Background

- Transcatheter closure of ventricular septal defects (VSD) is first-line therapy when anatomically appropriate.
- These closures are often challenged by proximity to the conduction system and aortic valve in perimembranous defects, or irregular defect shape, especially in residual defects that may remain post-operatively. 1,2
- Advancements in device design now allow for significant improvements in deployment techniques and overall safety.3
- Here we describe the first use of the Lifetech Konar-multifunction™ occluder device in North America

Patient Description

- Patient with Rastelli Type-C atrioventricular canal defect and trisomy 21 underwent initial surgical repair of her defect at 6 months of age.
- At 4 years of age and 15kg she had 2 VSDs still present (Figure 2)
- Cardiac catheterization demonstrated a Qp:Qs 1.63:1 and PVR of 1.83 indexed Woods units.
- Given significant shunt, associated left chamber enlargement and severe left atrioventricular valve regurgitation, the decision was made to pursue closure of the residual defects.

Device Description

- Transcatheter closure of ventricular septal defects (VSD) is first-line therapy when anatomically appropriate. 
- The device has many features that make it ideal for closure of complex VSDs.
- Soft woven mesh provides high conformability with septal defects making it particularly well suited for residual postoperative defects.
- Its design of a microscrew on each surface allows for placement from either the left or right ventricle. By delivering the device from the LV side, a rail is no longer needed which allows the tricuspid valve to be analyzed after deployment of the RV disc but before releasing the device.

Description of Procedure

(1) Muscular defect: The defect was crossed with a JR catheter over an 0.035” wire in retrograde fashion and then exchanged for a long 5 French delivery sheath. A 6/4 mm Lifetech Konar-MF™ Occluder was advanced retrograde across the defect. Under Transesophageal echocardiographic guidance, the RV disc was deployed followed by the LV disc. Further selective angiography and echo images were used to ensure adequate device position with a disc on either side of the interventricular septum and no interference with adjacent structures including free movement of right atrioventricular valve leaflets (Figure 2). Continuous rhythm analysis showed no change in the QRS waveform or conduction delays.

(2) Post-surgical perimembranous defect: The defect was crossed in retrograde fashion with a 0.014” BMW wire which was snared from the venous side to create a rail. This was exchanged for a glide catheter to safely cross the defect. A 5/3 mm Lifetech Konar-MF™ occluder was then prepared and deployed in a similar retrograde manner. (Figure 2)

Figure 2: Angiographic and Transesophageal imaging during case: (1) LV angiography (60° LAO, 20° Cranial) using pigtail catheter demonstrating post-operative perimembranous VSD with RV orifice of 3.2mm (a) and LV orifice of 4.3mm (b), additional muscular VSD with RV orifice of 3.1mm (c) and LV orifice of 5.1mm (d). (2) LV angiography after placement of device in muscular VSD showing shunt through perimembranous VSD. (3) Fluoroscopy showing placement of both closure devices in muscular and perimembranous VSDs. (x) post-operative residual perimembranous VSD. (star) high muscular VSD. (ii) pigtail catheter in LV chamber. (iii) transesophageal echocardiography probe.

Discussion

- The Lifetech Konar-MF™ occluder device has many features that make it ideal for closure of complex VSDs.
- Since its first implantation in 2013, this device has been used over 2,000 times in Asia and Europe with successful implantation rate >97%. 1,4
- Its flexible design is designed to reduce the risk of heart block and can adjust to a wide variety of defects.

Conclusions

The Lifetech Konar-MF™ occluder can easily, safely, and effectively be used for the closure of perimembranous, muscular, and post-operative residual ventricular septal defects.

References


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