Carcinoid tricuspid valve disease: incremental value of three-dimensional echocardiography

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A 51-year-old man previously diagnosed with metastatic carcinoid disease was admitted for shortness of breath and peripheral oedema. Physical examination demonstrated a holosystolic murmur over the left lower sternal border and an enlarged and pulsatile liver, with clear lungs. Echocardiographic study was indicated to rule out right heart valvular disease. Two-dimensional echocardiography showed thickened tricuspid leaflets fixed in a semi-open position (Panel A, arrows) with severe, free-flowing regurgitation (Panel B). At three-dimensional echocardiography (3DE), the rigid and retracted leaflets displayed a ‘board-like’ motion (Panel C; see Supplementary data online, Videos S1 and S2), delimitating a large, fixed regurgitation orifice with some degree of stenosis. En face visualization of all three leaflets simultaneously enabled the identification of individual leaflet involvement and the measurement of tricuspid valve opening orifice by planimetry. Chordae tendineae were thickened and fused, and extensive plaques deposits in the right ventricular cavity were identified (Panel D; see Supplementary data online, Video S3).

Transthoracic 3DE represents a unique imaging technique for a detailed qualitative and quantitative assessment of the right heart involvement (tricuspid orifice planimetry, right ventricular morphology, volume and ejection fraction; see Supplementary data online, Video S4), which is the main predictor of mortality in carcinoid disease. Three-dimensional echocardiography is particularly helpful in the setting of combined valvular lesions, when the presence of a severe regurgitation adversely affects the accuracy of Doppler indices for tricuspid stenosis quantification and conventional parameters of right ventricular function (e.g. TAPSE, Tei index, tissue Doppler velocities). Therefore, 3DE facilitates the timely identification of patients who would benefit from valve replacement surgery, before right ventricular failure ensues.

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Supplementary data are available at European Heart Journal – Cardiovascular Imaging online.

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