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Prosthesis-patient mismatch after transcatheter mitral valve replacement

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Topic(s):
Echocardiography

Citation:

Introduction:
Mitral valve in valve is a minimally invasive transcatheter mitral valve replacement (TMVR) procedure for patients with deterioration of mitral bioprosthesis. Prosthesis-patient mismatch (PPM) can be considered after insertion into the patient when the effective orifice area (EOA) of the inserted prosthetic valve is smaller than expected EOA in relation to the patient's body surface area, which results in an increased postoperative transvalvular gradient. PPM after mitral valve replacement (MVR) has not been widely investigated.

Clinical Case:
We present a 80 years-old woman with a 27 mm biological prosthesis implanted in 2010 due to combined severe mitral stenosis and mitral insufficiency, without residual pressure gradient across the mitral valve (4mmHg). The patient had not subsequent follow-up for personal reasons.

Five years later, she went to the emergency department due to progressive dyspnea. An urgent echocardiography was performed and it showed a degenerated and calcified biological prosthesis with increased gradients (11mmHg) and EOA calculated using continuity equation (VTI) of 0.96cm².

Due to her high surgical risk, it was decided a transcatheter procedure (valve-in-valve) with a 21mm corevalve implantation in mitral position, through the transapical approach. After the intervention, the mean gradient across the mitral valve prosthesis was 10mmHg and indexed EOA <0.9cm²/m². Two days after the procedure, the patient presented hemodynamic instability and shortness of breath. A transesophageal echocardiography (TEE) was performed, showing a severe increase in gradients across the mitral valve (23mmHg) and a thickening of one of the leaflet. Acute thrombosis on transcatheter mitral prosthesis was suspected, so it was decided to perform fibrinolysis at first, followed by treatment with intravenous heparian. One week later, a transthoracic echocardiogram (TTE) showed normal function of the prosthesis, despite similar gradients to those of the postoperative period; no image compatible with thrombus was observed, so she was diagnosed of severe prosthesis-patient mismatch.

Conclusions:
Transcatheter mitral valve repair has been recognized as an alternative for treating patients with severe MR at high or prohibitive surgical risk. More recently, TMVR has emerged as another transcatheter option for treating MR. Although evidence on clinical outcomes and valve performance after TMVR is available, the information has been limited to procedural or short-term outcome results. Prevalence of PPM is different depending on the methods used to calculate EOA (continuity equation (CE), pressure half time (PHT) method…) ranging from 7% to 62%. Some studies suggest that among the various methods used to define PPM, EOA by CE is the best predictor of postoperative hemodynamic parameters. Selecting a type of prosthetic valve with an appropriate EOA might be the only option to avoid mitral PPM and optimize the long-term outcomes of the MVR.
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