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CARDIOVASCULAR FLASHLIGHT
Heart failure

An unusual triphasic transmitral flow: a special case of 'mid-diastolic mitral regurgitation' due to acute aortic regurgitation

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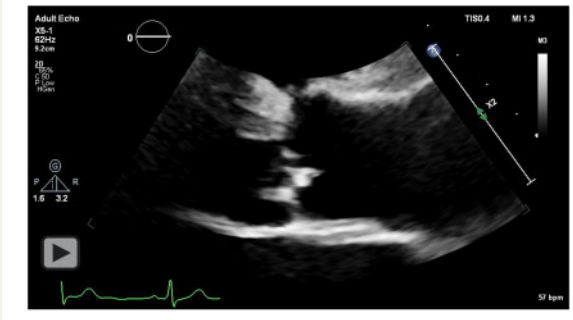
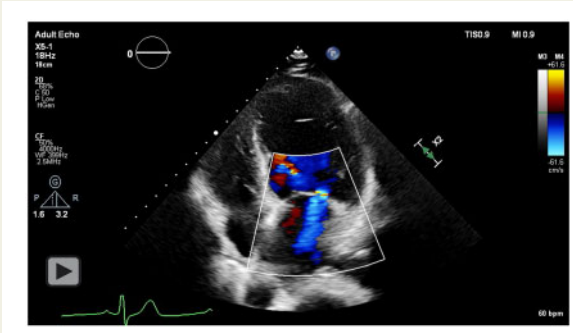
A 51-year-old man presented to a local hospital complaining of back pain and generalized fever. Repeated blood cultures revealed persistent bacteraemia with *Streptococcus agalactiae*, and a diagnosis of pyogenic spondylitis was made. On referral, cardiac auscultation revealed a harsh holodiastolic murmur at the 4th left intercostal space, concomitant with the 3rd and 4th heart sounds (*Panel A*). Transthoracic echocardiography showed an oscillating mass attached to the aortic valve (*Video 1*), complicated by severe aortic regurgitation (AR), consistent with infective endocarditis. Of note, significant 'mid-diastolic mitral regurgitation (MR)' was observed on colour and pulsed-wave Doppler echocardiography (*Panel B*, *dotted lines* and *Video 2*), which coincided with the coaptation gap between the mitral leaflets during mid-diastole (*Panel C*, *black arrows*). Transoesophageal echocardiography revealed a perforation of the left coronary cusp, resulting in massive AR (*Video 3*). Mid-diastolic MR was also recognised by a colour M-mode echocardiogram of the transmitral flow (*Panel D*, *black arrows*, and Supplementary material online, Video S1). Cardiac catheter examination confirmed another *v* wave (*v'*) on pulmonary capillary wedge pressure waveform during mid-diastole (*Panel E*), coinciding with mid-diastolic MR. After urgent aortic valve replacement, the mid-diastolic MR had completely disappeared without any surgical intervention to the mitral valve.

Generally, a brief diastolic MR can be limited at end-diastole in cases with elevated left ventricular (LV) end-diastolic pressure or prolonged atrioventricular conduction. In this special case, however, acute severe AR presumably led to overshoot of the LV mid-diastolic pressure and pressure crossover between the left ventricle and left atrium even during mid-diastole. Moreover, the massive AR could



Video 1 The parasternal long-axis view of transthoracic echocardiography shows an oscillating mass attached to the aortic valve.



Video 2 Colour Doppler mode of the apical four-chamber view clearly shows 'mid-diastolic mitral regurgitation'.

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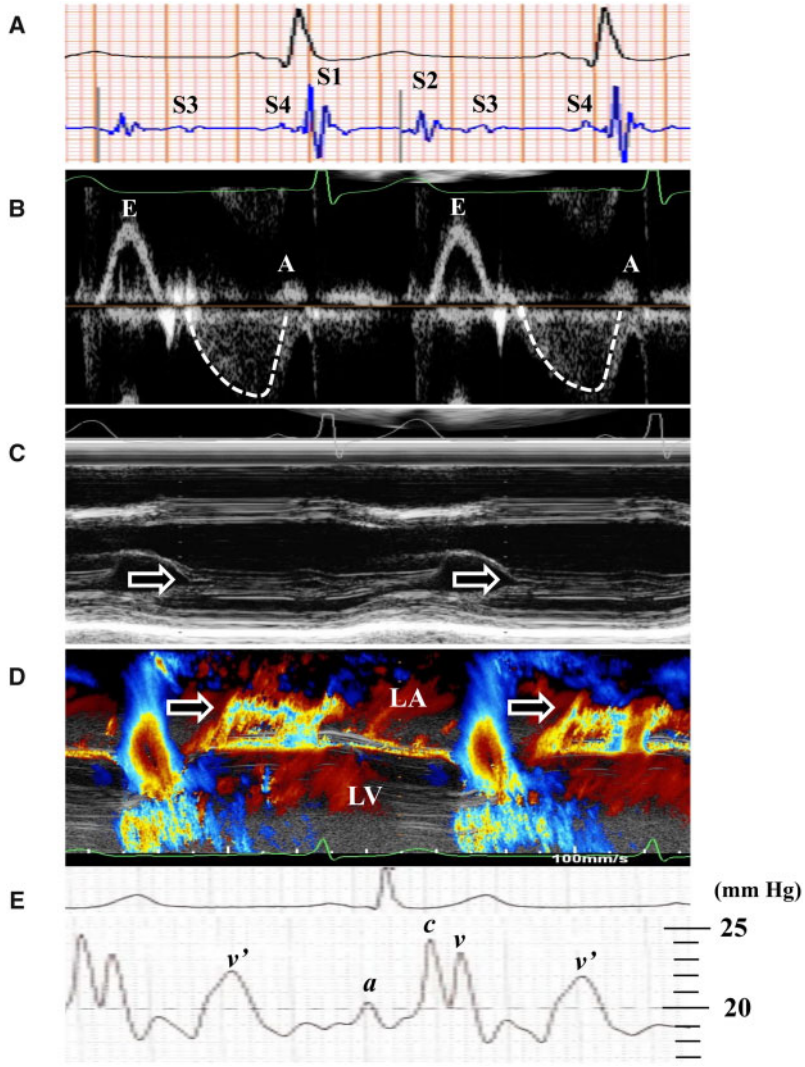
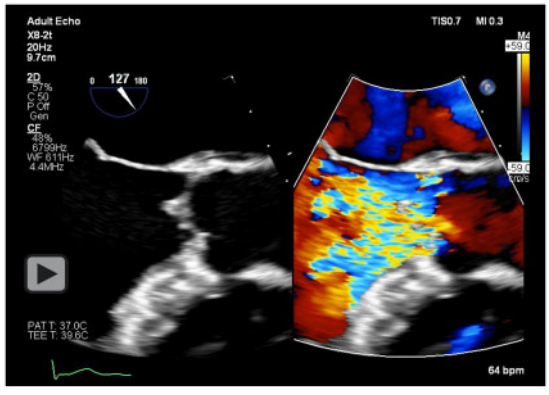


Figure



Video 3 Transoesophageal echocardiography shows a perforation of the left coronary cusp, which resulted in massive aortic regurgitation.

lead to an LV volume overload, which lead to LV distension, mitral annular distension, and ultimately valvular malcoaptation.

Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

Consent: The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

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