Valve-In-Valve Procedures After Failed Mitral Valve Repairs
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Background:
Transcatheter aortic valve implantation (TAVR) has become routine for native valves in elderly patients with high operative risk, but it’s role in patients with a surgical valve is still under discussion. With the background of over 10 years’ experience in TAVR there is a tendency to expand this technique into subgroups like TAVR in operated aortic valves (valve-in-Valve (VIV)) or even implantation of transcatheter valves into surgically operated mitral valve bioprosthesis. We report about our initial experience of 11 mitral valve-in-valve TAVR procedures into surgical implanted bioprosthesis.

Method:
From a total of over 900 TAVR procedures implantations since 2008, 37 patients received a valve-in-valve procedure. We performed transcatheter valve implantation (all Sapien valves) in 11 patients (1 male) with a preoperated mitral-bioprosthesis (mean bioprothesis size: 23.4 mm, range 25-31 mm), with high risk for a surgical reoperation (mean logistic Euroscore 28%, all patients had a history of 2 or more heart operation). All patient suffered from dyspnea and cardiac decompensation. We choose the apical access in all implantations. All procedures were performed together with cardiologist and heart surgeons in a hybrid operation room.

Results:
Transcatheter Valve Implantation into surgical bioprosthesis was successful in all patients. Except of two (23 mm), all implanted Sapien valves had a size of 26 mm. The placement of the intervention-wire through the surgical bioprosthesis into the pulmonary veins was more time consuming than in aortic valve-in-valve procedures, but has been successful in all procedures. As in TAVR in aortic bioprosthesis the positioning of the valve could be performed without difficulties, if the x-ray anatomy and size of the surgical valve is known, what, for us, is mandatory for the procedure. In all patients the valve was implanted without predilation to avoid debris embolization. Four patients died during follow up, one procedure related due to a ventricular rupture 1 month after the procedure. The three other death were as follows: one patient died at day 6 post procedure due to new bradyarrhythmias and cardiac decompensation, one patient died at month 4 for an unknown reason (follow-up echocardiography 3 month post procedure was normal) and one patient died 25 month post procedure due to cardiac decompensation with known bad left ventricular function. Due to the bigger size of the surgical implanted bioprosthesis in mitral position, we did not obtain any significant increased gradient after valve-in-valve implantation. Furthermore the mean gradient post procedural was reduced in mean from 9 to 3 mmHg.

Summary:
In heart teams with experience in transcatheter aortic valve techniques, TAVR-implantation into failed surgical mitral valve bioprosthesis is technically feasible with very good initial results. The patient number treated is even much smaller than in aortic valve-in-valve patients and too small to predict overall patient outcome. So fare, as in aortic valve-in-valve TAVR procedures, the indication for a mitral valve-in-valve implantation should be reserved for very selected patients with higher reoperative risk such as advanced age, pulmonary disease, neurological disease, highly reduced ejection fraction, high NYHA functional class. The decision whether to do TAVR mitral valve-in-valve or re-surgery should always be made in a common cardiology/surgical round (heart team).
Conclusion:
Transcatheter mitral valve-in-valve implantation into failed surgical mitral valve repair appears technically feasible with good direct implantation results. More implantation data are necessary to value the long-term patient outcome.