An Unusual Cause of Severe Mitral Regurgitation in a Patient with Aortic Valve Endocarditis

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A 61-year-old, 69-kg, 173-cm previously active man with a past medical history of hyperlipidemia, type-II diabetes mellitus, and pancreatitis was admitted to the authors’ institution for evaluation of low-grade fever, drenching night sweats, malaise, and progressive dyspnea on exertion of 2 weeks’ duration. He denied weight loss, productive cough, orthopnea, and chest pain. The physical examination was notable for a grade III of VI holosystolic murmur heard best at the apex with radiation to the axilla. The white blood cell count was normal. A chest radiograph was unremarkable. Transesophageal echocardiography was performed as part of the diagnostic evaluation and revealed the images shown in Figs 1 and 2 and Video clips 1 and 2). What is the diagnosis?

Fig 1. Modified four-chamber TEE image showing a large, thin-walled saccular structure and a vegetation on the A2-A3 scallop of the anterior mitral leaflet.

Fig 2. Modified four-chamber color Doppler TEE image showing severe mitral regurgitation.

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DIAGNOSIS: ANTERIOR MITRAL LEAFLET ANEURYSM WITH SEVERE MITRAL REGURGITATION

A modified four-chamber TEE image showed a large, echoluent, thin-walled saccular structure in the body of the anterior mitral leaflet (A2-A3 scallop) consistent with a leaflet aneurysm (Fig 1; Video clip 1). A small vegetation also was noted at the junction of the aneurysm and the distal normal leaflet (Fig 1; Video clip 1). Color Doppler blood-flow mapping in the same imaging plane showed severe mitral regurgitation (Fig 2; Video clip 2). The mitral leaflet aneurysm also was seen easily in a two-chamber TEE view (Fig 3) and was accompanied by severe regurgitation that was directed along the anterior left atrial wall (Fig 4; Video clip 3). A mobile vegetation was observed on the left coronary cusp of the aortic valve (not shown). Moderate aortic insufficiency was directed at the midbody of the anterior mitral leaflet (Fig 5; Video clip 2). An abscess of the aortic annulus was absent. Streptococcus viridans was isolated from blood cultures, confirming the diagnosis of bacterial endocarditis. The patient was treated with intravenous vancomycin. The mitral leaflet aneurysm was identified easily during cardiopulmonary bypass and contained a small perforation (Fig 6). The mitral and aortic valves were excised and replaced with 31 mm and 25 mm bioprostheses, respectively. The patient separated from cardiopulmonary bypass using inotropic support and was transferred to the intensive care unit in stable condition.

Mitral leaflet aneurysm is a rare but well-known complication of aortic valve endocarditis. As observed in the current patient (Figs 1 and 3; Video clip 1), a saccular, thin-walled echoluent structure that protrudes into the left atrium during systole and often collapses during diastole is the most prominent feature of a mitral valve aneurysm. The neck of a mitral valve aneurysm typically is narrower than the maximal width of its body, suggesting that this valvular abnormality should be formally termed a “pseudoaneurysm.” Regardless of the specific nomenclature, three major potential mechanisms have been postulated for the development of a mitral valve aneurysm in the presence of aortic valve endocarditis. First, extension of the aortic valve infection directly through the aortic annulus, across the aortic-mitral curtain, and into a valve leaflet may cause formation of an abscess, the rupture of which creates the aneurysm. However, there was no TEE or surgical evidence of an aortic annulus involvement in the current patient. Second, spread of aortic valve endocarditis through direct contact of a prolapsing vegetation with the anterior mitral
leaflet also may lead to transfer of bacteria, abscess development, and aneurysm formation. It is certainly plausible that such a mechanism may have played a role in the pathogenesis of mitral valve aneurysm formation in the current patient because a prolapsing vegetation was noted on the aortic valve left coronary cusp that produced moderate aortic insufficiency. However, the aortic valve vegetation was relatively small and neither the TEE nor the surgical findings demonstrated contact between this vegetation and the anterior mitral leaflet. Finally, a jet of aortic insufficiency directed toward the mitral valve from the infected aortic valve may shower and seed one or both leaflets with infected material. This process is thought to cause localized infection, weakness, dissection, and subsequent expansion of the affected leaflet as the infection spreads. In the current patient, a small vegetation was noted on the leaflet body near its distal junction with the aneurysm (Fig 1; Video clip 1) at the site of contact with the jet of aortic insufficiency (Fig 5; Video clip 2), suggesting that this third proposed mechanism may have contributed to the mitral valve aneurysm. Mitral valve aneurysms are identified most often using transthoracic or transesophageal echocardiography, but other techniques, including cardiac magnetic resonance imaging, also are capable of establishing the diagnosis. Some uncomplicated mitral valve aneurysms may be managed conservatively, but most require operative intervention for definitive treatment.

APPENDIX A. SUPPLEMENTARY DATA
Supplementary data are available in the online version of this article at http://dx.doi.org/10.1053/j.jvca.2013.10.021.

REFERENCES