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Intermittent, Non Cyclic Severe Mechanical Aortic Valve Regurgitation

Jong Hyun Choi, MD[1], Jung Hyun Choi, MD[1], Seunghwan Song, MD[2] and Myung-Yong Lee, MD[3]
Divisions of [1]Cardiology, [2]Cardiac Surgery, Pusan National University Hospital, Busan, Korea
[3]Division of Cardiology, Dankook University College of Medicine, Cheonan, Korea

Mechanical aortic prosthesis dysfunction can result from thrombosis or pannus formation. We describe an unusual case of intermittent, non cyclic mechanical aortic prosthesis dysfunction due to pannus formation with thrombus in the absence of systolic restriction of disk excursion, that presented with intermittent severe aortic regurgitation.

KEY WORDS: Intermittent aortic regurgitation · Acute prosthetic valve dysfunction · Pannus · Echocardiography.

Introduction

Mechanical prosthetic valve dysfunction may result from thrombosis or pannus formation and has a spectrum of clinical presentations that range from nonspecific symptoms to acute hemodynamic compromise leading to shock and death. Although intermittent dysfunction of a mechanical prosthesis is usually attributed to thrombus formation, pannus formation rarely has been reported to cause intermittent, cyclic dysfunction of a mechanical aortic prosthesis.[1-6] We describe the unusual case of intermittent, non cyclic severe mechanical aortic valve regurgitation due to pannus formation with thrombus.

Case

A 68-year-old man who had been performed aortic valve replacement with a bileaflet mechanical Tekna valve (23 mm, Baxter Health Care, Santa Ana, CA, USA) 12 years ago presented to the emergency department with an exertional chest pain and short of breath for four days. On presentation, he was clinically stable with blood pressure of 120/70 mmHg, heart rate of 97 bpm and 2/6 systolic murmur, but no diastolic murmur. Chest X-ray showed mild cardiomegaly and tortuous ascending aorta. The electrocardiography showed normal findings. Troponin I was normal at 0.01 ng/mL (normal range 0.00-0.05 ng/mL) and international normalized ratio was suboptimal at 1.04 sec. Transthoracic echocardiogram and transesophageal echocardiogram demonstrated intermittent non cyclic severe acute aortic valve regurgitation with normal systolic excursion of the occluding disk, a mean transprosthetic gradient of 14-23 mmHg (Fig. 1). A small less mobile echogenic mass was seen in the outflow tract immediately above the prosthesis consistent with pannus formation on which possible thrombus superimposed (Fig. 2). Doppler echo showed increased left ventricular filling pressure (E/e' 19) and steep slope of aortic regurgitation (pressure half time 120 msec). Left ventricular size and function were normal. Aortogram showed also non cyclic, intermittent incomplete closing of prosthesis with severe aortic regurgitation (Supplementary movie 1). After short term intravenous heparin infusion, he underwent urgent surgical treatment. At surgery, inspection and visualization of the structure with a cardiac optical fiber device confirmed echocardiographic data showing a focal pannus formation above the aortic prosthesis. The prosthetic valve leaflets were not involved and the disk motion appeared unrestricted (Fig. 3). Pannus was fully excised but the aortic valve was not replaced. Histologic examination revealed a structure of fibroconnective tissue consistent with pannus formation and superimposed thrombus. The patient had an uncomplicated postoperative recovery and was discharged on his 7th postoperative day. After 2 years with meticulous anticoagulation therapy, the patient was stable and follow-up echocardiogram showed normal aortic prosthetic valve function with a mean transprosthetic gradient of 10 mmHg.

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• Address for Correspondence: Jung Hyun Choi, Division of Cardiology, Pusan National University Hospital, 179 Gudeok-ro, Seo-gu, Busan 602-739, Korea
Tel: +82-51-240-7514, Fax: +82-51-240-7765, E-mail: mariahyeon@hotmail.com

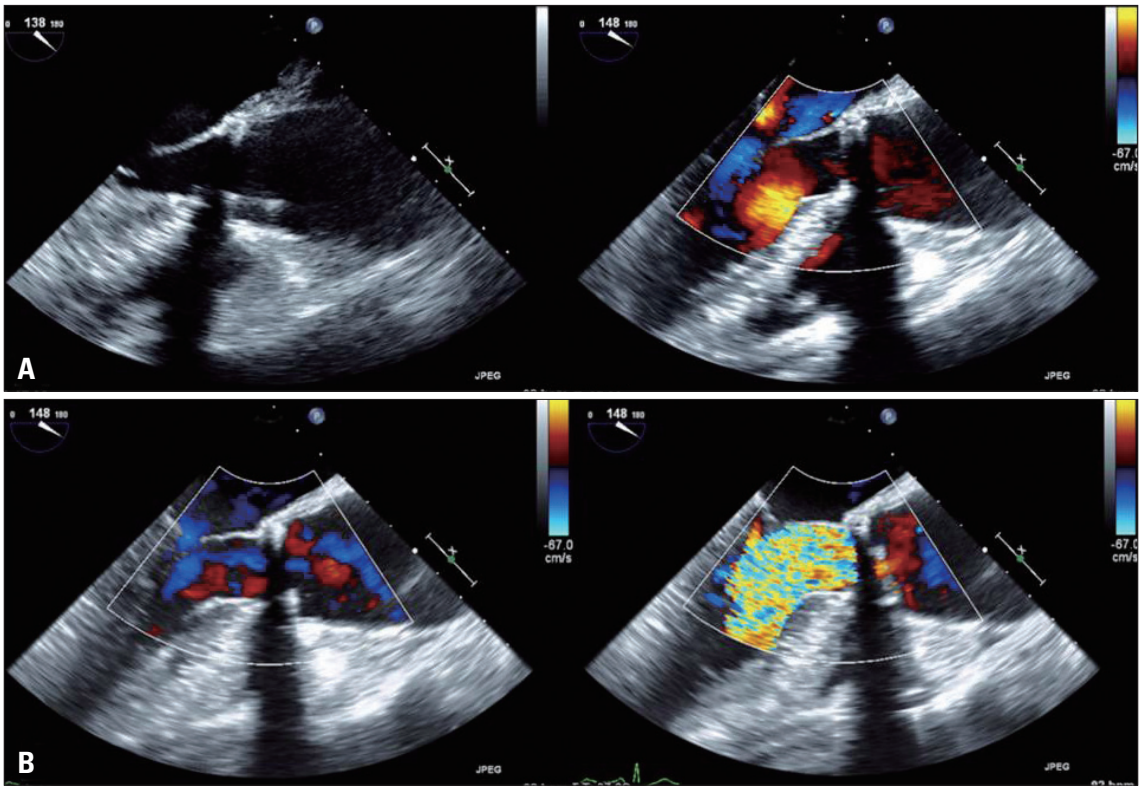

Fig. 1. Transesophageal echocardiography showed normal systolic excursion of the occluding disk (A) and color Doppler revealed intermittent non cyclic severe acute aortic valve regurgitation (B).

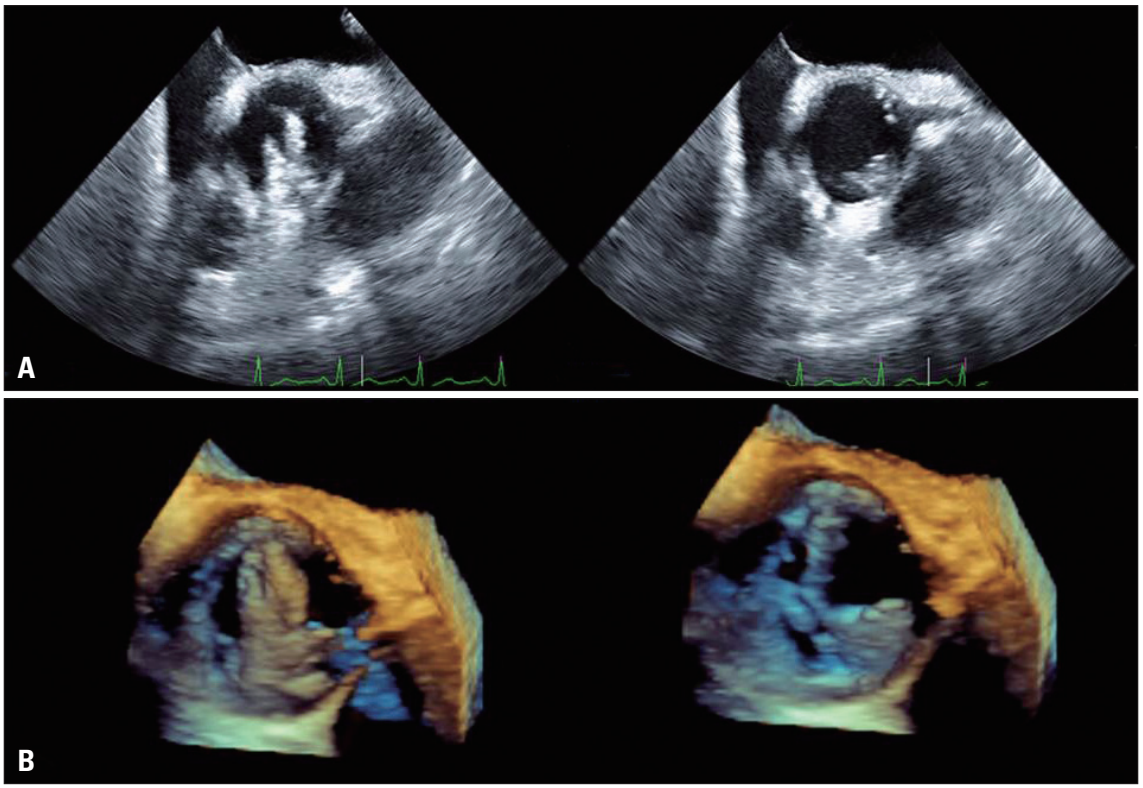

Fig. 2. Two-dimensional transesophageal echocardiography (A) and real time 3-dimensional transesophageal echocardiography (B) showed a small less mobile echogenic mass in the outflow tract immediately above the prosthesis consistent with pannus formation on which possible thrombus superimposed.

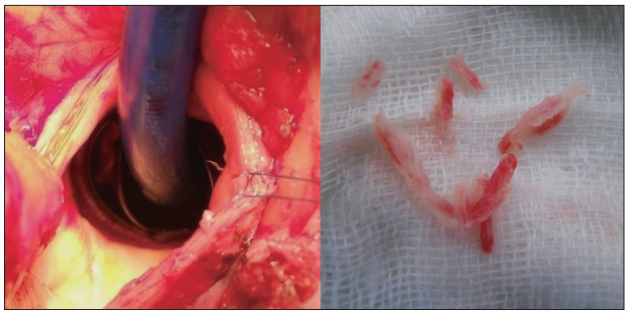

Fig. 3. On surgical finding, focal pannus formation above the aortic prosthesis was noticed.

Discussion

Prosthetic valve dysfunction as a result of pannus formation due to fibrous tissue ingrowth is an infrequent and usually produces a stenosis of the prosthesis due to obstruction of the left ventricular outflow tract or restriction on the movement of the opening of the discs of the prosthetic valve. Unlike thrombus formation, pannus is not related to inadequate anticoagulation,[7] and more common with prostheses in the aortic than mitral position and is often observed years after implantation of the prosthesis.[8] A single tilting-disc prosthesis seems to be a significant risk factor for pannus formation and the need for reoperation.[9] Differentiating pannus formation from thrombus is often difficult; however, the latter tends to be less video-dense and larger in size, and has increased mobility.[7][8]

There have been a few case reports of pannus causing intermittent, cyclic or non cyclic severe aortic regurgitation due to intermittent interference of disk closure.[1-6] Our case differs from previous reports in that the episodes of intermittent severe aortic regurgitation were non cyclic with random, short episodes of severe regurgitation lasting only several cardiac cycles, associated with brief angina pain and short of breath. Incomplete closure of the occluding disk was identified on fluoroscopy and echocardiography, in the absence of restricted systolic excursion. We suspect that pannus ingrowth on the outflow tract aspect of the valve extended slightly beyond the inner aspect of the prosthesis ring, such that the pannus tissue interfered with disk closure and resulted in severe aortic regurgitation, without altering systolic excursion of the disk. Marginal, especially around hinge contact of the occluding disk and pannus ingrowth and coexistence of thrombosis, in aorto-ventricular pressure differences might account for the intermittent nature of the dysfunction.

We report an unusual case of intermittent, non cyclic mechanical aortic prosthesis dysfunction due to pannus formation with thrombus, that presented with intermittent severe aortic regurgitation.

Supplementary movie legend

Movie 1. Aortogram showed also non cyclic, intermittent incomplete closing of prosthesis with severe aortic regurgitation.

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