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(CASE REPORT)

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INCIDENTAL DISCOVERY OF A RIGHT ATRIAL MASS: KEY ROLE OF MULTIMODALITY IMAGING IN DIAGNOSING A CARDIAC LIPOMA

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ABSTRACT

Background: Cardiac lipomas are rare benign tumors that are frequently discovered incidentally and may mimic other intracardiac masses, particularly thrombi or malignant tumors. Accurate non-invasive tissue characterization is essential to guide appropriate management and avoid unnecessary interventions.

Case summary: We report the case of an 87-year-old man referred for evaluation of an incidentally detected right atrial mass. Transthoracic echocardiography demonstrated a well-defined mobile intracavitary lesion, initially raising suspicion of thrombus. Cardiac magnetic resonance (CMR) provided comprehensive tissue characterization, revealing a well-circumscribed fatty mass with markedly reduced native T1 values, absence of first-pass perfusion, and no late gadolinium enhancement, findings highly suggestive of a cardiac lipoma. Whole-body ^18F-FDG PET/CT showed no abnormal metabolic activity, further supporting the diagnosis of a benign lesion. Given the absence of significant symptoms, hemodynamic compromise, or imaging features suggestive of malignancy, a conservative management strategy with regular imaging follow-up was adopted.

Conclusion: This case highlights the pivotal role of multimodality imaging, particularly CMR complemented by FDG PET/CT, in the non-invasive diagnosis of cardiac lipoma. An integrated imaging approach allows reliable differentiation from thrombi and malignant cardiac tumors, facilitating appropriate patient management while avoiding unnecessary surgery in carefully selected asymptomatic patients

Keywords: Cardiac lipoma; Right atrial mass; Multimodality imaging; Echocardiography; Cardiac magnetic resonance imaging; Cardiac computed tomography.

1 INTRODUCTION

Primary cardiac tumors are rare, with approximately 75% being benign. Among these, cardiac lipomas represent an uncommon entity, accounting for less than 10% of all benign cardiac tumors. They are composed of mature adipose tissue and may arise from the subendocardium, myocardium, or subepicardium. Their clinical presentation is highly variable, ranging from incidental findings to symptoms related to mass effect, arrhythmias, obstruction of intracardiac blood flow, or embolic complications.

The widespread use of modern cardiac imaging has considerably increased the incidental detection of cardiac masses. Transthoracic echocardiography is usually the first imaging modality to identify an intracardiac lesion, whereas cardiac magnetic resonance (CMR) provides superior tissue characterization and plays a pivotal role in differentiating lipomas from other benign or malignant cardiac tumors. In selected cases, 18F-FDG positron emission tomography/computed tomography (PET/CT) can provide additional metabolic information and help support the benign nature of the lesion.

We report the case of an elderly patient presenting with acute pericarditis, in whom multimodality imaging led to the incidental diagnosis of a right atrial lipoma. This case illustrates the complementary role of echocardiography, cardiac magnetic resonance, and FDG PET/CT in establishing a confident non-invasive diagnosis and guiding conservative management

2 CASE REPORT

An 87-year-old male patient, being treated for hypertensive heart disease and unexplained thrombocytosis managed with aspirin, was hospitalized for evaluation of a right atrial mass discovered incidentally during a cardiology consultation. Functionally, he reported exertional dyspnea (NYHA Class II), with no chest pain, palpitations, or syncope, a condition that had been present for one year. Upon admission, the patient was hemodynamically stable. The physical examination was unremarkable, with no signs of right or left heart failure. The electrocardiogram showed a regular sinus rhythm at 74 bpm, with no arrhythmias, conduction abnormalities, or repolarization abnormalities. Laboratory tests revealed thrombocytosis with a platelet count between 500 and 630 G/L , associated with moderate monocytosis and a slight increase in neutrophils, The evaluation was completed with testing for the JAK2 V617F mutation, which came back positive, strongly suggesting an underlying myeloproliferative disorder. without evidence of a clinical inflammatory syndrome.

Liver tests were largely unremarkable, apart from a moderate elevation in gamma-GT, without cytolysis. Cardiac biomarkers showed a modest increase in NT-proBNP and high-sensitivity troponin, in the absence of clinical signs of acute cardiac injury.

The transthoracic echocardiogram performed at admission showed a non-dilated left ventricle with non-hypertrophied walls (IVSd 10 mm, posterior wall 11 mm, left ventricular mass index 88 g/m^2), with preserved global and segmental contractility. The left ventricular ejection fraction was calculated at 60% using the Simpson biplane method. The assessment of diastolic function revealed a grade I relaxation profile, with no signs of elevated filling pressures, and an E/E' ratio estimated at 7.2. No significant left-sided valvular abnormalities were identified. The left atrium is of normal dimensions, with a volume index of 31 mL/m^2. The right atrium is also of normal size; however, it contains a rounded, mobile, and slightly hypoechoic intracavitary mass measuring approximately 26 × 24 mm.

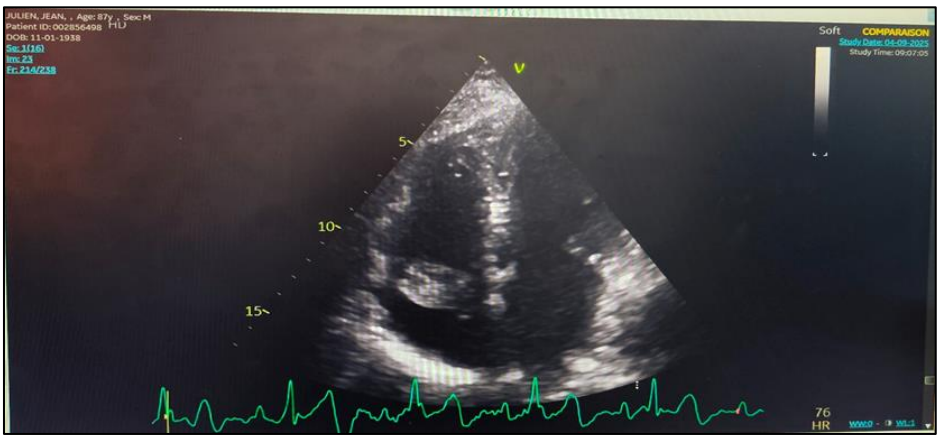

Figure 1: Transthoracic echocardiography revealing a well-circumscribed right atrial intracardiac mass.

This mass appears attached to the wall by a short pedicle and is located in the anteroseptal region, in close proximity to the tricuspid valve. The right ventricle is not dilated, with preserved longitudinal systolic function; the S' wave velocity was measured at 14 cm/s. No echocardiographic evidence of pulmonary hypertension is found; mean pulmonary artery pressure (MPAP) was estimated at 27 mmHg based on tricuspid regurgitation flow. The inferior vena cava appears small in caliber and compliant during inspiration, suggesting normal right filling pressures with a dry pericardial space. Overall, transthoracic echocardiography revealed a mobile intracavitary mass, well-defined within the right atrium, measuring 29 × 21 mm, located in the region of the interatrial septum, near the anterior leaflet of the tricuspid valve. Given its relatively homogeneous appearance, punctuated by a few internal hyperechoic areas, as well as the absence of a broad base of attachment that would allow it to be clearly distinguished from the adjacent atrial wall, the initial

diagnostic hypothesis of an intracardiac thrombus was adopted, although a tumorous origin or an infectious vegetation could not be formally ruled out, justifying the request for further cardiac imaging studies.

A cardiac MRI then provided key information for characterizing the mass. It revealed preserved overall cardiac function, with normal left and right ventricular volumes. The left atrium was moderately dilated, while the right atrium remained of normal size. No abnormalities were identified regarding the heart valves, pericardium, or myocardium. A well-defined mass with regular borders measuring approximately 21 × 24 mm was present, clearly demarcated within the right atrium, with a homogeneous signal and no abnormalities suggestive of an infiltrative or aggressive process. Tissue characterization of the mass revealed a complete lack of enhancement during first-pass perfusion as well as the absence of late intralesional enhancement following gadolinium injection. A faint peripheral rim remained enhanced, likely corresponding to a thin fibrous capsule. Native T1 mapping showed a very high signal within the lesion, consistent with a fatty composition. Furthermore, the absence of vascularization and internal enhancement provided strong evidence against a vascularized tumor or an active inflammatory process. The combined morphological and tissue data obtained from cardiac MRI thus allowed for a diagnosis of a right atrial lipoma to be made with a high degree of certainty.

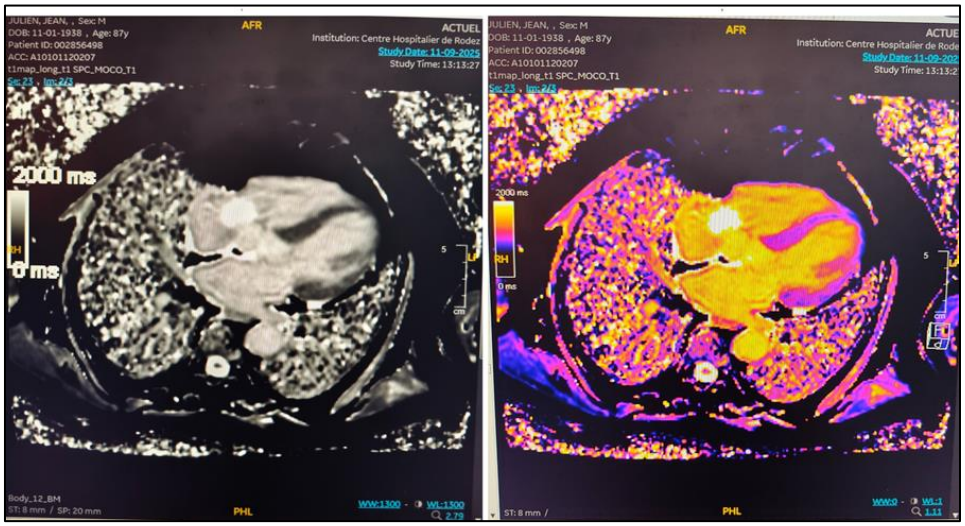

Figure 2: Native T1 mapping of the right atrial mass. (A) Grayscale native T1 map demonstrating markedly reduced T1 values within the lesion. (B) Corresponding colorcoded native T1 map confirming the fatty composition of the lesion.

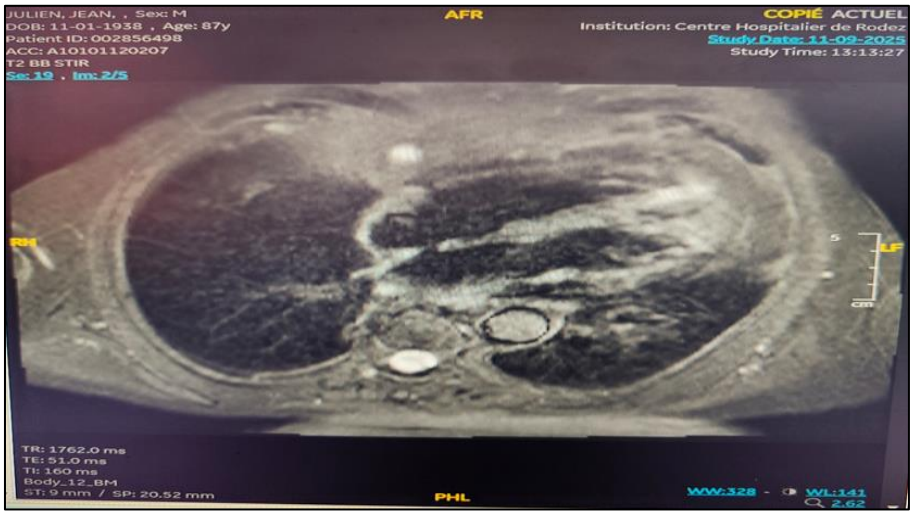

Figure 3: Axial T1-weighted turbo spin-echo black-blood (T1 TSE BB) cardiac magnetic resonance image demonstrating a well-circumscribed hyperintense right atrial mass, suggestive of a lipomatous lesion.

To further characterize the lesion, whole-body ^18F-FDG PET/CT was obtained. The cardiac mass showed no discernible FDG uptake, indicating the absence of increased metabolic activity. No abnormal hypermetabolic lesions

were identified elsewhere in the body. These findings complemented the CMR tissue characterization and reinforced the diagnosis of a benign lipomatous lesion, making an aggressive or metastatic process highly unlikely.

Figure 4: Whole-body 18F-FDG PET/CT demonstrating no abnormal FDG uptake within the right atrial mass, supporting the diagnosis of a benign cardiac lipoma

In the absence of clinical symptoms and given the right atrial location of the lesion, a conservative management approach was chosen following a multidisciplinary consultation with the cardiovascular surgery team. Thus, the initiation of anticoagulant therapy was not considered, given that the imaging data did not support the hypothesis of an intracardiac thrombus. Furthermore, management was based on optimizing medical treatment for hypertension. This involved reducing the dosage of diuretics due to hyponatremia, and the introduction of an angiotensin II receptor antagonist as well as a beta-blocker, with discontinuation of angiotensin-converting enzyme inhibitor therapy. Regular clinical and morphological monitoring via frequent quarterly transthoracic echocardiograms was recommended to ensure the stability of the lesion and to detect early any changes that might warrant reconsideration of the therapeutic strategy.

3 DISCUSSION

Cardiac masses comprise a heterogeneous group of lesions that may be of tumour or non-tumour origin. Their detection has become increasingly common thanks to advances in cardiovascular imaging, in particular echocardiography, CT scans and cardiac MRI. The differential diagnosis is quite broad and includes, in particular, intracardiac thrombi, infectious vegetations, primary cardiac tumours and metastatic lesions. This makes the precise characterisation of the lesion more challenging, as the diagnostic, prognostic and therapeutic implications differ considerably depending on the aetiology and nature of the mass. A multimodal approach plays a central role in the assessment of these lesions, enabling analysis of their location, morphological characteristics and tissue composition.

Primary cardiac tumours are a rare condition, with an estimated incidence of between 0.001 per cent and 0.03 per cent in autopsy series. Of these, 70 to 75 per cent are benign (2). Cardiac lipomas, meanwhile, account for a small proportion of these neoplasms, representing between 0.5 and 3 per cent of resected primary cardiac tumours and between 2 and 10 per cent of benign cardiac tumours, depending on the series reported (2,3,6). Although their histology is benign, their clinical significance lies in their potential to impair cardiac function, depending on their size, location and anatomical relationships.

Among these primitive processes, cardiac lipomas stand out: tumours of mature adipose tissue capable of forming different cardiac layers, with subendocardial localisation being the most common, accounting for around 50 per cent of cases, whilst myocardial and subepicardial localisation each account for nearly 25 per cent of cases (3). These tumours are usually characterised by sharp, regular margins with the presence of a well-defined fibrous capsule, although certain infiltrating forms have, in exceptional cases, been described (4). They can occur at any age, with no clear gender predominance (4). They can affect all the cardiac chambers, but involvement of the right atrium, as in our case, remains relatively uncommon (7–9).

Clinically, cardiac lipomas most often progress without causing any symptoms. It is estimated that 50–70 per cent of cases are asymptomatic and are discovered incidentally during imaging investigations carried out for another reason, or even at autopsy (1,4). When clinical symptoms do occur, they are generally closely linked to the size of the tumour and its location. Intracavitary lesions may cause obstruction of blood flow or valvular dysfunction, whilst myocardial involvement may compromise the conduction system and predispose to the development of arrhythmias (8,9). Several complications have been reported in the literature, including syncope, heart failure, conduction abnormalities, pulmonary embolism and, more rarely, sudden cardiac death (9–13). Among the most frequently described symptoms are dyspnoea, palpitations and asthenia.

The case presented in this article generally fits within this clinical context, whilst remaining relatively asymptomatic. The patient was an 87-year-old man in whom a mass in the right atrium was discovered incidentally during routine cardiological follow-up for his high blood pressure. On questioning, the patient reported exertional dyspnoea that had developed gradually over the past year or so, without chest pain, palpitations, syncope or signs of heart failure. Furthermore, the clinical examination and the electrocardiogram revealed no significant abnormalities.

Transthoracic echocardiography revealed a well-defined, mobile intracavitary mass located in the right atrium, with no impact on the valvular structures and no obstruction to intracardiac filling. Transoesophageal echocardiography confirmed this finding whilst providing a more precise anatomical characterisation of the lesion, particularly its location and its relationship with adjacent cardiac structures. Despite its size, mobility and location, no significant haemodynamic consequences were observed.

Cardiac magnetic resonance imaging was the decisive step in the diagnostic process. It revealed a homogeneous lesion with signal characteristics typical of mature adipose tissue, consistent with a lipoma of the right atrium. This non-invasive tissue characterisation made it possible to rule out the main differential diagnoses, notably malignant tumours and organised thrombi, whilst avoiding the need for further invasive investigations.

The differential diagnosis of a mass in the right atrium is broad and requires a thorough analysis, based on clinical data and the characteristics of the various imaging modalities. A thrombus is therefore the main alternative diagnosis, particularly in patients with atrial fibrillation or other thromboembolic risk factors. It usually presents as an irregular, avascular mass that does not enhance following the injection of contrast medium. In contrast, myxoma, which is the most common primary benign cardiac tumour, is most commonly located at the interatrial septum and exhibits morphological characteristics and mobility that differ from those observed in lipomas (18). Liposarcoma, on the other hand, remains rare, accounting for only around 1 per cent of primary malignant cardiac tumours. It is generally characterised by an infiltrative appearance, a heterogeneous architecture, the presence of areas of necrosis and enhancement following the administration of contrast medium (13–16).

Secondary cardiac involvement of metastatic origin should also be considered, particularly in patients with a known cancer, when an irregularly shaped mass is present, often associated with a pericardial effusion. Finally, certain much rarer lesions, such as lipomatous hypertrophy of the interatrial septum or hibernoma, may also mimic a lipoma. Distinguishing between them relies primarily on the characteristics of multimodal imaging and, in certain situations, on histopathological analysis (19).

When investigating these intracardiac masses, echocardiography remains the first-line investigation due to its widespread availability, its non-invasive nature and its ability to simultaneously assess the morphology of the cardiac chambers, the anatomical relationships of the lesion and its potential haemodynamic impact (14). However, its capabilities remain limited when it comes to tissue characterisation. In this respect, cardiac magnetic resonance imaging is now the gold standard, thanks to its excellent tissue resolution. Lipomas typically appear as homogeneous lesions, showing hyperintensity on T1- and T2-weighted sequences, with complete signal loss on fat-suppressed sequences and no significant enhancement following gadolinium injection (11,12). The combination of these criteria in the majority of cases allows for a reliable non-invasive diagnosis and distinguishes lipomas from other intracardiac masses.

In the absence of specific guidelines, the management of cardiac lipomas is based primarily on an individualised assessment that takes into account, simultaneously, clinical data, the morphological characteristics of the tumour and its functional impact. Surgical excision is generally indicated in symptomatic patients, in the presence of haemodynamic compromise, rhythm disturbances attributable to the lesion, or when a diagnosis of malignancy cannot be definitively ruled out (20). Published series report generally favourable postoperative outcomes, with a low incidence of recurrence following complete resection.

Conversely, in asymptomatic or minimally symptomatic patients presenting with a mass exhibiting radiological features typical of a lipoma and with no haemodynamic consequences, a conservative strategy based on regular clinical and morphological monitoring now appears to be a viable alternative.

In our case, several factors prompted this therapeutic approach: the patient's advanced age, the mild nature of the symptoms, the absence of haemodynamic impact, and the characteristics highly suggestive of a lipoma on cardiac magnetic resonance imaging. The patient's condition remained favourable throughout the follow-up period, with no clinical deterioration or emergence of new abnormalities, thereby confirming the appropriateness of this non-invasive strategy.

Beyond its clinical significance, this case highlights the importance of an integrated diagnostic approach combining clinical data with various imaging modalities. This strategy enables a reliable diagnosis to be made, guides treatment decisions and, in carefully selected patients, helps to avoid potentially unnecessary investigations or invasive procedures.

4 CONCLUSION

A lipoma of the right atrium is an exceptional benign cardiac tumour, most often discovered incidentally. This case highlights the crucial role of cardiac magnetic resonance imaging in the non-invasive characterisation of these lesions and in guiding management. In selected patients who are asymptomatic or have minimal functional impairment, a conservative strategy based on regular monitoring may be preferred, provided there is a reliable diagnosis and no evidence to suggest an unfavourable outcome.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

No external funding was received for the preparation of this case report.

Disclosure of conflict of interest

The authors declare that they have no competing interests related to this work.

Statement of ethical approval

This study describes a single clinical case and was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. According to institutional policy, formal ethical committee approval was not required for the publication of this case report.

Patient Confidentiality

All clinical data and imaging included in this report have been fully anonymized to protect the patient's identity.

Author Contributions

All authors contributed substantially to the clinical management of the patient, acquisition and interpretation of imaging findings, drafting of the manuscript, and critical revision of its intellectual content. All authors reviewed and approved the final version of the manuscript prior to submission.

REFERENCES

[1] Liu L, Fang A, Cheng S, Guo G, Zhang S, Chen X, et al. Diagnosis and survival analyses of patients with space-occupying cardiac lesions: a 10-year retrospective single-center study. Quant Imaging Med Surg. (2022) 12:4081–94. 10.21037/qims-21-1151

[2] Abdelradi A, Yekta A. A case of asymptomatic cardiac lipoma and literature review. CJC Open. 2020;3:207–209. doi: 10.1016/j.cjco.2020.10.002.

[3] Shu S, Wang J, Zheng C. From pathogenesis to treatment: a systematic review of cardiac lipoma. J Cardiothorac Surg. 2021;16(1):1. doi:10.1186/s13019-020-01379-6

[4] Karangelis D, Palios J, Tzertzemelis D, Economidou S, Panagiotou M. Surgical resection of a cardiac lipoma of the right ventricle. Ann Card Anaesth. (2019) 22:452–4. 10.4103/aca.ACA_87_18

[5] Shu S, Wang J, Zheng C. From pathogenesis to treatment, a systemic review of cardiac lipoma. J Cardiothorac Surg. 2021;16(1):1. 10.1186/s13019-020-01379-6. Published 2021 Jan

[6] Rainer WG, Bailey DJ, Hollis HW., Jr. Giant cardiac lipoma: refined hypothesis proposes invagination from extracardiac to intracardiac sites. Tex Heart Inst J. (2016) 43:461–4. 10.14503/THIJ-15-5342

[7] Bath AS, Gupta V, Kalavakunta JK. A right atrial fat ball: Rare case of cardiac lipoma. Clin Case Rep. 2019;7:1798–1799. doi: 10.1002/ccr3.2335.

[8] Shah OA, Badran A, Kaarne M, Velissaris T. Right atrial and SVC infiltrating mass-the entity of infiltrating lipoma. J Cardiothorac Surg. 2019;14(210) doi: 10.1186/s13019-019-1015-7.

[9] Fan W, Liao B, Li X. Lipoma across the wall of the right atrium. J Card Surg. 2021;36:3390–3392. doi: 10.1111/jocs.15753.

[10] Wang X, Yu X, Ren W, Li D. A case report: A giant cardiac atypical lipoma associated with pericardium and right atrium. BMC Cardiovasc Disord. 2019;19(247) doi: 10.1186/s12872-019-1221-1.

[11] Molek P, Urbańczyk-Zawadzka M, Mielnik M, Szlosarczyk B, Nessler J, Gackowski A. Right atrial lipoma: The significance of multimodality imaging. Kardiol Pol. 2021;79:893–894. doi: 10.33963/KP.a2021.0024.

[12] Bonnes J, Brink M, Nijveldt R. How to evaluate cardiac masses by cardiovascular magnetic resonance parametric mapping? Eur Heart J Cardiovasc Imaging. 2023;24(12):1605–7. 10.1093/ehjci/jead221

[13] Thriveni R, Bhosle S, Ramesh DNSV, Praveen AH. Hibernoma: a rare benign tumor. J Indian Acad Oral Med Radiol. 2021;33(2):230–2.

[14] Liu L, Zuo Y, Huang Y, Cao L. Echocardiographical findings of giant cardiac lipoma. Medicine (Baltimore) 2019;98(e14456) doi: 10.1097/MD.0000000000014456.

[15] Shu S, Yuan H, Kong X, Wang J, Wang J, Zheng C. The value of multimodality imaging in diagnosis and treatment of cardiac lipoma. BMC Med Imaging. 2021;21(1):71. 10.1186/s12880-021-00603-6.

[16] Zhao L, Su X, Song X, Ding Y, Wang Q. A massive cardiac lipoma in the right atrium with multimodality imaging. J Cardiothorac Surg. 2024;19(1):646. 10.1186/s13019-024-03162-3. Published 2024 Dec 19.

[17] Liu W, Bu H. Strategies to rare primary cardiac lipomas in the left ventricle in a patient: case report. BMC Cardiovasc Disord. (2022) 22:316. 10.1186/s12872-022-02748-w.