

Surgical Resection of a Cardiac Lipoma of the Right Ventricle

Abstract

Cardiac lipomas are rare, benign, encapsulated tumors which predominantly appear outside of the heart and less frequently inside the cardiac chambers. We describe a case of a right ventricular cardiac lipoma in a 72-year-old female patient who presented with palpitations. Surgical considerations, diagnostic modalities, and up-to-date literature are also presented and discussed.

Keywords: Cardiac surgery, cardiac tumors, lipoma, right ventricle

Introduction

Primary tumors of the heart are rare. According to the data of 22 large autopsy series, the frequency of primary cardiac tumors is approximately 0.02%.^[1] This percentage corresponds to 200 tumors in 1 million autopsies.^[1] More specifically, the incidence of cardiac lipoma is reported as 8.4% of the primary cardiac tumors.^[2] Cardiac lipomas are benign tumors which have been noted to arise not only from various cardiac sites, predominantly the epicardial surface, but also from the interatrial septum and left ventricle.^[3] The right ventricle (RV) represents a very unusual location for cardiac lipomas with only a handful of these cases presented in the literature.^[2,4,5] Herein, we report a case of a primary intracardiac lipoma of the RV which was attached to the interventricular septum (IVS).

Case Report

A 72-year-old female patient was referred to our department due to a mass which was incidentally found in the RV during workup for occasional palpitations. The 24-h tape revealed frequent episodes of ventricular tachycardia which were later attributed to the tumor. The patient was on medication for hyperlipidemia and hypertension, and her past medical history was free. Her physical examination, vital signs, and laboratory profile were normal, and the patient had a normal sinus rhythm. The surface echocardiogram was suggestive of a good LV function, while

a homogenous and mobile RV mass was identified to extend from the IVS to the right ventricular outflow tract (RVOT). The patient underwent magnetic resonance imaging (MRI) which identified the mass as a cardiac lipoma [Figure 1a-c]. The patient also had a coronary angiogram which was free of coronary artery disease. The case was planned on an elective basis. Once the patient was intubated, a transesophageal echocardiography was done [Figure 2a]. After median sternotomy and establishment of cardiopulmonary bypass, the tumor was approached through a 4-cm transverse incision on the anterior wall of the RVOT. The mass was lobulated and yellowish. It had a broad base attached to the ventricular septum, occupying the right ventricular cavity and extending to the RVOT without interfering with the tricuspid valve apparatus [Figure 2b]. The mass dimensions were 3.5 cm × 2 cm × 1 cm [Figure 2c]. The tumor was not strongly adhered to the IVS, and it was easily resected in one piece leaving no residual mass behind. The remaining defect on the RV was closed using a Prolene 4–0 suture. The patient was easily weaned from cardiopulmonary bypass and had an uneventful in-hospital recovery. She was discharged on the 5th postoperative day. Pathology report confirmed the initial diagnosis of a benign, cardiac lipoma [Figure 3a and b]. On a 3-month follow-up, she remains asymptomatic with no recurrent arrhythmias.

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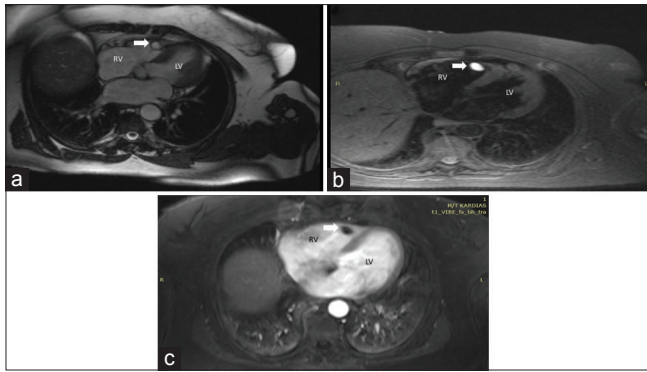


Figure 1: Cardiac magnetic resonance imaging images. LV: Left ventricle; RV: Right ventricle. (a) Four-chamber view T1-weighted cine image showing a high-intensity signal mass (white arrow) at the right ventricle. (b) Four-chamber view T2-weighted image showing a very high-intensity signal mass, consistent with lipoma (white arrow). (c) Four-chamber view T1-contrast perfusion image showing a low-intensity signal mass (white arrow) (no uptake)

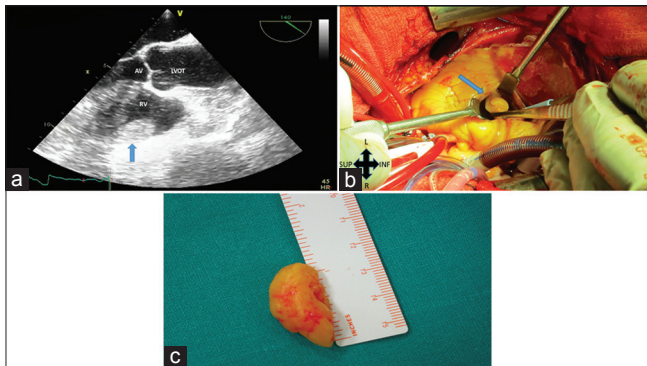


Figure 2: (a) Transesophageal echocardiogram long-axis view. Echocardiographic findings show a hyperechoic mass (blue arrow) with a broad base, adherent to the interventricular septum. RV: Right ventricle; AV: Aortic valve. (b) Intraoperative image of the lipoma (blue arrow) through a right ventricular incision. (c) Gross appearance of the surgically resected tumor. The size of the mass was 3.5 cm × 2 cm × 1 cm

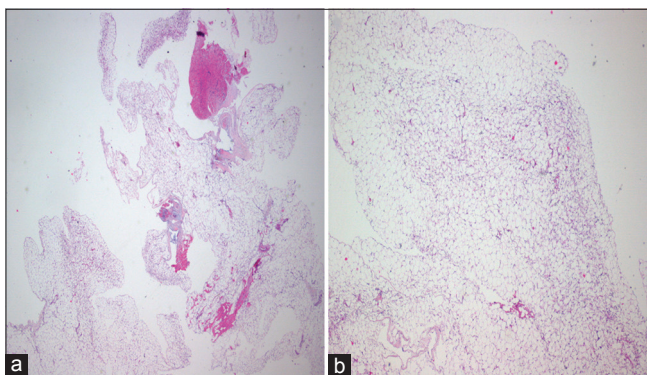


Figure 3: A benign tumor composed of lobules of matures white adipocytes. Histochemical stain (a) (H and E, ×25) and (b) (H and E, ×40)

Discussion

Cardiac lipomas are rare entities most commonly found in the subendocardial region (approximately 50%), and they show a predilection for right atrium and left ventricle.^[6] They have been reported in all age groups and are often

found incidentally.^[6] The clinical symptoms, when present, are nonspecific and usually are related to the size as well as the location of the tumor. Lipomas, in some cases, may cause arrhythmias, hemodynamic compromise, or even sudden death due to flow obstruction.^[7] Ventricular tachycardia is caused either by damage to the myocardium or by the conduction system. Moreover, they can cause compression phenomena or even act as embolic foci.^[7]

Preoperative evaluation should be thorough, and most of the times, it begins with a simple echocardiogram. Nevertheless, the transthoracic echocardiogram may be an inexpensive, noninvasive approach but may not differentiate the nature of cardiac tumors. For better assessment of the tumor and its proximity to adjacent structures, MRI or computerized tomography (CT) scan can also be used. These two modalities can accurately determine the degree of myocardial invasion and demarcate the exact dimensions of the tumor.^[8] Especially, the MRI's lipid suppression mode can add further information.^[8] The key diagnostic finding of lipomas on cardiac MRI images is homogeneous high signal intensity (relative to myocardium) on T1-weighted images that markedly suppresses with the application of additional fat saturation. An additional useful clue is the similar signal intensity of the surrounding chest wall fat on T1-weighted and T2-weighted images. Lipomas are avascular and do not enhance with contrast [Figure 1c].

Finally, transesophageal echocardiogram (TEE) can provide excellent views as in our case, assess the mobility of the mass, and can also determine the location of the tumor and its relation to other major landmarks such as the valve apparatus.^[9] The role of TEE is pivotal as it provides vivid images of the mass and facilitates a surgeon–operator interaction for optimal decision-making and management. TEE also confers the benefit of detecting small masses or unclear cardiac structures, especially when a transthoracic echocardiogram is suboptimal.^[5]

Surgical excision is usually the therapeutic intervention of choice. However, due to the infrequency of this entity, there are no clear guidelines as to the optimal time of the intervention, especially in asymptomatic patients. In fact, some authors suggest simple monitoring for asymptomatic patients with surgery reserved only for patients with arrhythmias, heart failure, thromboembolic sequelae, or inability to rule out malignancy.^[10] Our case mandated a surgical resection mainly, because the tumor was mobile and floating in the RV, thus rendering it prone to detachment and embolization. Moreover, the patient was also symptomatic, suffering from frequent episodes of ventricular tachycardia triggered by the RV lipoma.

Lipomas should be differentiated not only from well-differentiated liposarcomas but also from lipomatous hypertrophy which refers to the hyperplasia of the naturally occurring fat in the interatrial septum.^[10] In the differential

diagnosis of an RV mass, we should also include thrombus and vegetation.^[5]

There are several technical considerations that need to be taken into account whenever a surgical treatment is planned. First and foremost, excision of a ventricular tumor should be carried with respect to the remaining myocardium, aiming to preserve as much portion as possible. Second, we should always respect major landmarks such as the conduction system, valve apparatus, or coronaries in proximity. Moreover, it is always a safe strategy to enforce suture lines by incorporating Teflon strips on both sides of the ventriculotomy. Finally, separating the mass from the surrounding myocardium can sometimes pose significant risks as the tumor can be immersed in the ventricular wall^[5] or be integrated with the chordae, the papillary muscle of the tricuspid leaflets as well as the right ventricular trabecular muscle.^[2] This was not however the case in our patient, as the lipoma was easily detached from the myocardium.

Conclusions

Cardiac lipoma is a rather uncommon primary cardiac tumor, and especially RV lipomas are extremely rare. Echocardiography due to its widespread use and low cost remains the initial diagnostic tool. MRI which provides tissue characterization with T1, T2 and perfusion images has additional value. Surgery should be performed in cases of symptomatic or large lipomas as well as when a lipoma is considered to be high risk for thromboembolic sequelae.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not

be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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