

# Multi-modality imaging of a left atrial myxoma

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## Abstract

**Objectives:** Although echocardiography has traditionally been used to diagnose myxoma, invasive or non-invasive coronary angiography can be useful diagnostic tool before surgery.

**Methods:** We present a case of an angiographically detected left atrial myxoma feeding from the left circumflex coronary artery.

**Results:** The patient underwent open-heart surgery to remove the left atrial myxoma. After ligation of feeding artery, the mass was successfully excised.

**Conclusion:** Preoperative coronary angiography can offer additional valuable information moreover detecting coronary artery disease. Because, there is sudden death risk from embolization during invasive coronary angiography, preoperative cardiac computed tomography angiography should be considered to plan the surgery of myxoma.

## Keywords

Myxoma, coronary angiography, computed tomography angiography

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## Introduction

Cardiac myxoma is uncommon, even though accounts for 50% of primary cardiac tumor, histologically benign disease but may be lethal because of its strategic position. It has diverse clinical manifestations mimicking various diseases, which can be described under the three headings: constitutional, obstructive and embolic and the diagnosis can be easily missed unless clinician has high index of suspicion. A correct diagnosis is made before operation with the development of echocardiography.<sup>1</sup> But the necessity of preoperative coronary angiography is still controversial. Because of possible procedure-related complications, potential risk of sudden death from myxoma itself, and lack of characteristic tumor vascularity, coronary angiography is not routinely performed before surgery.<sup>2</sup> But preoperative coronary angiography can offer additional valuable information moreover detecting coronary artery disease. The detection of feeding vessels can alter the surgical method when there is blood shunting and therefore can be considered prior to myxoma resection.<sup>3</sup> We report one case of atrial myxoma with a feeding vessel detected on invasive and non-invasive coronary angiography.

## Case study

A 71-year-old woman without past medical history was admitted to our emergency room for acute chest pain. On arrival, her

vital sign was stable. On physical examination, a diastolic cardiac murmur was heard. The 12-lead electrocardiogram showed no ST-segment changes. Initial set of cardiac enzymes were creatine kinase MB (CK-MB) 0.6ng/mL and troponin I 98.3 pg/mL. Based on typical chest pain and slightly increased troponin I, she was diagnosed as non-ST-segment elevation myocardial infarction (NSTEMI). One day after admission, coronary angiography was performed. Coronary angiography demonstrated the feeding vessel arising from the proximal left circumflex artery that supplied the mass. And there was no evidence of coronary artery stenosis (Figure 1). Two-dimensional echocardiography was followed, and a large gelatinous mass measuring 53 × 30 mm<sup>2</sup> in the left atrium was founded (Figure 2). Left ventricular (LV) geometry was normal with LV end-diastolic

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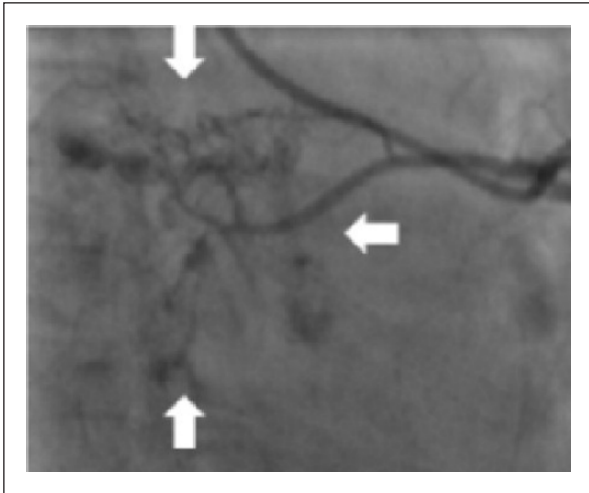
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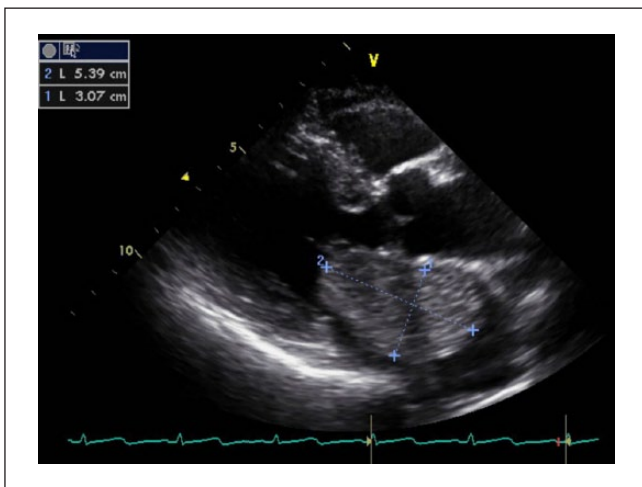
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**Figure 1.** Selective left coronary angiography showing the large amount of contrast media enhancing the tumoral mass (white arrows).



**Figure 2.** Two-dimensional echocardiogram showing an echogenic mass measuring  $53 \times 30 \text{ mm}^2$ , arising from the interatrial septum and anterior leaflet of mitral valve.

dimension of 48mm, and she had no regional wall motion abnormality with calculated ejection fraction of 63%. To evaluate the location and vascularity of the mass more thoroughly, we performed cardiac computed tomography angiography (cCTA) using dual-source 320-slice multidetector computed tomography scanner (Aquilion ONE, Toshiba Medical Systems). A large and ovoid mass based on interatrial septum and anterior leaflet of mitral valve was founded. The mass was mainly fed by sinus node branch of left circumflex artery (Figure 3(a) and (b)). The patient underwent open-heart surgery to remove the left atrial myxoma (Figure 4). After ligation of feeding artery, the mass was excised. The pathology was consistent with a villous myxoma (Figure 5). She was discharged without complications and remains asymptomatic.

## Discussion

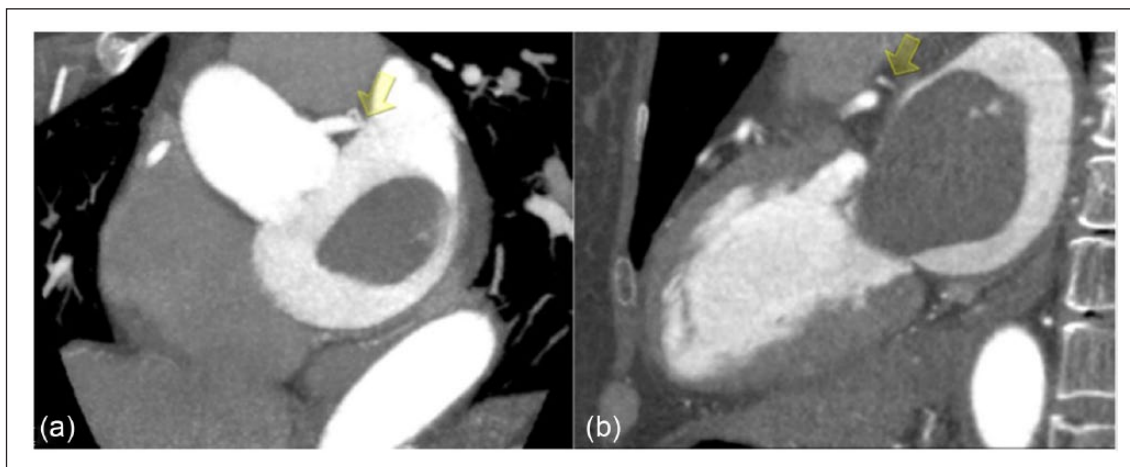
The coronary artery embolization secondary to myxoma, although rare, has been described well to cause acute myocardial infarction. Braun et al.<sup>4</sup> reviewed 40 cases of myocardial infarction due to left atrial myxoma from 1970 to 2002. He found that the right coronary artery was the common culprit with inferior myocardial infarction seen in most of the cases. In 33% of the documented coronary angiogram, it was found to be normal. The reason behind having normal coronary angiogram in patients with atrial myxoma and myocardial infarction is still not clearly known. Soejima et al.,<sup>5</sup> Rath et al.<sup>6</sup> and Hashimoto et al.<sup>7</sup> suggested that it is due to high rate of spontaneous recanalization after the myxomatous embolization from myxoma as a probable cause.<sup>8</sup> To avoid embolic complications, immediate surgical resection is recommended after diagnosis of atrial myxoma. Because of the tumors' tissue composition, making them dissolving, we postulated that coronary angiography of our patient did not show significant stenosis or occlusion, even her clinical manifestations was matched with NSTEMI.<sup>9</sup>

Although there are no guidelines for preoperative coronary angiography, whether or not to perform it is based mainly on the patient's age and gender or the presence of angina. The reasons for opposing routine preoperative coronary angiography in all myxoma patients are the procedure-related complications and the risk of sudden death from its embolization. But angiographic visualization of the feeding vessels can alter the surgical method when there is blood shunting.<sup>3</sup> In case of occurring a steal phenomenon caused by blood shunting, many surgeons ligate these feeding vessels before excision of mass. Marco et al.<sup>10</sup> demonstrated the case of left atrial myxoma which was removed successfully after ligation of feeding artery.

While echocardiography has traditionally been used to diagnose myxoma, cCTA has become an emerging modality for the evaluation of cardiac masses. Compared to other cardiac imaging modalities, cCTA is suitable for the assessment of calcified masses, the global evaluation of the chest, lung and vascular structures, and the exclusion of obstructive coronary artery disease or masses involving the coronary arteries.<sup>11</sup> And also cCTA is useful for the differentiation between left atrial myxomas and thrombi by assessing the size, origin, shape, mobility and prolapse of the mass.<sup>12</sup> Kim et al. reported two patients of left atrial myxoma underwent preoperative cCTA to rule out coronary artery disease. Preoperative cCTA was useful for the evaluation of coronary artery and provided an overview of the heart as well as its vascular anatomy and help surgeons to understand the anatomical complexity before surgery.<sup>13</sup>

## Conclusion

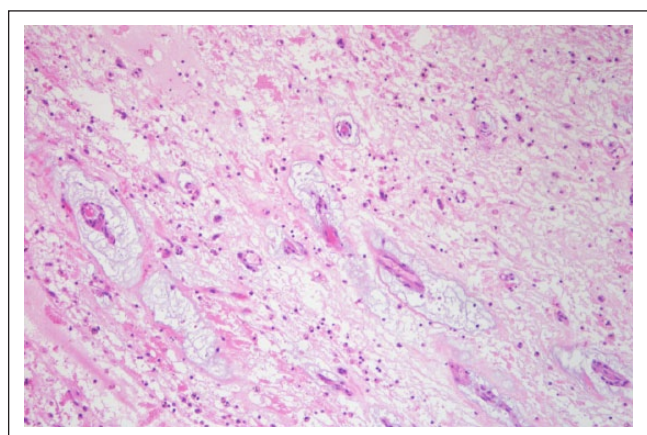
Although there are no guidelines for preoperative coronary angiography in myxoma patients, preoperative coronary



**Figure 3.** Horizontal (a) long-axis MIP and (b) short-axis MIP images of cCTA revealed an atrial branch from the left circumflex artery (yellow arrow head) supplying a large left atrial mass originating from the interatrial septum and anterior leaflet of mitral valve. MIP: maximum intensity projection; cCTA: cardiac computed tomography angiography.



**Figure 4.** Gross findings of the myxoma.



**Figure 5.** Histologic examination showed spindle-shaped cells and stellate cells in a myxoid stroma (H&E stain,  $\times 100$ ).

angiography can offer additional valuable information moreover detecting coronary artery disease. Because invasive coronary angiography can cause procedure-related

complication and there is sudden death risk from embolization during invasive procedure, preoperative cCTA should be considered to characterize the lesion, and multiplanar reformatted images and three-dimensional reconstructions should be used to plan the surgery of myxoma.

#### Declaration of conflicting interests

The author(s) declared that there is no potential conflict of interest with respect to the research, authorship and/or publication of this article.

#### Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

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#### Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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