or they may present with systemic, embolic, or cardiac symptoms such as dyspnea and palpitations.[1-3]

Chondromas are benign, slow-growing tumors composed of mature hyaline cartilage, most frequently found in the small bones of the hands and feet.[4] Visceral chondromas are extremely rare and are most often associated with Carney's triad, involving pulmonary chondromas as one of its components.[5]

The origin of chondroid differentiation in primary cardiac tumors remains unclear, as cartilage is not a normal constituent of human cardiac tissue. Previous studies have suggested that chondrocyte-like cells may emerge in the context of valvular myxomatous degeneration through aberrant osteogenic differentiation and endochondral ossification processes, particularly involving the mitral valve.[6] In the present case, however, the lesion did not originate from the mitral valve, making this mechanism unlikely.

The differential diagnosis of cardiac masses containing cartilaginous elements includes primary or metastatic chondrosarcoma, teratoma, and myxoma with focal chondroid differentiation.

Recent advances in cardiac imaging modalities—including echocardiography, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET)—have substantially improved the detection and characterization of cardiac masses, facilitating more accurate differentiation between benign and malignant lesions and enabling better surgical planning.[7,8] Although data on cardiac chondroid tumors are limited, for extracardiac cartilaginous lesions, MRI criteria were shown to be useful in differentiating benign or atypical cartilaginous lesions from high-grade chondrosarcomas, with benign lesions typically demonstrating well-defined margins, homogeneous internal architecture, and high signal intensity on T2-weighted images, whereas malignant tumors more often exhibit infiltrative growth patterns, heterogeneous signal characteristics, and aggressive imaging features.[9] Despite these advancements, primary cardiac chondroma remains extraordinarily rare, with only 4 cases reported in the literature to date. Herein, an additional case of primary cardiac chondroma presenting as a left atrial mass, highlighting the diagnostic challenges, imaging features, and surgical considerations associated with this exceptional entity.

CASE REPORT

A 79-year-old male presented with progressive shortness of breath and palpitations over the preceding month. Transthoracic echocardiography (TTE) revealed a 3.5 × 4.5 cm mass occupying the left atrium. The patient had an unintentional weight loss of approximately 6-7 kg in 1 month. His past medical history

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included benign prostatic hyperplasia (BPH) but no other chronic illnesses. Transesophageal echocardiography (TEE) and thoracic CT demonstrated a homogeneous mass with irregular margins attached to the atrial roof, extending into the pulmonary veins, but not the left ventricle (Figure 1). Echocardiography reveals the morphology and mobility of the mass, as shown in Videos 1 and 2. Despite the large size of the mass, no significant hemodynamic compromise was detected. Doppler echocardiographic assessment revealed no evidence of transmitral inflow obstruction, and estimated pulmonary artery pressures were within normal limits. The pulmonary veins were closely abutted by the mass; however, no radiological or functional evidence of pulmonary venous stenosis or obstruction was observed. Electrocardiography revealed T-wave inversions in the precordial leads. Laboratory evaluation showed borderline elevations of Cancer Antigen 19-9 (CA 19-9) and prostate-specific antigen, as well as subclinical hypothyroidism. Thyroid ultrasound revealed no nodules. Abdominopelvic CT identified bilateral renal cortical cysts and simple hepatic cysts. Prostate MRI was consistent with BPH. The PET CT was performed to further characterize the lesion and to exclude malignancy, given the patient's unintentional weight loss and the irregular morphology of the mass on cross-sectional imaging. The absence of fluorodeoxyglucose uptake supported a benign etiology and helped differentiate the lesion from metabolically active malignant cardiac tumors.

No specific radiological feature unique to cardiac chondroma was identified; however, the lesion appeared as a relatively homogeneous mass without invasive characteristics, favoring a benign process. Although the margins appeared irregular on CT, this finding was interpreted as tumor contours rather than true infiltrative growth, as there was no evidence of myocardial invasion or destruction of adjacent structures. Coronary angiography showed normal coronary anatomy.

A multidisciplinary team decided to proceed with surgical intervention. During surgery, a firm, fixed mass was visualized, attached to the left atrial roof and extending toward the pulmonary veins and left ventricle. Complete resection was not feasible due to dense adhesion to surrounding cardiac tissues (Figure 2A). Three biopsy samples were taken.

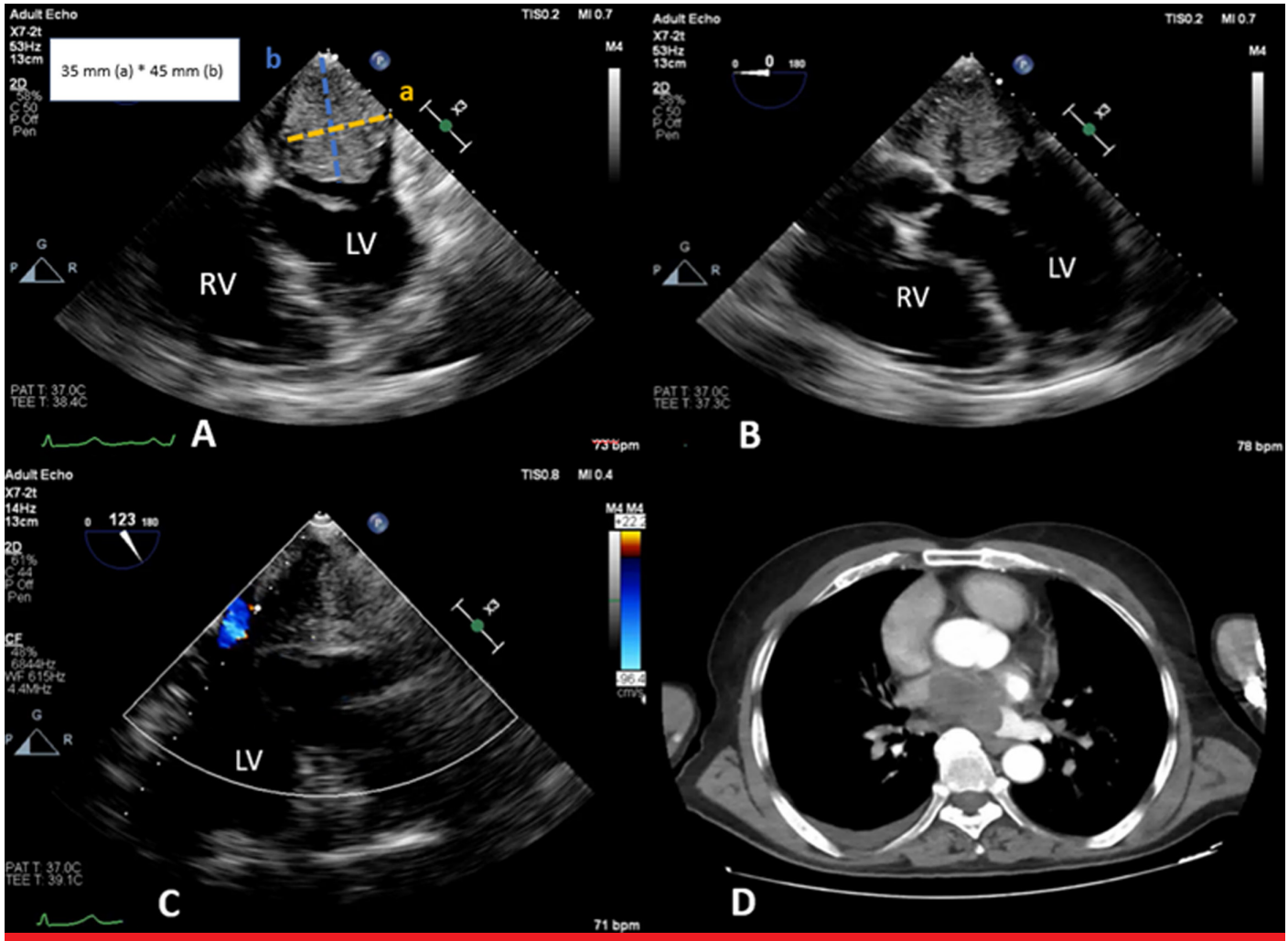

Figure 1. (A, B, C) Preoperative transesophageal echocardiography image demonstrating a cardiac mass. (D) Preoperative thoracic computed tomography image demonstrating a cardiac mass.

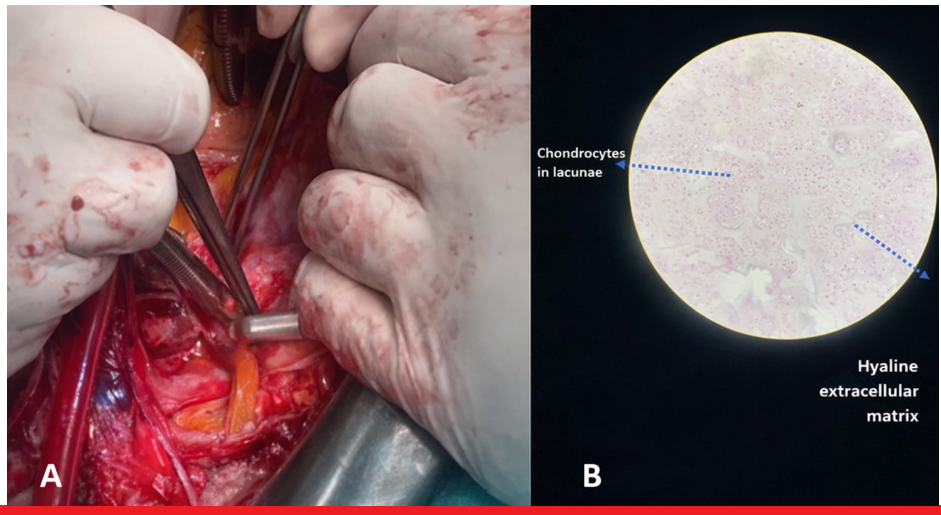

Figure 2. (A) Intraoperative image shows the occupation of the left atrium by the tumor. (B) Histopathological view showing mature cartilaginous tissue consistent with primary cardiac chondroma (hematoxylin–eosin staining, magnification × 10).

Histopathological analysis revealed mature hyaline cartilage consistent with primary cardiac chondroma (Figure 2B).

DISCUSSION

Primary cardiac tumors are rare clinical entities, and primary cardiac chondroma is one of the rarest forms. Most benign cardiac tumors are asymptomatic until they cause obstruction, embolization, or arrhythmia. Clinical presentation depends on tumor size, growth rate, and location within the heart.[1,2]

Only 4 previous cases of primary cardiac chondroma have been documented. The first case described by Vigraizer et al in 1973, involving a 55-year-old man with heart failure and myocardial infarction; autopsy revealed a 4 × 5 cm benign chondroma in the left atrium.[10] Dralle et al in 1994 reported a 36-year-old man presented with dyspnea and palpitations; a 2.5 × 1.6 cm tricuspid valve mass was surgically excised and diagnosed as chondroma. The patient had an uneventful postoperative course.[11] Sebire et al in 2004 reported a 16-year-old boy presented with superior vena cava obstruction and heart failure; the patient died postoperatively due to hemodynamic instability.[12] The most recent case published by Koskinas et al in 2011, a 62-year-old male with acute pulmonary edema was incidentally found to have a cardiac mass, later confirmed as chondroma after excision.[13]

On imaging, chondromas generally present as well-circumscribed, homogeneous masses that may contain calcifications but lack aggressive features, whereas chondrosarcomas tend to demonstrate infiltrative growth, heterogeneous internal architecture, destruction of adjacent structures, and increased metabolic activity on PET. Histopathologically, chondromas are characterized by mature hyaline cartilage with low cellularity, uniform chondrocytes, absence of nuclear atypia, and lack of mitotic activity, in contrast to chondrosarcomas, which exhibit increased cellularity, pleomorphism, hyperchromatic nuclei, and mitotic figures.[9] In the present case, the absence of fluorodeoxyglucose uptake on PET CT and the presence of mature hyaline cartilage without atypia supported a benign diagnosis.

Surgical management was particularly challenging due to the firm adherence of the mass to the left atrial roof and its extension toward the pulmonary veins and adjacent myocardial structures. Complete resection was deemed unsafe because attempted radical excision carried a substantial risk of atrial wall disruption, pulmonary venous injury, and postoperative atrial arrhythmias resulting from involvement of critical atrial conduction pathways. Therefore, a conservative surgical strategy with partial excision and biopsy was preferred to minimize the risk of structural compromise and life-threatening complications.

Given the incomplete resection, long-term clinical and imaging follow-up is of paramount importance. Although cardiac chondromas are benign and slow-growing tumors, residual tumor tissue may pose a risk of progressive obstruction, arrhythmia, or local recurrence over time, necessitating close surveillance.

Although not performed in this case, cardiac MRI may provide valuable additional information in the evaluation of chondroid cardiac tumors.

This case emphasizes the importance of thorough preoperative imaging and a multidisciplinary approach for management of rare cardiac tumors.

CONCLUSION

Primary cardiac chondroma is an exceptionally rare benign tumor that may mimic other intracardiac masses. Despite its benign histological features, its location within vital cardiac structures can make surgical excision challenging and may result in life-threatening complications.

Informed Consent: Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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Videos 1,2: Preoperative transesophageal echocardiography demonstrating a cardiac mass within the left atrium.

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