Journal of Cardiology Cases 13 (2016) 52–55

Contents lists available at ScienceDirect

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

Case Report

A rare appearance of a large mural thrombus in left atrium detected two years after the Maze procedure

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ARTICLE INFO

Article history:
Received 23 March 2015
Received in revised form 20 September 2015
Accepted 8 October 2015

Keywords:
Complication
Maze procedure
Atrial fibrillation

ABSTRACT

A 77-year-old Japanese woman underwent bioprosthetic aortic valve replacement (AVR) and the Maze procedure for severe aortic valve disease and paroxysmal atrial fibrillation (AF), and one year after the AVR, she also underwent a permanent pacemaker implantation for sick sinus syndrome. At two postoperative years, a large mural mass happened to be detected in her left atrium on routine trans-thoracic echocardiography. The cardiac rhythm records produced by the implanted pacemaker demonstrated the recurrence of AF. As anticoagulant therapy was not effective at reducing the size of the mass, surgery was performed and organized thrombus was detected on the ablation line made at the Maze procedure.

<**Learning objective:** The formation of large mural thrombi in the left atrium after the Maze procedure is rare in patients without mitral valve disease. The thrombus was considered to have been caused by several complex factors, including atrial wall damage brought by the Maze procedure and the recurrence of atrial fibrillation (AF). It is important to be aware that the recurrence of AF after the Maze procedure can carry a risk of unexpected mural thrombus formation in the left atrium.>

Introduction

Atrial fibrillation (AF) is a major cause of thrombus formation in the left atrium, especially in the left atrial appendage (LAA). The Maze procedure is effective at maintaining sinus rhythm for those patients with AF, and consequently, preventing thrombus formation [1]. Although arrhythmia, e.g. sinus bradycardia, is a well-known postoperative complication of the Maze procedure [2], only a few reports have described thrombus formation in the left atrium (LA) after this procedure [3,4]. We experienced a case in which a rare appearance of a large mural thrombus was detected in the LA as late as two years after the Maze procedure. The thrombus was considered to have been caused by several complex factors, including atrial wall damage brought by the Maze procedure and recurrent AF.

Case report

A 77-year-old Japanese woman with paroxysmal AF and severe aortic valve stenosis and regurgitation underwent bioprosthetic aortic valve replacement (AVR) and the Maze procedure. On left side Maze procedure, the LA was opened via right lateral approach. Bipolar radio-frequency ablation was applied for isolation of bilateral pulmonary veins, and also between LAA and the origin of the left upper pulmonary vein. Because she continued to exhibit a sinus rhythm postoperatively, she was administered only warfarin for three months after the operation. One year after the AVR, a permanent dual chamber (DDD) pacemaker implantation for sick sinus syndrome was performed. Recurrence of AF had not yet been confirmed at that time. Transmitral Doppler demonstrated abnormal relaxation pattern (E = 0.76 m/s, A = 0.87 m/s, E/A = 0.87). LA volume was calculated with 92 ml (volume index: 70.6 ml/m^2). Another year has passed after the implantation of the DDD pacemaker, and routine trans-thoracic echocardiography (TTE) was performed. We accidentally discovered a large high echoic mass adhering to the posterior wall of the LA (Fig. 1A).

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http://dx.doi.org/10.1016/j.jccase.2015.10.002
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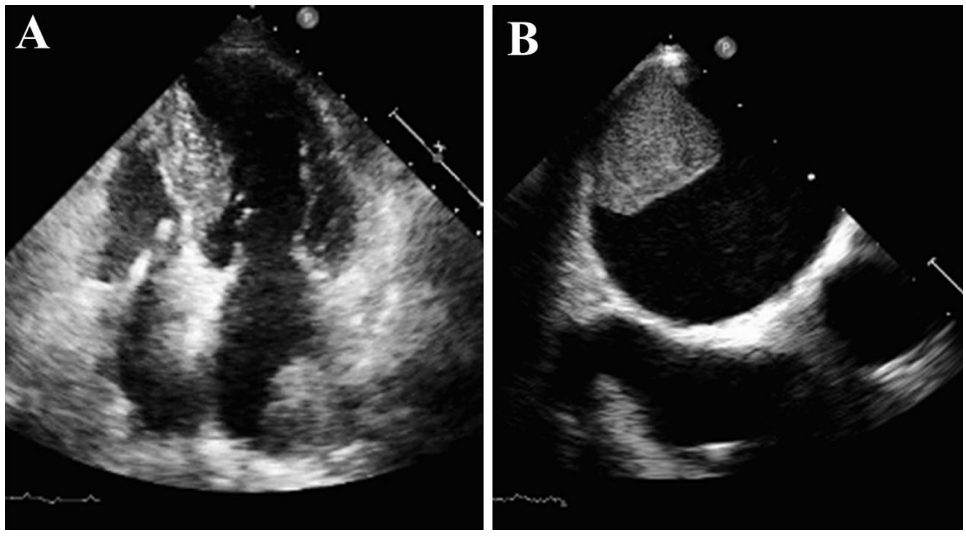

Fig. 1. (A) A large roundish high echoic mass adhered to the posterior wall of the left atrium on apical 4-chamber view on trans-thoracic echocardiography. (B) Trans-esophageal echocardiography demonstrated a homogenous fixed mass with a smooth surface.

TTE demonstrated normal left ventricular ejection fraction (54%) (left ventricular end-diastolic/end-systolic dimension: 38.7/24.0 mm). No significant mitral valve stenosis or regurgitation had been involved. LA volume was calculated as 116 ml (volume index: 89.0 ml/m^2). Transmitral Doppler demonstrated pseudonormalization pattern (E = 0.87 m/s, A = 0.62 m/s, E/A = 1.40) at this time. Trans-esophageal echocardiography (TEE) detected a large immobile mural mass (22 mm × 27 mm) that had adhered to the posterior wall of the left atrium (Fig. 1B). The emptying velocity of the LAA was measured as 35 cm/s. Contrast-enhanced computed tomography (CT) showed a homogenous mass that did not exhibit a stalk-like morphology (Fig. 2). The cardiac rhythm records produced by the DDD pacemaker demonstrated that AF had recurred around six months earlier.

At first, we started anticoagulant therapy with both heparin and warfarin. The dose of warfarin was adjusted so that the patient's prothrombin time-international normalized ratio (PT-INR) remained between 2.0 and 3.0. Although the warfarin treatment was continued for more than one month, it did not reduce the size of the mass. Therefore, we decided to remove the mass surgically for fear that it could increase the patient's risk of systemic embolization.

The LA was opened via a trans-septal approach. A brownish relatively hard mass was seen on the posterior wall of the LA. It was located on the ablation line which had been made with a bipolar radio-frequency device at the Maze procedure (Fig. 3A and C). As the mass did not adhere tightly to the atrial wall, it was removed easily with forceps (Fig. 3B). The mass was pathologically proven to be an organized thrombus. After the operation, we continued to administer warfarin to ensure that the patient's PT-INR remained between 2.0 and 3.0. Her condition remained stable postoperatively, and she was safely discharged after cardiac rehabilitation.

Discussion

We report a case in which a large mural thrombus developed in the LA of a patient without mitral valve disease two years after she had undergone the Maze procedure. Anticoagulant therapy was not effective at reducing the size of the thrombus, and so surgical

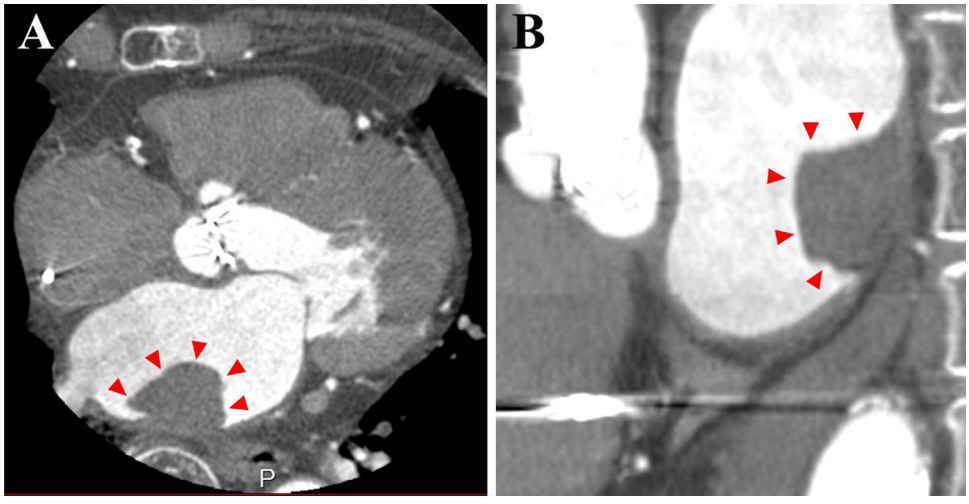

Fig. 2. Contrast-enhanced cardiac computed tomography demonstrated a homogenous mass that did not exhibit a stalk-like morphology. (A) Horizontal section. (B) Sagittal section.