Right subclavian approach in transcatheter aortic valve implantation using the CoreValve prosthesis

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1. Introduction

Transcatheter aortic valve implantation (TAVI) is an alternative approach to surgical aortic valve replacement (SAVR) in high-risk patients with severe symptomatic aortic stenosis. Typically, transfemoral access using the self-expanding CoreValve Revalving System (Medtronic Cardiovascular, Santa Rosa, CA) is the initial default strategy. Subclavian access is a potential alternative to the femoral route in patients with peripheral vascular disease. The left subclavian is preferred due to the favourable orientation of the delivery system through the aortic arch and annulus. However, right subclavian access may also be feasible in cases with specific anatomical conditions of the aortic root and valve annulus. Here, we present one of the three cases where TAVI using the CoreValve prosthesis was performed via right subclavian artery in our centre.

2. Case report

A 60-year-old diabetic on insulin therapy and with a previous history of a coronary artery bypass graft (LIMA-LAD) with mitral valvuloplasty, after carotid end-arterectomy of both carotid arteries and with peripheral artery disease and stenting of both common iliac arteries, was hospitalised for congestive heart failure several times over the previous year. He was also treated for myelodysplastic syndrome with pancytopenia (haemoglobin (HGB) 80 g/L, platelets (PLT) 46 G/L, and white blood cells (WBC) 1.7 T/L). Echocardiography
showed an ejection fraction of 35%, aortic stenosis with $V_{\text{max}}$ of 4.8 m/s, and a pressure gradient (PG) of 90/48 mmHg. His euroscore was 22% and he was indicated for TAVI by the Heart Team. The diameter of the stented common iliac arteries was 5 mm on CT and in the ostium of the left subclavian artery a calcified plaque with 50% stenosis was present with a residual diameter of 4 mm. Calcified plaque was also present in the ostium of the truncus brachiocephalicus (Fig. 1). We decided to perform TAVI through a right subclavian access with a carotid protective device inserted through the right femoral artery due to the high risk of calcified plaque embolisation (Fig. 2). TAVI was performed under general anaesthesia after administration of three platelet separator units and two transfusions. The right subclavian artery was exposed surgically. After balloon valvuloplasty, a 29-mm CoreValve prosthesis was successfully implanted. The prosthesis was observed in an asymmetric position during implantation, but the position has completely normalised after complete release (Fig. 3). White atherosclerotic masses were visible in the protective device after its retrieval. No complications or conduction abnormalities occurred and the patient was discharged after 8 days. The patient underwent 1 year of echocardiographic and clinical control, his NYHA status was I, and the aortic prosthesis showed good function with mild aortic paravalvular leakage.

3. Discussion

Since April 2009, TAVI using the CoreValve prosthesis has been performed in 67 high-risk patients with severe symptomatic aortic stenosis in our centre. These cases included six patients in whom subclavian access was used. The prosthesis was successfully implanted in three patients via right subclavian access with good 1 year outcome. In all three patients, femoral and left subclavian access was not possible due to calcification and tortuosity of the vessel with diameters less than 6 mm.

To date, there have been only up to 10 cases reported in the literature where right subclavian access was used during the TAVI procedure [1–3]. Our three cases confirm the feasibility and good mid-term clinical outcomes of right subclavian access during TAVI if specific anatomical conditions are present (angulation of the aortic valve annular plane less than 30° from horizontal–vertical aorta) [4]. Based on the presented case, the insertion of the carotid protective device seems to be effective in prevention of periprocedural stroke if atherosclerotic disease of the truncus brachiocephalicus is present and right subclavian access is used. However, in the case of iliofemoral disease, left subclavian access remains the first choice [5] and right subclavian access should only be
considered if the vessel has stenotic calcification and tortuosity or if there is a risk of LIMA obstruction or dissection in patients with a previous functional coronary bypass graft. This approach could be also preferred over more invasive direct transaortic access.

4. Conclusion

Right subclavian access in TAVI using the CoreValve prosthesis is feasible in cases with specific anatomical conditions of the aortic root and valve annulus if femoral and left subclavian access is not suitable. Carotid protective device could be considered for prevention of periprocedural stroke in selected patients if this access is used.

Disclosure

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REFERENCES