

## VALVULAR HEART DISEASE

# Stenotic mitral valve prosthesis with left atrial thrombus

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We report the CMR findings of a patient with stenotic biological mitral valve prosthesis that was complicated by thrombus formation in the left atrium. The case illustrates the ability of CMR to assess biological prosthetic valves and to provide a comprehensive diagnostic approach in this clinical scenario.

*Key Words:* Mitral valve; Prosthesis; Magnetic resonance; Thrombus

## 1. Case report

A 57-year-old female patient was admitted to our hospital because of progressive exertional dyspnea over the last weeks. The patient had a history of rheumatic mitral valve disease, rheumatoid arthritis, hypercholesterolemia, and hypothyroidism. A biological mitral valve prosthesis was implanted 1.5 years ago (Hancock, 27) combined with a bypass graft on the right coronary artery in the same setting.

Echocardiographic findings included reduced ejection fraction, elevated transmitral pressure gradient (20 mmHg), and pulmonary hypertension (50 mmHg). Transesophageal echocardiography confirmed those findings; in addition, a mass next to the lateral wall of the left atrium was discovered. A thrombus was suspected and a cardiovascular magnetic resonance (CMR) study was requested for further verification.

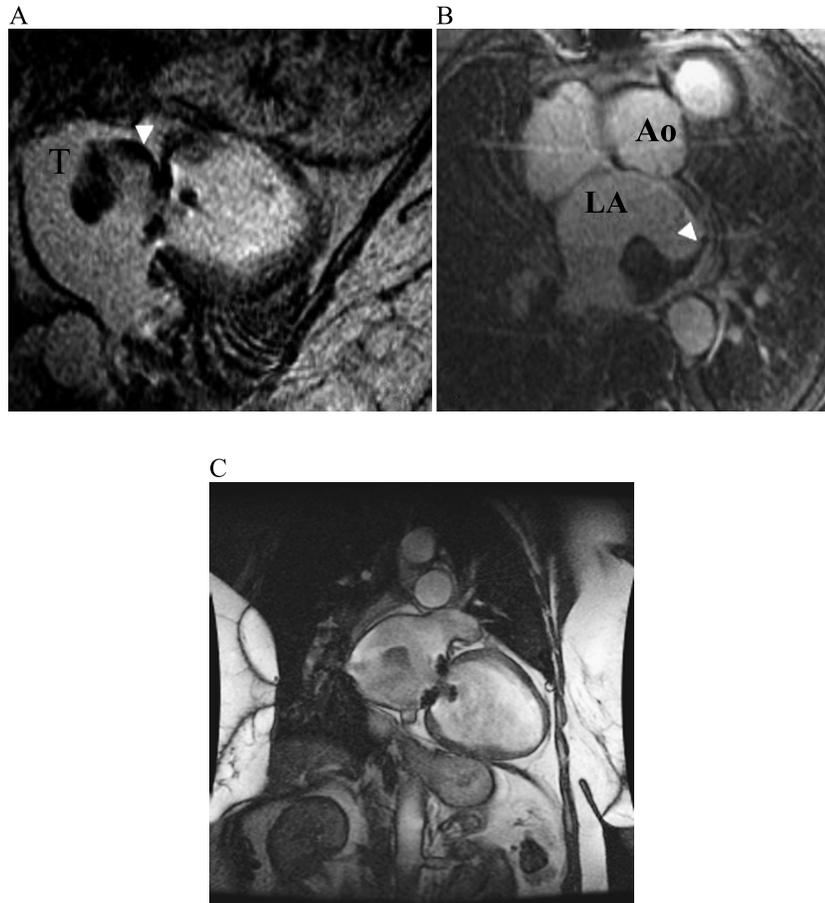
Findings on CMR were reduced ejection fraction of 43% and dilated left atrium (68 × 76 mm) with a well-defined

mass adjacent to the posterior and lateral walls measuring 54 × 45 × 26 mm and connected to the mitral valve leaflets (Fig. 1). Signal void flow jet across the valve to the left ventricular cavity suggested valve stenosis (Fig. 2, video clip available online at <http://journalsonline.tanf.co.uk>). After contrast media application, the mass did not enhance, but delayed enhancement of the left ventricular posterolateral wall was evident, suggesting previous myocardial infarction (Fig. 2).

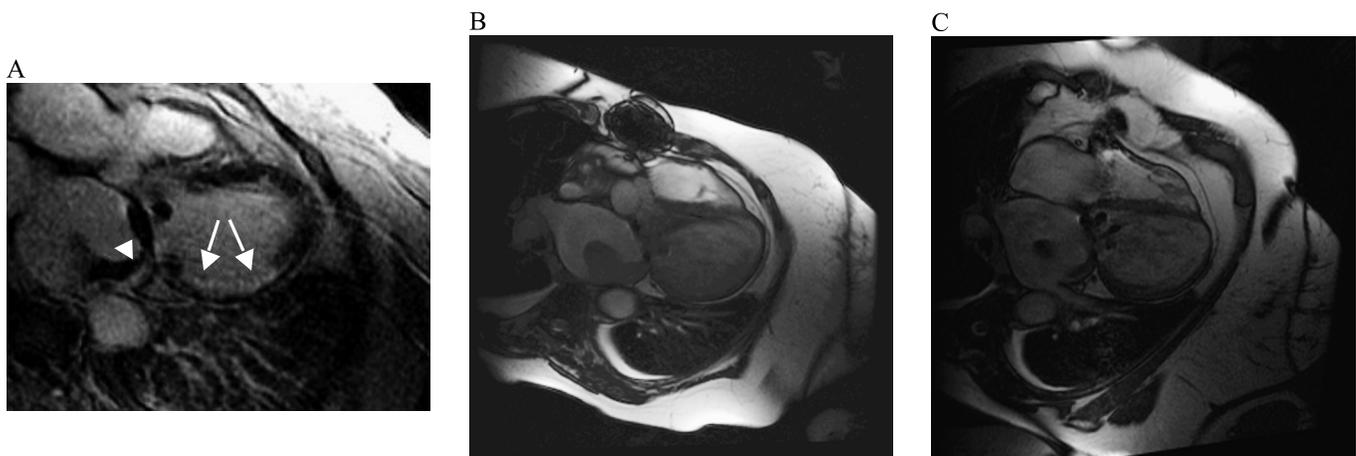
## 2. Discussion

Mitral valve bioprostheses are generally less thrombogenic than mechanical prostheses, and even when thrombosis occurs, this is usually observed in the immediate postoperative period (1). Our patient is thus an exception to this rule. However, one frequently overlooked risk factor is rheumatoid arthritis. Rheumatoid arthritis is associated with increased levels of fibrinogen, von Willibrand factor, and tissue plasminogen activator antigen, which increase the likelihood of thrombogenesis in these patients (2). In fact, the patient had a history of a subclavian vein thrombosis 7 years earlier. The dilated left atrium is another known “local” risk factor for atrial thrombus formation. Atrial tumors, particularly myxomas, top the differential diagnosis list of an atrial mass (3). However, myxomas are more likely to originate from the interatrial septum (4) and exhibit enhancement, which usually is heterogeneous (5). None of these features were observed in our case. Instead, the complete absence of contrast enhancement was an important clue to the diagnosis of an atrial

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**Figure 1.** (A) Contrast-enhanced image in the 2-chamber view. (B) Contrast-enhanced image in axial orientation. (C) Cine image set (SSFP) in the 2-chamber view. The thrombus (T) within the dilated left atrium is connected to the Hancock mitral valve prosthesis via a connecting stalk (arrowhead). Ao: ascending aorta, LA: Left atrium.



**Figure 2.** (A) Contrast-enhanced image in the 3-chamber view: Delayed enhancement of the posterolateral wall of the left ventricle (arrows) indicating previous myocardial infarction; arrowhead: thrombus connecting stalk. (B) Cine image set (SSFP) in the 3-chamber view. Hypokinesia of the left ventricular wall corresponding to the delayed enhancement region. Bilateral pleural effusion is noted. (Video clip available online.) (C) Cine image set (SSFP) in the 4-chamber view: The mitral valve bioprosthesis can be localized leading to small regional signal voids on the ventricular side of the valve. A diastolic signal void indicates the stenotic jet distal to the mitral valve.

thrombus, because thrombi are mostly nonvascularized with no appreciable contrast enhancement unless old and organized (6). Myxomas can also extend to the mitral valve (3); However, the mass in our case appeared to follow an opposite course, i.e., towards the left atrium (see video clip in Fig. 2b). Finally, the mass was likely to have a recent onset because it was detected neither during surgery nor during echocardiographic follow-up. This also explains the recent onset of progressive dyspnea. The discrepancy between the relatively short history of the mass and its large size together with the other imaging and clinical findings described established the diagnosis of left atrial thrombus on top of a stenotic mitral valve prosthesis.

The case illustrates:

- First, the “CMR-friendly” nature of bioprostheses, resulting in artifact-free images that would not have been expected with mechanical prostheses that could be even hazardous to be examined by CMR (7).
- Second, the “one-stop-shop” potential of CMR in the clinical routine with the ability to assess morphology (the thrombus and the prosthetic valve), valvular and myocardial function (stenotic jet, global, and regional quantification of volumes), and viability (scar imaging) as well as extra-cardiac structures (pleural effusion) in a single 30-minute examination.

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