Treatment of a severely degenerated mitral valve bioprosthesis with simultaneous transapical paravalvular leak closure and valve-in-valve implantation

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A 75-year-old female presented with New York Heart Association (NYHA) III–IV functional class and peripheral oedema after repeated mitral valve replacement in the years 1982, 1997, and 2003 (Hancock II, 27 mm, Medtronic). Three-dimensional transoesophageal echocardiography (3D-TEE) revealed relevant paravalvular and severe transvalvular leakage of the degenerated mitral valve bioprosthesis (Panel A: 3D-TEE demonstrating broad paravalvular and transvalvular regurgitation). Open-heart surgery was declined because of relevant comorbidities (Euro-SCORE-II: 24%; STS-Score: 13.9%); therefore, a combined interventional approach was chosen. After standard transapical access, a 26 F transapical valve delivery sheath (Ascendra, Edwards Lifesciences) was placed in the left ventricle. First, a guide wire was positioned retrograde across the paravalvular leakage (Panel B) and a plug device (Amplatzer Vascular Plug III, AGA Medical Corporation) was released resulting in an immediate decrease in periprosthetic regurgitation (Panel C). Secondly, a transcatheter bioprosthesis (Edwards SAPIEN 9000TFX26, 26 mm) was implanted within the degenerated mitral valve (Panels D and E). The procedure was guided by 3D-TEE (iE33/X7-2t, Philips Medical Systems) and fluoroscopy. Finally, there was a marked decrease in periprosthetic leakage and complete resolution of transvalvular regurgitation without de novo mitral valve stenosis (Panel F). Twelve hours after the intervention, the patient was discharged from the intensive care unit in good medical conditions. Four weeks after the procedure, the functional status of the patient improved relevantly to NYHA I–II.

The transapical approach gives an excellent access to the mitral valve for the valve-in-valve procedure and beyond that it enables sophisticated interdisciplinary solutions as shown here. In this challenge, 3D-TEE is an indispensable tool for interventional navigation.