JACC: CASE REPORTS VOL. 2, NO. 10, 2020

MINI-FOCUS ISSUE: IMAGING

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Valvular Disease Begets Valvular Disease

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ABSTRACT

In acute severe aortic regurgitation, an inversion of pressure gradient from the left ventricle to the left atrium causes the classical sign of end-diastolic mitral regurgitation. Here we present a case of mid-diastolic mitral regurgitation in a 51-year-old man with severe aortic regurgitation secondary to infective endocarditis. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2020;2:1587–8) © 2020 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

A 51-year-old man with a past history of drug addiction and chronic hepatitis C was admitted to the hospital with fever and acute prostration. Cardiac examination demonstrated a high-pitched grade III/VI systolic murmur that radiated throughout the precordium and no diastolic murmur. The lungs were clear. Janeway lesions and Osler nodules were evident, as well as brain, liver, kidney, and spleen embolization noted on a computed tomography scan. The electrocardiogram showed sinus rhythm at 98 beats/min with no other significant abnormalities. Transthoracic echocardiography revealed nondilated cardiac chambers and normal wall motion and left ventricular (LV) function. A vegetation attached to the aortic valve was evident (**Figures 1A and 1B**). Severe diastolic aortic regurgitation (AR) (**Figures 1C and 1D**) was demonstrated by color flow Doppler imaging, fast deceleration (pressure half-time of 180 ms) on continuous wave Doppler, and an increased LV outflow tract velocity time integral (36 cm). No diastolic mitral flow reversal was evident. Transesophageal echocardiography was performed to rule out local complications and confirmed a vegetative of approximately 18-mm attached to the noncoronary cusp with severe AR. After initial antibiotic therapy and before surgery, transesophageal echocardiography was repeated and showed not only systolic but also diastolic mitral flow (Videos 1, 2, 3, and 4). Diastolic mitral regurgitation (DMR) was documented by color flow Doppler imaging (**Figure 1E**). Pulsed wave Doppler imaging of mitral inflow revealed a short E-wave deceleration time and DMR after the E-wave (**Figure 1F**).

DMR is not a common phenomenon. For it to occur, 1 of 2 conditions must be present. First, DMR occurs whenever there is a reversal of the atrioventricular pressure gradient, as in severe AR (1) or dilated cardiomyopathy (2). Second, DMR results from the absence or delay of effective LV contraction essential to mitral valve closure, as in atrioventricular block (3) and atrial tachyarrhythmias (2). Acute AR is classically associated with end-DMR (1). In our patient, DMR was observed in mid-diastole, immediately after the E-wave. This finding suggests that DMR was generated directly by overshoot backward aortic flow to the left atrium, instead of the very typical high diastolic LV pressure. Mid-DMR in atrioventricular block is reported (2). It is believed

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: Case Reports* author instructions page.

Manuscript received March 20, 2020; revised manuscript received June 12, 2020, accepted June 24, 2020.

ISSN 2666-0849 https://doi.org/10.1016/j.jaccas.2020.06.042

ABBREVIATIONS AND ACRONYMS

AR = aortic regurgitation

DMR = diastolic mitral regurgitation

LV = left ventricular

that DMR is not hemodynamically significant. In addition, because of its relatively low velocity, DMR may be difficult to diagnose noninvasively (2).

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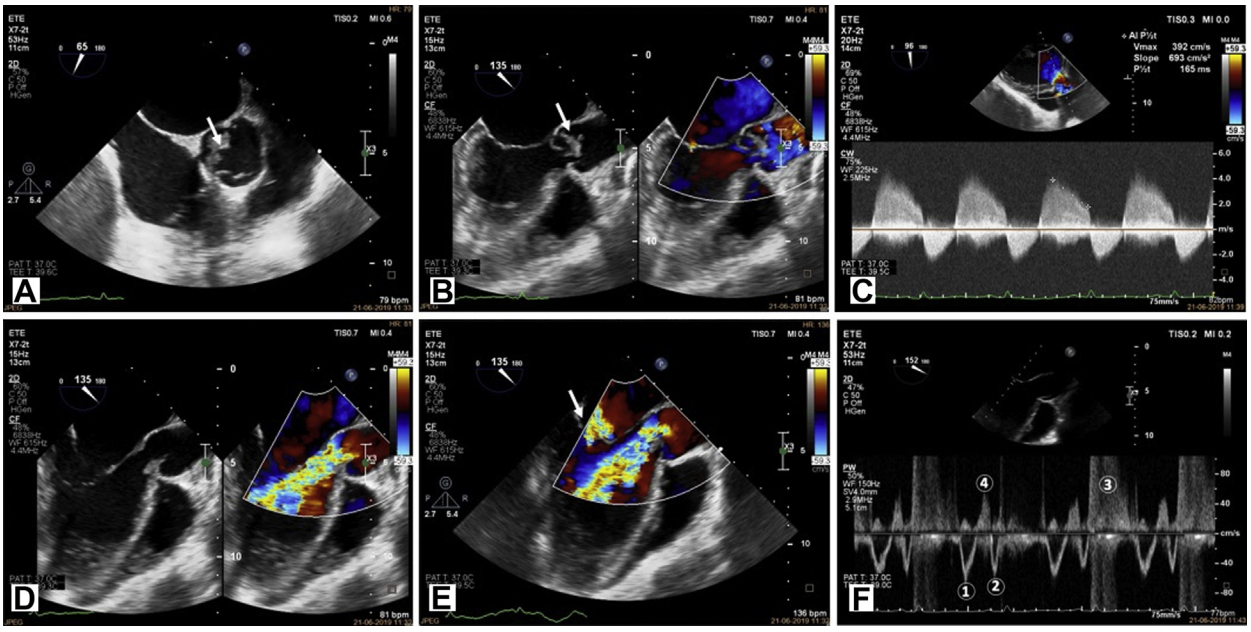
FIGURE 1 Transesophageal Echocardiography



(A and B) Vegetation attached to the noncoronary cusp **(arrows)**. **(C and D)** Severe aortic regurgitation. **(E)** Color Doppler showing diastolic mitral regurgitation **(arrow)**. **(F)** Pulsed waved Doppler of the mitral valve: 1, E-wave; 2, A-wave; 3, systolic mitral regurgitation; 4, diastolic mitral regurgitation.

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KEY WORDS aortic valve, echocardiography, endocarditis, insufficiency, mitral valve

APPENDIX For supplemental videos,