Fracture of an Edwards Duromedics Mitral Prosthesis Leaflet

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ABSTRACT

We report the case of a 54-year-old patient who underwent a repeated mitral replacement after a nontraumatic fracture of a leaflet of an Edwards Duromedics (Baxter) mechanical prosthesis that was performed 33 years after implantation. This paper discusses the different options for surgical management of such a complication. (Level of Difficulty: Intermediate.) (J Am Coll Cardiol Case Rep 2020;2:2202–4) © 2020 Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

This paper describes the case of a 54-year-old patient who was admitted for sudden acute progressive dyspnea. The patient had a history of double-valve replacement that was performed 33 years previously after implantation, using 25 aortic and 33 mitral Edwards’ Duomedic (ED) prostheses (Baxter Healthcare, Edwards Division, Santa Ana, California).

Urgent transthoracic echocardiography showed a malfunctioning bileaflet mitral prosthesis with severe regurgitation. Transthoracic echocardiography demonstrated 1 leaflet was working properly, but the second leaflet was suspected to be either stuck in the open position or was absent.

The patient’s hemodynamic system had deteriorated, so urgent surgery was chosen. Perioperative transesophageal echocardiography confirmed the leaflet was missing (Figure 1, Videos 1 and 2). Femorofemoral cardiopulmonary bypass was instituted first, using a mitral prosthesis approached by left atriotomy. After the pulmonary veins, the left cardiac chambers, and the ascending aorta were carefully inspected, the missing leaflet was not found. The ED prosthesis (Figure 2A) was excised and replaced.

Full-body computed tomography (CT) scanning was performed and showed the displaced leaflet was fractured in 2 halves (Figure 1B). Vascular surgery was performed to remove the embolized parts of the leaflets (Figure 2B). The follow-up was uneventful.

COMMENTS. Unlike a bioprosthesis, a mechanical valve prosthesis is deemed to undergo no structural valve deterioration and offers lifelong durability, unless it is affected by external factors such as endocarditis, thrombosis, or surgical malpractice (1).

Thus, leaflet escape remains an exceptional but life-threatening complication, with an incidence that does not exceed 0.3% (1) and a surgical mortality of up to 17% (2).

Due to its increased susceptibility to cavitation, it is well known that the ED prosthesis was associated with a higher risk of leaflet fracture and escape and was withdrawn from the market 6 years after its introduction (3).
The current patient had 2 mechanical ED protheses, but only the mitral valve was involved. Previous studies reported a higher incidence of leaflet fracture in mechanical mitral valves than in aortic valves. Although the mechanism is still unclear, the mitral prosthesis experienced higher systolic pressure (1–3). The patient showed the longest period ever reported among 16 similar cases in the original ED prosthesis (2). Interestingly, the escaped leaflet, throughout its migration, neither damaged the aortic prosthesis nor prevented its normal functioning. Careful examination of the aortic prosthesis showed a good function with no macroscopic leaflet damage and precluded, therefore, a prophylactic replacement despite the high risk of complication in the future.

Two important factors should be considered in leaflet escape: hemodynamic changes related to acute severe regurgitation and consequences of the migration of the leaflet (1). The most common sites of migration are abdominal aorta and iliofemoral axes, unless the leaflet breaks into small pieces (2).

Principally, the migrated leaflet should be found and retrieved to minimize the risk of erosions and infections (1). In the present case, the option for side-graft cannulation of the femoral artery was chosen to prevent arterial wall damage. It is definite that the blind introduction of a femoral cannula should be avoided because the exact position of the embolized leaflet was unknown.

**AUTHOR DISCLOSURES**

All authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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**FIGURE 1** Perioperative Transoesophageal Echocardiography 2-Chamber View

(A) Perioperative transoesophageal echocardiography 2-chamber view. Only 1 leaflet is seen in the closed position. Color Doppler flow showed severe mitral regurgitation coming from the missed leaflet. (B) Postoperative computed tomography scanning showed the embolized leaflet at the origin of the left common iliac artery.
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KEY WORDS embolization, fracture, mitral valve

APPENDIX For supplemental videos, please see the online version of this paper.