

## Case Report

# An Unusually Accentuated Diastolic Anterior Motion of the Mitral Valve in Aortic Insufficiency

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Received 3 November 2011; accepted 9 April 2012

**ABSTRACT:** A 55-year-old woman was diagnosed with endocarditis involving the aortic valve and resulting in moderate aortic insufficiency. Transesophageal and transthoracic echocardiography demonstrated an unusually accentuated diastolic anterior motion of the anterior mitral valve leaflet toward the interventricular septum. The anterior leaflet remained within a few millimeters of the septum throughout diastole, with a narrow jet of aortic insufficiency separating the anterior leaflet from the septum. We hypothesize that the particularly long anterior mitral leaflet was drawn toward the septum during diastole due to the Venturi effect of the aortic insufficiency jet within a narrow ventricular outflow tract. This accentuated diastolic anterior motion may be a diastolic correlate of systolic anterior motion of the mitral valve. © 2012 Wiley Periodicals, Inc. *J Clin Ultrasound* 00:000–000, 2012; Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/jcu.21948

**Keywords:** aortic insufficiency; mitral valve

A 55-year-old woman was diagnosed with *Streptococcus viridans* endocarditis involving the right coronary cusp of the aortic valve and resulting in moderate aortic insufficiency. Three weeks later, she was admitted for recurrent fevers despite appropriate antibiotic therapy. Transesophageal echocardiography performed on admission demonstrated persistent

aortic valve vegetation and no change in the degree of aortic insufficiency.

In addition, there was an unusual diastolic movement of the anterior mitral valve leaflet toward the interventricular septum (Figure 1). The anterior leaflet remained within a few millimeters of the septum throughout diastole (Supporting Information Video 1), with a narrow jet of aortic insufficiency separating the anterior leaflet from the septum (Supporting Information Video 2). On transthoracic M-mode recordings of the mitral valve, there was a flattened E–F slope (Figure 2). Tridimensional transesophageal echocardiography did not yield further information.

We refer to this unusual movement of the anterior leaflet of the mitral valve as accentuated diastolic anterior motion (ADAM). This is in contrast to the classic description of the motion of the anterior mitral leaflet in significant aortic insufficiency that includes diastolic “damping” or “reverse doming” toward the mid ventricle with premature closure of the mitral valve and mitral valve fluttering. In addition, significant aortic insufficiency is frequently associated with an increased E–F slope, typically 120–160 mm/s.<sup>1–3</sup> This again is in contrast with our patient who had a diminished E–F slope. Typically, a decreased mitral E–F slope may be seen in mitral stenosis, reduced left ventricular compliance, pulmonary hypertension, atrial fibrillation, and decreased preload or afterload.<sup>4</sup> None of these were present in our patient.

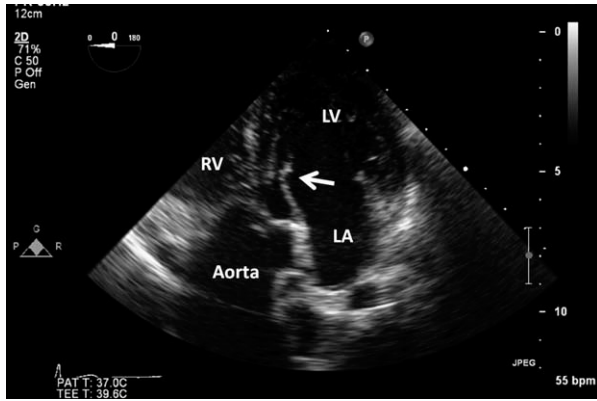
We hypothesize that the mechanism and risk factors for ADAM are similar to those of systolic anterior motion (SAM) of the mitral valve. Our patient was noted to have an acute

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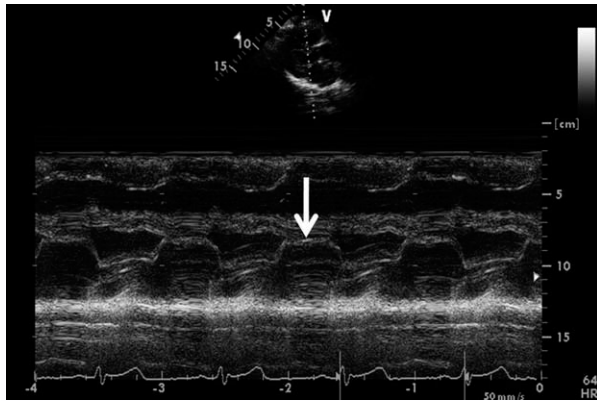
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VOL. 00, NO. 0, MONTH 2012



**FIGURE 1.** Deep transgastric long-axis view on transesophageal echocardiogram demonstrating accentuated diastolic anterior motion (ADAM) of the anterior mitral leaflet. LA, left atrium; LV, left ventricle; RV, right ventricle (arrow indicates the anterior leaflet of the mitral valve on M-mode demonstrating accentuated diastolic anterior motion).



**FIGURE 2.** M-mode through the mitral valve on transthoracic echocardiogram demonstrating accentuated diastolic anterior motion (ADAM) of the anterior mitral leaflet and diminished E-F slope (arrow indicates anterior mitral leaflet in diastole).

mitral-aortic angle, a prominent septal knuckle narrowing the left ventricular outflow tract, and a long anterior mitral valve leaflet, all of which are risk factors for SAM. Nevertheless, the left ventricular function was not hyperdynamic and there was no evidence of SAM. In our patient, however, there was a significant jet of aortic insufficiency through a narrowed left ventricular outflow tract, which apparently drew the anterior mitral leaflet toward the septum during diastole, perhaps due to the Venturi effect of the aortic insufficiency jet. As no additional imaging technique (eg, cardiac magnetic resonance) was available in this patient, our explanation of ADAM remains speculative, but we think that this case was worth reporting because it was never described before.

In conclusion, ADAM may be a diastolic correlate of SAM.

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