APVALVES2016

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Challenging situation 1: Valve-in-valve: mitral





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Valve-in-valve Implantation for failed Bioprostheses: mitral

A





> With time, bioprosthetic tissue can be expected to deteriorate and eventually fail.



The operative mortality for an elective redo aortic valve surgery is reported to range from 2% to 7%, but this percentage can increase to more than 30% in high-risk and non-elective patients.

Endocarditis

Thrombus



Challenges of mitral VIV

Approaches
Understanding surgical valves and sizing
Positioning and implantation depth
Possible complications and how to avoid them
Choice of devices

Transcatheter Valve-in-Valve Implantation for Failed Bioprosthetic Heart Valves

John G. Webb, MD; David A. Wood, MD; Jian Ye, MD; Ronen Gurvitch, MD; Jean-Bernard Masson, MD; Josep Rodés-Cabau, MD; Mark Osten, MD; Eric Horlick, MD; O. Wendler, MD; Eric Dumont, MD; Ronald G. Carere, MD; Namal Wijesinghe, MD;

A first-in-human attempt using a percutaneous transseptal approach for transcatheter mitral VIV was unsuccessful.



Noncoaxial and too ventricular positioning of the THV within the surgically implanted prosthesis resulted in embolization.

(Circulation. 2010;121:1848-1857.)

Transcatheter Valve-in-Valve Implantation for Failed Bioprosthetic Heart Valves

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In the second patient, an open transatrial approach was attempted.
Stable cannulation and coaxial positioning within the mitral prosthesis could not be accomplished, and the procedure was converted to a transapical approach.

2	Baxter Edwards (model 6900P)	25	S	Atrial & apical	26	17	6	328	117	1	N/A
3	Edwards SAV (model 6650)	27	R	Apical	26	8	9	N/A	N/A	4	0
4	Edwards SAV (model 6650)	27	R	Apical	26	10	9	93	105	4	0
5	Medtronic Mosaic (model 310)	25	S	Apical	26	18	9	301	183	1	1
6	Edwards SAV (model 6650)	27	R	Apical	23	11	8	130	121	4	1*
7	Medtronic Intact (model 705)	27	R & S	Apical	23	20	7	198	164	4	1†

> After that, all 5 subsequent implantations were successfully performed with transapical access.

Successful Percutaneous Anterograde Transcatheter Valve-in-Valve Implantation in the Mitral Position Transvenous access



> The procedure is time-consuming and carries a higher risk.



Noncoaxial of the THV within the surgically implanted prosthesis remains a problem.

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Transvenous vs. transapical approach for mitral VIV



A direct and coaxial access to the mitral prosthetic valve can be achieved from the left ventricular apex.



Edwards' SAPIEN XT Valve Approved in Europe for Transcatheter Mitral and Aortic Valve-in-Valve Procedures

currently, most of the reported series used Edwards SAPIEN balloon-expandable valve for TM VIV.

IRVINE, CA, February 05 science of heart valves a for valve-in-valve proced treatment option for patie extreme risk for surgery. c position, which address risk surgery.

"The European approval While this is not a large through a second open-Edwards' corporate vice



), the global leader in the ceived CE Mark in Europe iding a minimally invasive ement, and who are at indication for the mitral le an alternative to a high-

s a milestone achievement. or patients unable to go " said Larry L. Wood,



The labeled valve size ≠ inner base ring diameter!



The manufacturer's labeled valve size (in millimeters) does not match the inner base ring diameter or any significant hemodynamic-related dimension of the valve.

	Labeled Valve Size	Stent Outer Diameter (1)	Stent Inner Diameter (2)	Suture Ring Outer Diameter (3)	Valve Height (4)	
		Porcine Aortic				
Medtronic Mosaic	23	23	20.5	28	16	
Medtronic Hancock II	23	23	20.5	28	16	
Medtronic Hancock Modified Orifice	23	23	20	29.2	16/18	
Edward's Porcine	23	23	21		16 (implant height)	
St. Jude Biocor/Epic	23	23	21		15	

J Am Coll Cardiol Intv 2011;4:721–32



Figure 4. Dimensions of Stented Bioprosthetic Valves

(A) Diagrammatic representation of stented bioprosthetic valve dimensions where A = outer stent diameter; B = inner stent diameter; C = prosthesis height; and D = outer sewing ring diameter. (B) Inferior (ventricular) view of stented bioprosthesis. (C) Side view of stented bioprosthesis.

J Am Coll Cardiol Intv 2011;4:721–32

F 79, presented with progressive dyspnea for 6 months, Fc III-IV



- Rheumatic heart disease s/p redo AVR (Edwards SAV porcine 21mm), MVR (Edwards porcine 31mm) and TVA 8 years ago
- > Chronic atrial fib, Chronic kidney disease stage 3, Old pulmonary TB
- > Logistic Euroscore: 50%





Preserved LV & RV systolic function. AV: Prosthetic: 8 mmHg MPG, 24 mmHg PPG. MV: Prosthetic: 9 mmHg MPG, 20 mmHg PPG, MVA = 3.1 cm2 by PHT. MR: Severe, TV: Repaired but with TR: Severe, RVSP = 42 mmHg. PR: Mild.

Measured inner diameter of mitral bioprosthesis ~27mm



Transapical approach with an Ascendra 3 introducer and a 29mm Sapien XT



Transapical implantation of Sapien XT



Correct positioning: the THV wedged and overlapped with the surgical prosthesis, allowing secure fixation.

TEE after implantation of Sapien XT



M 65, presented with progressive dyspnea for 6 months, Fc III, s/p MVR (Hancock 29mm) 10 years ago

intra-operative TEE



Deployment of a 29mm Edwards Sapien XT → stabilized the delivery system by putting the guidewire into RUPV and keeping a conical shape of the deployed THV valve towards LA



Intra-operative TEE immediate post TmVIV







A device w/ only one chance!

Figure 4. Transcatheter valve deployed within a surgical prosthesis (SAPIEN THV and Carpentier-Edwards). A. Incorrect positioning. The outflows of the surgical prosthesis and THV are superimposed. During balloon deployment, the prosthetic struts may be splayed, allowing the THV to embolize (as in Figure 5). B, Correct positioning. The THV overlaps the sewing ring of the surgical prosthesis, allowing more secure fixation.

Complications of transcatheter mitral VIV

Circulation. 2010;121:1848-1857

Bail-Out Alcohol Septal Ablation for Left Ventricular Outflow Tract Obstruction After Transcatheter Mitral Valve Replacement Complications of transcatheter mitral VIV



(A) Before replantation of the provinesis, the atatic pressure was TIT/45 mm Hg, the shape of the acetic pressure ware manned, and there was not a significant goldent at the CVDT. (B) Immediately after implantation of the provinesis, the acetic pressure decreased to 78/45, the shape of the acetic pressure wave changed to a spike-incid-domegratem, and the manned LVDT gradeet was -100 mm Hg (310m Values 2 and 3), LV - last metricite, LVDT - last semicular outflow tract.

(A) A coronary angiogram confirmed the presence of a septal artery suitable for alcohol ablation. Two millitiers of pure ethanol were injected in the first septal branch (B), with complete occlusion of the artery (C, white arrows). (D) immediately after injecting the ethanol, a normalization of the shape of the aorta pressure curve and recovery of the pressure were observed. (E) Echocardiographic assessment confirmed the maximal left ventricular outflow gradient of 24 mm Hg (Online Video 4). LV – left ventricular.

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M 83, presented with progressive dyspnea for 3 months, Fc III, TEE



VHD w/ severe MR s/p MVR (Tissue, Biocor 31mm) 11 yrs ago
Generalized RV hypokinesis, paradoxical motion of IVS.
RVEF= 26 %, LVEF> 55 %;. Severe TR and RVSP 106mmHg

TEE-guided guidewire passage into the right upper pulmonary vein for better stabilization of the delivery system



Deployment of a 29mm Edwards Sapien XT



Final positioning with good prosthesis function of the 29mm Edwards Sapien XT, Confirmed by intraoperative TEE



Transcatheter VIV for failed mitral bioprosthesis

Recently, the mechanically expanded Lotus valve has also been successfully used for TM VIV.



The Lotus Valve is repositionable and fully retrievable, which was designed to facilitate accurate primary positioning, early valve function, and hemodynamic stability during deployment reduce paravalvular leaks.

Radiographic appearance of stented bioprosthesis



Correct positioning and deployment of transcatheter valves during a TAV-in-SAV procedure requires correct radiographic recognition of stented bioprostheses.

M 82, presented with progressive dyspnea for 4 months, Fc III-IV Treated with Lotus system



Safari wire can self-center the device during deployment.

F 78, presented with progressive dyspnea for 3 months, Fc III-IV



Wiring



Positioned a little high in LA



Positioned a little high in LA



v in v_A5

PHILIPS

Re-sheathing and re-positioning



After final releasing with en face view



Final results



Conclusions

- Valve-in-valve (VIV) implantation can be considered as an acceptable alternative to re-do open heart surgery for elderly high-risk surgical patients with bioprosthetic degeneration.
- Proper sizing, selection of appropriate devices, and precise implantation depth are the keys to success in transcatheter VIV procedures.
- The Lotus Valve has the advantages of being repositionable and fully retrievable.
- However, longer term follow-up and head-to-head comparisons will be needed to establish the true role of VIV implantation for dysfunctional bioprosthesis and the roles of different devices for this application.

Heart Team Approach is The Key to Success !

A total of 12 mitral VIV cases have been accomplished from March 2014 to July 2016



