

Original research article**Beyond coronary artery disease, coronary angiography has clinical significance in cardiac myxoma**

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Abstract

Primary cardiac tumors are rare, and most of them are benign cardiac tumors. Atrial myxoma is the most common benign cardiac tumor. Echocardiography is the preferred mode of evaluation of myxoma size. But before undergoing surgery Coronary angiography is a must to rule out coronary artery disease and vascular supply of myxoma. We here report an interesting case of a left atrial myxoma having dual blood supply, one from the right coronary artery and the other from the left circumflex artery demonstrated by preoperative coronary angiography. The mass was successfully excised and the diagnosis of cardiac myxoma was confirmed via histopathology. Thus, this case report highlights the importance of Coronary angiography before LX myxoma resection. Coronary angiography can alter the surgical approach and may therefore be considered prior to myxoma resection.

Keywords: Atrial myxoma, cardiac tumour, coronary angiography, coronary artery disease

Introduction

Atrial myxoma is a rare but most common benign cardiac tumor. It constitutes approximately 50 percent of all cardiac tumors in adults ^[1]. Most myxoma around 80 percent found in the left atrium. They were also found in decreasing order in the right atrium, right ventricle, and left ventricle.

Echocardiography is the preferred mode of imaging for demonstrating myxoma. Coronary angiography (CAG) is only performed under special circumstances. Presently the indications of coronary angiography to rule out coronary artery disease before myxoma excision are primarily based on the patient's age or the presence of angina.

However, other than ruling out coronary artery disease (CAD), it is important to detect neovessel of myxoma. Coronary angiography can visualize a feeding vessel which has several clinical and therapeutic implications. A neo vascularised myxoma with blood leak into atria can create a steal phenomenon and subsequent angina can occur. S Subash, *et al.* reported a case of acquired coronary cameral fistula in a case of highly vascular left atrium myxoma ^[2]. Huang CY, *et al.* described the angiographic pattern as a "sea anemone" appearance of the tumor vasculature ^[3].

This case report presents a 43-year-old female diagnosed with atrial myxoma via echocardiography. The patient had coronary angiography to exclude CAD. CAG revealed a rare condition with left atrial myxoma vascularised by two arteries from the Right coronary artery (RCA) and left circumflex (LCX). This finding highlight that every patient of any age with myxoma should have CAG as a routine preoperative workup.

Case Description

A 43-year-old woman was admitted because of chest tightness and shortness of breath for the last seven months. The physical examination was normal except systolic murmur at the apex. 12 lead Electrocardiogram (ECG) showed poor progression of R wave and ST-T changes in inferior leads (Figure 1). 2D echocardiography revealed a large mass in the Left Atrium of size 6.3 cm x 4.4 cm, almost filling more than 50% of the left atrium volume attached to the interatrial septum (Figure 2), with moderate eccentric mitral regurgitation, mild tricuspid regurgitation with pulmonary artery systolic pressure of 35 mm Hg. Because of her presenting symptoms and ECG changes coronary angiography was performed to assess coronary artery disease. CAG showed no stenosis in the coronary arteries but a

strong neo vascularized left atrial mass supplied by two feeding vessels from LCX and RCA (Figure 3). The case was discussed with the CTVS team and the myxoma was successfully excised with ligation of feeding arteries. The pathological analysis showed presence of tumor with myxoid background. Presence of stellate shaped cells with hyperchromatic nuclei which consistent with myxoma (Figure 4, 5). Echocardiography performed after surgery showed no residual mass and no flow seen across the interatrial septum. The patient was successfully discharged from the hospital after 5 days.

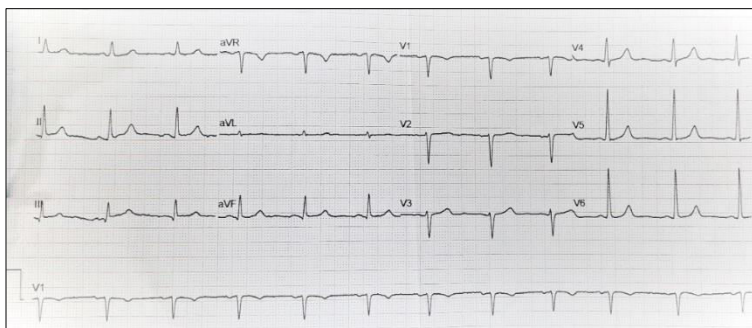


Fig 1: Electrocardiogram showing NSR, poor R wave progression with ST changes in inferior leads

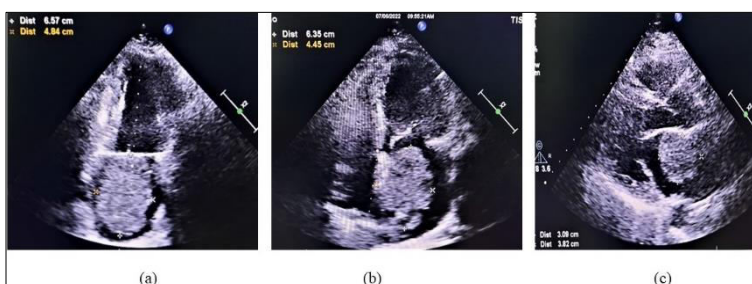


Fig 2: (a) 2D Echo two chamber view (b) 2 D Echo four chamber view (c) 2 D Echo PLAX view

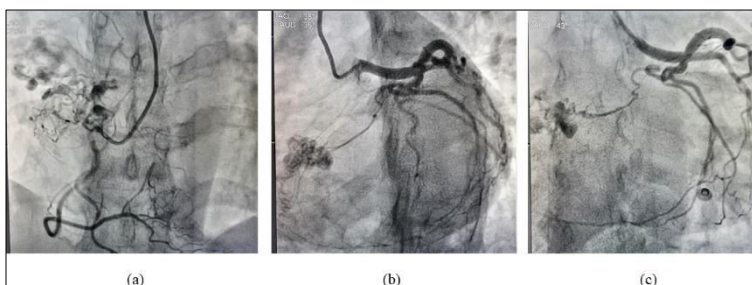


Fig 3: (a) LAO Cranial view LA myxoma supplied by RCA (b) LAO caudal view showing feeding vessel to LA myxoma from LCX (c) LAO Caudal showing feeding artery to LA myxoma from LCX

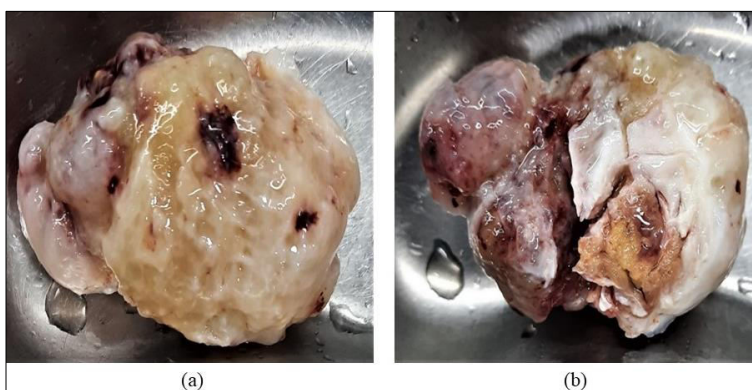


Fig 4: Surgically excised LA myxoma

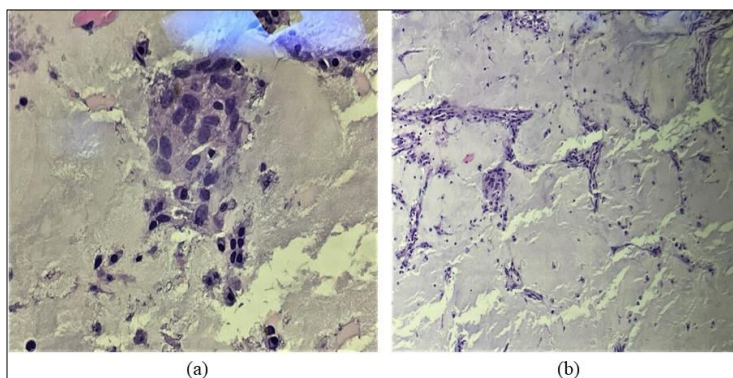


Fig 5: Haematoxylin-eosin staining of the mass consistent with myxoma

Discussion

Myxomas are the most frequent benign form of heart tumor. The majority of the myxomas (85%), are located in the left atrium. Although myxomas are histologically benign, they can be lethal because of their position. The tumor is typically pedunculated and attached to the left atrial septum in the region of the fossa ovalis. The incidence of cardiac myxoma peaks at 40 to 60 years of age with a female to male ratio of approximately 3:1 ^[4].

Patients with Left atrial myxoma may get embolised. The signs vary depending upon the vascular territory involved. Involvement of cerebral vessels can present as stroke, coronary artery involvement can cause the acute coronary syndrome, intestinal obstruction can result from bowel ischemia, and peripheral arterial obstruction can result in critical limb ischemia.

Most patients were asymptomatic. The patient may present with nonspecific symptoms like fatigue, cough, low-grade fever, arthralgia, myalgia, weight loss, and rash. If it causes obstruction to left ventricle inflow, it can present as syncope, dyspnoea, and pulmonary edema.

In 64% of patients, cardiac auscultation abnormality was detected ^[5]. Most common auscultation findings are systolic murmur (50%) followed by loud S1 (32%), opening snap (26%), and diastolic murmur (15%). Tumour “plop” may also be heard ^[6]. Laboratory findings of anemia, increased ESR and increased CRP.

The electrocardiogram is usually normal. Laboratory findings showed anemia with raised ESR and CRP. 2D echocardiography preferred modality of imaging to demonstrate, mass in the atrium with the stalk attached to the inter-atrial septum. TEE provides a specific delineation of the tumor, including size and origin. CT and MRI scans can provide better delineation but are usually not preferred.

While a limited number of studies have demonstrated the rare condition with coexisting coronary artery supply as seen in our case ^[7, 9, 10, 11]. The origin of the vessels supplying the tumor is most commonly LCX followed by the RCA ^[12]. Some studies have shown that the rate of growth of myxoma is more rapid due to dual blood supply ^[13].

The closest differential diagnosis of myxoma is LA thrombus. CAG can differentiate the two masses. The presence of neovascularisation favors the diagnosis of cardiac myxoma rather than thrombus.

Neovascularisation of atrial myxomas with blood leak into the atria can create a steal phenomenon and can cause myocardial ischemia. The steal phenomenon is defined as a leak from the coronary artery into the atria, causing blood to spurt from the myxoma pedicle after surgery. The visualization of coronary supply to myxoma has changed the surgical approach to preventing postoperative steal phenomenon and myocardial ischemia ^[14]. Surgeons usually resect part of the septum with myxoma and feeding vessels can be ligated and sutured well in a suture line to prevent flow into the atrium. Thus, demonstrating vascularisation to surgeons, chances of post-operative steal phenomenon and myocardial ischemia can be prevented. Before surgical excision angiographic visualization of the feeding vessels has important therapeutic implications.

Even after excision lifelong follow is needed as it has a recurrence rate of 5 to 15% and the time of recurrence varies from 0.5 to 6.5 years ^[3, 4].

Conclusion

In conclusion, we strongly advise preoperative coronary angiography in all cases of atrial myxomas even in the absence of ischemic symptoms. Furthermore, the angiographic presence of tumor neovascularisation should be informed to surgeons before surgery. During surgery feeding vessels should be ligated and sutured well to prevent fistula formation.

References

1. Thomas-de-Montpréville V, Nottin R, Dulmet E, Serraf A. Heart tumors in children and adults: clinicopathological study of 59 patients from a surgical center. *Cardiovascular Pathology: The Official Journal of the Society for Cardiovascular Pathology*. 2007 Jan-Feb;16(1):22-28. DOI:

- 10.1016/j.carpath.2006.05.008. PMID: 17218211.
2. Subash S, Thimmarayappa A, Patel GP, Dhananjaya M, Gopal D, Manjunatha N. A Rare Case of Left Atrial Myxoma Vascularity Causing Acquired Coronary Cameral Fistula: Role of Transesophageal Echocardiography. *Heart Views*. 2018;19(1):12-15. doi: 10.4103/HEARTVIEWS.HEARTVIEWS_79_17
3. Huang CY, Yu WC, Chen KC, Lin SJ. Coronary angiography of cardiac myxoma. *Clin Cardiol*. 2005 Nov;28(11):505-9. doi: 10.1002/clc.4960281104. PMID: 16450793; PMCID: PMC6654044.
4. Ekmektzoglou KA, Samelis GF, Xanthos T. Heart and tumors: location, metastasis, clinical manifestations, diagnostic approaches and therapeutic considerations. *J Cardiovasc Med (Hagerstown)*. 2008 Aug;9(8):769-77. doi: 10.2459/JCM.0b013e3282f88e49. PMID: 18607239.
5. Pinede L, Duhaut P, Loire R. Clinical presentation of left atrial cardiac myxoma. A series of 112 consecutive cases. *Medicine (Baltimore)*. 2001 May;80(3):159-72. doi: 10.1097/00005792-200105000-00002. PMID: 11388092.
6. Rahmanian PB, Castillo JG, Sanz J, *et al*. Cardiac Myxoma: Preoperative Diagnosis Using a Multimodal Imaging Approach and Surgical Outcome in a Large Contemporary Series. *Interactive Cardiovascular and Thoracic Surgery*. 2007;6:479-483. <https://doi.org/10.1510/icvts.2007.154096>
7. Yazici M, *et al*. Asymptomatic Giant Left Atrial Myxoma Supplied from Right Coronary Artery in a 65-Year-Old Woman. *International Journal of Cardiology*. 2005;101:495-496.
8. Van Cleemput J, Daenen W, De Geest H. Coronary Angiography in Cardiac Myxomas: Findings in 19 Consecutive Cases and Review of the Literature. *Catheterization and Cardiovascular Interventions*. 1993;29:217-220. <https://doi.org/10.1002/ccd.1810290308>
9. Vasconcelos MC, Macedo LF. Multicavitated Left Atrial Myxoma with Dual Coronary Supply. *Arquivos Brasileiros de Cardiologia*. 2008;90:e32.
10. Omar HR. The Value of Coronary Angiography in the Work-Up of Atrial Myxomas. *Herz*. 2015;40:442-446. <https://doi.org/10.1007/s00059-013-3930-z>
11. Gereide DM, *et al*. Case Report: A Giant Left Atrial Myxoma Neovascularized from the Right Coronary Artery. *Case Reports in Cardiology*, 2015, Article ID: 614830.
12. Acebo E, Val-Bernal JF, Gómez-Román JJ, Revuelta JM. Clinicopathologic study and DNA analysis of 37 cardiac myxomas: A 28-year experience. *Chest*. 2003 May;123(5):1379-85. doi: 10.1378/chest.123.5.1379. PMID: 12740251.
13. Marinissen KI, Essed C, de Groot C, *et al*. Growth Rate of Left Atrial Myxoma. Development of a Symptomatic Left Atrial Myxoma Less than Two Years after Coronary Artery Bypass Grafting. *Chest*. 1987;92:941-942. <https://doi.org/10.1378/chest.92.5.941>
14. Janas R, *et al*. Should We Perform Preoperative Coronary Angiography in All Cases of Atrial Myxomas? *Catheterization and Cardiovascular Interventions*. 2006;67:379-383. <https://doi.org/10.1002/ccd.20643>