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Quadricuspid aortic valve: usefulness of cardiac computed tomography, cardiac magnetic resonance compared with transthoracic echocardiography

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PURPOSE: To describe the imaging findings of quadricuspid aortic valve (QAV) using cardiac computed tomography (CCT), cardiac magnetic reonance (CMR) and to evaluate the usefulness of CCT and CMR for assessing QAV compared with TTE.
MATERIALS AND METHODS: Ten patients (6 men and 4 women, mean age 53 years) with QAV were retrospectively evaluated. Demographics, diagnostic and imaging findings and surgical treatment were reviewed. Aortic valve morphology and function were evaluated by using CCT, CMR and TTE and these findings were compared with the intraoperative findings. The internal diameter of the ascending aorta was measured with CCT at 4 levels from mid-diastole.
RESULTS: All patients underwent CCT and TTE. Six of the 10 patients underwent CMR. The image quality of CCT, CMR, and TTE was all diagnostic. Aortic valve repair was performed in 7 patients and 2 of the 7 patients underwent concomitant ascending aorta wrapping. Nine patients had pure aortic regurgitation (AR) and 1 patient had moderate aortic stenosis and severe AR on TTE. Aortic root and ascending aorta dimensions were increased in 4 patients, particularly 1 patient with aneurysm. All CCT and CMR detected QAVs. TwoQAVs were misdiagnosed as tricuspid aortic valves on TTE. In accordance with the Hurwitz and Roberts classification, the patients were classified as type A (n = 1), type B (n = 2), type C (n = 1), type D (n = 3), type F (n = 2), and type G (n = 1) on CCT. Excellent correlation existed between regurgitant orifice area (ROA) by CCTand regurgitant fraction (RF) by CMR (r = 0.93) and between ROA by CCTand regurgitant severity by TTE (r = 0.85). Moderate (r = 0.59) existed between RF by CMR and regurgitant severity by TTE.
CONCLUSION: CCT and CMR play an important role in evaluating the QAV and enable comprehensive preoperative assessment in patients of QAV.