

Coronary protection during TAVR: When and how?

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In selected patients:

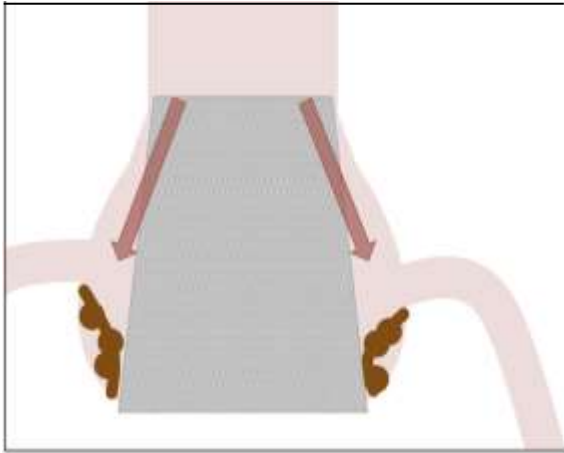
Coronary artery occlusion during TAVR is a rare but often fatal complication!

Patients at risk:

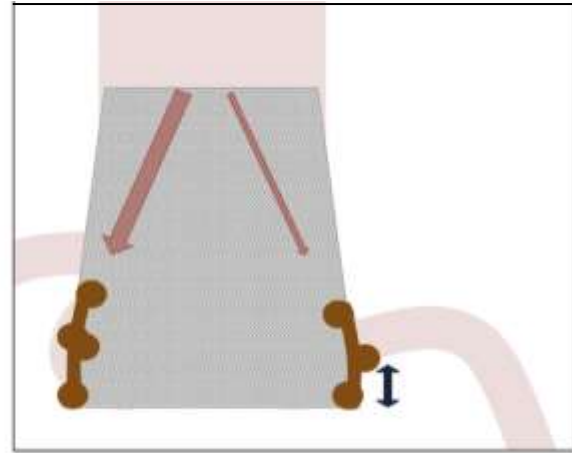
- Native aortic valve stenosis
- VinV for degenerated bioprosthetic aortic valve

Native aortic valve

High coronary take-off
Wide sinus of Valsalva
High sinotubular junction
Short non-calcified cusps

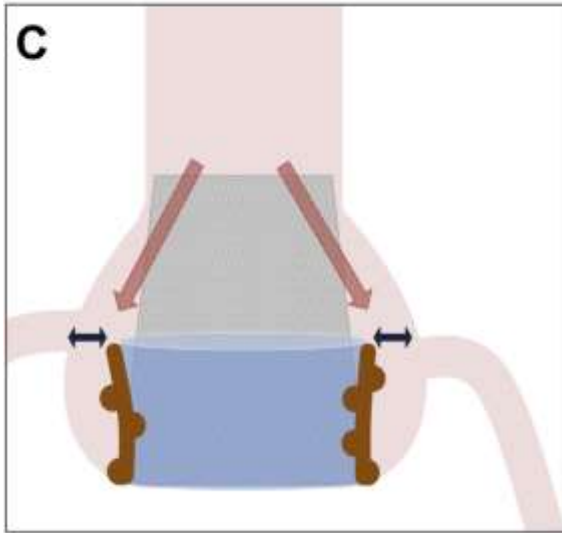


Low coronary take-off
Shallow sinus of Valsalva
Low sinotubular junction
Long calcified cusps

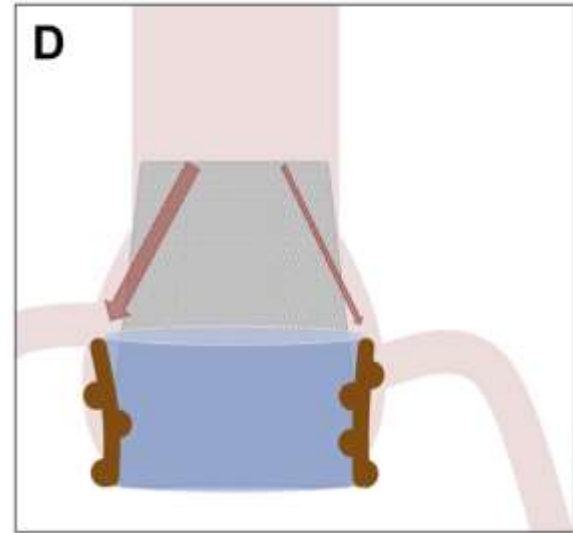


TAVR in degenerated surgical bioprostheses

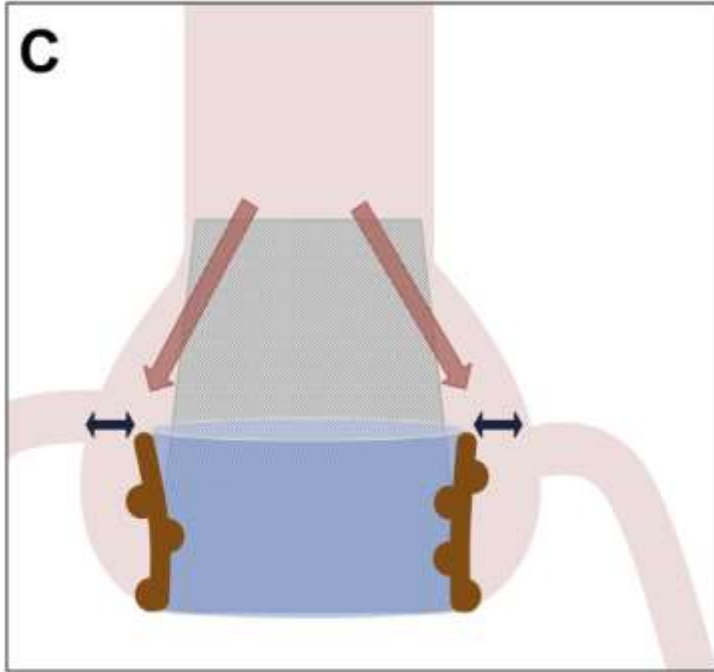
High coronary take-off
Wide sinus of Valsalva
High sinotubular junction



Low coronary take-off
Shallow sinus of Valsalva
Low sinotubular junction

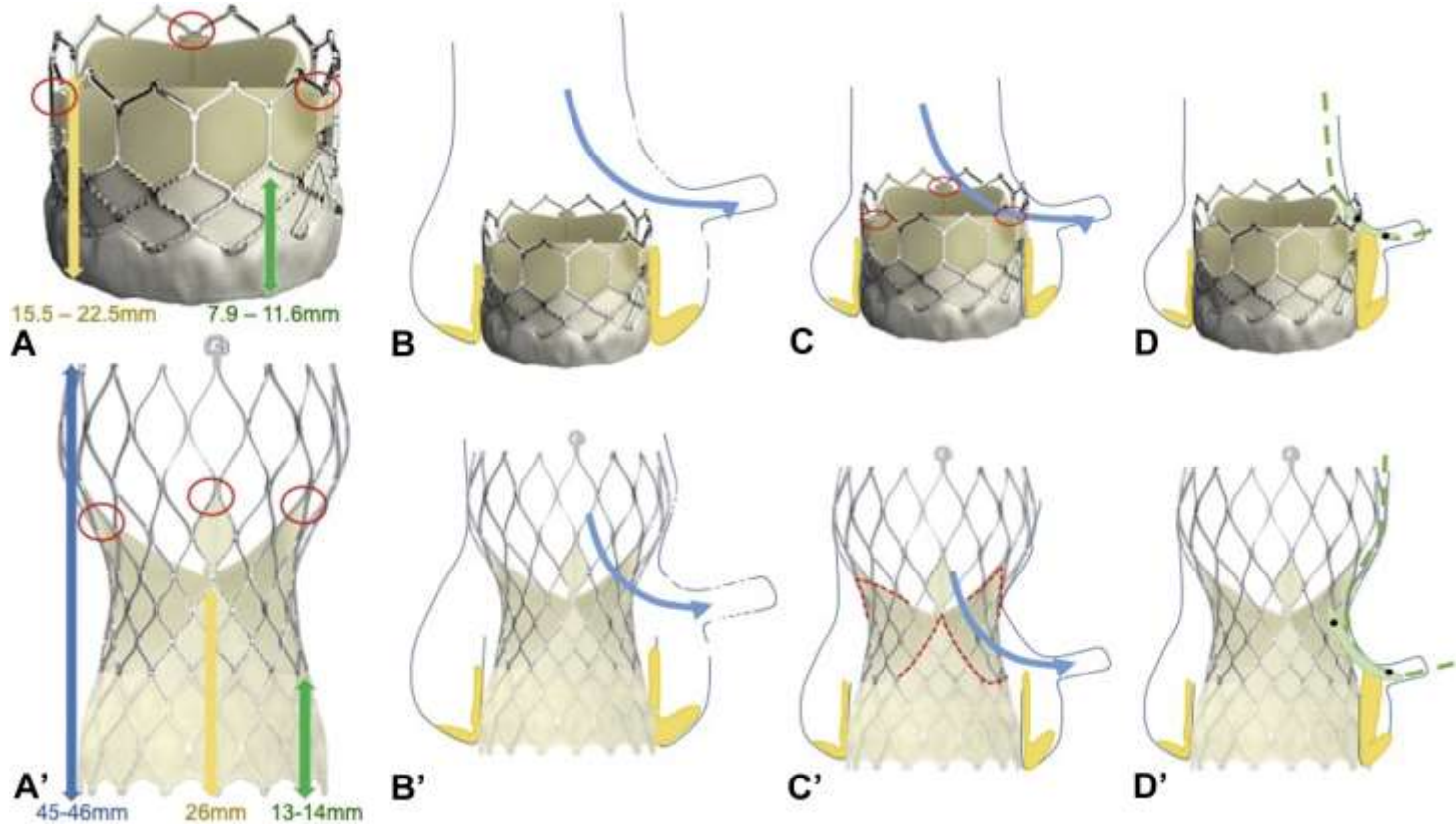


TAVR in degenerated surgical bioprostheses



Valve-to-Coronary (VTC):
<4 mm a risk factor!

Know your transcatheter heart valve!



Surgical bioprosthetic valve types

Stented bioprosthesis



Mosaic



Mitroflow & Trifecta

Leaflets sutured
'outside' stent

Stentless bioprosthesis



Freedom Solo

High risk of coronary occlusion

Stented bioprosthesis



Mosaic

Stentless bioprosthesis



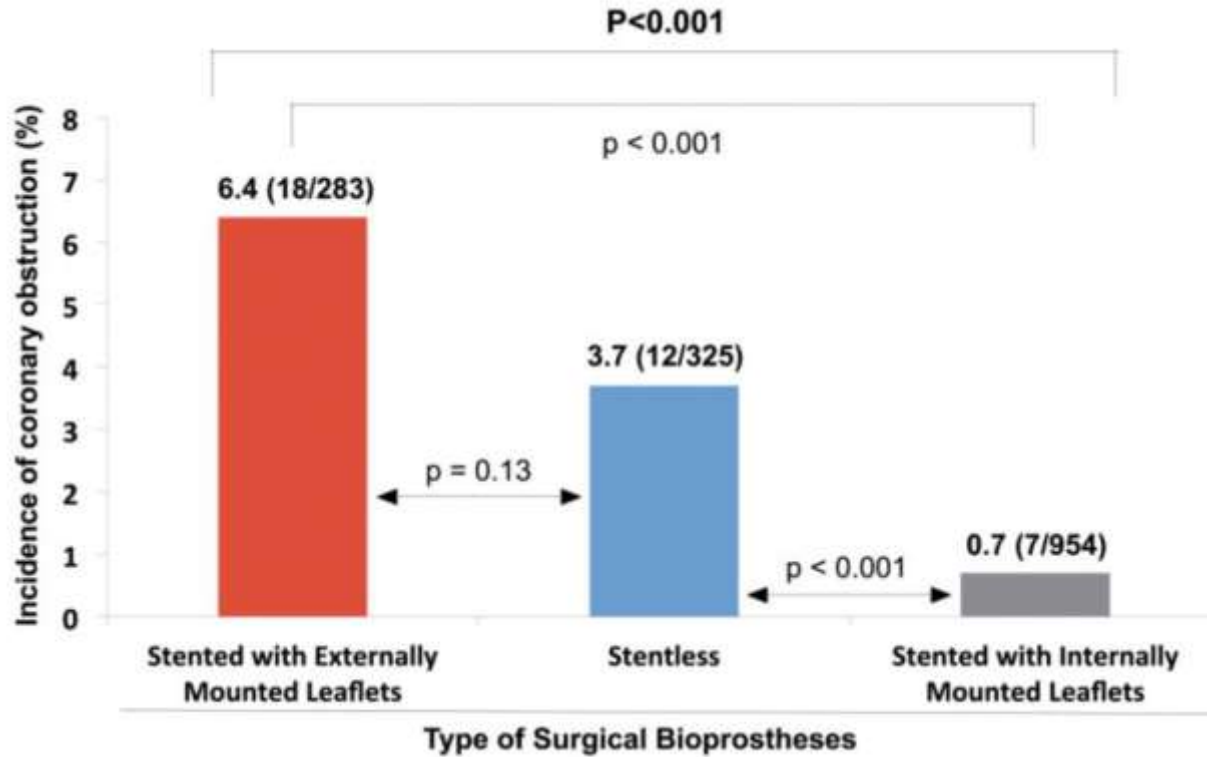
Mitroflow & Trifecta

Leaflets sutured
'outside' stent

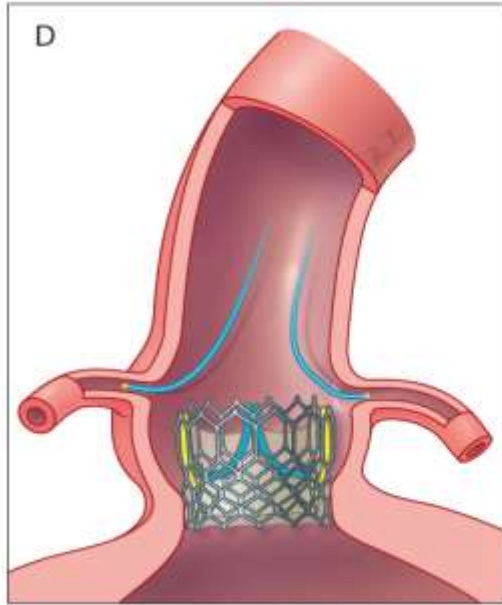


Freedom Solo

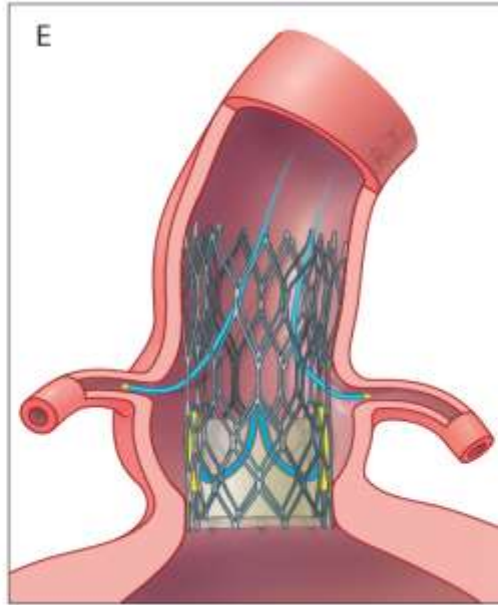
Coronary occlusion in VinV



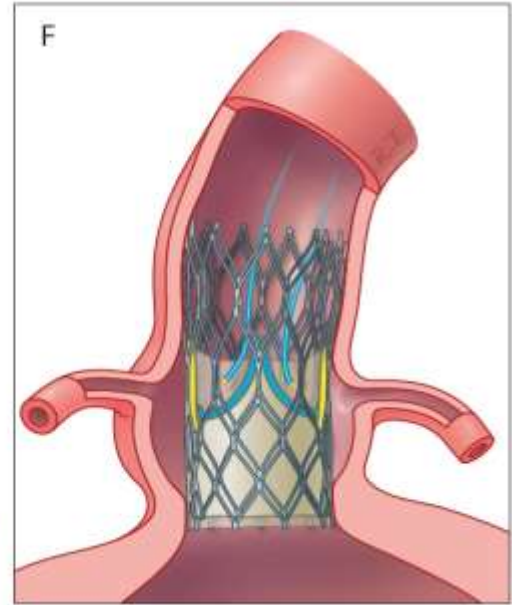
Coronary access after TAVR-in-TAVR



Low-frame
Intra-annular leaflets

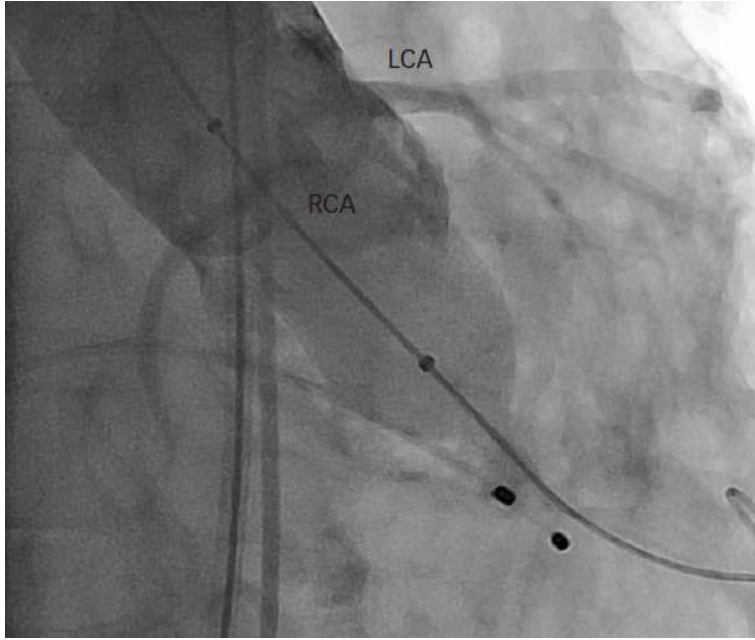


High-frame
Intra-annular leaflets



High-frame
supra-annular leaflets

Coronary flow assessment during BAV



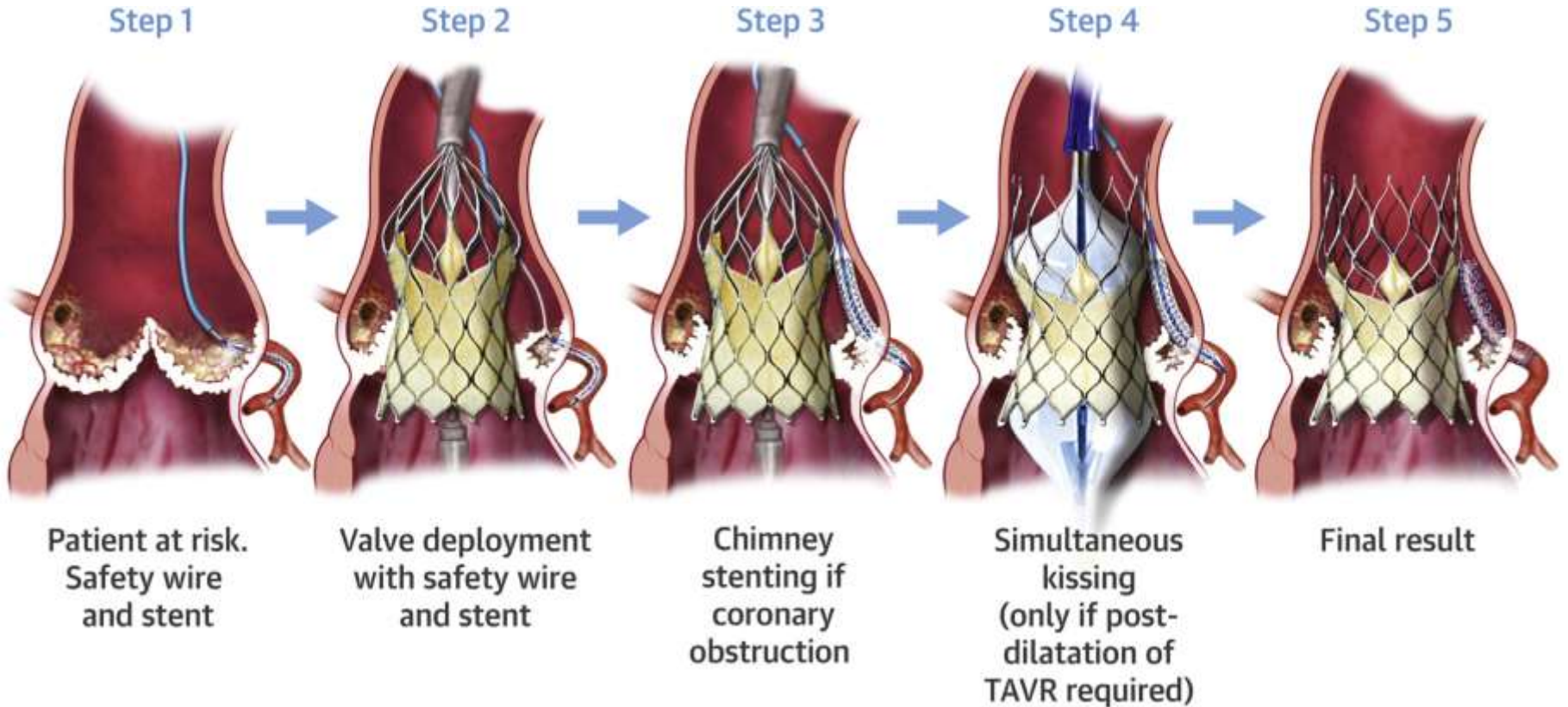
- Balloon with same diameter as true ID
- Simultaneously aortic root injection
- Confirm that coronary flow is unaffected

TAVR with surgical team stand-by



- Surgeon in the room
- Heart-lung machine primed
- Introducer sheath -> arterial cannula
- Venous access, stiff-guide wire in IVC

Chimney stenting



Frequency of chimney stenting

60 (0.5%) procedures in 12,800 TAVR

- *18 native aortic annulus*
- *42 VinV*

30-day clinical outcomes

	Total (N = 60)	CAO		p Value
		iCAO (n = 35)	eCAO (n = 25)	
Procedural death	3 (5.0)	0 (0.0)	3 (12.0)	0.07
30-day death	3 (5.0)	0 (0.0)	3 (12.0)	0.07
MI	13 (21.6)	0 (0.0)	13 (52.0)	<0.01
Cardiogenic shock	14 (23.3)	1 (2.9)	13 (52.0)	<0.01
Stroke	1 (1.7)	0 (0.0)	1 (4.0)	—
Major vascular complication	2 (3.4)	1 (2.9)	1 (4.0)	0.7
Life-threatening bleeding	1 (1.7)	0 (0.0)	1 (4.0)	—
AKI grade 3	3 (5.0)	1 (2.9)	2 (8.0)	0.4

TABLE 6 Predictors of 30-Day Death, Myocardial Infarction, and Cardiogenic Shock

	Univariate Analysis			Multivariate Analysis		
	Odds Ratio	95% CI	p Value	Odds Ratio	95% CI	p Value
Absence of coronary protection	8.81	2.41-32.16	<0.01	7.39	1.95-27.93	<0.01
No VIV	1.41	0.43-4.67	0.6			
Balloon-expandable THV	3.36	1.01-11.18	0.05	2.18	0.56-8.43	0.26
SOV diameter <30 mm	1.93	0.60-6.23	0.27			
Coronary height <10 mm	2.16	0.41-11.37	0.36			
VTC \leq 4 mm*	1.54	0.34-6.93	0.58			

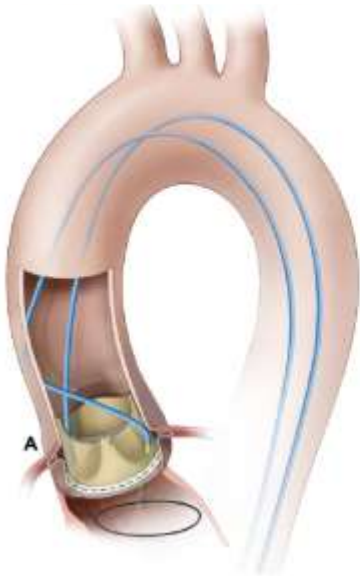
Stent failure after chimney stenting (3.5%)

Median follow-up 612 days (IQR 405-842 days)

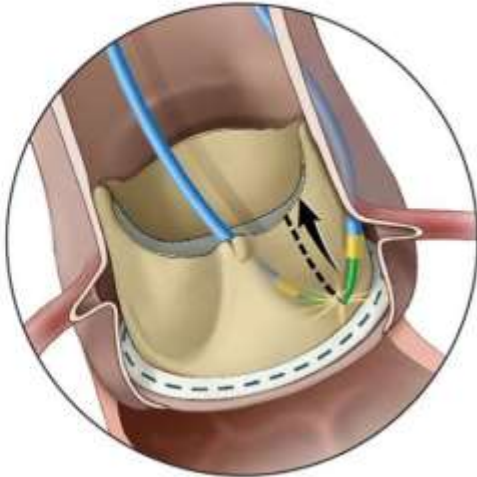
- *1 in-stent restenosis (day 157)*
- *1 possible late stent thrombosis (day 374)*

BASILICA - laceration of cusp

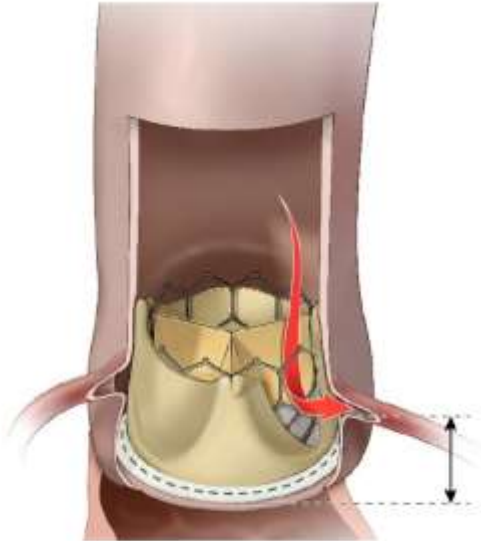
Leaflet wire transversal and snaring



Leaflet slicing



Preserved coronary flow



Anatomically considerations for BASILICA

Favorable for BASILICA	Unfavorable for BASILICA
Typical calcium pattern which spares the nadir of the leaflet	Confluent calcium at the leaflet nadir
	Bulky calcium mass on the leaflet
Commissures aligned with native commissures	Bioprosthetic valve post in-front of coronary artery ostium
Femoral access for BASILICA catheters preferred for ergonomics	Nonfemoral access (femoral artery or transcaval) for double leaflet BASILICA
Single leaflet BASILICA	Double BASILICA not recommended for new operators in their first 2–3 cases
Risk from sinus sequestration	

Clinical outcomes with BASILICA

Native aortic valve: 13 (43%), surgical bioprosthesis 17 (57%)

Clinical outcomes	At 30 days (n=30)	At 1 y (n=30)
All death	1 (3.3%)	3 (10%)
Cardiovascular	1 (3.3%)	2 (6.7%)
Noncardiovascular	0 (0%)	1 (3.3%)
All stroke	3 (10%)	3 (10%)
Disabling	1 (3.3%)	1 (3.3%)
Nondisabling	2 (6.7%)	2 (6.7%)
Coronary artery obstruction	0 (0%)	0 (0%)

Summary

- Coronary occlusion is rare in native aortic annuli, but a risk during VinV procedures
- Pre-procedural CT may identify patients at risk
- Chimney stenting relative simple and safe, but concerns regarding re-access and stent failure
- BASILICA more technical challenging and may fail

Coronary occlusion during TAVR:
If you think about it, protect it!