Transcatheter aortic valve implantation (TAVI) has become a reliable treatment modality for aortic valve stenosis. More than 10 years after the first implantation, it is still debatable which patients may benefit from TAVI compared with surgical aortic valve replacement (SAVR) although the Partner A study [1] described a well-defined patient population as optimal candidates for TAVI. Evidence for further indications is still needed.

Aortic valve re-operation may carry a higher perioperative risk compared with first-time SAVR because patients are older but technically speaking, redo-SAVR is not extremely demanding [2]. Transcatheter aortic valve-in-valve implantation (ViV TAVI) might...
be of particular interest for some patients scheduled for SAVR as a redo-procedure, for instance, in those with patent coronary artery grafts.

The present study [3], which was sponsored by Medtronic, reports on 18 patients from three different centres in Germany who received a CoreValve™ ViV TAVI to treat a degenerated aortic bioprosthetic valve.

Including patients older than 75 years with either a logistic EuroSCORE of ≥15% or one additional self-defined risk factor (i.e., atrial fibrillation) might appear rather arbitrary. But with an overall logistic EuroSCORE of 34%, patient selection seems adequate. Unfortunately, more accurate STS scores are lacking. Procedural success was achieved when echocardiography showed adequate valve placement and function at discharge or on POD 10 without any composite Major Adverse Outcomes (MAE) until discharge.

Indications for TAVI in the presence of a degenerated tissue valve were isolated regurgitation in 33% of patients, isolated stenosis in 28% and a combination of both in 39%. The average time interval since primary AVR was 7 years (range 1–16 years).

Valve-in-valve TAVI represents an attractive and less invasive alternative to conventional redo-surgery and some technical details, as, for instance, the radio-opaque frame of the in situ tissue valve facilitates accurate valve-in-valve deployment. Moreover, fluoroscopic orientation requires smaller doses of contrast and also allows for ViV implantation in pure regurgitation of the tissue valve. Sizing is easier because the diameter of the prior valve is usually known from the time of surgery. Finally, the landing zone is more circular and decreases the risk of para-valvular leakage, and annular tear from overexpansion is unlikely. The risk of a permanent aortic valve (AV) Block III with consequent pacemaker implantation is low.

Although ViV TAVI in stented bioprosthesis may be technically less demanding, decision making requires additional experience and expertise; for instance, a profound understanding of the type of surgical bioprosthesis and its construction is important.

In contrast to stented tissue valves, stentless valves pose a unique challenge for ViV TAVI. The absence of struts, sewing ring and fluoroscopic landmarks increase the procedural complexity. In this series, 44% of the ViV procedures were performed in stentless xenografts. This might be the reason for the reported 30% AV blocks with consequent pacemaker implantations in more than 10%.

Further understanding of how a bioprosthesis degenerates is essential. The leaflet’s changes increase the difficulty of retrograde passing. A degenerated prosthetic leaflet may generate more embolic events since the debris are sometimes very loose and might detach more easily. This is the reason why experts generally do not recommend balloon pre-dilatation.

It is surprising that the authors performed pre-dilatation in up to 75% of the patients in this series with stenotic degeneration and the fact that two neurological events occurred only in patients with stenotic degeneration points towards the increased risk of embolization after pre-dilatation.

The overall incidence of 30-day Major Adverse Cardiac and Cerebrovascular Events (MACCE) (39%) and 30-day composite MAE (44%) is high but a 30-day mortality of 12% in the presence of high-risk patients with a predicted EuroSCORE mortality of 34% is acceptable.

Transvalvular gradient and effective orifice area (EOA) are further important aspects that deserve detailed attention when performing ViV TAVI. With a baseline mean gradient of 37 mmHg and a valve orifice area of 0.9 cm², haemodynamic results were encouraging: mean gradient decreased to 19 mmHg at one year and EOA increased to 1.5 cm². Similar results were reported in the literature after ViV with either the Edwards Sapiens™ or the Medtronic CoreValve™ device [4]. But these results also indicate that ViV cannot be repeated several times as transvalvular gradients might then not decrease sufficiently.

TAVI indications will most likely expand in the future. With the current TAVI data, the feasibility of a later ViV TAVI procedure alone does not justify the implantation of tissue valves into younger patients (<60-65 years). The goal of each valve procedure should remain one, and only one, procedure for the rest of the patient’s life (ESC Guidelines). Decision making for a patient with a degenerated tissue valve prosthesis is substantially enhanced by the multidisciplinary heart team approach. Taking advantage of the joint expertise of the cardiac surgeon and the interventional cardiologist, ultimately enhances patients safety.

REFERENCES