

Diastolic mitral regurgitation in a patient with coronary artery disease and anaemia

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DESCRIPTION

An 88-year-old man presented to the emergency department due to haematuria and blood clots in his urine. The patient's history was significant for hypertension and prostate cancer, for which he received radiotherapy. He did not have any other risk factor for coronary artery disease. On admission, his haemoglobin was 9 g/dL (baseline 13 g/dL). Repeat haemoglobin on the consecutive days improved to 10 g/dL. The patient did not receive

any blood transfusion during the hospital stay. He developed chest pain with ECG showing normal sinus rhythm at 76 bpm, new right bundle branch block and new left anterior fascicular block (bifascicular block). Troponin was elevated with peak of 7.46 ng/dL (normal 0.04–0.8 ng/dL). Transthoracic echocardiogram showed ejection fraction of 44%, presence of diastolic mitral regurgitation (DMR), and anterolateral and apical wall hypokinesia accompanied by moderate aortic regurgitation (AR). The

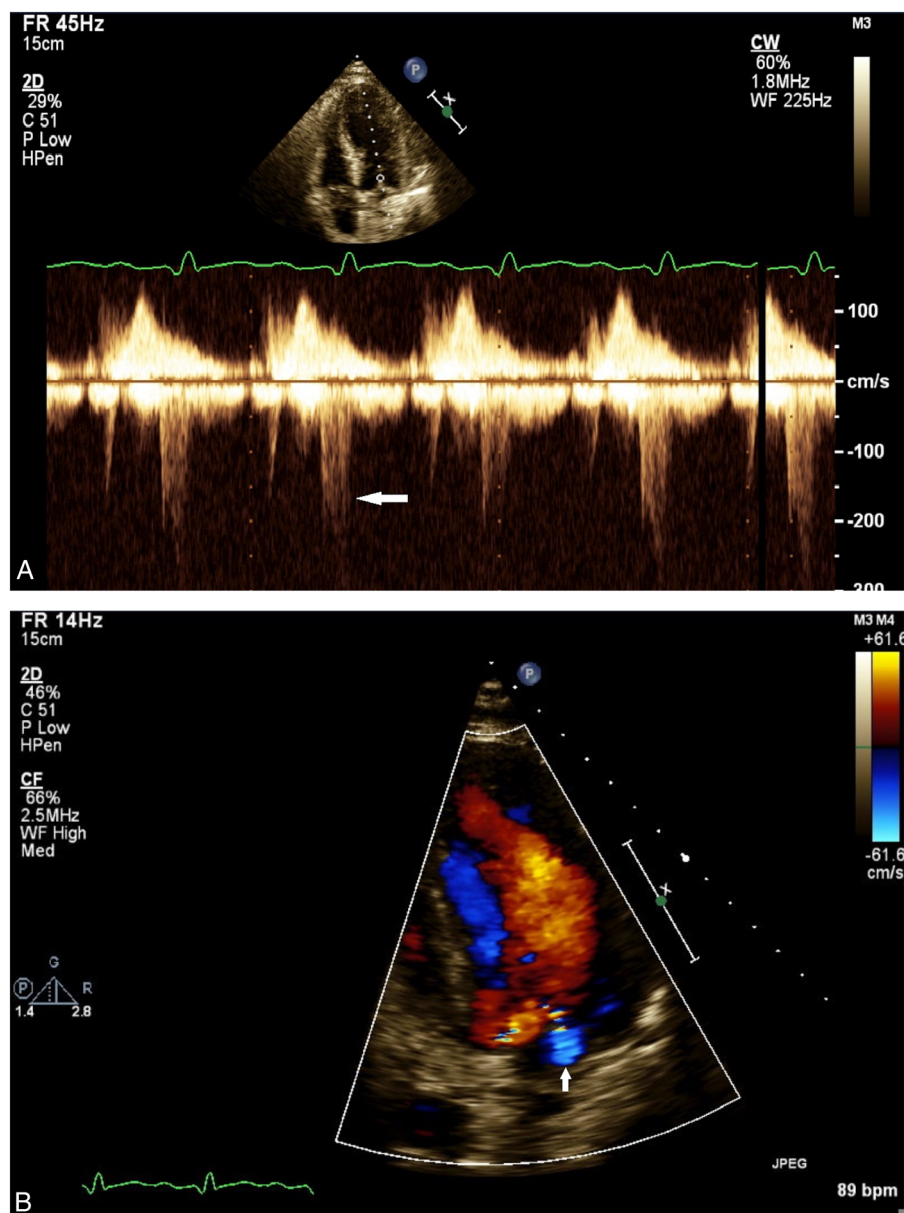


Figure 1 (A) Continuous wave Doppler image showing mid-diastolic mitral regurgitation (white arrow). (B) Colour Doppler showing diastolic mitral regurgitation (white arrow).



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Figure 2 Systolic (A) and diastolic (B) images showing apical hypokinesis (white arrow) and hyperdynamic mid-ventricular wall motion (yellow arrow) causing functional left ventricular (LV) outflow obstruction.

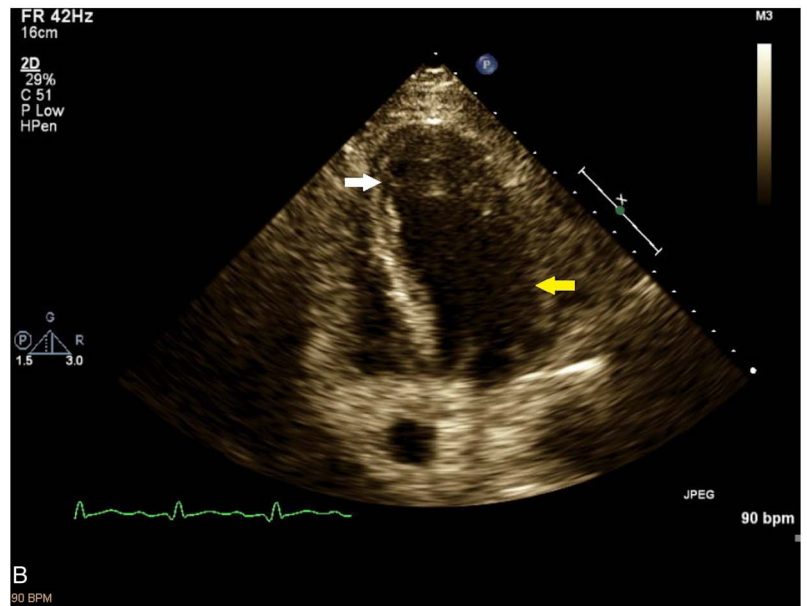
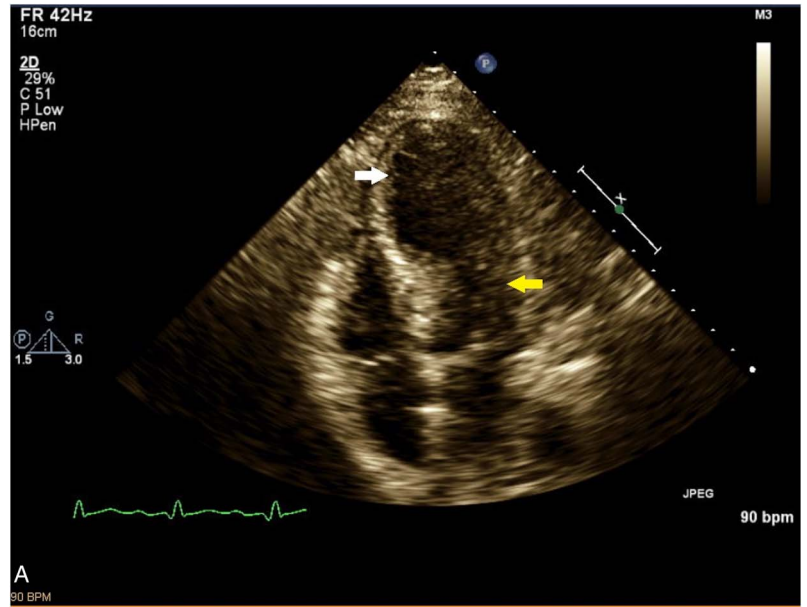


Figure 3 Tissue Doppler showing elevated medial E' velocity suggestive of hyperdynamic circulation.

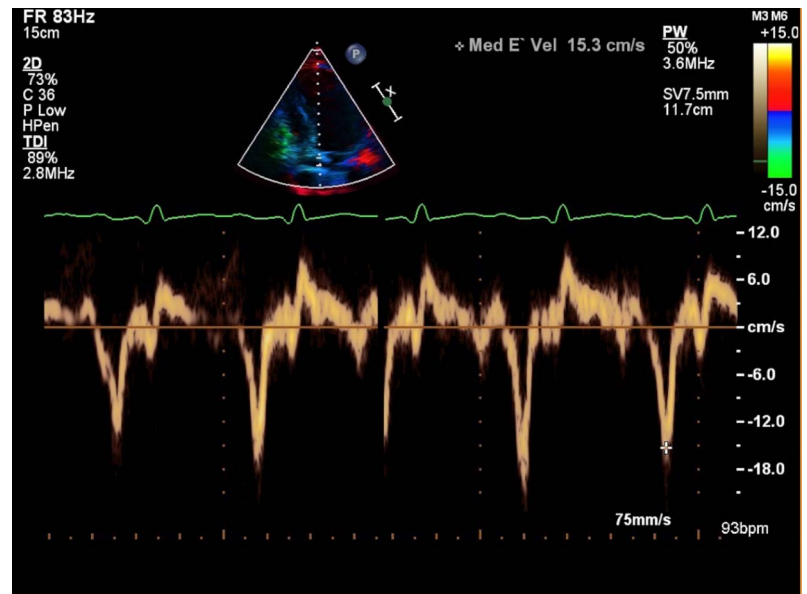
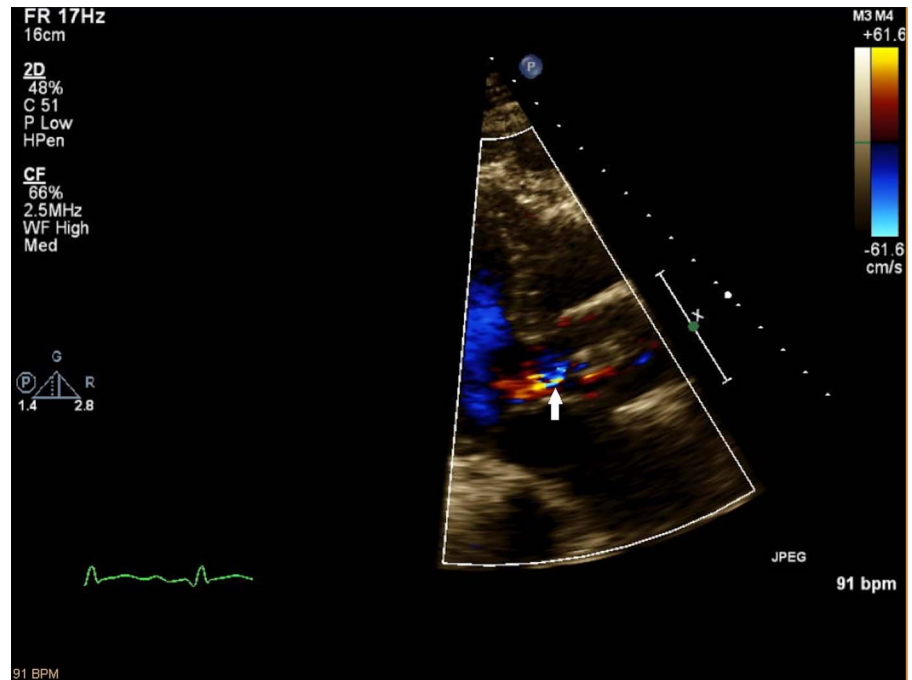


Figure 4 Colour Doppler showing aortic regurgitation.



patient underwent a cardiac catheterisation, which showed four-vessel disease. He was scheduled for coronary artery bypass grafting. He was also started on iron supplements for his anaemia.

Effective left ventricular (LV) contraction is essential for the closure of the mitral valve. DMR occurs when ventricular pressure exceeds the atrial pressure during any phase of diastole, producing a reverse atrioventricular gradient. This has been

observed in patients with diastolic LV dysfunction, severe AR and atrioventricular blocks.^{1–3} In our patient, we noticed a mid-DMR on Doppler waveform (figure 1A, B). He had apical hypokinesis (figure 2A, B) in the setting of hyperdynamic circulation (figure 3) due to the anaemia from haematuria. This led to a functional LV outflow tract obstruction (figure 2A, B) in the absence of septal hypertrophy. This resulted in pooling of blood in the apex during systole. This was exacerbated by moderate AR (figure 4) and early diastolic filling of the LV leading to further increase in LV volume. Owing to the factors aforementioned, in diastole, there is a reversal of atrioventricular gradient across the mitral valve in diastole leading to DMR.

Learning points

- ▶ Effective left ventricular (LV) contraction is essential for the closure of the mitral valve. Diastolic mitral regurgitation (DMR) occurs when ventricular pressure exceeds the atrial pressure during any phase of diastole, producing a reverse atrioventricular gradient.
- ▶ It can be caused by diastolic LV dysfunction, severe aortic regurgitation (AR) and atrioventricular block.
- ▶ Apical hypokinesis in the presence of hyperdynamic circulation can lead to functional LV outflow tract obstruction. This can lead to pooling of blood in LV and reversal of the atrioventricular gradient causing DMR.
- ▶ This pooling of blood can be exacerbated in the presence of moderate to severe AR leading to DMR.

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Competing interests None declared.

Patient consent Obtained.

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