

Bovine bioprosthetic mitral valve tear with intra-leaflet hemorrhage

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Case description

A 78-year-old female presented to the outpatient department with dyspnea persisting for several months. She had undergone mitral valve replacement with a bioprosthetic valve Carpentier Edwards Perimount MAGNA Mitral 27 mm (Edwards Lifesciences, Irvine, CA) at the age of 69. Her medical history included hypertension treated with an antihypertensive drug, insulin-dependent pancreatic diabetes mellitus resulting from pancreatectomy for pancreatic cancer, and chronic kidney disease with creatinine clearance of 42 mL/min. Transesophageal

echocardiography showed severe mitral stenosis with a mean pressure gradient of 26 mmHg and moderate regurgitation without any evidence of vegetation (Figure 1A). Computed tomography revealed calcification of all leaflets of the bioprosthetic valve without thrombus. The bioprosthetic valve was surgically removed followed by a mechanical valve replacement. The ventricular surface of the bioprosthetic valve and a tear of the leaflet at the commissure were mainly calcified (Figure 1B). Pathologically, the torn portion of the leaflet demonstrated intra-leaflet hemorrhage with hemosiderin deposition and moderate inflammatory cell infiltration on the ventricular side. Mild intrinsic nodular calcification

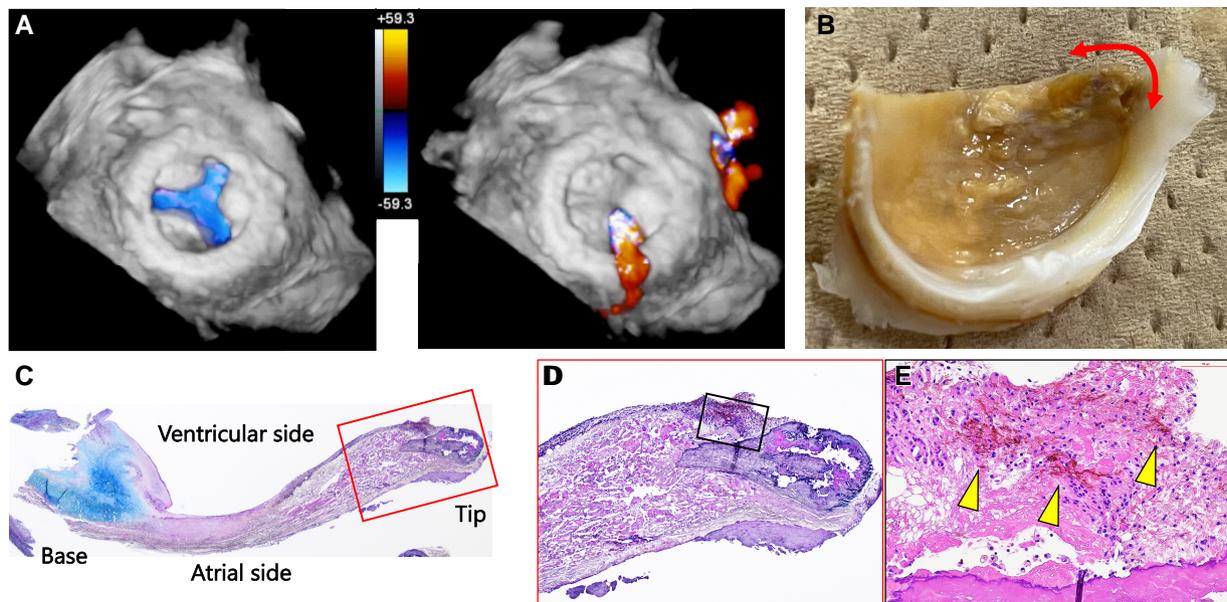


Figure 1 Gross image and pathological examination of resected bioprosthetic mitral valve. (A) Echocardiography showed severe mitral stenosis and moderate regurgitation (left: systole, right: diastole). (B) Gross examination demonstrates leaflet tear at the commissure (arrow) and moderate calcification on the ventricular side of the bioprosthetic valve leaflet. (C) Low-power image of the pathological section demonstrates moderate intrinsic nodular calcification on the tip of the leaflet with pannus formation (Movat Pentachrome stain). (D and E) High-power image of the pathological section demonstrates (D) intra-leaflet hemorrhage (Movat Pentachrome stain) with (E) hemosiderin deposition (arrowheads) at the torn part of the leaflet (hematoxylin and eosin stain).

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was also observed on the tip part of the torn leaflet (Figure 1C, 1D, and 1E). Pathological analysis of the resected bioprosthetic valve revealed moderate pannus formation on the base of ventricular side and intrinsic sheet calcification.

The bioprosthetic valve dysfunction of the bovine pericardium is reported to be caused by mechanical stress due to a lack of self-repair and pannus formation derived from the immune response.¹ Intra-leaflet hemorrhage is an etiology of rapidly progressive valve stenosis in native valve leaflets.² Another study has reported the association of lipid-mediated inflammatory reactions and lipid-rich plaque infiltration in the bioprosthetic valve leaflets.³ However, a case of leaflet tear with the intra-leaflet hemorrhage in bioprosthetic valve has not been previously reported. Although it may remain unclear which came first, the tear or the intra-leaflet hemorrhage, the findings of the present case suggest that the mechanism of bioprosthetic valve dysfunction has multifactorial aspects involving intra-leaflet hemorrhage.

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Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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