

Importance of the Prosthesis Choice in the Valve-in-Valve Era

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Heart team

CHRU de Lille



EuroValve

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Speaker's name: Thomas Modine

☒ I have the following potential conflicts of interest to report:

Affiliation/Financial Relationship

Grant/Research Support
Consulting Fees / Honoraria
Major Stock Shareholder/Equity
Royalty Income
Ownership/Founder
Intellectual Property Rights
Other Financial Benefit

Company

- Edwards
- Abbott, Boston Scientific, Medtronic, Edwards, Cephea, Microport, GE
- Nanosurg
- Microport
- Valmy Ltd
- Yes
- Nil

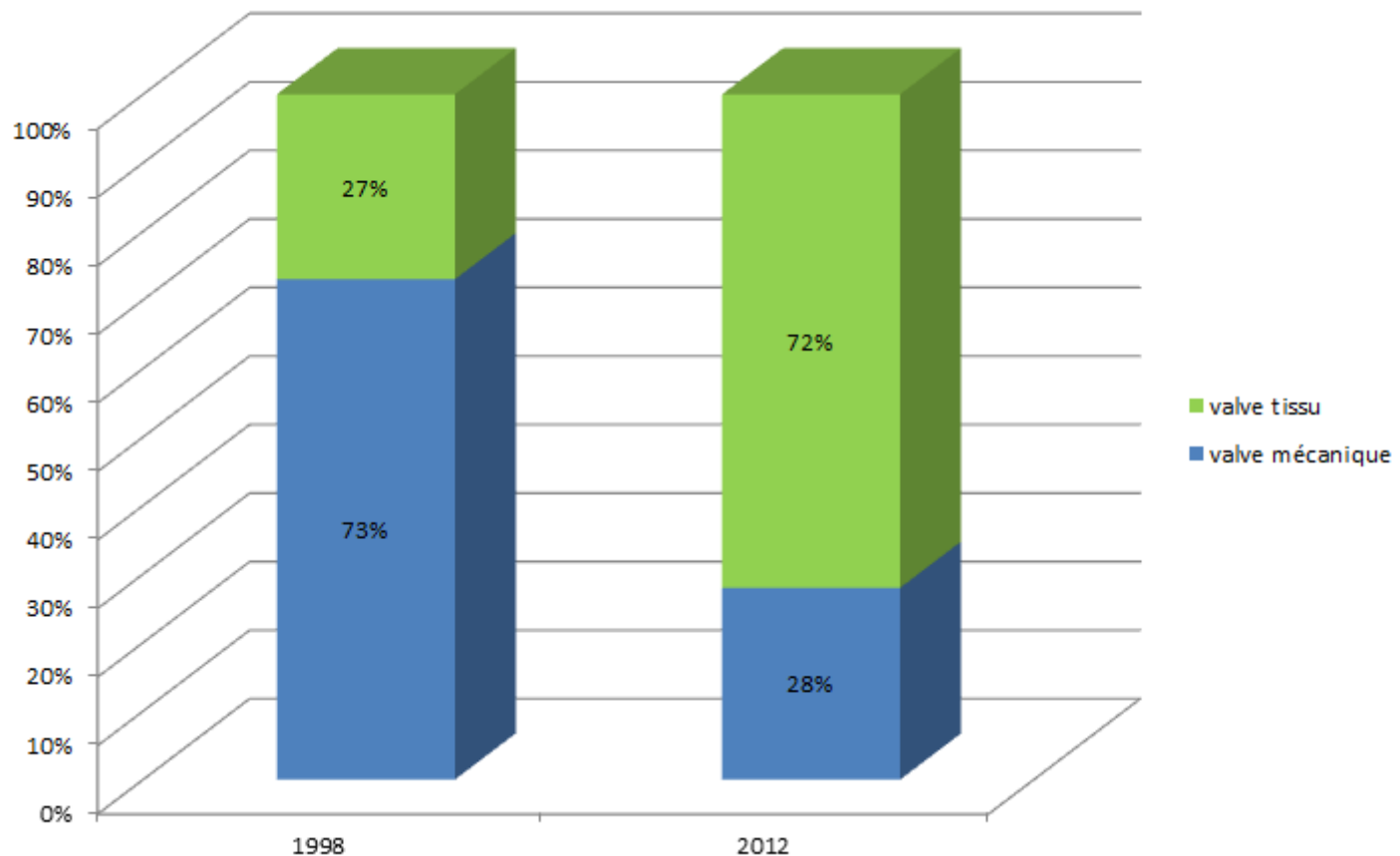
www.eurovalvecongress.com

Background

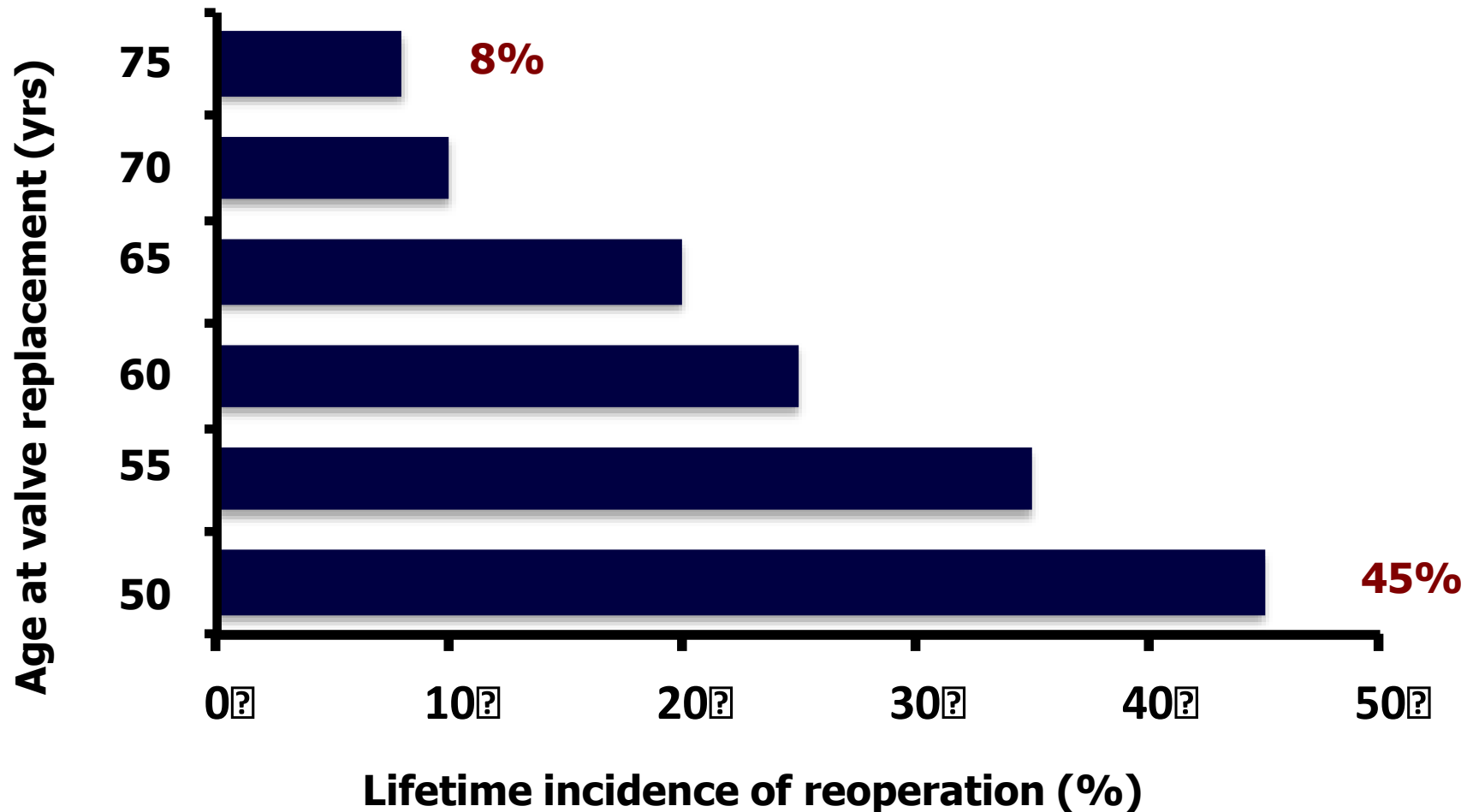
- STS Database from 1997-2006
- Over the last 10 years, the majority of surgically implanted aortic valves have been bioprosthetic (80% increase).

International market

valve type distribution



Risk of re-do surgery after surgical aortic valve replacement



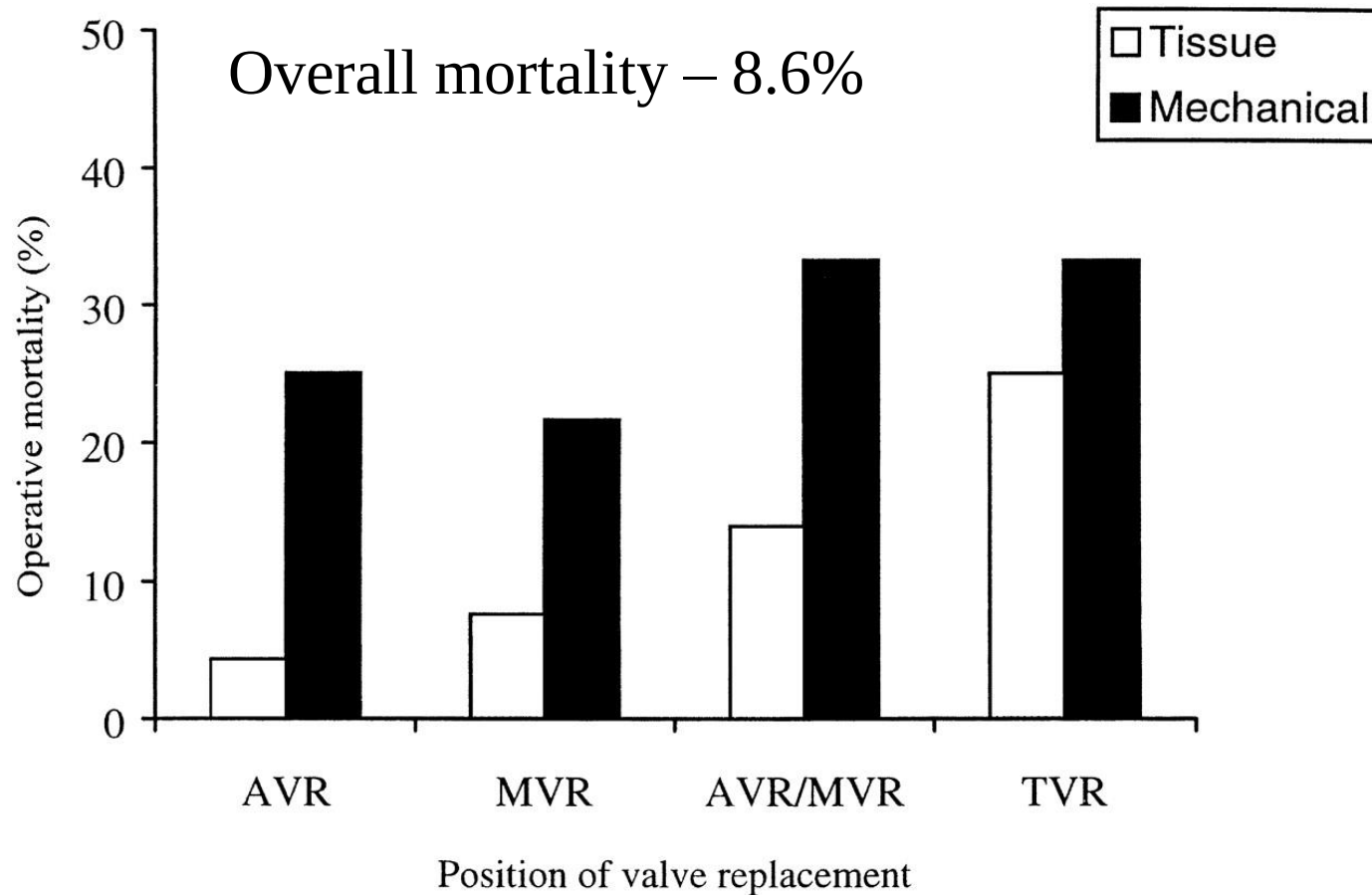
Evidence based data

Elderly patients with comorbidities, redo surgery may be a risky situation.

- Operative mortality for an elective redo surgery ranges from 2% to 8%
- It can increase to 30% in high-risk

Repeat Heart Valve Surgery

671 pts (mean age 54.7 yrs) – 1st repeat heart valve surgery between 1969-1998 @Royal Victoria Hospital, Belfast, Northern Ireland



TAVI in Valve

How to proceed?

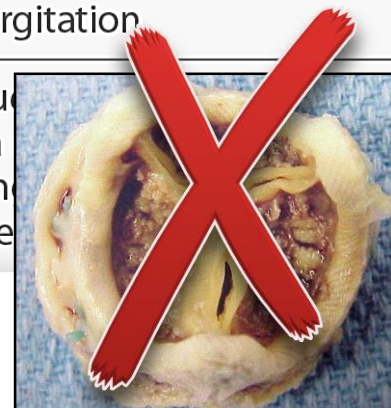
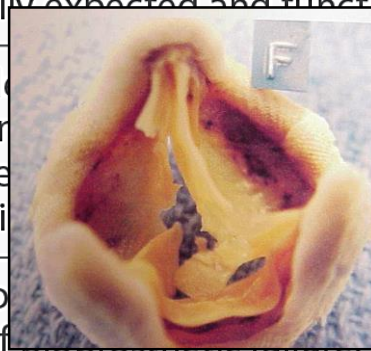
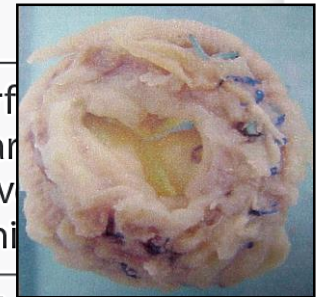
➤ Type of valve

TAVlinValve

How to proceed?

➤ Mechanism of failure

Type	Cause	
Calcification	Residual glutaraldehyde binding sites by: 1. Residual glutaraldehyde 2. Phospholipid extrusion 3. Residual glutaraldehyde	may serve as potential
Pannus	Host tissue response to the prosthesis. Pannus is composed of myofibroblasts, fibroblasts, and capillary cells. Overtime pannus may calcify. Some pannus formation over the prosthesis is normally expected and functions to form a nonthrombogenic surface.	
Wear & Tear	Calcific degeneration of the leaflets and commissures. Calcification is most likely to develop in areas where leaflet flexion and attachment occur. That is, at the basal and commissural regions. Approximately three-fourths of patients with leaflet calcification develop aortic regurgitation.	
Thrombosis / Endocarditis	Thrombosis and endocarditis occur less frequently than pannus formation, occurring at a rate of 1.2% per year, respectively. Patients presenting with these conditions are contraindicated for implantation of a CoreValve.	mentioned endocarditis



Bioprosthetic Valves world

Carpentier-Edwards



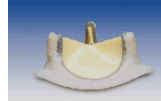
Magna



Theon



CE SAV



Perimount

Sorin



Pericarbon



Mitroflow



Solo



Soprano

St Jude Medical



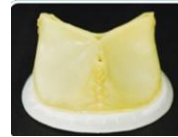
Toronto SPV
Stentless



Biocor



Epic



Trifecta

Labcor laboratories



Dokimos



Maxime



Imperiii stentless

Medtronic



Hancock II



Mosaic



Freestyle
Stentless

Shelhigh



NR 2000
Semistented



NR 900 A
Tricuspid valve

Vascutek



Aspire
stented



Elan
stentless



Ionescu Shiley



Cryolife O'Brien
stentless



TLPB-A-Supra



Kiros

Surgical bioprosthetic valves

Stented

**Bovine
pericardial**

**Porcine aortic
valve**



Medtronic
Hancock II



Medtronic
Magna
Mosaic



CE Perimount
Magna Ease
SAV



Sorin
St. Jude
Biocor

Components of stented bioprosthesis

Stent posts + Base ring = Prosthesis



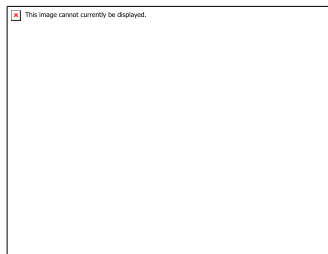
**Elgiloy wireform
stent**



**Elgiloy and Polyester
ring and stent posts**



**Edwards
PERIMOUNT Magna**



**Acetyl homopolymer stent
Stellite ring
Haynes Alloy eyelets**



**Medtronic
Hancock II**

Components of stented bioprosthesis

Stent posts + Base ring = Prosthesis



Acetyl stent



**Silicone
base ring**



**Polyester covered
stent and base ring
with outer single
layer of pericardium**

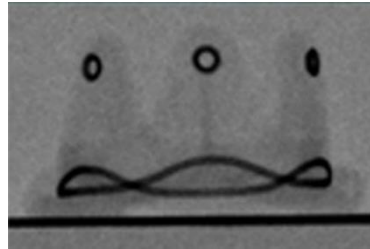


**Sorin
Mitroflow**

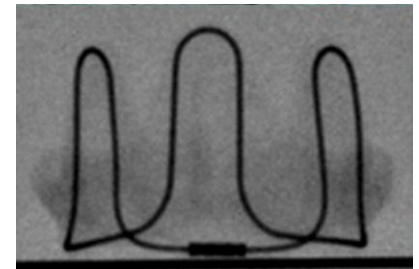
Surgical Valves are different

Medtronic Hancock II

Markers located in crown

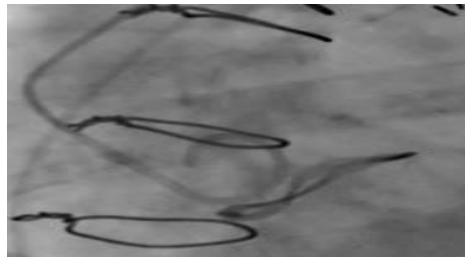


CE Porcine

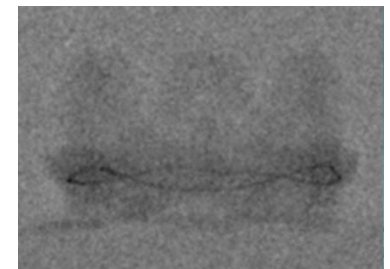


Markers located in sewing ring

Sorin Mitroflow



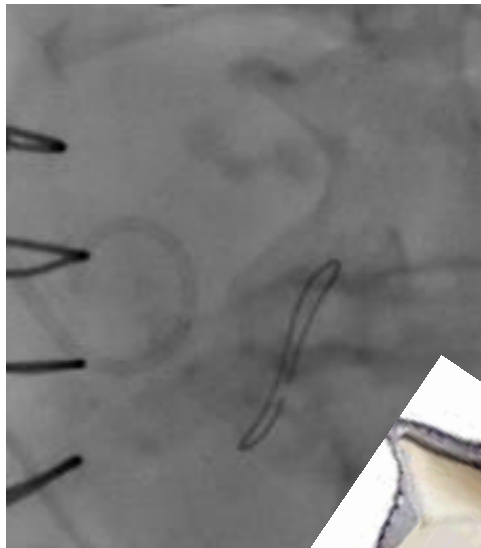
St. Jude Biocor Supra



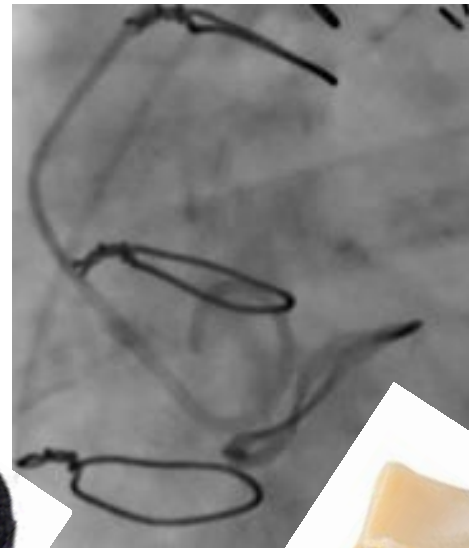
Markers located below sewing ring

Fluoroscopic images of bioprosthetic valves

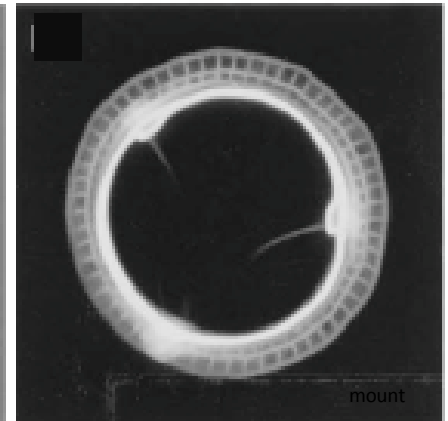
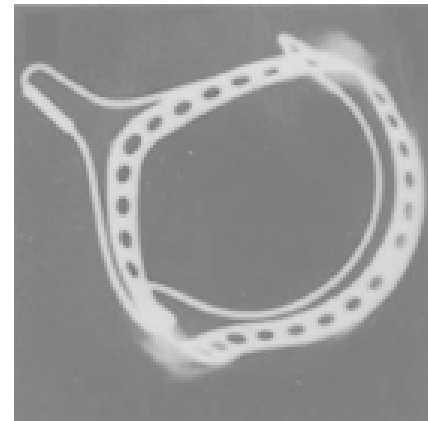
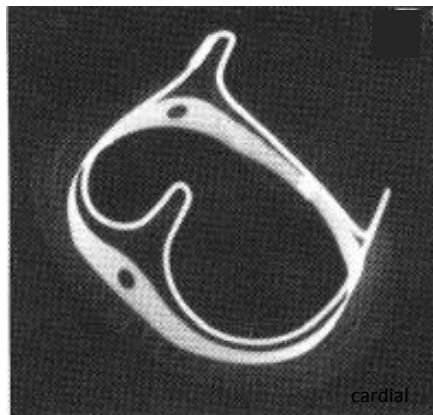
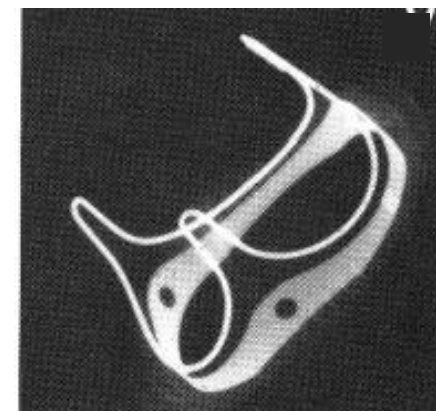
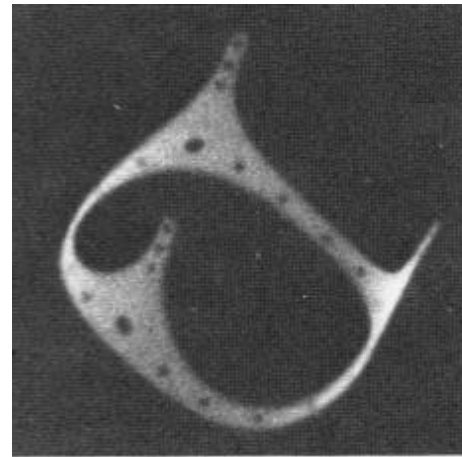
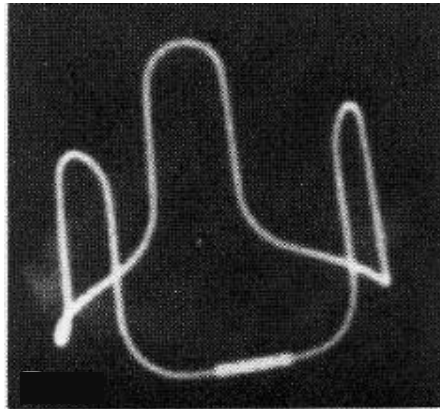
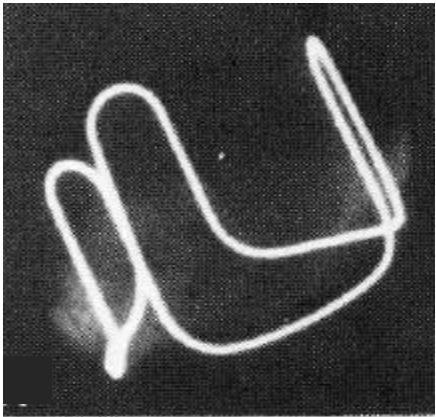
Sorin Soprano



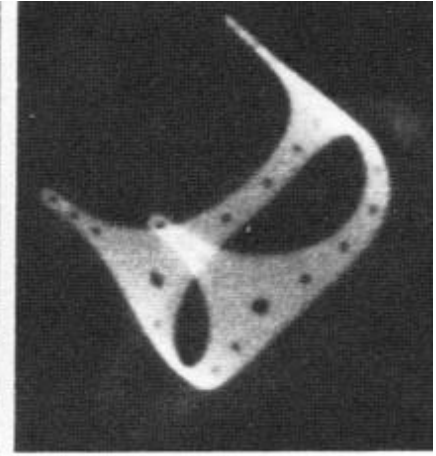
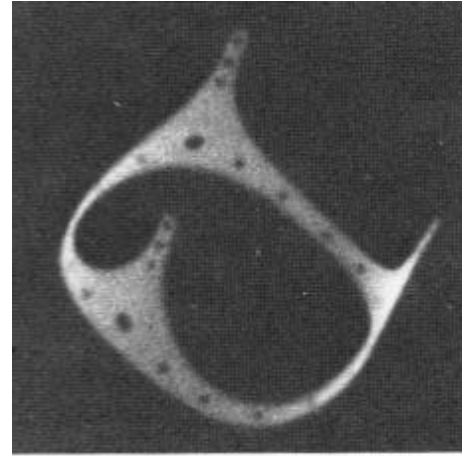
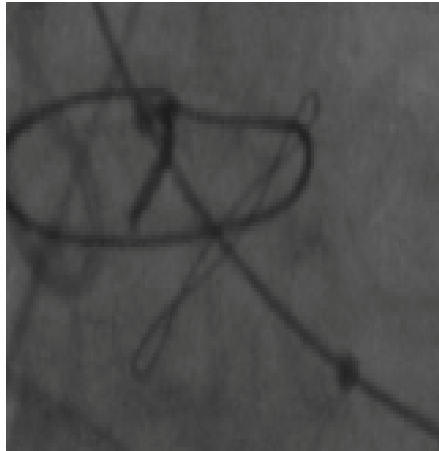
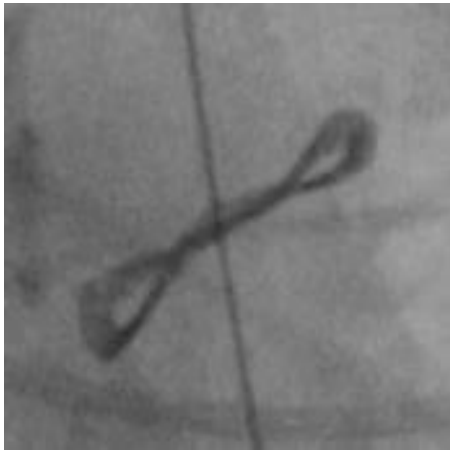
Mitroflow



Can you identify these valves?



Can you identify these valves?



Surgical bioprosthetic valves

Stentless

Bovine pericardial



**Edwards Prima
Freedom Plus**

Porcine aortic valve



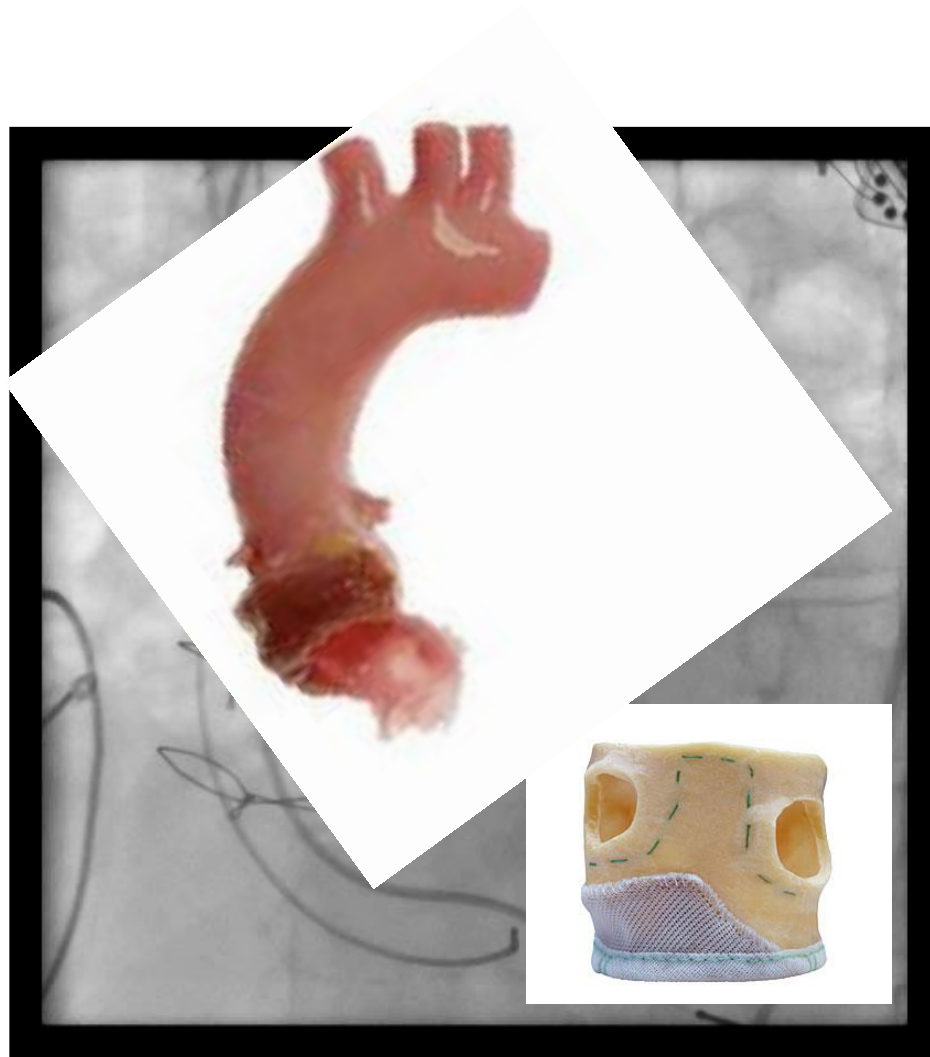
**Medtronic
Freestyle**

Homograft



**St. Jude
SPV**

Flouroscopy quizz!



Medtronic Freestyle

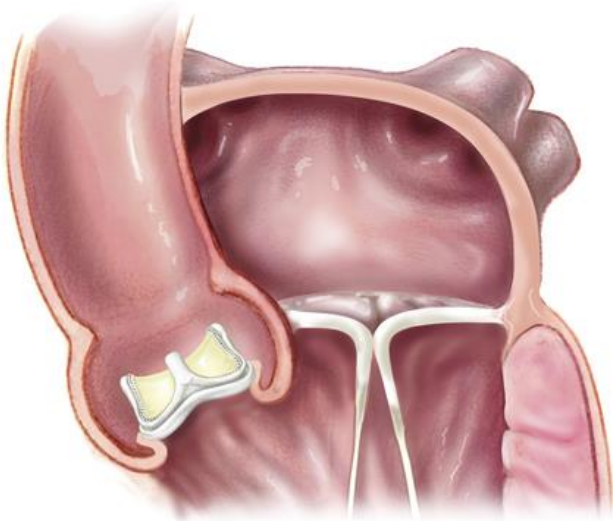
TAVI in Valve

How to proceed?

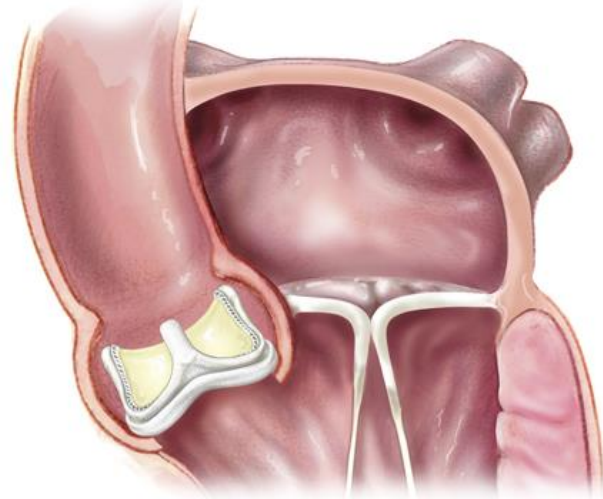
➤ Surgical technique

Intra/ Supra- Annular = Valves are different

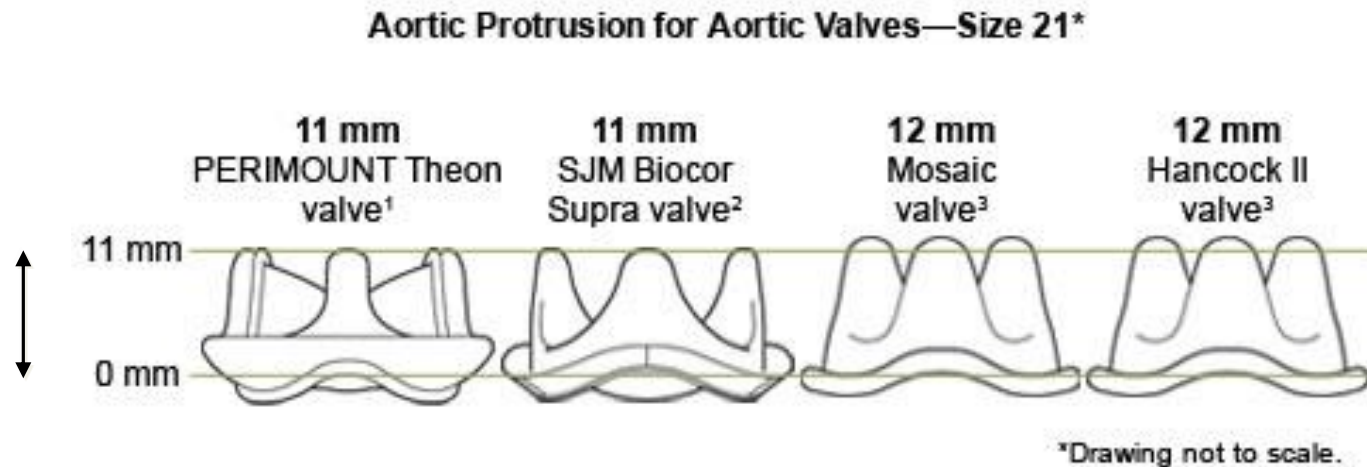
Intra-Annular
placement



Supra-Annular
placement



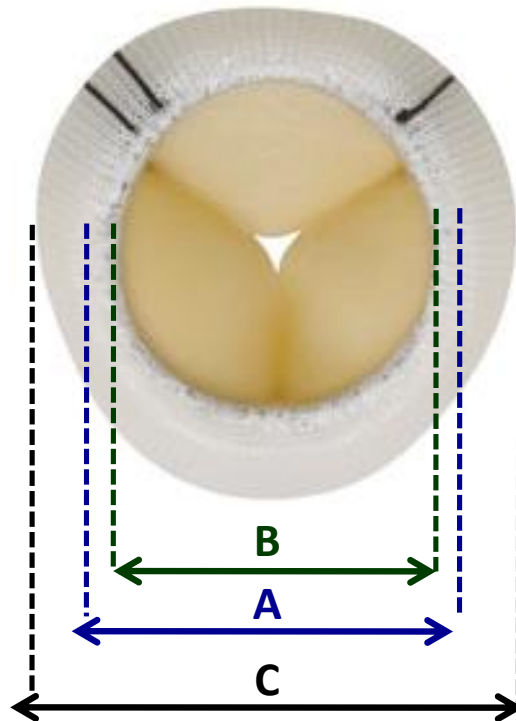
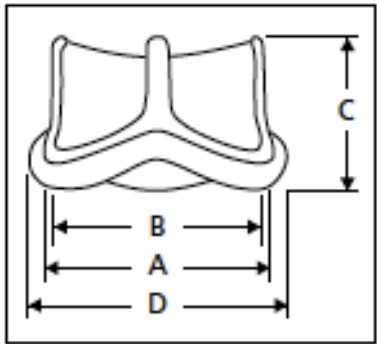
Aortic Protrusion= valves are different



References:

1. Data on file. Edwards Lifesciences, 2006.
2. St. Jude Medical SJM Biocor® and SJM Biocor® Supra marketing collateral (ITEM 1860/0705/7.5M/EN/BD).
3. Medtronic Mosaic® and Hancock® II Porcine Bioprostheses Inservice Guide (UC200102908b EN).

Dimensions of surgical stented bioprosthesis

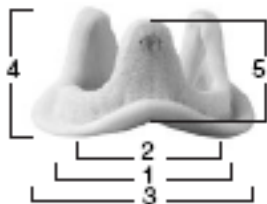


A – Stent outer diameter

B – Stent inner diameter

C – Sewing ring outer diameter

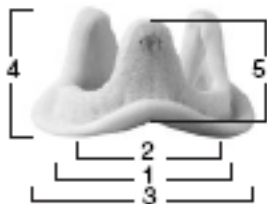
D – Stent height



Size 21 mm

Dimensions in (mm)

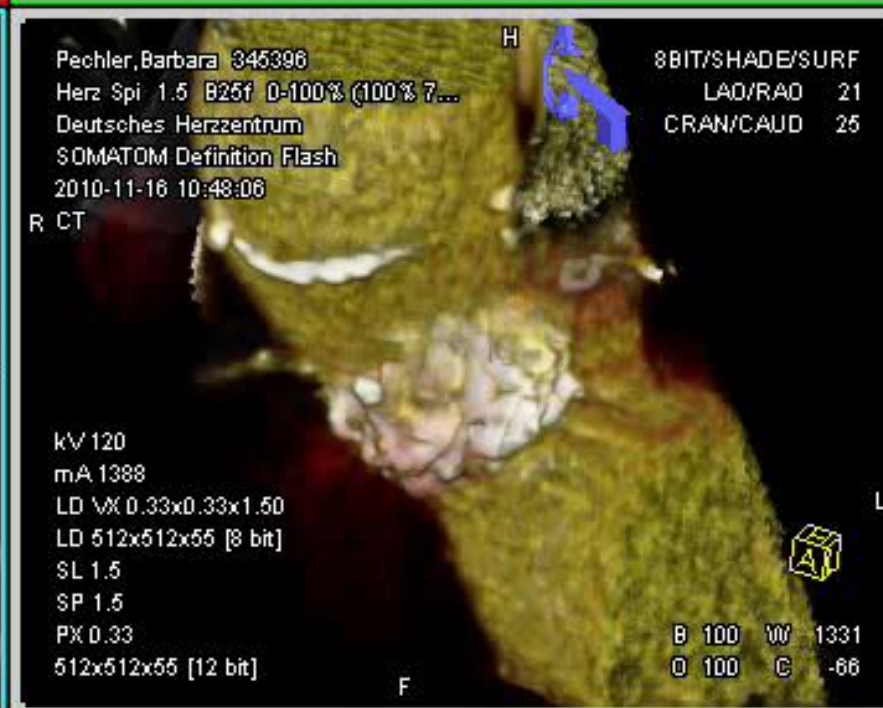
	Labeled Valve Size	Stent Outer Diameter (1)	Stent Inner Diameter (2)	Suture Ring Outer Diameter (3)	Valve Height (4)
Porcine Aortic Valves					
Medtronic Mosaic	21	21	18.5	26	15
Medtronic Hancock II	21	21	18.5	26	16
Medtronic Hancock Modified Orifice	21	21	18.0	26	15
Edward's Porcine	21	21	19		16
St. Jude Biocor/Epic	21	21	19		14
Pericardial Aortic Valves					
Edward Perimount	21	21	20	28	15
Edward Perimount Magna	21	21	20	28	15
Sorin Mitroflow	21	20.6	N/A	24	13



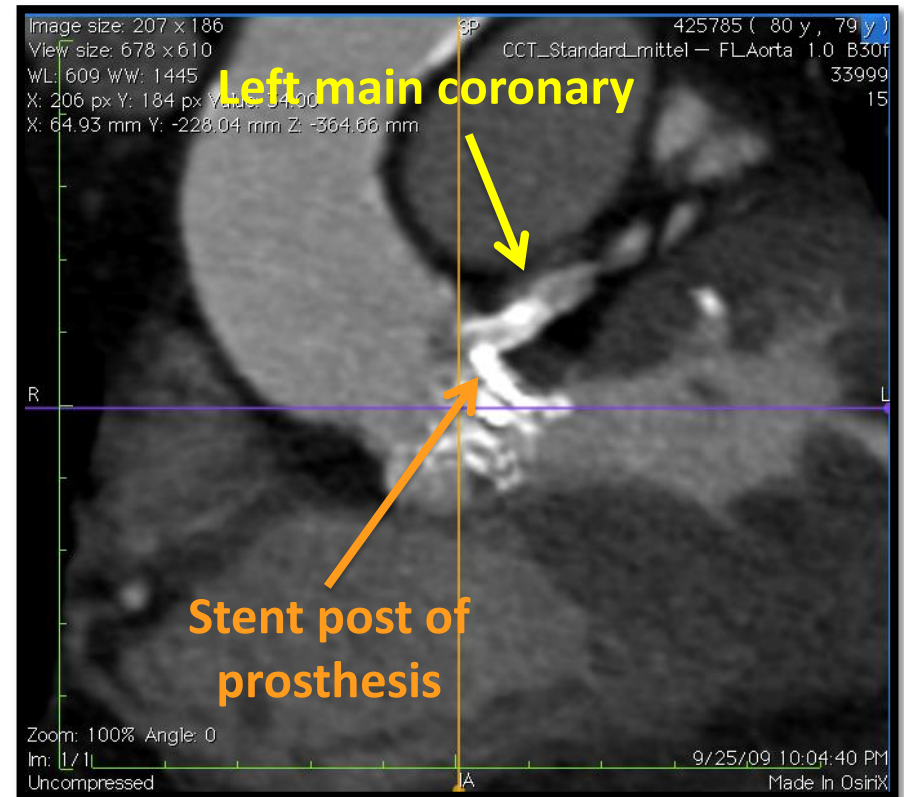
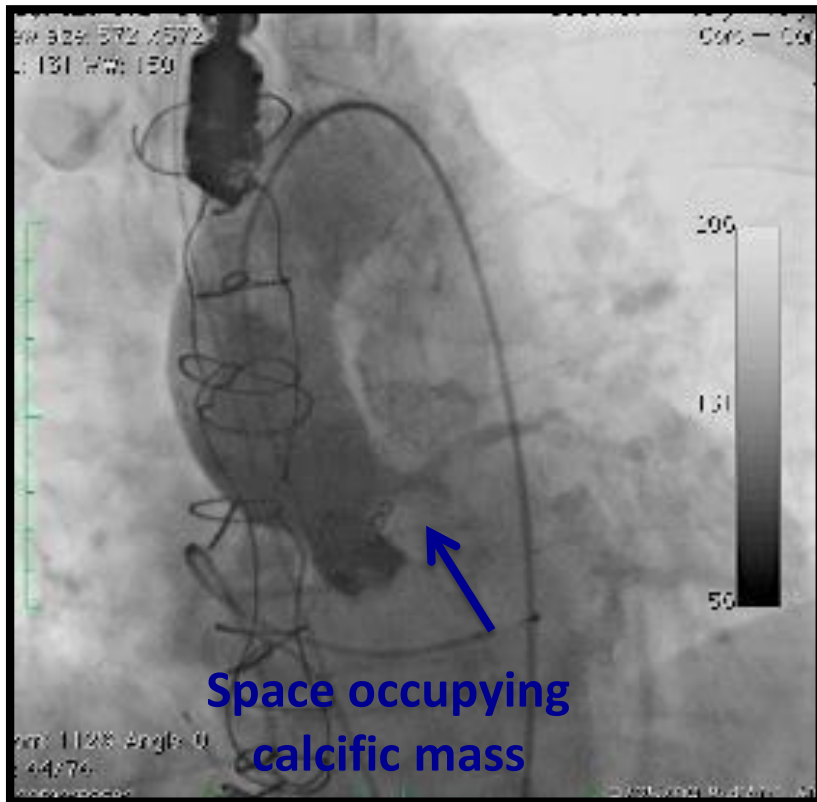
Size 23 mm

Dimensions in (mm)

	Labeled Valve Size	Stent Outer Diameter (1)	Stent Inner Diameter (2)	Suture Ring Outer Diameter (3)	Valve Height (4)
Porcine Aortic Valves					
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	16
Edward's Porcine	23	23	21		16
St. Jude Biocor/Epic	23	23	21		15
Pericardial Aortic Valves					
Edward Perimount	23	23	22	31	16
Edward Perimount Magna	23	23	22	31	16
Sorin Mitroflow	23	23	19	26	14

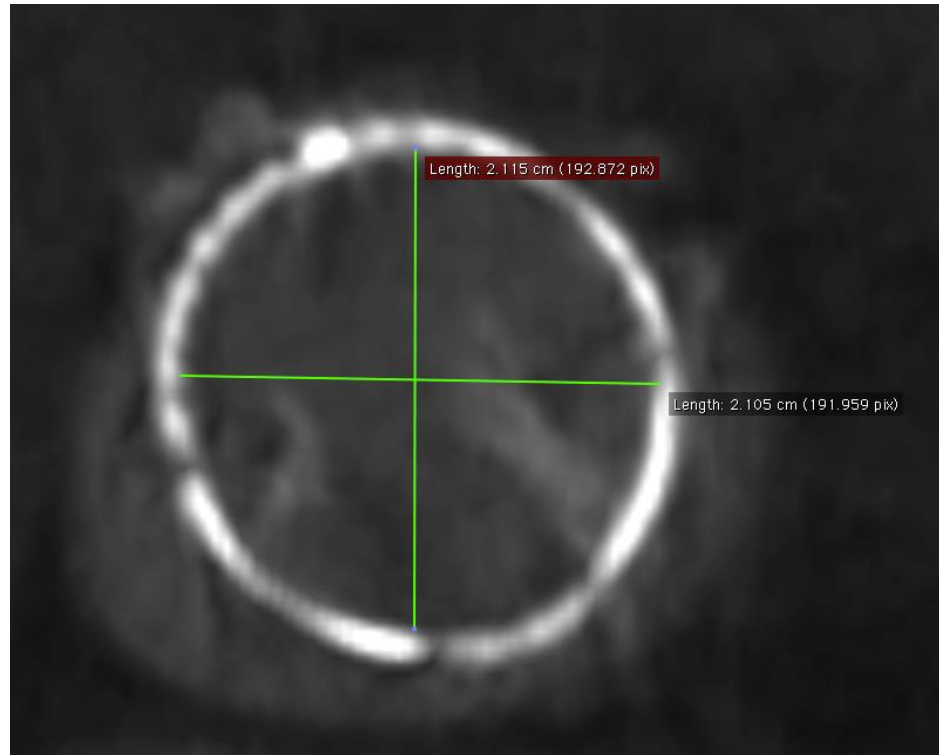


“Hindsight” analysis



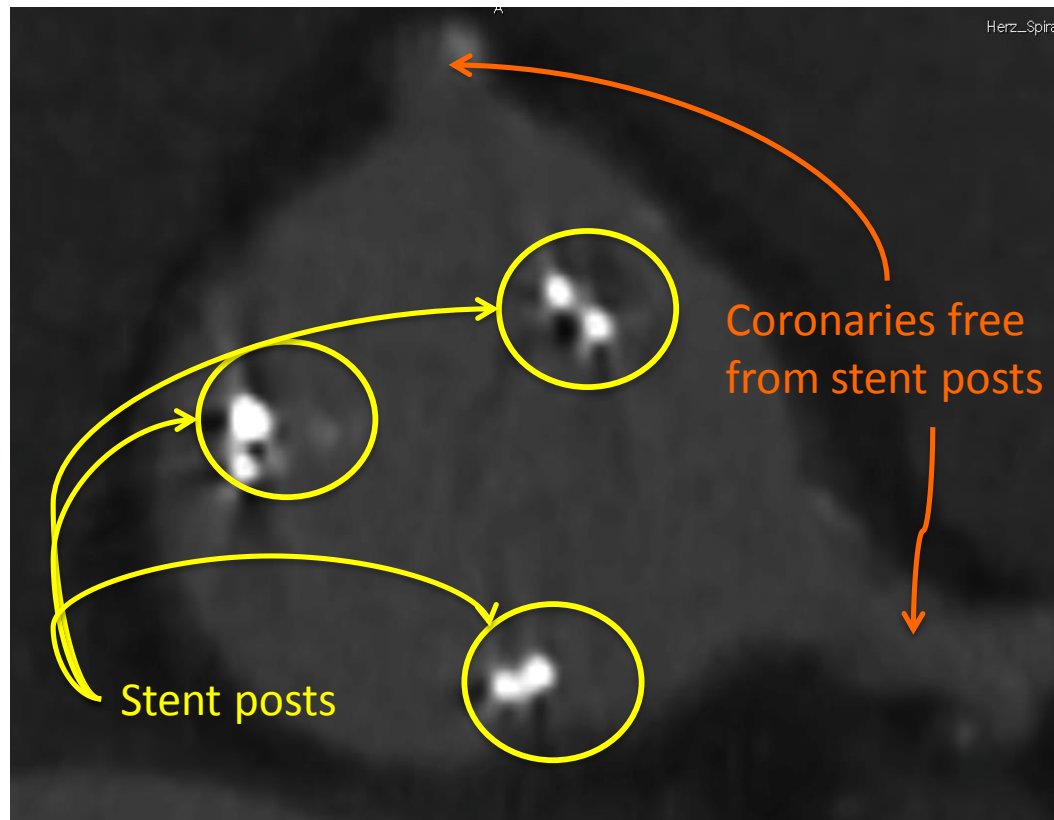
MSCT

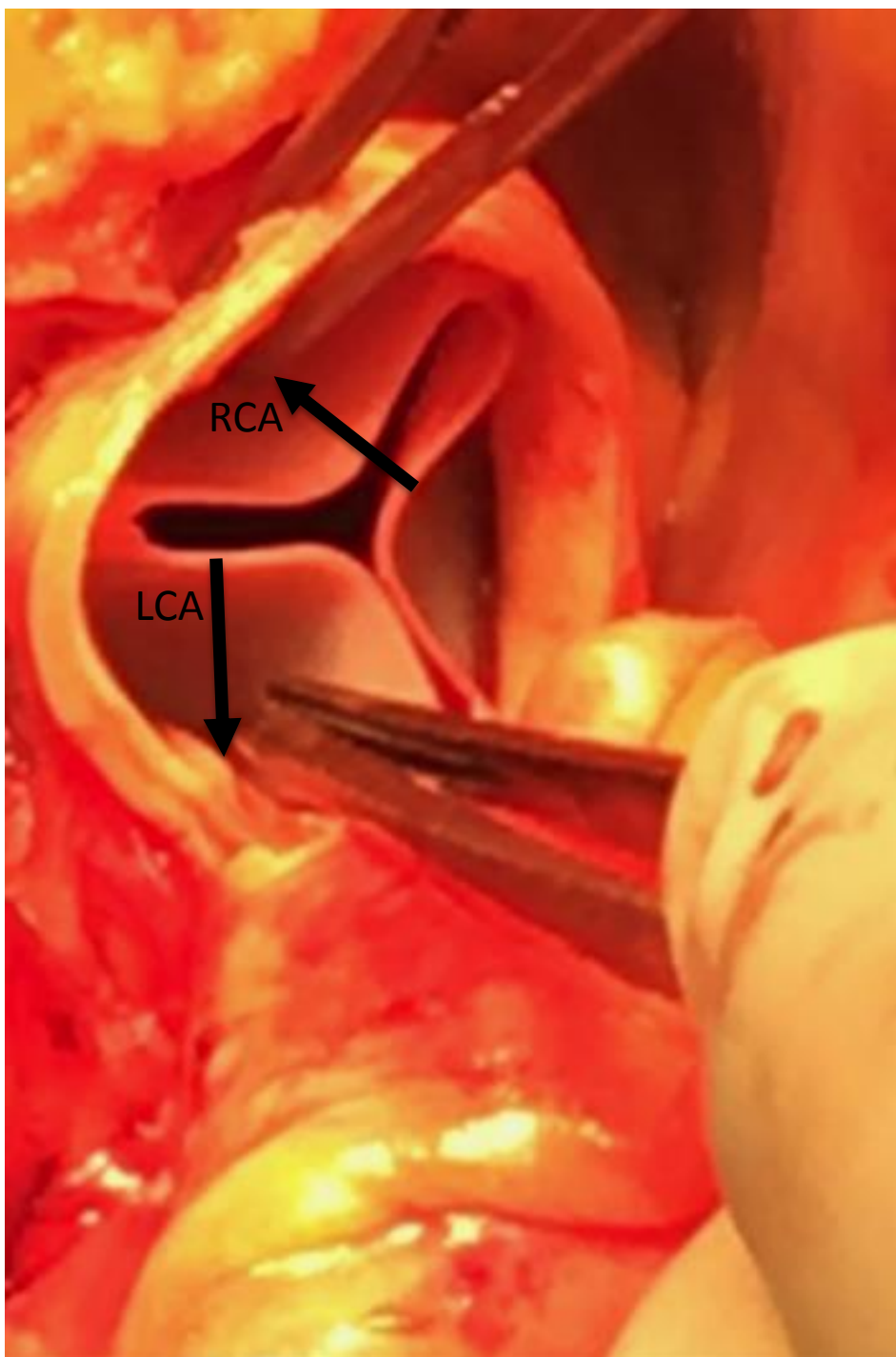
Stent Internal Diameter



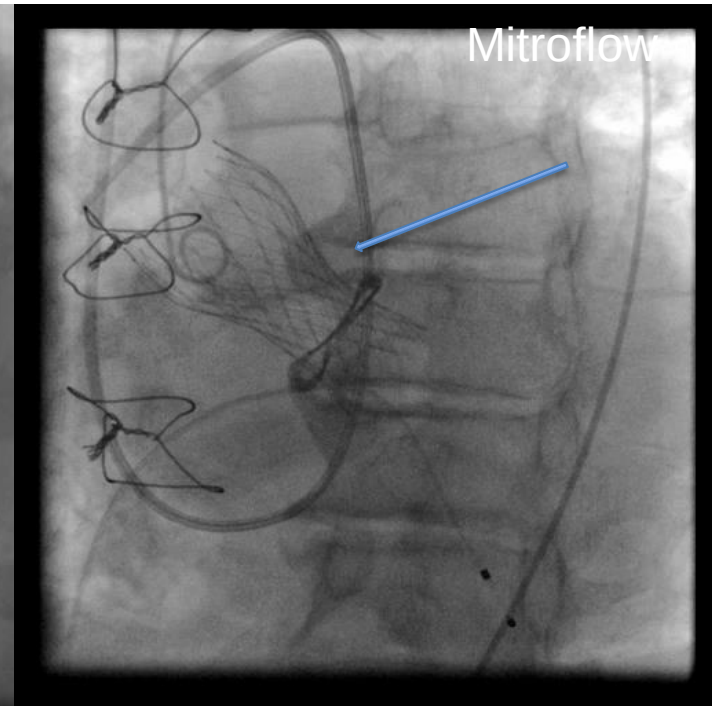
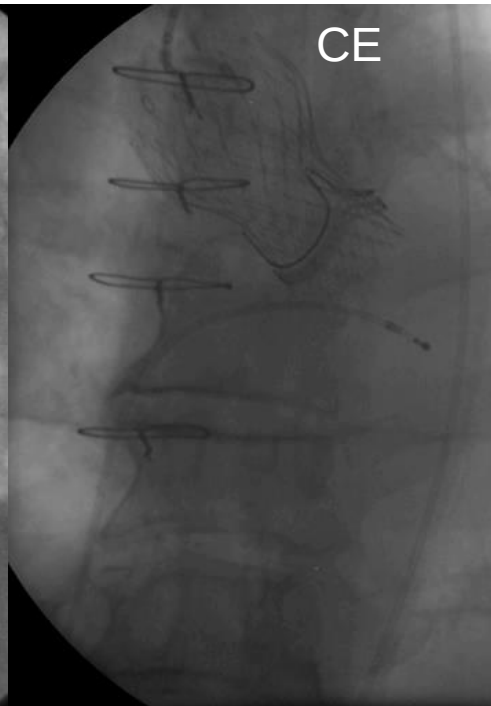
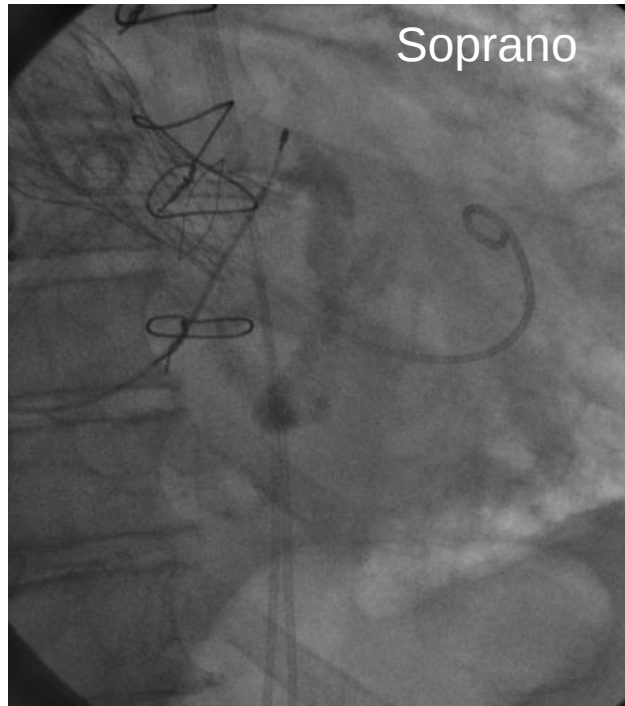
23-mm Edwards Perimount
(21 x 21 mm)

Now part of routine screening





Because this what we should endup with



VIV Procedure: Pre-case Planning

Careful pre-case planning is essential to Valve-in-Valve procedural success

Patient Selection

Avoid patients:

- Concomitant PVL
- Is not securely fixed in the native annulus
- Has a partially detached leaflet (embolization risky)

Valve Identification

through patients charts & flourosopic imaging

- CT is highly recommended bioprosthesis
- Determine valve size and differents diameters

Valve Sizing

Select appropriate appropriate TAVI to implant

Global Valve-in-Valve Registry

Overview: Retrospective collection of data; 38 centers from Europe, North America, Australia, New Zealand and the Middle East.

- The CoreValve 26mm & 29mm and Sapien 23mm & 26mm devices were used in this study.

Purpose: To evaluate the efficacy and safety of ViV procedures

Objectives:

- Examine clinical outcomes
- Evaluate results of ViV procedures performed inside bioprostheses types
- Give correlates for high post-procedural gradients
- Supply data on possible rare complications
- Compare procedural characteristics and clinical results of performing Valve in Valve between SAPIEN and CoreValve

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION



Transcatheter Aortic Valve Replacement for Degenerative Bioprosthetic Surgical Valves:
Results from the Global Valve-in-Valve Registry
Danny Dvir, John Webb, Stephen Brecker, Sabine Bleiziffer, David Hildick-Smith, Antonio Colombo, Fleur Descoutures, Christian Hengstenberg, Neil E. Moat, Raffi Bekeredjian, Massimo Napodano, Luca Testa, Thierry Lefevre, Victor Guetta, Henrik Nissen, José-Maria Hernández, David Roy, Rui C. Teles, Amit Segev, Nicolas Dumonteil, Claudia Fiorina, Michael Gotzmann, Didier Tchetché, Mohamed Abdel-Wahab, Federico De Marco, Andreas Baumbach, Jean-Claude Laborde and Ran Kornowski

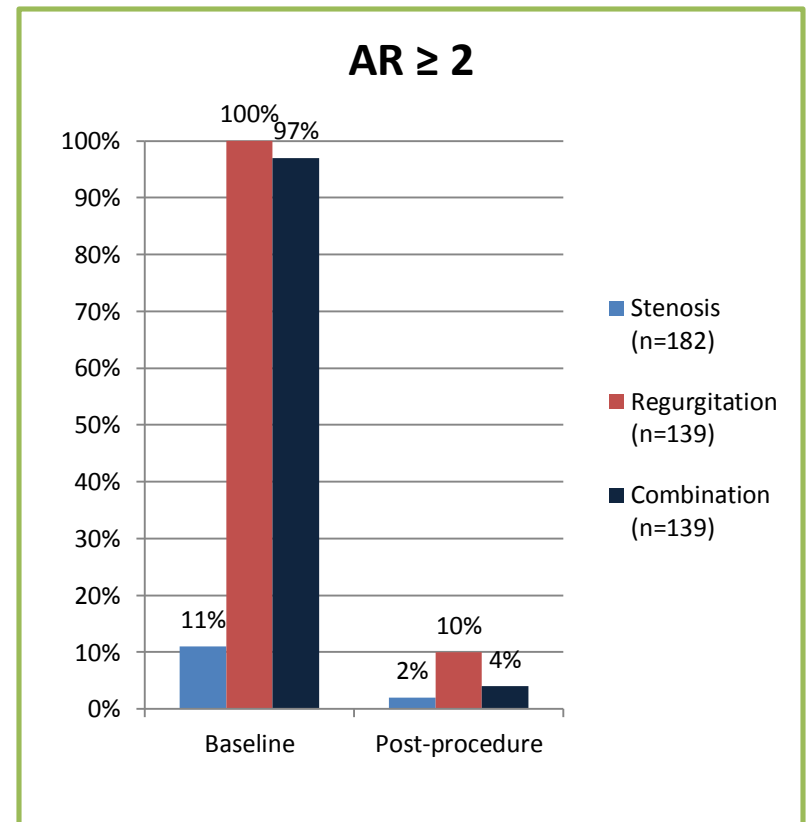
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Global Valve-in-Valve Registry Results

Improvements in AV area, mean gradients, and regurgitation in Valve in Valve procedures

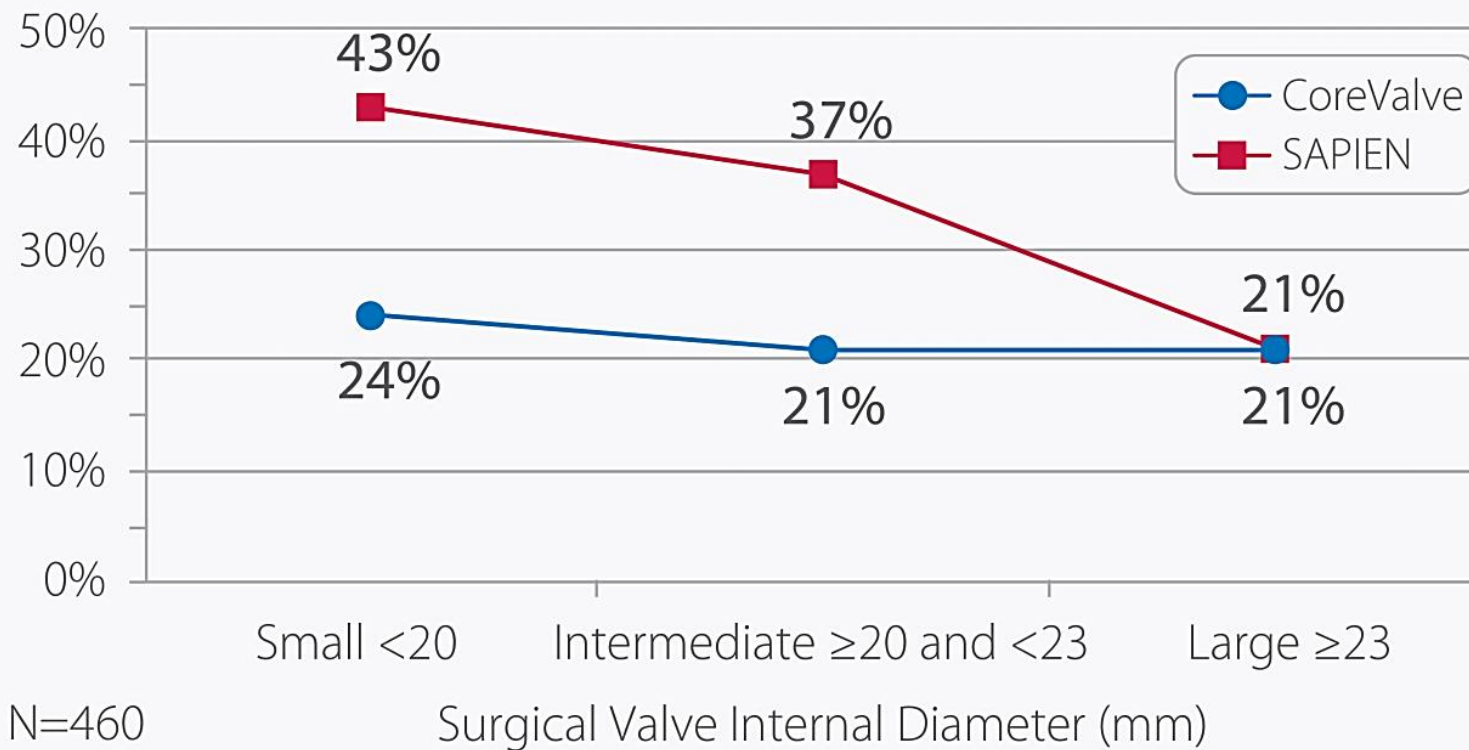
	AV Area (cm ²)		AV Mean Gradients (mmHg)	
	Baseline	Post-Procedure	Baseline	Post-Procedure
Stenosis (n=182)	0.70 ± 0.20	1.37 ± 0.33	46.4 ± 16.1	18.4 ± 9.8
Regurgitation (n=139)	1.48 ± 0.60	1.56 ± 0.49	18.0 ± 10.1	12.0 ± 6.7
Combination (n=139)	0.91 ± 0.30	1.56 ± 0.65	37.6 ± 14.9	16.0 ± 8.3
p value	<0.001	0.01	<0.001	<0.001



Global Valve-in-Valve Registry

Hemodynamic Results

Rate of Post-Procedural Gradients >20 mmHg (%)⁵



AVR in the era of TAVI

- Valve type and dimensions
 - The bigger the better (gradient, coronary obstruction)
 - Lower profile
- Mode of implantation
 - Intra- or supra-annular
- Distance from the LMCA and RCA
- Decalcification, root enlargement...TAVI in elderly female

Conclusion

TAV-in-SAV may “disrupt” conventional surgical practice patterns