21st Century Publisher

21 ST CENTURY CARDIOLOGY

21st Century CARDIOLOGY

Commentary

Open Access

Transcatheter Melody Valve Placement in a Native Right Atrioventricular Valve in a Pediatric Patient

Christopher Herron[1], Shabana Shahanavaz[2,3*]

[1]Department of Pediatric Cardiology, Arnold Palmer Hospital for Children, Orlando, FL, USA

[2]Department of Pediatrics, University of Cincinnati, Cincinnati, OH, USA

[3]Division of Cardiology, The Heart Institute, Cincinnati Children's Hospital, Cincinnati, OH, USA

***Corresponding Author:** Shabana Shahanavaz, Division of Pediatric Cardiology, The Heart Institute, Cincinnati Children's Hospital Medical Center, University of Cincinnati, 3333 Burnet Ave, Cincinnati, OH 45229, USA; E-mail: Shabana.Shahanavaz@cchmc.org

Received: 05 September; **Revised:** 11 September 2023; **Accepted:** 26 September 2023; **Published:** 01 October 2023

Abstract

Transcatheter tricuspid valve replacement is generally done when a dysfunctional surgically placed valve with ring is present. We previously described a case of a 12-year-old female with Trisomy 21 with severe tricuspid valve stenosis post 2 patch surgical repair who underwent placement of a Melody valve in the native annulus.

Keywords: *Tricuspid valve; Congenital heart disease; Transcatheter valve placement*

Description

The use of transcatheter tricuspid valve replacement (TTVR) is becoming more commonplace in the current interventional era. Typically, patients are considered candidates where a dysfunctional valve is present within a surgical ring, giving the interventionist a landing zone for transcatheter valve placement. National and international registries have looked at the efficacy of these procedures in patients with congenital heart disease; with the majority of patients having Ebstein's anomaly [1-4]. These registries depict a high rate of success with significant improvement in symptomatology. Outside of having a surgical ring, there is little literature on the possibility of placement of a transcatheter valve in the tricuspid position in a native valve [5]. In our case report titled, "Transcatheter Melody Valve Placement in a Native Right Atrioventricular Valve in a Pediatric Patient", we describe a 12-year-old female with Trisomy 21 and repaired complete atrioventricular septal defect who underwent TTVR [6].

We initially determined the child to be a candidate for TTVR due to her hypoplastic right sided atrioventricular valve which measured 11mm by transthoracic echocardiogram and later measured 16mm by transesophageal echocardiogram. The valve was severely stenotic with a direct pressure gradient of 11mmHg. While we believed her annulus to be stenotic enough for placement of a transcatheter valve, our surgeons were aware and available for surgical backup in the setting of possible embolization.

We describe our femoral venous approach to be most optimal as well as placing a wire in the distal right pulmonary artery, allowing for the angle of delivery to be more into the right ventricular outflow versus into the apex of the right ventricle. This angle of delivery was best seen with balloon sizing of the annulus, and it also provided us with a fluoroscopic marker for a landing zone. Prior to valve introduction, a Palmaz XL stent was mounted over the Melody valve to assist in apposition to the valve annulus. We have previously performed this maneuver when placing Melody valves in the pulmonic position to increase its radial strength and it has been described in the literature [7-9]. Having multiple imaging modalities for placement of the valve was crucial. Transesophageal echocardiogram was performed and allowed visualization of the valve in the right ventricle and reassured us during deployment that we were not implanting into muscle bundles.

Placement of a bioprosthetic valve within a surgical tricuspid ring is becoming more commonplace but this intervention can also be suitable for native tricuspid valves in optimal circumstances such as our own. Careful patient selection needs to be considered along with extensive procedural planning. Coordinating with our surgical and imaging colleagues allowed for us to place this valve successfully while still having back up for any possible embolization.

Conclusion

Transcatheter tricuspid valve placement can be performed in native right atrioventricular valves with severe stenosis in pediatric patients with repaired congenital heart disease without the need for a previously placed surgical ring or hybrid surgical approach. Careful patient selection and appropriate coordination with surgical and imaging colleagues needs to be taken to allow for an optimal outcome.

References

1. McElhinney DB, Cabalka AK, Aboulhosn JA, Eicken A, Boudjemline Y, Schubert S, et al. Transcatheter tricuspid valve-in-valve implantation for the treatment of dysfunctional surgical bioprosthetic valves: an international, multicenter registry study. Circulation. 2016 Apr 19;133(16):1582-93. https://doi.org/10.1161/CIRCULATIONAHA.115.019353

2. McElhinney DB, Aboulhosn JA, Dvir D, Whisenant B, Zhang Y, Eicken A, et al. Mid-term valve-related outcomes after transcatheter tricuspid valve-in-valve or valve-in-ring replacement. J Am Coll Cardiol. 2019 Jan 22;73(2):148-57. https://doi.org/10.1016/j.jacc.2018.10.051

3. Pluchinotta FR, Piekarski BL, Milani V, Kretschmar O, Burch PT, Hakami L, et al. Surgical atrioventricular valve replacement with Melody valve in infants and children: a multicenter study. Circ Cardiovasc Interv. 2018 Nov;11(11):e007145. https://doi.org/10.1161/CIRCINTERVENTIONS.118.007145

4. Menahem S, Roberts PA, Tanous D. Melody valve insertion for relief of "Tricuspid" stenosis in an unbalanced atrioventricular septal defect. Cardiol Young. 2022 Jan;32(1):135-7. https://doi.org/10.1017/S1047951121002419

5. Sumski CA, Bartz P, Gudausky T. Percutaneous melody valve implantation in a native tricuspid valve following failed surgical repair. Catheter Cardiovasc Interv. 2018 Dec 1;92(7):1334-7. https://doi.org/10.1002/ccd.27872

6. Herron C, Lehenbauer D, Shahanavaz S. Transcatheter Melody Valve Placement in a Native Right Atrioventricular Valve in a Pediatric Patient. Pediatr Cardiol. 2023 Mar 3;44(5):1183-1186. https://doi.org/10.1007/s00246-023-03132-x

7. Zablah JE, Døhlen G, Ystgaard MB, Morgan GJ. Piggyback mounting for stent and valve deployment during percutaneous pulmonary valve implantation. Catheter Cardiovasc Interv. 2022 Oct;100(4):606-611. https://doi.org/10.1002/ccd.30391

8. Boudjemline Y. A new one-step procedure for pulmonary valve implantation of the melody valve: Simultaneous prestenting and valve implantation. Catheter Cardiovasc Interv. 2018 Jan 1;91(1):64-70. https://doi.org/10.1002/ccd.27332

9. Guyon Jr PW, Nijres M, Justino H, Davtyan A, Mosher B, Courelli A, et al. Expanded Use of the One-Step Technique for Simultaneous Landing Zone Stenting and Placement of the Melody Transcatheter Pulmonary Valve. J Invasive Cardiol. 2021 Nov 18;33(12):E954-9.