

Transcatheter Mitral Valve-in-Valve Replacement - A rare case of leaflet malfunction after TMVR

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Introduction

A 76 year-old woman, with prior surgical aortic valve replacement and coronary artery bypass graft, was referred to our institution^a with severe shortness of breath (New York Heart Association [NYHA] class 4). Past medical history includes hypertension, hyperlipidemia, diabetes mellitus type II and moderate chronic kidney disease. Transoesophageal echocardiogram (TEE) showed normal left ventricular ejection fraction (50%), severely calcific mitral stenosis (peak gradient 22 mmHg, mean gradient 8 mmHg), moderate mitral regurgitation, failed aortic bioprosthesis with severe stenosis (peak gradient 47 mmHg, mean gradient 27 mmHg) and moderate aortic regurgitation. Cardiac computed tomography revealed a 650 mm mitral valve area with a mean diameter of 28.7 mm and an aortic valve area of 2.99 cm. Patient was deemed at high surgical risk (logistic EuroSCORE 14%, EuroSCORE II 15%). Recent studies showed feasibility and effectiveness of transcatheter mitral valve replacement (TMVR) via a transapical approach^{1,2}.

Methods

The heart team decided to proceed with a simultaneous transapical transcatheter aortic valve-in-valve replacement (TAVR) and TMVR. Limited left anterior thoracotomy approach was chosen for the valve replacement.

Results

Under TEE and fluoroscopic guidance, a SAPIEN XT 23 mm was successfully deployed in aortic position with good results (mean gradient 33 mmHg, peak gradient 18 mmHg). During the same procedure, a SAPIEN XT 29 mm was successfully implanted inside the native mitral valve. To guide positioning, the dog-bone effect was used, created by a very slow inflation of the balloon. Post-procedure TEE showed mild to moderate paravalvular leak. A cardiogenic shock occurred 3 hours after the procedure due to severe central mitral regurgitation resulting from a leaflet malfunction. Urgent mitral valve-in-valve replacement was performed with a SAPIEN XT 29 mm with immediate improvement of the hemodynamic parameter and resolution of the central mitral regurgitation. A cine-MRI³ was performed and showed similar results comparing to TEE. Clinical evolution was satisfying and patient was discharged on post-operative day fifteen.

Discussion

Mitral regurgitation following TMVR has been associated to the perforation of native anterior mitral valve⁴, in patients with previous bioprosthetic mitral valve implantation⁵ or after mitral valve-in-valve implantation⁶. To our knowledge, this is the first report of mitral transcatheter heart valve (THV) leaflet malfunction in a native mitral valve. Two hypotheses could explain the clinical findings in this patient: damage to leaflet during removal of the delivery system or a native mitral leaflet precluding the appropriate closing of the transcatheter heart valve. Late leaflet malfunction, although rarely described⁶, can occur after TMVR and attention should be paid to avoid damaging leaflet during removal of stiff-wire or delivery system. Further studies are needed to determine the risk of early and late prosthesis malfunction following TMVR.

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The authors declare that there are no conflicts of interest.

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