Tri-leaflet mitral valve anatomy: a rare occurrence leading to severe mitral valve regurgitation

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A 61-year-old male patient was referred to our clinic for acute cardiac decompensation (NYHA III). Associated comorbidities included chronic renal failure, type II diabetes, systemic arterial hypertension, and obesity. A transthoracic echocardiography was followed by a trans-oesophageal investigation that confirmed a preserved LVEF with severe mitral valve (MV) regurgitation. At 3D echocardiographic reconstruction, the MV appeared to have three leaflets and a circular annulus. Differently from an MV cleft, the three leaflets had a central co-aptation (A) and were evenly spaced by three commissures (B). Moreover, there was no antero-lateral MV commissure. Although the anterior leaflet seemed to impinge in the left ventricular outflow tract during systole (C), no sub-aortic gradients were measured. Furthermore, no images suggesting asymmetrical septal hypertrophy were noticed. A haemodynamic evaluation showed severe MV regurgitation with a wide central jet (D).

The presence of a tricuspid MV is a rare condition that may remain undiagnosed and asymptomatic for years. It has been already described in the literature as often leading to symptoms most likely resulting from outflow tract obstruction, rather than from valve dysfunction per se. The condition has been also associated with hypertrophic cardiomyopathy, septal hypertrophy, and direct papillary muscle continuation into the anterior MV leaflet. In our report, 3D echocardiography was of focal importance to depict the MV anatomy. Although a systolic anterior movement of the anterior MV leaflet was noticed, we could not observe any haemodynamically significant outflow obstruction. The tri-leaflet MV was diagnosed as a stand-alone anatomical anomaly leading to severe symptomatic MV regurgitation.