A 46-year-old man presented with a 48-hour history of fevers, sweats, and dyspnea. He had bacterial endocarditis of the native mitral valve 12 years earlier with subsequent mitral valve replacement (MVR) with a Hancock II porcine valve (Medtronic Inc). Examination revealed a Grade 3/6 holosystolic murmur at the apex radiating into the axilla with crackles heard halfway up both lung fields. A diagnosis of infective endocarditis with acute mitral regurgitation (MR) was made and serial blood cultures drawn. Transesophageal echocardiogram (TEE) revealed severe MR (Figure 1). The MR was transvalvular with no perivalvular leak.1–3 A large mobile linear echodense mass (length = 2.0 cm) was seen in the left ventricle and this prolapsed across the valve into the left atrium (LA, Figure 2 through 4) along with partial prolapse of one of the leaflets of the valve (Figure 3 and 4). The patient underwent urgent mitral valve replacement where the tissue bioprosthesis was replaced with a 29-mm St Jude Medical bileaflet mechanical valve (St Jude Medical Inc). The left atrium was closed with a patch. Postoperatively, the patient developed complete heart block and required a permanent pacemaker. Blood and tissue cultures were sterile.

Pathology

The Hancock II porcine bioprosthesis showed degeneration of the porcine aortic valve cusps (Figures 5 through 7) and focal nodular calcification (Figures 5 and 6) close to one commissural region. A second cusp showed a 0.7-cm, vertical, commissural region tear, a horizontal tear from commissure to commissure, and a 0.4-cm long vertical tear at the opposite commissural region (Figure 6). This torn strip (2.5-cm long × 0.6-cm wide) of cuspal tissue was attached to the prosthesis by a 0.2-cm strip of cuspal tissue (Figure 6). This allowed it to flop into the ventricle and float up into the atrium (the “highly mobile mass” on TEE), leading to the significant acute MR noted on TEE. There was no evidence of infection in or around the bioprosthesis. Acute bioprosthesis failure was due to tissue degeneration and may also be related to the significant pannus that covered the stent posts (Figure 5 and 7) and extended onto the adjacent part of the cusps with resultant stress aggregation at the cusp pannus interface.4

References
Figure 1. Transesophageal (TEE) view of mitral valve showing the severe transvalvular MR.

Figure 2. TEE 2-chamber view showing transvalvular MR.

Figure 3. TEE 4-chamber view showing the torn leaflet in the left ventricle (LV).

Figure 4. TEE view showing the mitral valve with torn leaflet in LA and partial prolapse of one of the other leaflets.

Figure 5. Atrial surface of the prosthesis shows a thick layer of shiny gray-white tissue (pannus) covering the flow surface of the fabric (arrow heads) with extension on to the base of the cusps. Two prolapsed cusps lie virtually horizontally. No vegetations are seen. One nodular area of calcification is seen (curved arrow).
Figure 6. Ventricular (non-flow) surface of the bioprosthesis shows a large 2.5-cm long and 0.6-cm wide (white arrows) strip of one cusp torn off at one end (end held up with forceps) and near totally torn at the other (short arrow). This is the torn tissue seen as a prolapsing mass on echocardiography. It simulated a mobile vegetation. The adjacent cusp shows a second tear (long arrow). Prolapse of 2 cusps due to tissue degeneration and cusp tears and nodular calcification (curved arrows) are noted. Extensive pannus is seen on stent posts (arrowheads).

Figure 7. A longitudinal section through the porcine bioprosthesis (stent and fabric sewing cuff removed). The cusp shows tissue degeneration with areas of calcification, as well as calcification in the porcine aortic tissue (arrow). Significant pannus is seen on the flow and non-flow surfaces of the porcine tissue (curved arrows) (stain: Movat Pentachrome; Original magnification ×16)
Acute Mitral Regurgitation Due to a Torn Porcine Bioprosthetic Cusp
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