

Cardiac Lipoma as an Incidental Finding in Cardiovascular Imaging Exam

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Introduction

The advent of cardiac imaging has ushered in an era where incidental findings can be detected using less invasive methods, even in asymptomatic patients. The clinical presentation of cardiac masses, characterized by their varying growth rates and diverse locations within the heart, poses a formidable challenge to cardiologists. Therefore, paramount importance lies in reducing the clinical burden and costs, considering the potential of cardiac imaging to optimize the clinical pathway.¹ The most common cardiac masses in the right atrium include thrombi, vegetations, and neoplasia. Approximately 75% of primary tumors are benign, with myxomas comprising 50% of benign cases. Other benign tumors that usually may arise in the right atrium are rhabdomyomas, fibromas, fibroelastomas, and lipomas. Cardiac lipomas are rare, accounting for 2.9% to 8% of all benign cardiac tumors. They rank third in frequency after myxomas and papillary fibroelastomas. The literature suggests that 25% of cardiac lipomas are intramyocardial; 25% are extracavitary of epicardial origin, and 50% are intracavitary of subendocardial origin.² Lipomas are well-encapsulated and homogeneous masses composed of mature fat. Although the etiology of cardiac lipomas is unknown, they can originate from any of the three cardiac tissues: subendocardial (the most common), pericardial, or myocardial.³

The aim of this report is to present a case of an asymptomatic right atrial lipoma and to discuss the etiology, natural history, and optimal management strategies for right atrial lipomas.

Case presentation

A 66-year-old asymptomatic woman was diagnosed with cardiac tumor. Physical examination and laboratory test results were unremarkable. An electrocardiogram showed normal sinus rhythm. Chest X-ray was also unremarkable. Echocardiography demonstrated an echogenic image, which was homogeneous, measuring approximately 26 × 17 mm, sessile, with well-defined borders, located in the posterior wall of the right atrium (Figure 1). Magnetic resonance imaging described a homogeneous nodular image in the posterior wall of the right atrium, which was movable, with well-defined

borders, measuring 2.4 × 2.2 × 1.9 cm. It showed low signal intensity on T2-weighted images, high signal intensity on T1-weighted images with fat saturation, absence of first-pass gadolinium perfusion, and absence of delayed enhancement (Figure 2). The patient was referred to cardiac surgery with cardiopulmonary bypass. After right atriotomy, a smooth, yellowish fatty mass protruding into the right atrium was noted. The 3 × 3 × 2.5-cm mass had a broad attachment to the right atrium. The tumor was resected (Figure 3); free margins of the atrium were cautiously taken (Video 1). The patient had an unremarkable recovery and was discharged from the hospital at day 4.

Pathological examination revealed proliferation of mature adipose cells forming monotonous sheets traversed by thin collagen septa in continuity with a thin capsule. Additionally, there were randomly arranged vessels of various sizes. At the periphery, there was representation of adhered endomyocardial tissue with mild interstitial edema, and the muscle fibers were focally separated by adipocytes (Figure 4).

Discussion

Cardiac lipomas are slow-growing tumors that may remain asymptomatic for years. However, they may present a wide range of clinical symptoms and signs, including arrhythmia, peripheral embolization, obstructive symptoms, and even sudden cardiac death. The manifestation of symptoms is often influenced by the size, location, and infiltration of the tumor.⁴ There are no differences in the incidence of cardiac lipomas between age groups or sexes.⁵

These tumors can occur anywhere within the heart, with approximately 53.1% located in the cardiac chambers, 32.5% in the pericardium, 10.7% within the myocardium, and 3.7% involving multiple structures. Specifically, around 40% of cardiac lipomas are found in the right atrium.⁵

In a setting of 26 cases of right atrial lipomas, with 13 cases in females, 12 cases in males, and 1 case in a transgender individual, the median age of the patients was 55.5 years, ranging from 17 to 74 years. Symptoms related to right atrial lipomas were present in 21 out of 26 patients (80%). The symptoms varied significantly, with dyspnea being the most common (35%), followed by chest pain (15%) and palpitations (12%).⁶

Lipomas are characterized as soft masses of fat tissue often surrounded by a thin layer of fibrous tissue. While most cardiac lipomas are composed of mature white adipose tissue, there have been reported cases of cardiac lipomas consisting of fetal brown fat. The etiology of these mesenchymal tumors remains unknown. Genetic variations, mainly involving the HMGA2 gene, are commonly observed in extracardiac lipomas.^{6,7} Multiple cardiac lipomas have been reported in patients with tuberous sclerosis, although their relationship

Keywords

Cardiovascular Surgical Procedures; Neoplasms; Lipoma

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Manuscript received June 23, 2023; revised August 10, 2023;

accepted August 22, 2023

Editor responsible for the review: Daniela do Carmo Rassi Frota

DOI: <https://doi.org/10.36660/abcimg.20230059i>

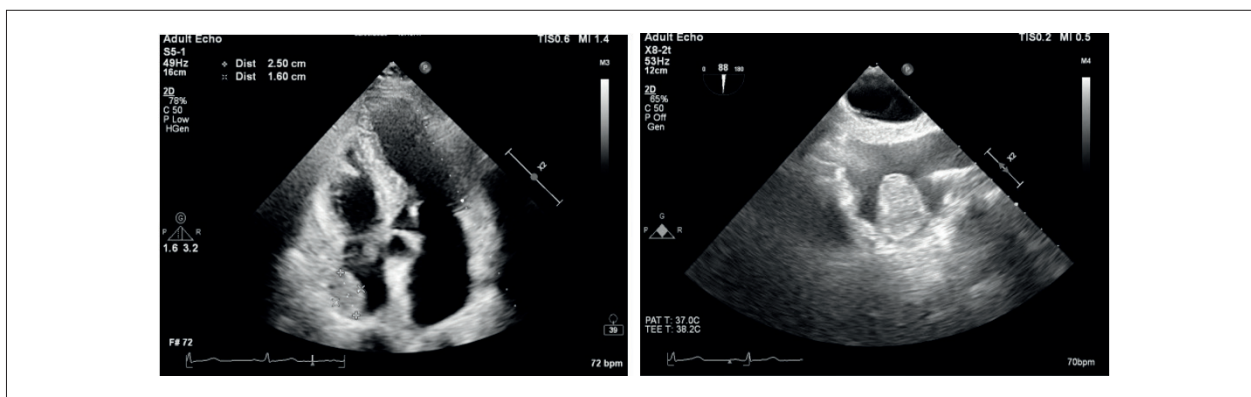


Figure 1 – Echocardiography: echogenic, homogeneous image, measuring approximately 26 x 17 mm, sessile, and with well-defined borders, located in the posterior wall of the right atrium

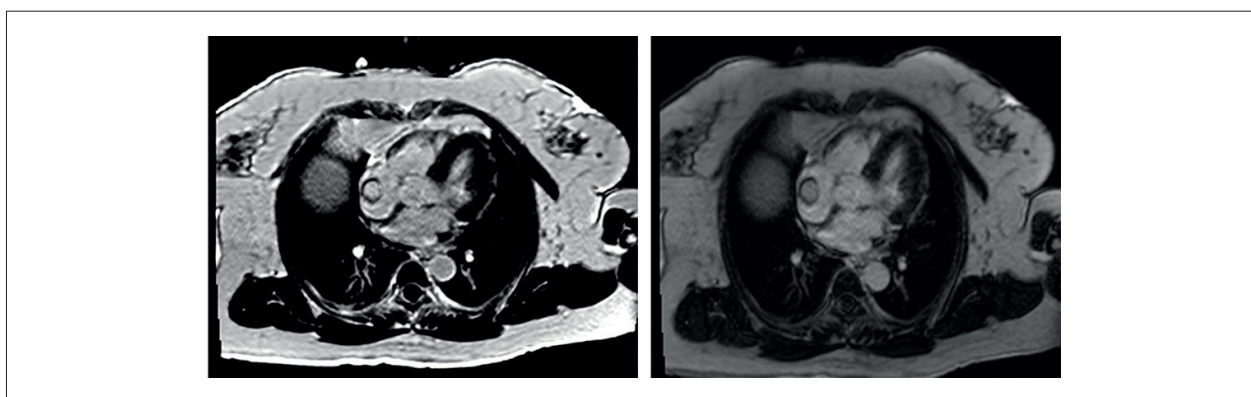


Figure 2 – Magnetic resonance image showing low signal intensity on T2-weighted images, high signal intensity on T1-weighted images with fat saturation, absence of first-pass gadolinium perfusion, and absence of delayed enhancement.

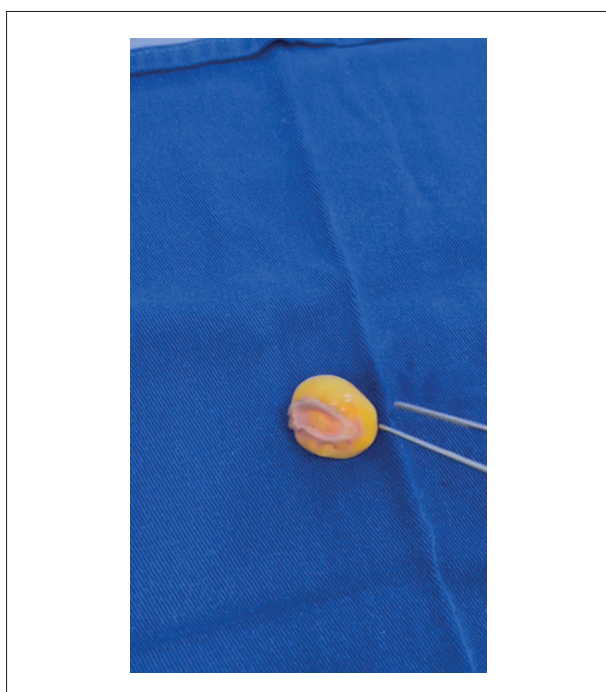


Figure 3 – Gross macroscopy of the tumor. Left: upper view of the tumor revealing smooth, yellowish fatty mass; right: bottom view, resected pediculous attachment to the atrium wall.

Video 1 – Link: http://abcimaging.org/supplementary-material/2023/3603/2023-0059_CC_video_1.mp4

has yet to be fully established. There is currently no evidence suggesting that cardiac lipomas can undergo malignant transformation. However, it is possible for mature lipomas and well-differentiated liposarcomas to coexist within the same heart.⁸ Cardiac liposarcoma is another rare entity with an unfavorable prognosis that is predominantly localized in the right atrium.

Case Report

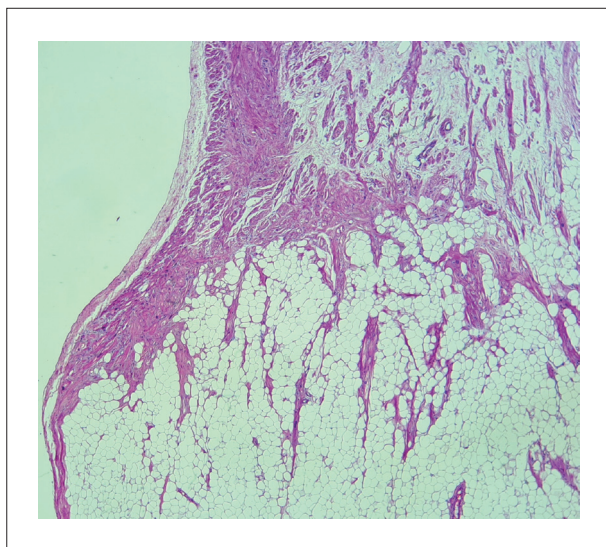


Figure 4 – Tumor cells demonstrated by mature adipose cells.

Accurate diagnosis and comprehensive evaluation of cardiac lipomas are heavily reliant on the utilization of multimodality imaging methods. Among these, transthoracic echocardiography emerges as a cost-effective and easily accessible approach that avoids exposure to radiation or ionizing contrast agents. Meanwhile, transesophageal echocardiography assumes significance in the assessment of atrial lesions or mobile valvular lesions, offering superior visualization of mass morphology and its anatomical relationships. Complementary to these techniques, cardiac computed tomography plays a vital role in providing a detailed assessment of calcified lesions and extracardiac anatomy, in addition to the opportunity to highlight irregular mass margins

and invasions. Lastly, cardiac magnetic resonance imaging demonstrates exceptional prowess in accurately distinguishing between thrombus and tumor entities, thereby bolstering the diagnostic accuracy in this intricate domain.^{1,4,6}

The management of asymptomatic patients with cardiac lipomas is a subject of debate. Radical resection of the lipoma is the optimal method of treatment in symptomatic patients. Conservative management may be implemented for asymptomatic cardiac lipomas, and prophylactic resection should also be considered.

Author Contributions

Conception and design of the research, analysis and interpretation of the data, statistical analysis, writing of the manuscript: Taniguchi FP; acquisition of data and critical revision of the manuscript for intellectual content: Taniguchi FP, Silas MG, Oliveira PM.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any thesis or dissertation work.

Ethics Approval and Consent to Participate

This article does not contain any studies with human participants or animals performed by any of the authors.

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