Transcatheter transapical valve-in-valve implantation for degenerated mitral bioprosthesis

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A 76-year-old woman with a history of aortic and mitral valve (Mosaic 19 mm; Hancock II 25 mm bioprosthesis, Medtronic Inc., Minneapolis, Minnesota) replacement and former coronary artery bypass grafting in 2010 (left internal mammary artery-left anterior descending artery (LIMA-LAD), aorta-obtuse marginal coronary artery (Ao-OM)) was admitted to our hospital with recurrent pulmonary edema. Her past medical history consisted of arterial hypertension, diabetes, renal insufficiency with an estimated glomerular filtration rate of 51 ml/min and previous stroke. Transthoracic (TTE) and transesophageal (TEE) echocardiography revealed a degenerated bioprosthesis in the mitral position with severe eccentric regurgitation (Figure 1 A); the aortic bioprosthesis was of normal function; moderate left ventricular systolic dysfunction was observed (LVEF 45%). In coronary angiography patent LIMA-LAD and Ao-OM grafts were found. Taking into account the high surgical risk, the Heart Team decided to perform a mitral transcatheter valve-in-valve (TVIV) procedure. Mitral TVIV implantation was conducted under general anesthesia via the transapical approach. In the pre-procedural period the mitral bioprosthesis was also evaluated and sized in multi-slice computed tomography (MSCT) (Figure 1 B). According to the manufacturer's specifications with regard to the inner diameter of the Hancock II 25 mm bioprosthesis and the data obtained from MSCT, a 23 mm balloon-expandable SAPIEN XT valve (Edwards Lifesciences, Irvine, California) was slowly deployed extending 4 mm atrially relatively to the mitral radiopaque sewing ring during a short period of rapid pacing (Figure 1 C). Peri-procedural TEE and TTE before discharge revealed good implant stability and no residual mitral regurgitation (Figure 1 D). The further in-hospital course was uneventful, and the patient was discharged on the seventh day after the procedure. Mitral TVIV implantation is an emerging clinically effective technique for eligible patients with a degenerated mitral bioprostheses [1]. The access to the mitral valve can be antegrade through the venous system with a transseptal approach or retrograde, through the left ventricle apex via a mini left thoracotomy. The first approach was found technically challenging, with difficulty in achieving co-axial alignment of the valve to the mitral prosthesis for optimal implantation [2]. The transapical approach provides the shortest and co-axial access to the mitral valve. A potential complication of the mitral TVIV procedure is left ventricular outflow tract (LVOT) obstruction. The above risk should be determined by preoperative echocardiography and MSCT. In some cases a high diastolic pressure gradient across the mitral orifice after TVIV procedures was also reported [3]. Another important issue is selecting the proper implant size. The inner diameter of the previously implanted bioprosthesis provided by manufacturers as well as measurements obtained from MSCT are the most important. Generally, adequate oversizing should result in a "flared" or "conical" deployment, which will prevent atrial migration [4].

Conflict of interest

The authors declare no conflict of interest.

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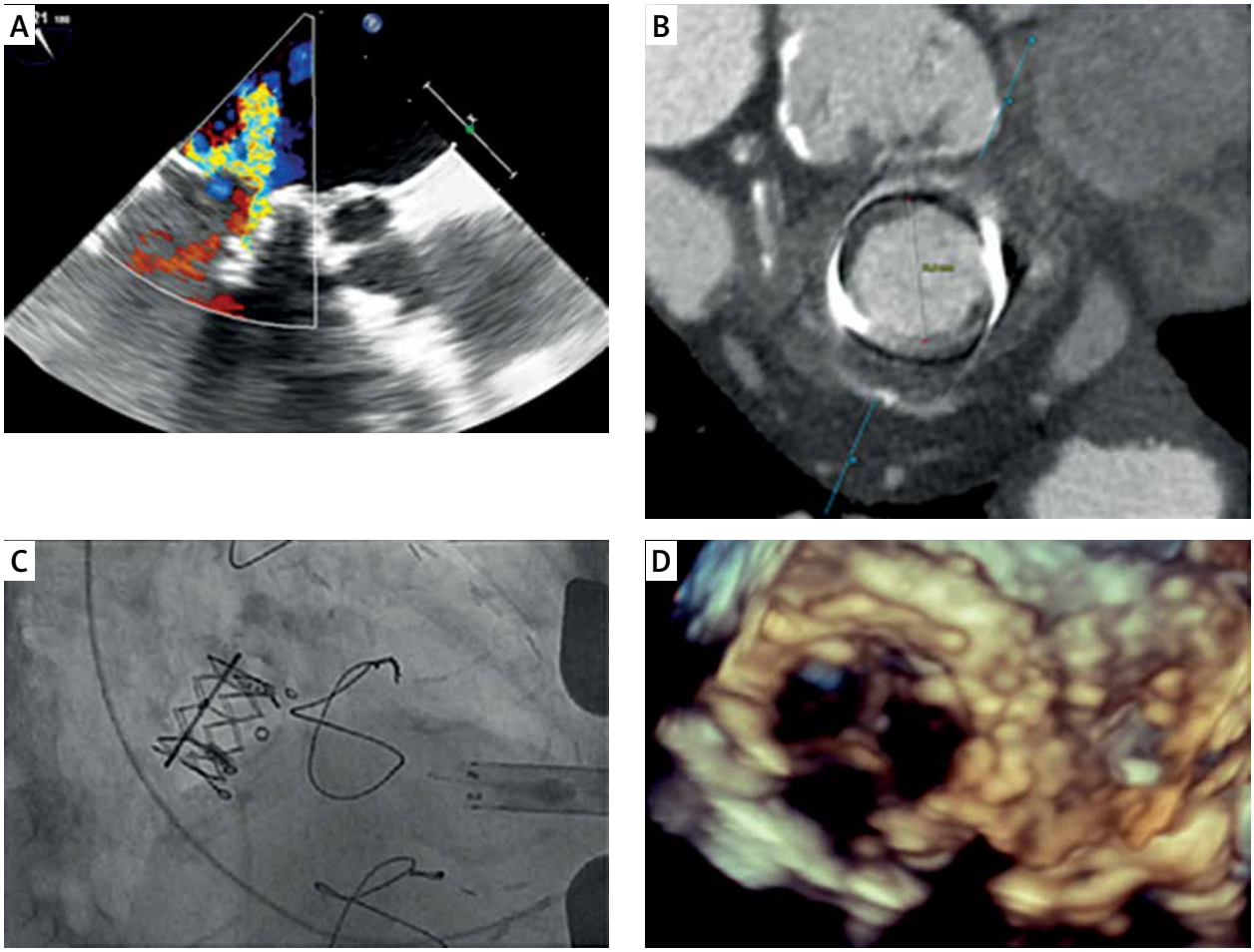

Figure 1. A – Transesophageal echocardiography – severe mitral bioprosthesis regurgitation, **B** – computed tomography – inner diameter of Hancock II bioprosthesis, **C** – optimal position of implanted Sapien XT prosthesis, **D** – three dimensional transesophageal echocardiography – visible good leaflet coaptation of Sapien XT prosthesis

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