Patient Screening for TAVI

Sung-Han Yoon, MD

Division of Cardiology, Heart Institute, University of Ulsan College of Medicine, Asan Medical Center

Background

TAVI has been established as treatment option for high-risk and inoperable patients with severe AS. Due to old age and comorbidities, periprocedural complications are associated with clinical outcomes of TAVI. Thus, cautious patient screening and individualized treatment strategy is required for TAVI procedure.

TAVI Procedure

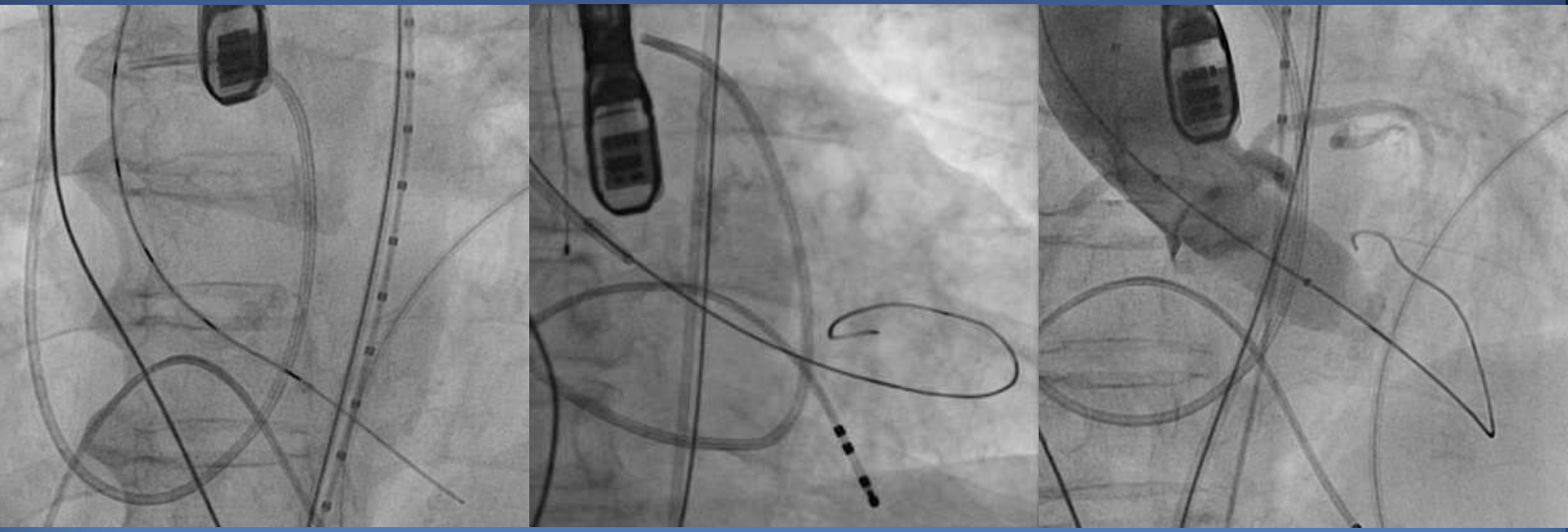
Vascular Access

TAVI Procedure

Vascular Access

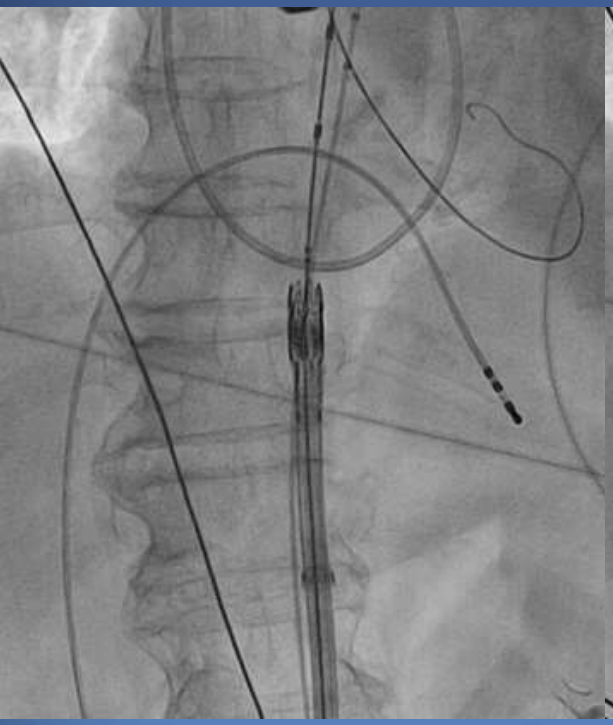
TAVI Procedure

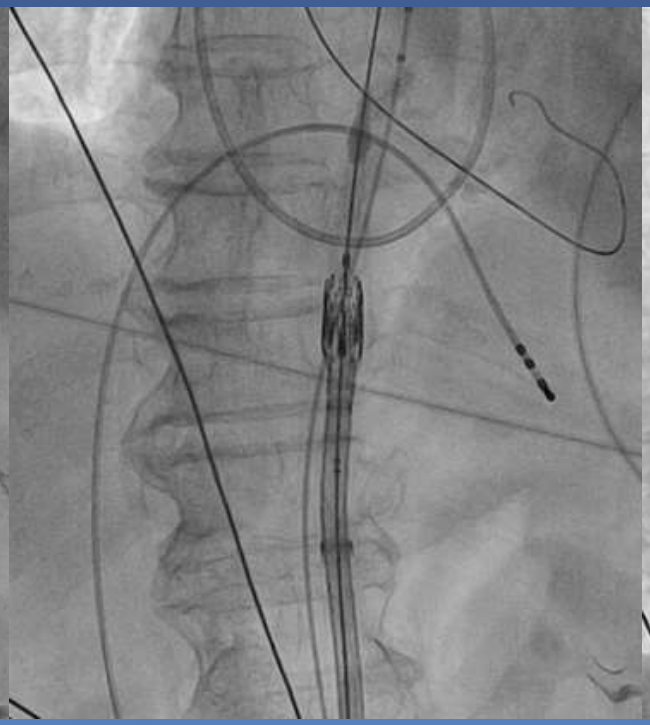
Wiring And Pre-ballooning

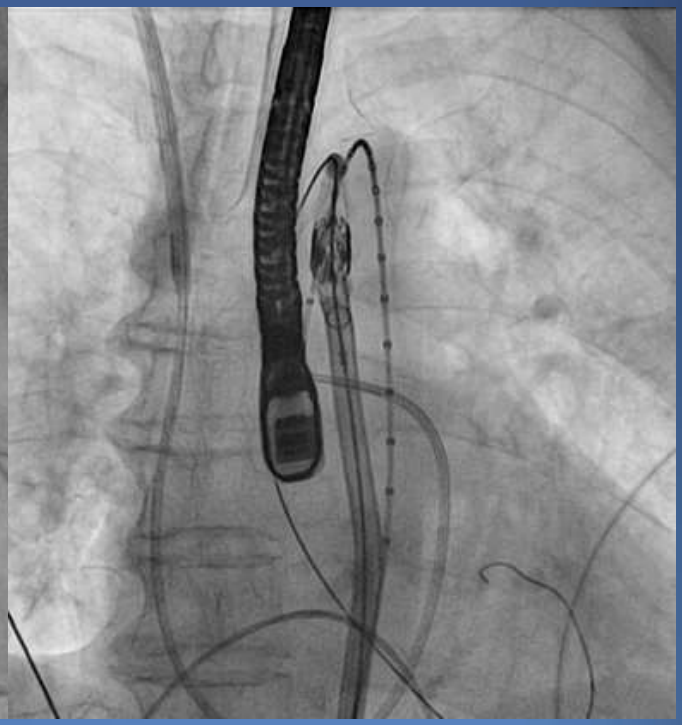


TAVI Procedure

Device Mount And Delivery

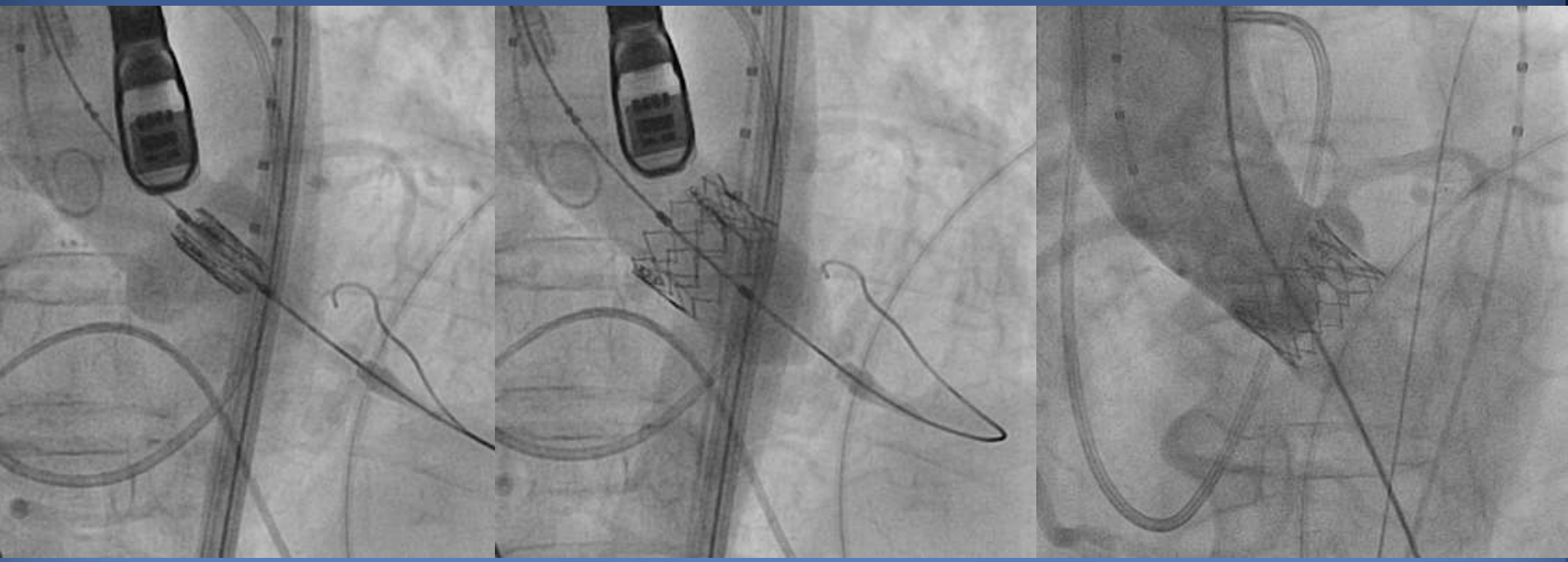






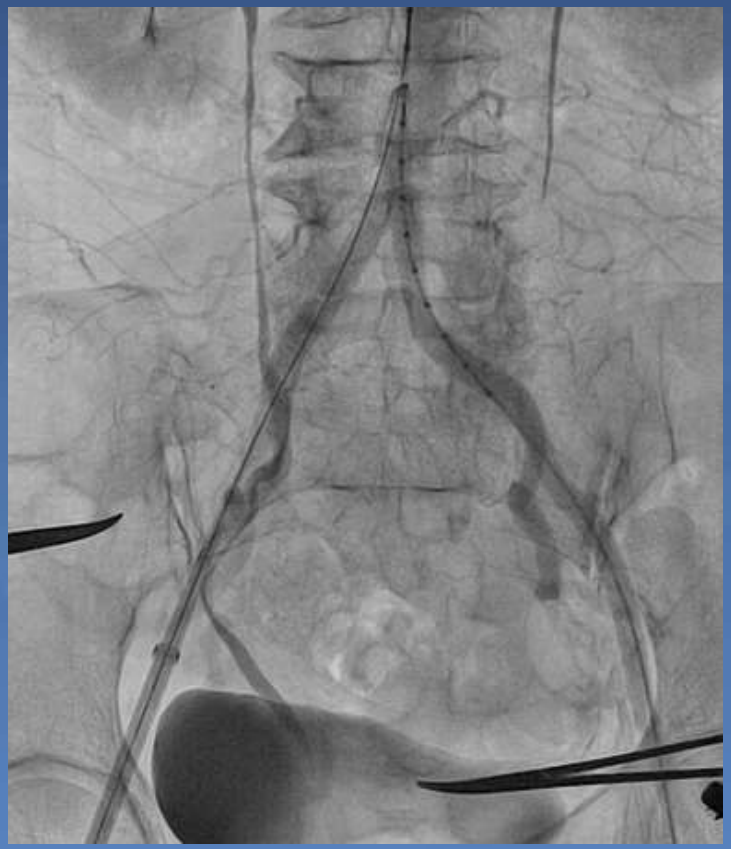
TAVI Procedure

Implantation



TAVI Procedure

Femoral angiography



TAVI Procedure

- Contralateral femoral angiography
- Puncture
- Introducing the sheath
- Setting the pacemaker
- Aortography and adjust the perpendicular angle
- Wiring through the aortic valve
- Pre-dilation with rapid pacing
- Introducing the TAVI device system
- Mount the prosthesis on delivery system
- Delivery the system
- Implantation of the TAVI prosthesis
- Aortography
- Femoral angiography

Vascular complications

AV Block

Stroke

Aortic root injury

Post-TAVR AR and Coronary Obstruction

Vascular complications

Complications of TAVI

Common complications

- Vascular complications
- Conduction disturbance
- Post-TAVI AR
- Stroke

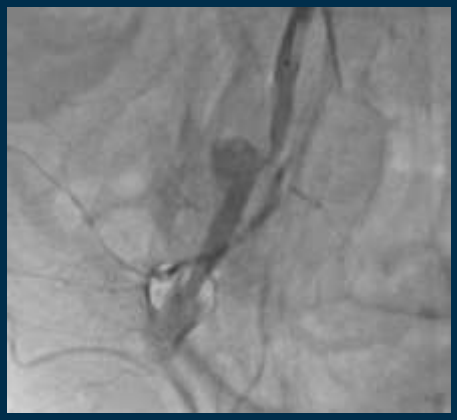
Catastrophic complications

- Coronary obstruction
- Aortic root rupture

Vascular complications

Type of complications

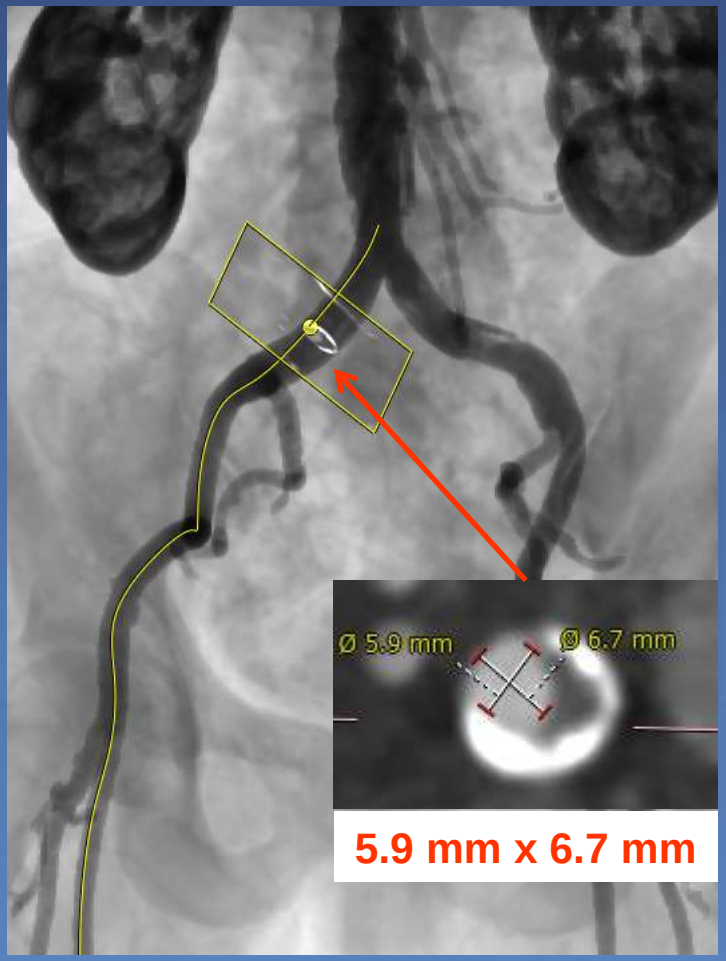
- Perforation
- Dissection
- Closure device failure



Assessment

- Diameter
- Calcification
- Tortuosity

MDCT Assessment



Minimum Vessel Diameter

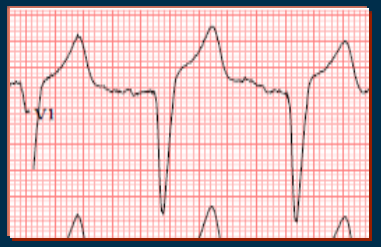
Size	SAPIEN XT	CoreValve	Lotus
23	5.5	6.0	6.0
26*	6.0	6.0	6.5
29**	6.5	6.0	6.5
31	-	6.0	

* 25 mm for Lotus valve
** 27mm for Lotus valve

Conduction Disturbance

Incidence of Permanent Pacemaker

- 4-15% for SAPIEN
- 25% for CoreValve and Lotus



Post-TAVI PPM and LBBB

- No impact on Mortality
- Longer hospital stay

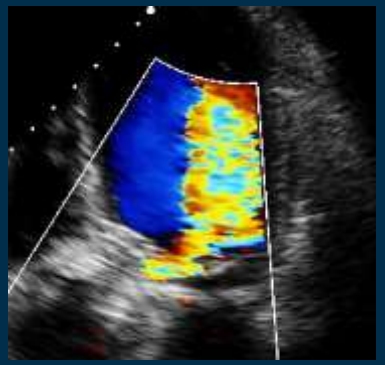
Predictors of PPM

- CoreValve
- Baseline LBBB
- Implantation depth and aortic valve calcium

Post-TAVI AR

Incidence of Post-TAVI AR

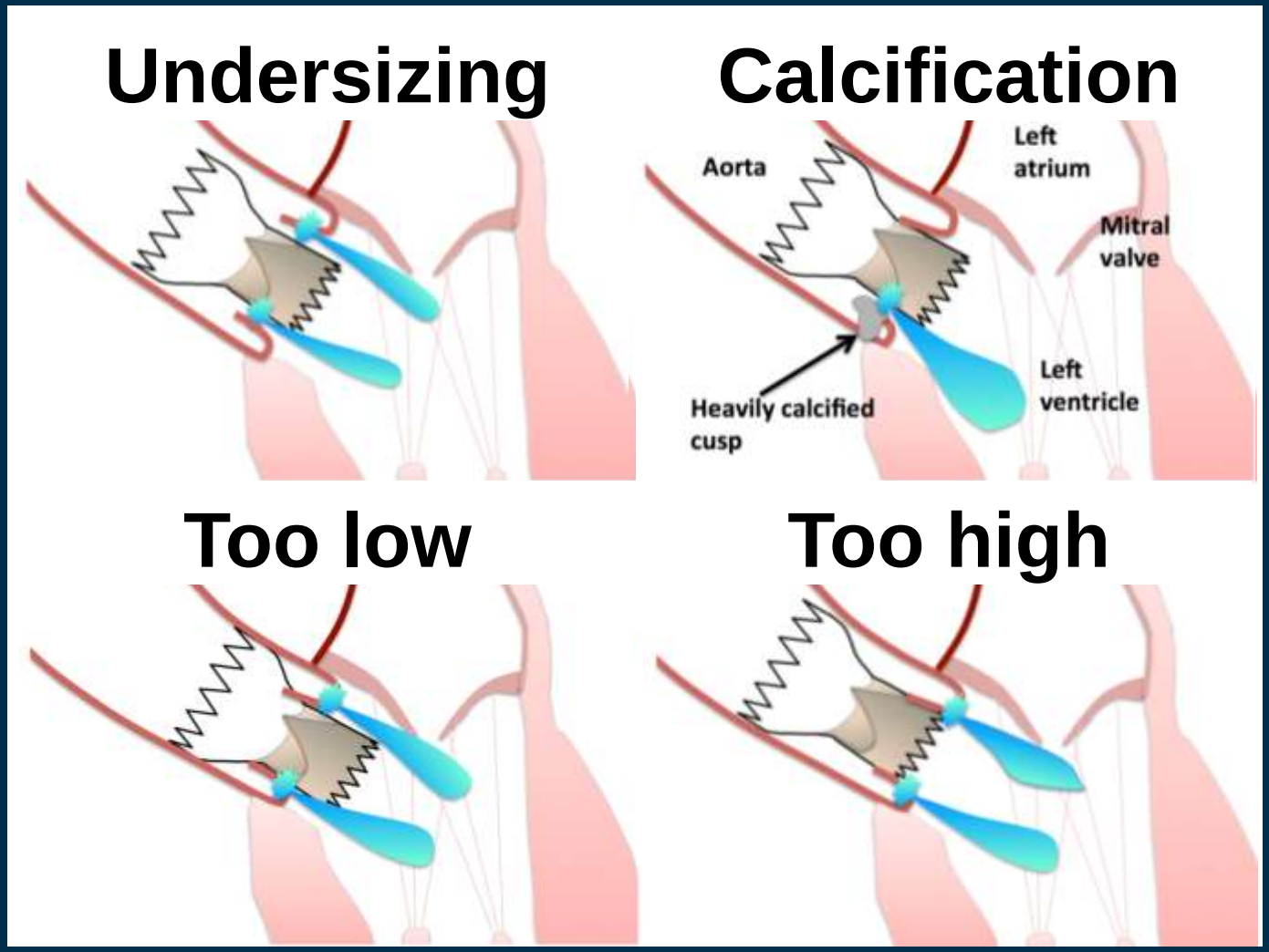
- 4-15% for SAPIEN
- 10-25% for CoreValve
- < 5% for Next generation devices



Post-TAVI AR ≥ Moderate

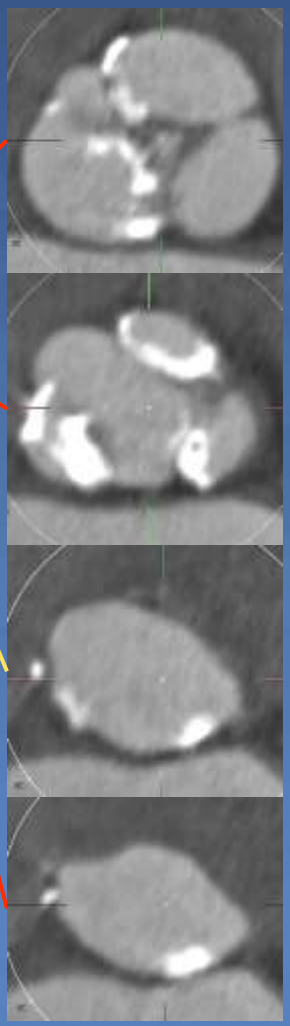
- Significant impact on Mortality

Predictors of Post-TAVI AR



Sinning JM et al., JACC 2012

Aortic Root Structure



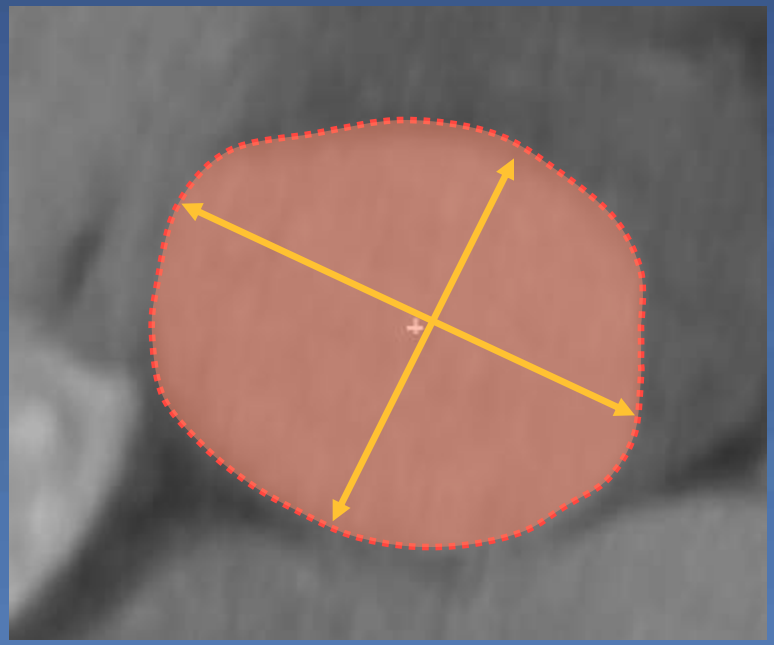
Sinus of Valsalva

Leaflet

Annulus

LVOT

Annulus Measurement



- Maximal Diameter
- Minimal Diameter
- Perimeter
- Area

Post-TAVI AR in Asia

	Overall (N = 874)	SAPIEN (N = 549)	CoreValve (N = 325)	p value
Post-TAVI AR				
None-trace	10.5%	10.4%	10.7%	0.27
Mild	35.0%	35.6%	33.9%	
Moderate	9.2%	7.9%	11.7%	
Severe	0.3%	0.2%	0.7%	
≥ Mild	54.4%	53.9%	55.4%	0.68
≥ Moderate	9.5%	8.0%	12.4%	0.037

Coronary Obstruction

Incidence

- 0.5-1% for SAPIEN
- Mainly Left coronary artery

Impact

- Strong impact on Mortality
- No assurance of safety even after PCI

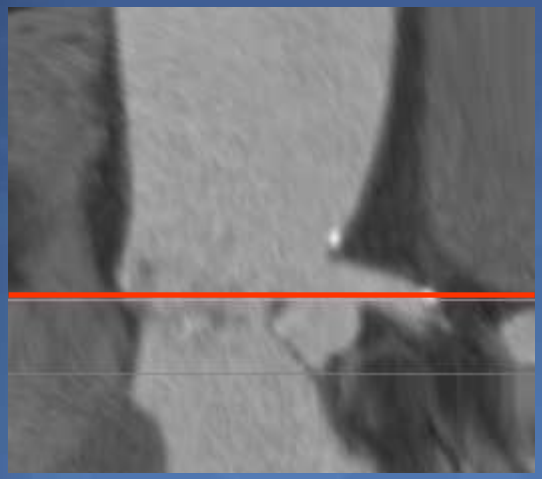
Predictors

- Height of left coronary artery < 10 mm
- Small Valsalva (< 30 mm)

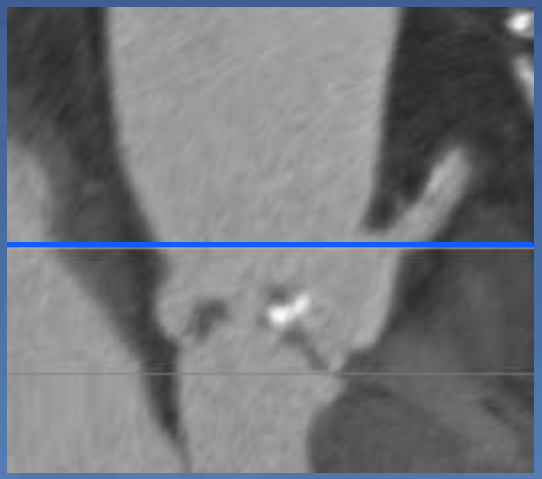
Coronary Obstruction in Asia

	Overall (N = 874)	SAPIEN (N = 549)	CoreValve (N = 325)	p value
Need for 2nd device	4.3%	0.9%	10.2%	< 0.001
Coronary obstruction	**1.3%**	**1.5%**	**0.9%**	**0.76**
Aortic root rupture	0.5%	0.7%	0.0%	0.30
Conversion to SAVR	1.3%	1.1%	1.5%	0.55
Permanent pacemaker	10.8%	4.2%	21.8%	< 0.001

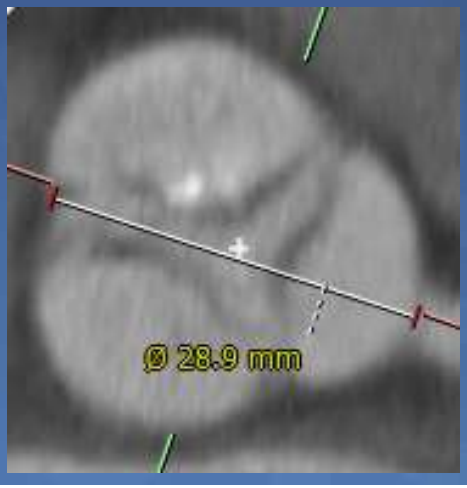
Assessment of Coronary Height



LCA height: 9.6 mm



RCA height: 15.6 mm



Width of Valsalva: 29mm

Aortic Root Injury

Incidence

- 0.5-1% for SAPIEN
- Rare for CoreValve (without balloon-dilation)

Impact

- High mortality for Annulus rupture, dissection
- Subclinical Aortic root injury (L-R shunt)

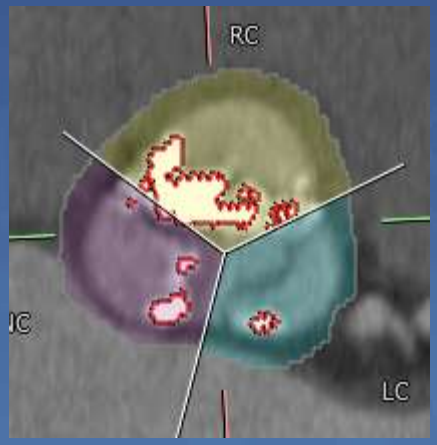
Predictors

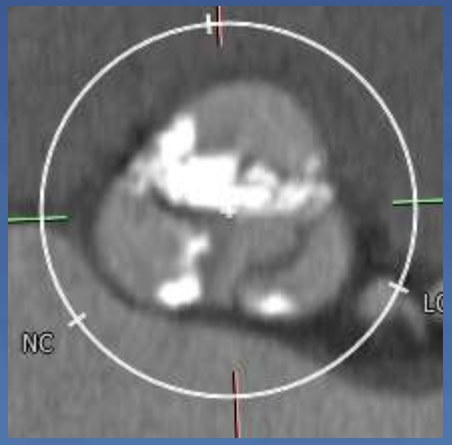
- Extreme oversized device of SAPIEN
- LVOT Calcification

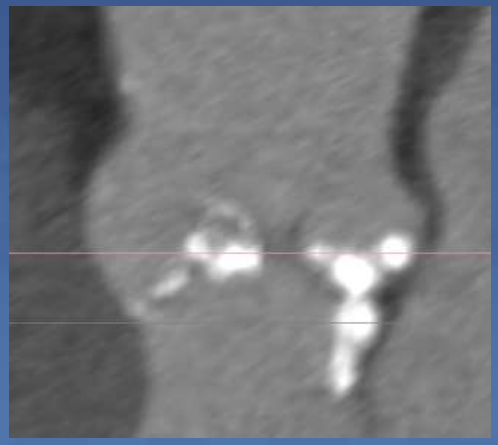
Annulus Rupture in Asia

	Overall (N = 874)	SAPIEN (N = 549)	CoreValve (N = 325)	p value
Need for 2nd device	4.3%	0.9%	10.2%	< 0.001
Coronary obstruction	1.3%	1.5%	0.9%	0.76
Aortic root rupture	**0.5%**	**0.7%**	**0.0%**	**0.30**
Conversion to SAVR	1.3%	1.1%	1.5%	0.55
Permanent pacemaker	10.8%	4.2%	21.8%	< 0.001

Assessment of Calcification



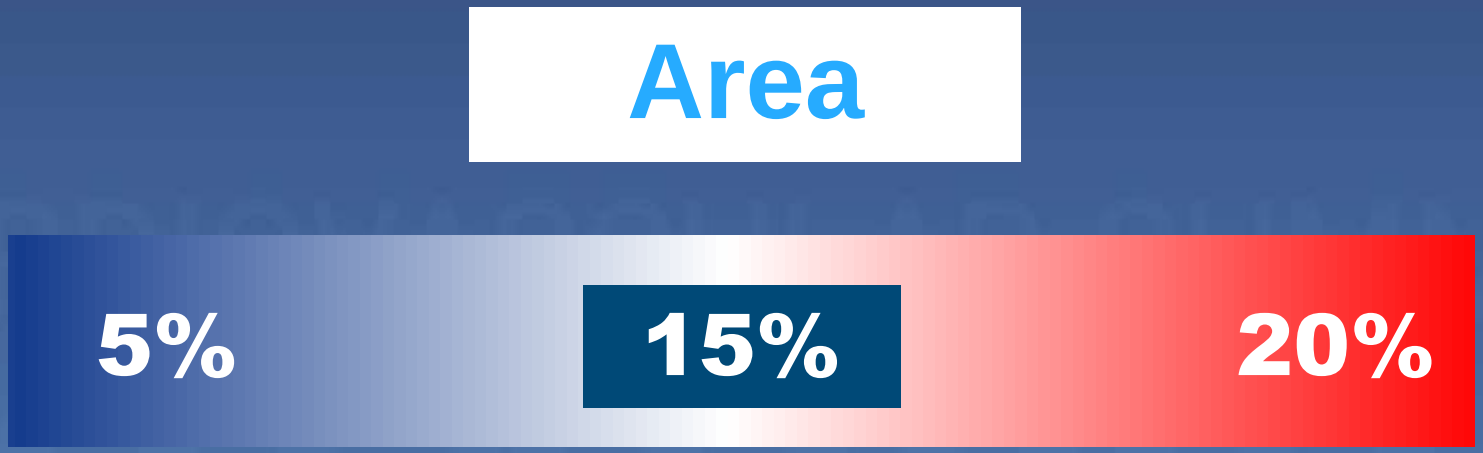




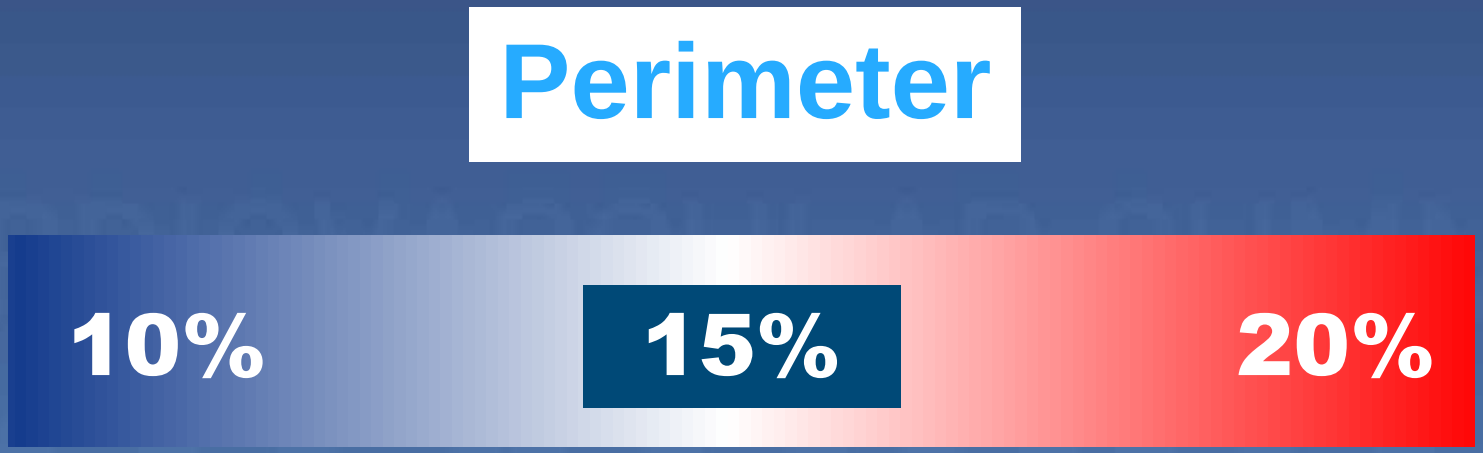
Calcium volume score	
NCC	148.8 mm^3
RCC	445.7 mm^3
LCC	49.0 mm^3
Total	643.6 mm^3

Threshold 850 HU

Device Sizing for SAPIEN



Device Sizing for CoreValve



Stroke

The most feared complication

- 2-10% incidence
- Associated with age and other comorbidities (peripheral vascular disease)

Prevention

- Gentle maneuver
- Smaller profile device

Stroke

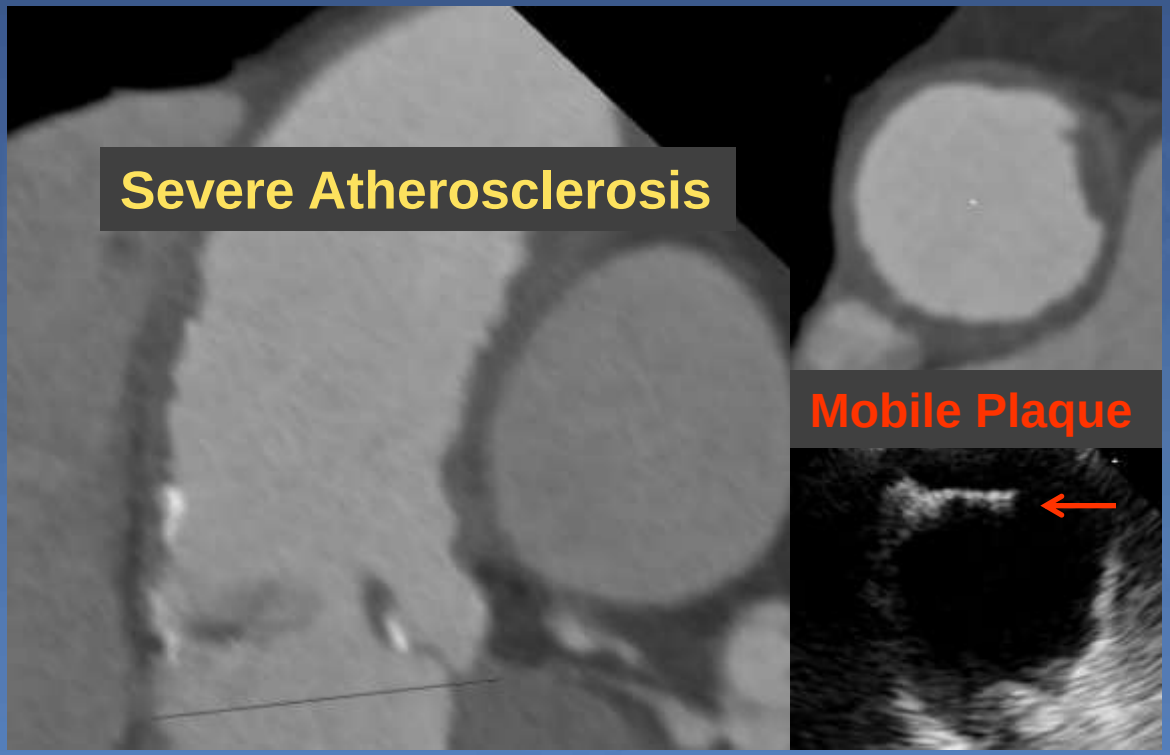
TAVI vs. SAVR

- **TAVI > SAVR → TAVI < SAVR**
- **Stroke rates decreasing (5-7% → ~2%)**

Transfemoral vs. Transapical

- **Similar stroke rates (3.4% vs. 3.3%)**

Selection of Access Site



Transapical approach

Conclusions

1. Cautious patient screening and treatment strategy is mandatory for successful TAVI procedure.
2. Single each steps of procedure is associated with serious complications.
3. TAVI procedure is performed not only by cardiologists or surgeons alone. The cooperation between interventionalits, surgeons, anesthesiologists and technicians is the key.