

LEFT ATRIAL INTRAMURAL HEMATOMA AFTER REMOVAL OF ATRIAL MYXOMA: CARDIAC MAGNETIC RESONANCE IN THE DIFFERENTIAL DIAGNOSIS OF INTRA-CARDIAC MASS

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Left atrial (LA) dissection is a rare entity, which is, in most cases, observed after valvular intervention. Transesophageal echocardiography (TEE) is considered to be a modality of choice in the diagnosis of LA dissection. However, LA dissection might be missed clinically in the absence of significant hemodynamic changes, and moreover physicians are occasionally reluctant to perform TEE due to its semi-invasiveness. Recently, cardiac magnetic resonance (CMR) has been introduced as a modality to perform different roles to existing imaging modalities, such as echocardiography. Given that CMR can provide information on tissue characteristics, it may give incremental information to TEE. We here present a rare case of LA dissection following LA myxoma removal, where CMR can make a correct diagnosis and guide management strategy.

KEY WORDS: Left atrial dissection · Cardiac myxoma · Echocardiography · Cardiac magnetic resonance.

INTRODUCTION

Left atrial (LA) dissection is an uncommon pathological condition that is characterized by the creation of a false chamber that is clearly distinct from the true LA.^{1,2)} In most cases, it is observed in patients undergoing mitral valve intervention, with its incidence being estimated to be approximately up to 0.84%.³⁾ Although rare, associated conditions other than mitral intervention are described such as aortic valve interventions,⁴⁾ calcified mitral annulus,⁵⁾ infective endocarditis,⁶⁾ and non-penetrating cardiac trauma,²⁾ as well. Recent publication showed that this rare disease can take place even in the absence of clear etiology, i.e., spontaneous occurrence.⁷⁾ Intramural hematoma complicating LA dissection can lead to sudden hemodynamic compromise, requiring emergent surgical management.^{2,8)} In order to “not” miss this critical condition, echocardiography, particularly transesophageal echocardiography (TEE), is strongly recommended in patients at high risk, owing to its accuracy and comprehensive nature in terms of cardiac anatomy, function and hemodynamics.^{2,9)} However, it sometimes fails to

provide a correct diagnosis,¹⁰⁾ and furthermore its semi-invasiveness is a serious hurdle for physicians to order TEE without hesitation.²⁾

We here present one rare case of LA dissection following removal of LA myxoma attached to the atrial septum. Even though LA dissection assessed by cardiac magnetic resonance imaging (CMR) has been previously reported,¹¹⁻¹³⁾ this case report is unique in that 1) LA dissection with hematoma occurred after LA myxoma excision, and 2) CMR changed the diagnosis and finally guided management decision.

CASE

A 51-year-old female presented with a LA mass suggesting myxoma detected by transthoracic echocardiography (TTE) incidentally during a routine check-up. Her past medical history was unremarkable. Her vital sign was stable and blood examinations showed no abnormalities. Her initial electrocardiogram showed normal sinus rhythm without any significant ST-T change, and chest X-ray revealed nothing abnormal. On

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preoperative TEE, there was a cystic mass (1.7 × 1.3 cm-sized) that was attached to the atrial septum in the LA, without any evidence of valvular insufficiency or stenosis. Similar findings were observed in thoraco-abdominal computed tomography angiography.

Minimal invasive surgery was planned on patient request and thus incision through right 4th anterior thoracotomy under total cardiopulmonary bypass (CPB) was performed, and myocardial protection was achieved using antegrade cardioplegia. About 1.5 cm-sized yellowish gray mass with cystic cavity was successfully removed from the LA septum, and then inter-atrial septum and right atrium were directly closed without using any prosthetic materials. Weaning of CPB went smoothly, and the postoperative clinical conditions were stable and uneventful without hemodynamic compromise. Pathological review confirmed that the mass removed was cardiac myxoma.

On postoperative day 4, TTE was performed to look into her overall postoperative condition, and unexpectedly a new large mass occupying the entire LA was found (Fig. 1). It minimally increased transmitral pressure gradient. Follow-up thoraco-abdominal CT angiographic findings were in line with that found on TTE (Fig. 2). Since newly detected LA mass on CT had 60 Hounsfield units, it was hard to identify what the mass was. It only gave us little information on the real nature of the mass, thrombus versus recent bleeding. For the diagnostic confirmation, thus, CMR was undergone, and showed a 5.4 × 4.4 × 4.0 cm-sized ovoid mass adjacent to the posterior and inferior wall of LA with obtuse angle. It was covered by fibrous smooth wall, meaning intramural rather than intra-atrial condition. Gadolinium enhancement was not observed on early post-contrast T1-weighted images. The mass showed low signal intensity on long-time interval delayed enhancement sequence, and displayed intermediate signal intensity on T1-weighted images and a high signal intensity on T2-weighted images, highly suggestive of acute hematoma, rather than recent bleeding (Fig. 3). Since her vital sign was stable and she

was totally asymptomatic, conservative management and close medical follow-up were recommended without additional invasive procedures, and then after a few days of monitoring, she was uneventfully discharged on the post-operative day 8. She has been doing well after discharge, and any other complication was not observed on regular exam. The size of LA intramural hematoma was getting smaller and transmitral pressure gradient decreased on TTE which was performed on the post-operative day 50 (Fig. 4). CMR performed 5 months after index operation demonstrated that LA intramural hematoma finally disappeared (Fig. 5).

DISCUSSION

Although the incidence of intramural hematoma complicating LA dissection is unknown, LA dissection is a rare entity with limited publications.^{1,3)} Based on the current limited information, the triggering factors are mainly related to cardiac interventions like catheterization or surgery.²⁾ Echocardiography, particularly TEE, is a modality of choice to diagnose this disease in time, differentiate from other similar clinical and hemodynamic situations, and treat the problem immediately.^{2,14)} TEE is generally useful for the diagnosis of LA dissection, but it is limited in terms of tissue characterization. Therefore, it sometimes cannot tell us appropriate information on the nature of the given structure in time.^{13,14)} In contrast, CMR is the vanguard of alternative cardiac imaging in the contemporary era, serving more accurate anatomic as well as tissue details.^{2,9)} CMR can visualize the full contents of the abnormality that is not obvious on echocardiography and, thus, can clarify the nature of intra-cardiac structures thanks to its excellent spatial resolution and a variety of CMR techniques like T1 and T2.^{12,13)} In this case, it was not easy to perform TEE under conditions with high hemorrhagic risk, and it is generally well recognized that ultrasound has a limitation to investigate tissue characteristics of any intra-cardiac mass. More specifically in relation to this patient, intra-atrial mass showing heterogeneous intermediate

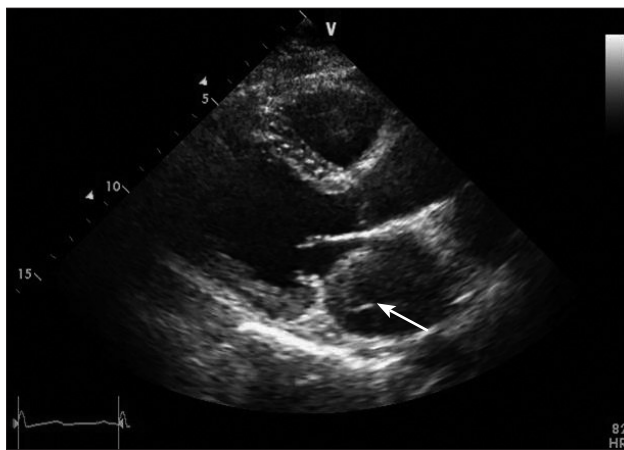


Fig. 1. Echocardiography is a diagnostic tool of choice for left atrial dissection. Left atrium occupied by a newly developed mass (arrow) was found in parasternal long axis on postoperative day 4.



Fig. 2. Postoperative thoraco-abdominal computed tomography showed a large mass having 60 Hounsfield units (arrow), which was inconclusive because of ambiguous value of Hounsfield unit.

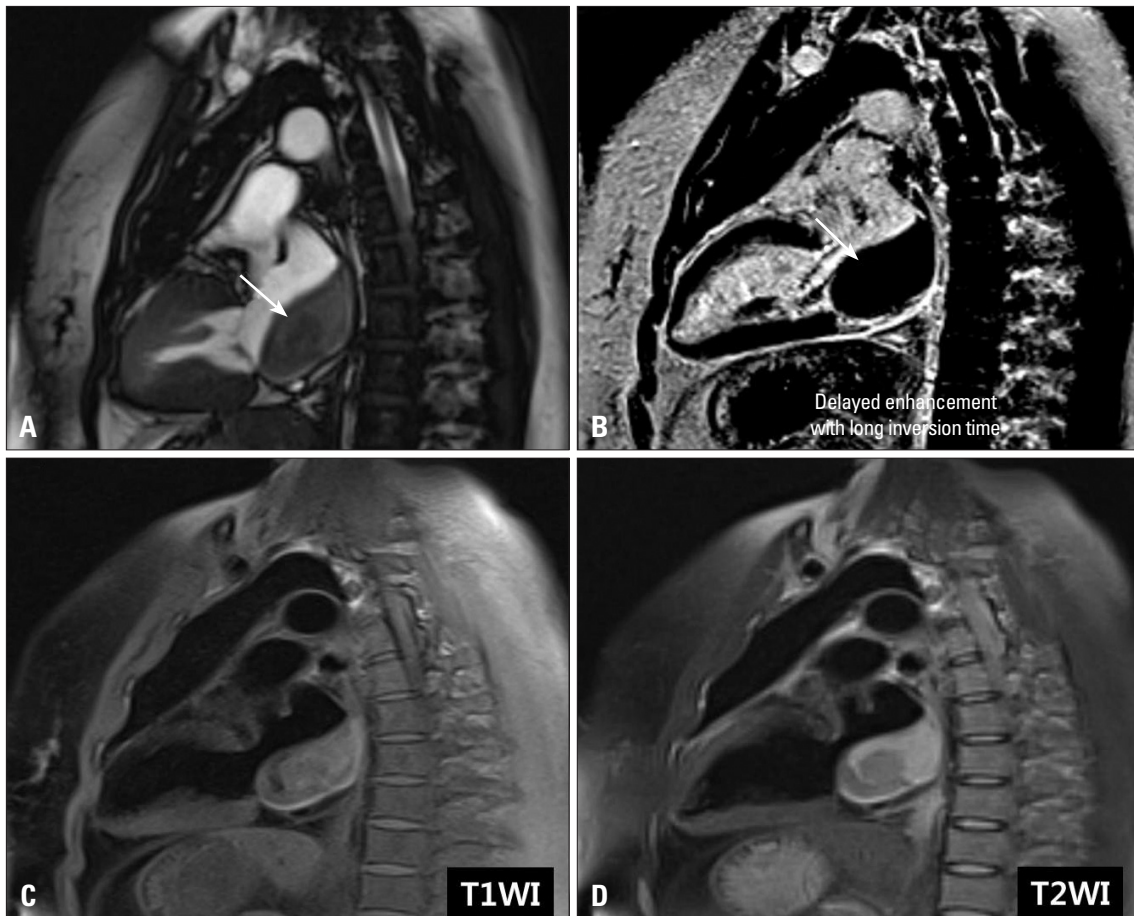


Fig. 3. Cardiac magnetic resonance performed on postoperative day 4 revealed that newly detected left atrial mass (arrow in A and B) was an intramural hematoma caused by left atrial dissection (A) showing no gadolinium enhancement (B), and heterogeneous intermediate signal intensity in T1- (C) and high T2- (D) weighted images.



Fig. 4. Follow-up transthoracic echocardiography on postoperative day 50 confirmed that the size of left atrial mass (arrow) was getting smaller.

signal in T1- and high in T2-weighted images of CMR without late gadolinium enhancement was observed, suggesting a high possibility of LA intramural hematoma complicating LA dissection, not thrombus, in the posterior and inferior wall of the LA.

Since there is no definite guideline for the management of intramural hematoma followed by LA dissection, individualized decision-making is generally accepted for this disease en-

tity. In most cases, immediate surgical correction is recommended due to significant obstruction of blood flow leading to hemodynamic instability.^{2,8)} Surgery can help patients acquire rapid stabilization and mechanically perfect correction. However, we also found several reports where LA dissection was treated conservatively without any complications.^{10,15)} When the patient is asymptomatic, and hemodynamically stable, conservative management under close supervision could

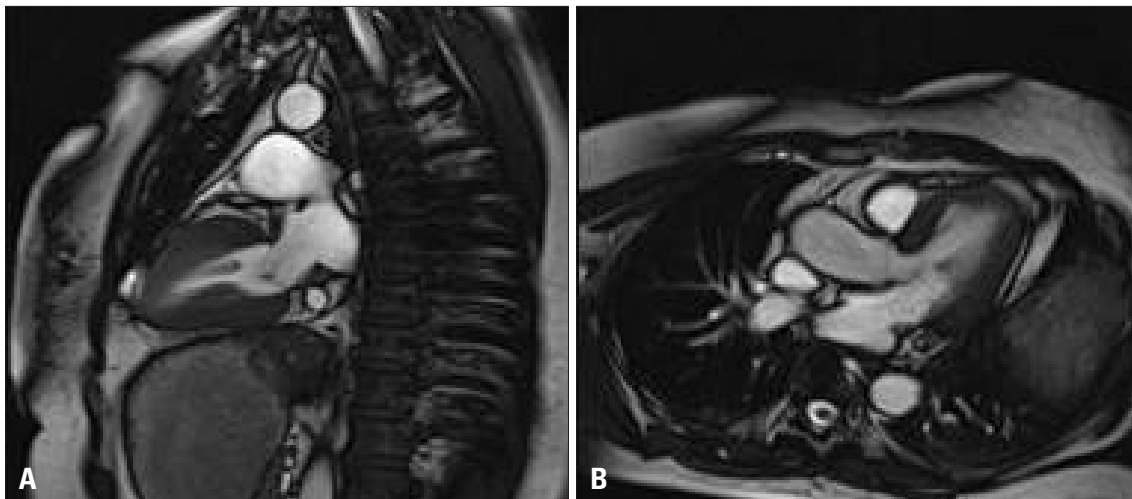


Fig. 5. Left atrial intramural hematoma, followed by left atrial dissection, completely disappeared on follow-up cardiac magnetic resonance imaging 5 months after index surgery. A: Sagittal view. B: Transverse view.

avoid the several surgery-related problems, such as high risk of bleeding or infection and reduce the duration of hospitalization. In the present case, the patient was not re-operated on, and we only waited for spontaneous resolution of the mass lesion, based on the CMR findings. During monitoring, she was very stable and asymptomatic. Echocardiography showed no flow obstruction except for mild transmitral flow disturbance. Five months after the index surgery, intramural hematoma combined with LA dissection spontaneously disappeared on follow-up echocardiography. Without the help of CMR findings, “watchful waiting” strategy could not be adopted and she might have to undergo the second surgery for mass excision. Therefore, we believe that multimodality imaging approach with echocardiography and CMR in this particular patient made unnecessary operation avoided. CMR can offer complementary and additional information on myocardial tissue characteristics that echocardiography cannot provide. In this respect, CMR should be considered as a useful diagnostic option additional to echocardiography in selected patients with intracardiac mass lesion.

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