

# Diastolic mitral regurgitation

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## Case report

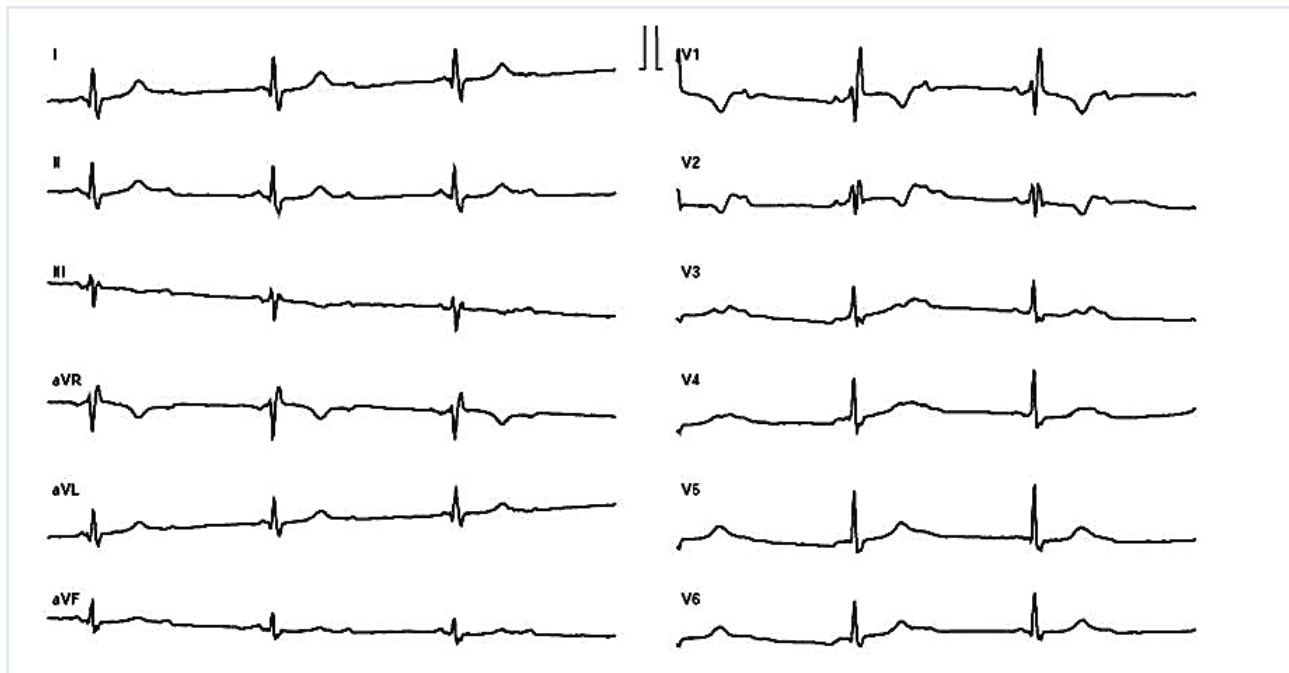
A 90-year-old female patient was admitted with congestive heart failure. The ECG showed a heart rate of 40 beats per minute with Mobitz II second-degree atrioventricular (AV) 2:1 block (fig. 1). Two-dimensional echocardiography revealed concentric left ventricular (LV) hypertrophy with normal systolic function (LV ejection fraction 70%) and dilatation of the left atrium. Doppler echocardiography detected only minimal early systolic and moderate to severe diastolic mitral regurgitation (fig. 2), mild-to-moderate, particularly diastolic tricuspid regurgitation, and elevated pulmonary artery pressure. Subsequently a VDD pacemaker was implanted and transthoracic echocardiography was repeated with a normal AV conduction time. Doppler echocardiography showed only minimal early systolic mitral regurgitation without diastolic regurgitation (fig. 3) and only minimal tricuspid regurgita-

tion. Although clinical signs of congestive heart failure had already improved after initiation of medical therapy, they disappeared only after implantation of the pacemaker.

Diastolic mitral and tricuspid regurgitation is a common finding in AV conduction abnormalities [1]. Delayed ventricular contraction following atrial contraction may lead to diastolic mitral and tricuspid regurgitation, because AV valve closure does not occur unless ventricular systole supervenes [2]. In the event of higher ventricular than atrial pressure during atrial relaxation, an incompletely closed AV valve may lead to a reverse gradient with a considerable regurgitation volume. Sequential dual-chamber pacing at a physiological AV interval improves haemodynamics by prolongation of the LV diastolic filling time and elimination of diastolic mitral regurgitation, thus lowering LV filling pressures and increasing cardiac output [3].

Diastolic mitral regurgitation in the presence of normal

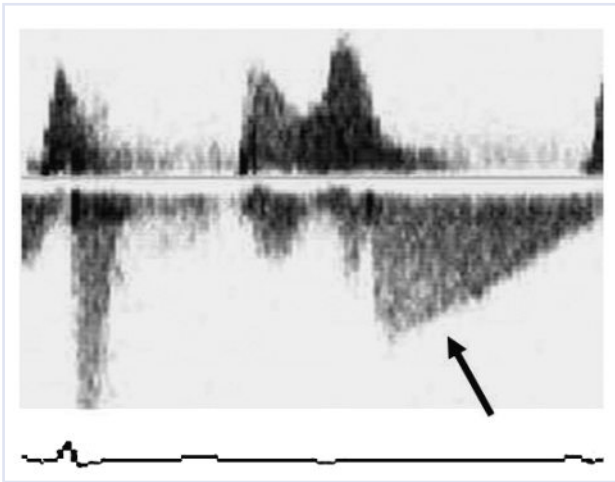
**Figure 1**  
ECG on admission showing Mobitz II second-degree AV block.



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**Figure 2**

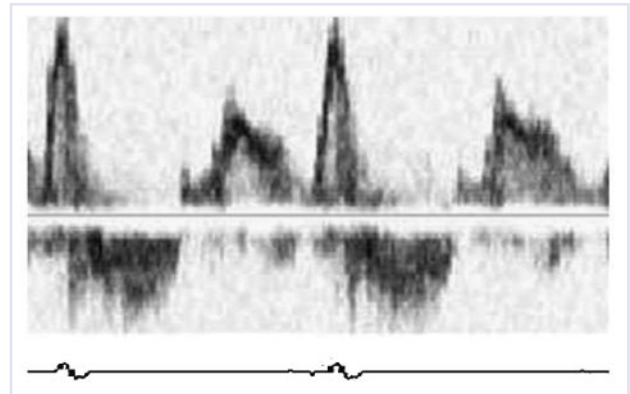
Continuous wave Doppler on admission showing mitral flow with only minimal early systolic and moderate to severe diastolic mitral regurgitation (arrow).



LV function can contribute to overt congestive heart failure if a high reverse ventriculo-atrial pressure gradient occurs. In this case, sequential AV pacing at a physiological conduction time may bring substantial improvements in haemodynamics by elimination of diastolic mitral regurgitation.

**Figure 3**

Pulsed wave Doppler after implantation of a VDD pacemaker showing mitral flow with only minimal early systolic mitral regurgitation without diastolic regurgitation.



## References

- 1 Panidis IP, Ross J, Munley B, Nestico P, Mintz GS. Diastolic mitral regurgitation in patients with atrioventricular conduction abnormalities: a common finding by Doppler echocardiography. *J Am Coll Cardiol.* 1986;7:768–74.
- 2 Schnittger I, Appleton CP, Hatle LK, Popp RL. Diastolic mitral and tricuspid regurgitation by Doppler echocardiography in patients with atrioventricular block: new insight into the mechanism of atrioventricular valve closure. *J Am Coll Cardiol.* 1988;11:83–8.
- 3 Auricchio A, Ding J, Spinelli JC, Kramer AP, Salo RW, Hoersch W, et al. Cardiac resynchronization therapy restores optimal atrioventricular mechanical timing in heart failure patients with ventricular conduction delay. *J Am Coll Cardiol.* 2002;39:1163–9.