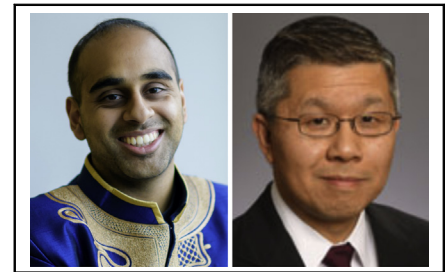


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Commentary: How can you mend a broken heart: Mechanical valve leaflet fracture

Parth M. Patel, MD, and Edward P. Chen, MD



Parth M. Patel, MD (left), and Edward P. Chen, MD (right)

CENTRAL MESSAGE

A rapid and accurate diagnosis, along with appropriate management, offers the best chance for optimal patient outcomes in mechanical prosthetic valve leaflet fracture.

Helgeland¹ has reported the fourth known case of On-X mechanical valve leaflet fracture with embolization and only the second patient to have survived this complication. Acute massive prosthetic mitral valve regurgitation carries high mortality, and Helgeland¹ should first be commended on their successful treatment of this patient.² Although older mechanical valves had a greater propensity of valve fracture and embolization, newer generation models can also be at risk for this complication, as seen by this report and others.³⁻⁶

Patients presenting with acute mitral regurgitation will often be in cardiogenic shock.⁷ The initial management should include stabilization of the hemodynamics to optimize end organ perfusion and appropriate intervention to correct the mitral regurgitation.⁷ In the setting of a previous mechanical valve implant, prosthetic valve thrombosis has often represented a common etiology of this condition. Preoperative management can include elective intubation, depending on the severity of the pulmonary edema. Patient hemodynamics can be supported by afterload reduction and inotropic medication but might require mechanical circulatory support in the form of an intra-aortic balloon pump, a percutaneous ventricular assist device, or, even, extracorporeal membranous oxygenation.⁷ Ultimately, patients will typically require reoperative mitral valve replacement, and the timing of surgical intervention will depend on the presence and severity of heart failure,

severity of hemodynamic compromise, and the patient's responsiveness to the initial stabilizing measures.

Helgeland¹ appropriately highlighted that rapid diagnosis and treatment are critical to patient survival in the setting of leaflet fracture. As outlined in the report, the imaging modalities essential for the diagnosis of leaflet fracture include transesophageal echocardiography and non-contrast-enhanced computed tomography. The use of transesophageal echocardiography will allow the identification of the nature and severity of the mitral regurgitation, and non-contrast-enhanced computed tomography will be necessary to identify the location of the embolized portion of the prosthetic valve.⁷ Plain roentgenograms, although an appropriate initial test on patient presentation, will not be sufficient to identify the presence of a fractured leaflet or the location of the embolized fragment. Similarly, the use of fluoroscopy, as in this case, could delay the diagnosis.

The potential benefit of retrieving an embolized fractured leaflet and the appropriate timing of such an intervention have continued to be debated.^{4,8} The distal location of an embolus and patient symptoms, including signs of malperfusion, should be used as clinical guides to determine the urgency of retrieval. In this case, Helgeland¹ wisely chose to first address the patient's hemodynamic compromise with redo-mitral valve replacement before performing further diagnostic studies, followed by retrieval of the embolized piece during a second operation.

With this case report, Helgeland¹ has brought to light an extremely, rare but important, complication of modern

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prosthetic valves. Leaflet fracture can occur at any time after prosthetic valve implantation and must remain a part of the differential diagnosis for acute prosthetic valve mitral regurgitation.⁴⁻⁶ Transesophageal echocardiography and non-contrast-enhanced computed tomography are necessary tools for an accurate diagnosis, and the appropriate management is similar to that for acute mitral regurgitation secondary to valve thrombosis. Given the mortality of 50% in the reported data, a rapid, and accurate diagnosis, as well as appropriate initial management, offers the best chance for optimal patient outcomes.⁴⁻⁶

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