

TRANSCATHETER TRICUSPID VALVE-IN-VALVE IMPLANTATION IN EBSTEIN ANOMALY

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Introduction

Transcatheter tricuspid valve-in-valve implantation

Ebstein anomaly (EA) is a rare malformation of the tricuspid valve (TV) and right ventricle (RV). The anatomic and pathophysiologic characteristics are variable and lead to a wide spectrum of clinical scenarios. Clinical presentation depends on the anatomic and functional severity of EA, the presence of associated anomalies and arrhythmia burden. Most patients will require catheterbased arrhythmia procedures and cardiac surgery in their lifetimes.

Operative management is generally focused on TV repair. Many techniques and operative modifications have been applied and modified for TV repair in EA. Prosthetic TV replacement remains a good alternative for the treatment of EA when valve repair is not feasible. Bioprosthetic valve replacement is generally preferred over mechanical valve replacement. Bioprosthetic valves undergo degeneration over time, redo surgery is not uncommon in EA.

Patient's previous history

- Our patient is a 56-year-old male with Ebstein anomaly. He was born in 1967.
- 1995.: he underwent his first tricuspid valve replacement (St.Vincent 31 mm)
- 2003: he underwent redo TVR, a Hancock 30 bioprosthesis was implanted.
- Hypertension

Clinical presentation

Transcatheter valve-in-valve (TViV) implantation has been established as an important alternative in the management of aortic and mitral bioprosthesis failure.

Bioprosthesis degeneration after tricuspid valve replacement can require tricuspid re-intervention; however, previous data demonstrate that tricuspid valve reoperations have a significant procedural risk with high in-hospital mortality rates. In recent years, tricuspid TViV repair has emerged as promising treatment option for high-risk patients.

Our ACHD Heart Team discussed our patient in detail. Based on our center's previous experience, we decided that a transcatheter approach was more favourable for our patient as compared to a second redo surgery.

Computed tomography imaging was performed for accurate THV sizing.

The procedure was conducted via transfemoral vein access and conscious sedation was used. The transcatheter delivery system was inserted into the inferior vena cava, then positioned across the tricuspid bioprosthetic valve. The procedure was performed under transoesophageal echocardiography and fluoroscopy guidance.

The patient underwent successful valve implantation using Edwards Sapien 3 (29 mm) heart valve (Edwards Lifesciences, Irvine, CA). Transoesophageal echocardiography showed good intraoperative results.



He presented to our Clinic with decreased functional capacity in March 2023.

Transthoracic echocardiography revealed dilated right ventricle (43 mm) and dilated right atrium with leftward deviation of the atrial septum. The right ventricular function was visually satisfying, TAPSE was 12 mm.

Adult Echo X5-1 S0Hz 18em D V C 50 P Low HGen * Dist 4.33 cm



The mean transvalvular gradient on the biograft was 8.5 mmHg, which was significantly elevated compared to previous gradients. The inferior vena cava was dilated (27 mm) with reduced inspiratory collapse.



The patient tolerated the procedure well and was discharged to his home on the 7th day of his hospitalisation. The recommended antithrombic therapy was 3 months of vitamin K antagonist treatment. The discharge echocardiography showed good THV function, the mean transvalvular gradient was 5 mmHg.





We performed 3D transoesophageal echocardiography, which confirmed the severe tricuspid valve stenosis with a mean gradient of 9 mmHg. The Hancock bioprosthesis was heavily degenerated and stenosed, the opening area was less then 1 cm² with repeated measurements (average opening area was 0.75 cm²; with planimetry on colour 3D loop: 1.1 cm², with PISA method: 0.6 cm²)











The 3 months follow-up echocardiographic study demonstrated good THV function with adequate haemodynamic parameters. The patient reported significant improvements in symptoms and functional status.

Conclusion

The valve-in-valve procedure of the tricuspid valve is feasible.

TViV may provide a less invasive and safe treatment option for carefully selected patients with degenerated bioprosthetic tricuspid valve at high operative risk.

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