The role of cardiovascular magnetic resonance in a challenging case of aortic bioprosthesis dysfunction

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Background: recent advancements in Cardiovascular magnetic resonance (CMR) have led to an increased role of this modality for qualifying and quantifying various valve diseases, in particular in the assessment of their regurgitant or stenotic jets. Here we present a challenging case in which the use of CMR allowed to clarify the diagnosis.

Clinical Case: F.S. is a 69 years-old woman who came to our emergency department due to typical chest pain associated with diffuse ST depression and a raise in troponine level (Figure 1, Panel A). She was known for a previous aortic valve replacement with a bioprosthesis (TriFlecta 21 mm) associated with the enlargement of the non-coronary sinus of Valsalva with a patch in June 2017. After the surgical intervention the patient started to have typical chest pain that was treated with a stent implantation in the right coronary artery (RCA) with only a slight resolution of the symptomatology. A transthoracic echocardiography showed a preserved LVEF without any abnormalities in contraction and an aortic bioprosthesis with a surface of 1.2 cm², normal gradient (29/12 mmHg), with a mild regurgitation that was difficult to assess (Figure 1 Panel B). A Coronary angiography was then performed showing no critical stenosis, but an aberrant origin of the circumflex (CX) artery from the proximal tract of the right coronary artery was shown (Figure 1 Panel D, yellow arrow). The patient kept being symptomatic for chest pain with ECG modification for mild effort, so due to the aberrant decors of CX behind the aortic root a compression during stress was supposed. To better evaluate the situation, a stress CMR was performed showing a large area of ischemia in all territories (Figure 1 Panel E). A through-plane flow on the aorta and a 4D flow acquisition permitted to better evaluate the bioprosthesis that was found to be severely insufficient with a regurgitant fraction of 32% (22 ml) only in the protodyastole phase (Figure 1 Panel F). Then the patient underwent to a transesophageal echocardiography to evaluate the valve anatomy that showed an asynchronism in the movement of the aortic cusps with a delay of closure of the right coronary cusp causing a large leak limited to protodiastole as showed in the 4D flow (Figure 1 Panel C). Considering all exams results a surgical intervention of aortic valve replacement and aortic root replacement was performed without complications (Figure 1 Panel F). The patient was discharged completely asymptomatic and without aortic regurgitation or stress ischemia at the CMR of follow-up. Discussion: Accurate quantification of AR by echocardiography frequently remains difficult. CMR is recommended as the complementary method and its role, as shown in our case, has becoming of detrimental importance for a comprehensive evaluation of these patient.
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