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IMAGES IN CARDIOLOGY

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Increasing severity of functional mitral regurgitation by left bundle branch block

A 70-year-old man with a history of hypertension and diabetes was admitted for new onset congestive heart failure. Three days later, at the time of the diagnostic echocardiography, he exhibited intermittent left bundle branch block (LBBB) and mild mitral regurgitation (MR) (panels A and B).

Narrow- and LBBB-QRS complex corresponding shells of identical velocity proximal to the regurgitant orifice obtained 34 seconds apart are shown in panels C and D, respectively. The continuous wave Doppler derived jet velocity corresponding to the narrow-QRS isovelocity shell (panel E) was higher than those corresponding to the LBBB-QRS isovelocity shell (panel F) because the narrow-QRS complex was associated with a steeper increase of transmitral pressure. Thus, the effective regurgitant area of MR increased from 0.09 cm² (narrow-QRS) to 0.17 cm² (LBBB-QRS).

LBBB related features which might have contributed to this finding include a decrease in left ventricular (LV) ejection fraction and maximal rate of systolic pressure rise from 48% and 1236 mm Hg/s to 43% and 641 mm Hg/s, respectively, and an increase in electromechanical delay between the myocardial segments adjacent to the papillary muscles (as assessed by tissue Doppler velocity analysis) from +4.6 ms to +70.3 ms (not shown).

Resynchronisation therapy in patients with LBBB and severely impaired LV systolic function acutely reduces the severity of MR, thus indirectly supporting the concept of LBBB-related MR aggravation. Our images directly illustrate this concept in a patient with preserved LV ejection fraction and mild MR.

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