
Successful repair of a quadricuspid aortic valve illustrated by transoesophageal echocardiography, 64-slice multidetector computed tomography, and cardiac magnetic resonance

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Case illustration
A 54-year-old man presented with a 6-month history of dyspnoea on exertion. On physical examination, his blood pressure was 120/50 and a diastolic murmur of grade 2/6 was heard at the left parasternal border. Transthoracic echocardiography demonstrated severe aortic regurgitation. Transoesophageal echocardiography showed a quadricuspid aortic valve with four equally sized cusps, which presented a central coaptation defect resulting in a central aortic regurgitation (Panel A). This aspect was confirmed by 64-slice multidetector computed tomography (MDCT, Panel C) and cardiac magnetic resonance imaging (cMR) (Panels D and E). According to phase contrast cMR, pre-operative aortic regurgitant volume was 49 mL (Panel F). According to 64-MDCT, the coronary arteries were calcified but without significant stenosis (Panel B). This was confirmed by cardiac catheterization.

The patient underwent an aortic valve repair that consisted of suturing the two non-coronary cusps to turn the valve from quadricuspid to tricuspid. Six months after the surgery, the patient was asymptomatic. Follow-up cMR showed a functional ‘tricuspid’ aortic valve (Panel G) with minimal aortic regurgitation (Panel H), measured as 9 mL regurgitant volume on phase contrast imaging (Panel I).

Panel A. Pre-operative short-axis colour Doppler TEE shows quadricuspid aortic valve with central regurgitation.
Panel B. Pre-operative MDCT shows calcification of coronary arteries without significant stenosis.
Panel C. Pre-operative MDCT short-axis images through the aortic valve confirms quadricuspid aortic valve.
Panel D. Pre-operative short-axis cardiac MR confirming quadricuspid aortic valve.
Panel E. Pre-operative 3-chamber view cardiac MR shows severe central aortic regurgitation.
Panel F. Pre-operative phase contrast cardiac MR measurement demonstrates severe aortic regurgitation (49 mL).
Panel G. Six months post-operative short-axis cardiac MR shows repaired valve, which is now ‘tricuspid’.
Panel H. Six months post-operative 3-chamber view cardiac MR shows mild aortic regurgitation.
Panel I. Six months post-operative phase contrast cardiac MR measurement demonstrated mild aortic regurgitation (9 mL).

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