PCI in Post-TAVR Patients: Beyond the Barrier

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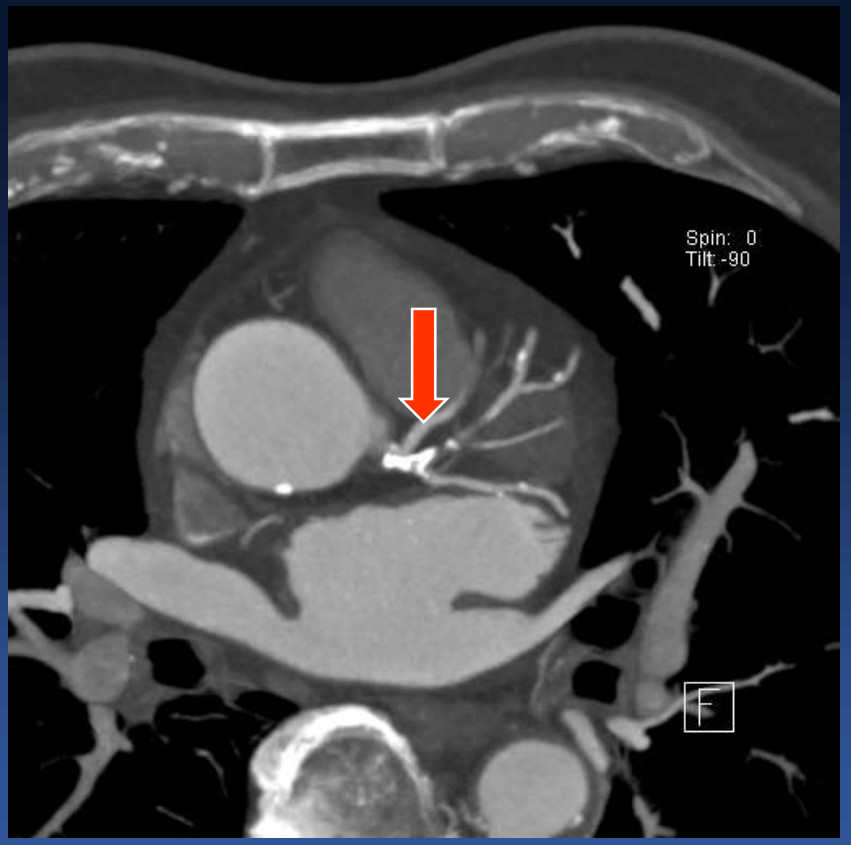
TAVR and PCI

- Concomitant CAD
- Coronary Obstruction

M/91 with Chest Pain

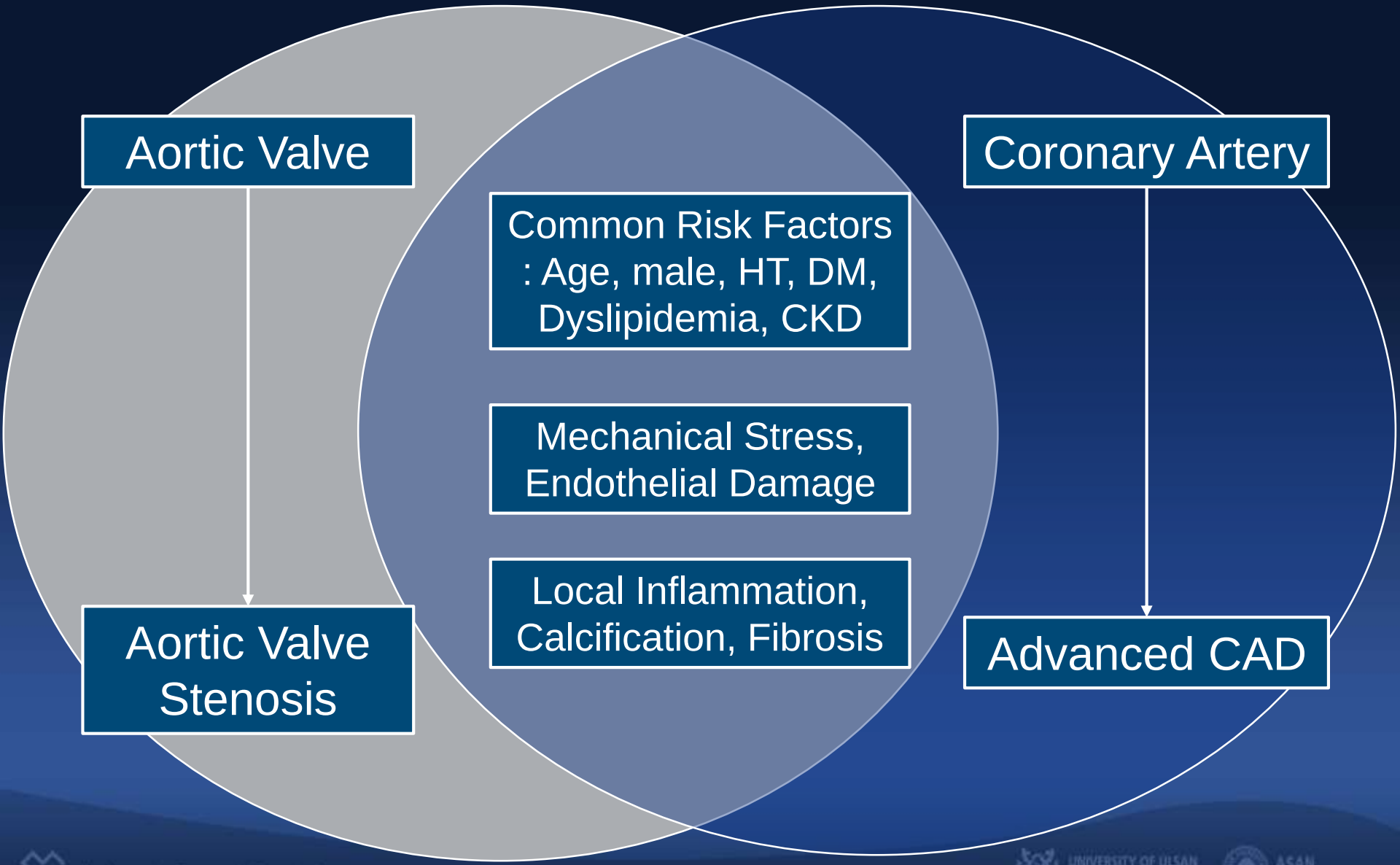
Severe AS and Severe CAD



M/91 with Chest Pain

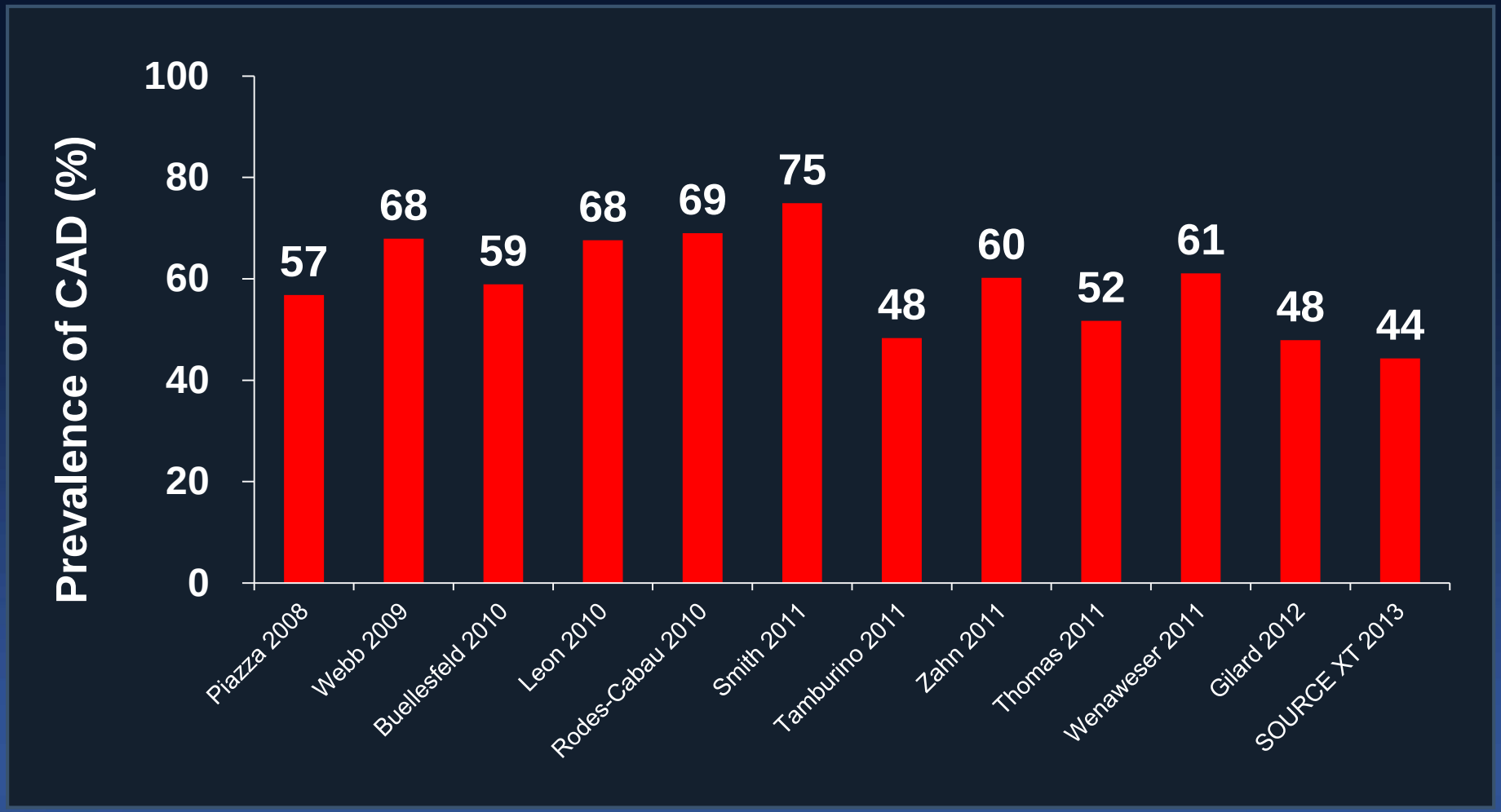
Severe AS and Severe CAD

Common Pathophysiology



Milin AC et al, J Am Heart Assoc. 2014 Sep;5:e001111

Incidence of CAD in TAVR Patients



Stefanini GG et al, Eurointervention. 2013;9:S63-S68

Impact of CAD on Outcomes after TAVR

- Meta-analysis: 7 studies, 2472 patients, median follow-up 452 days

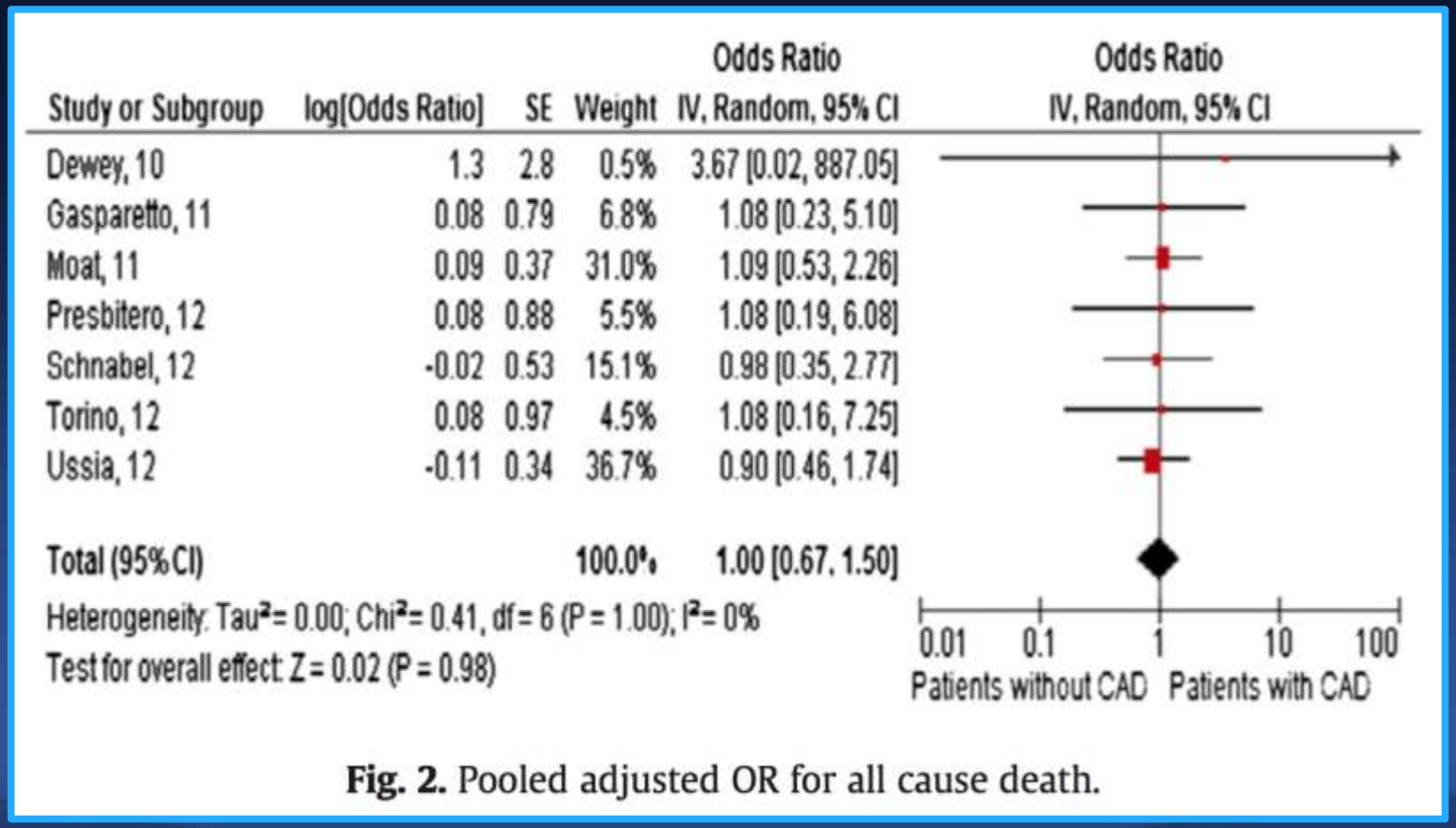
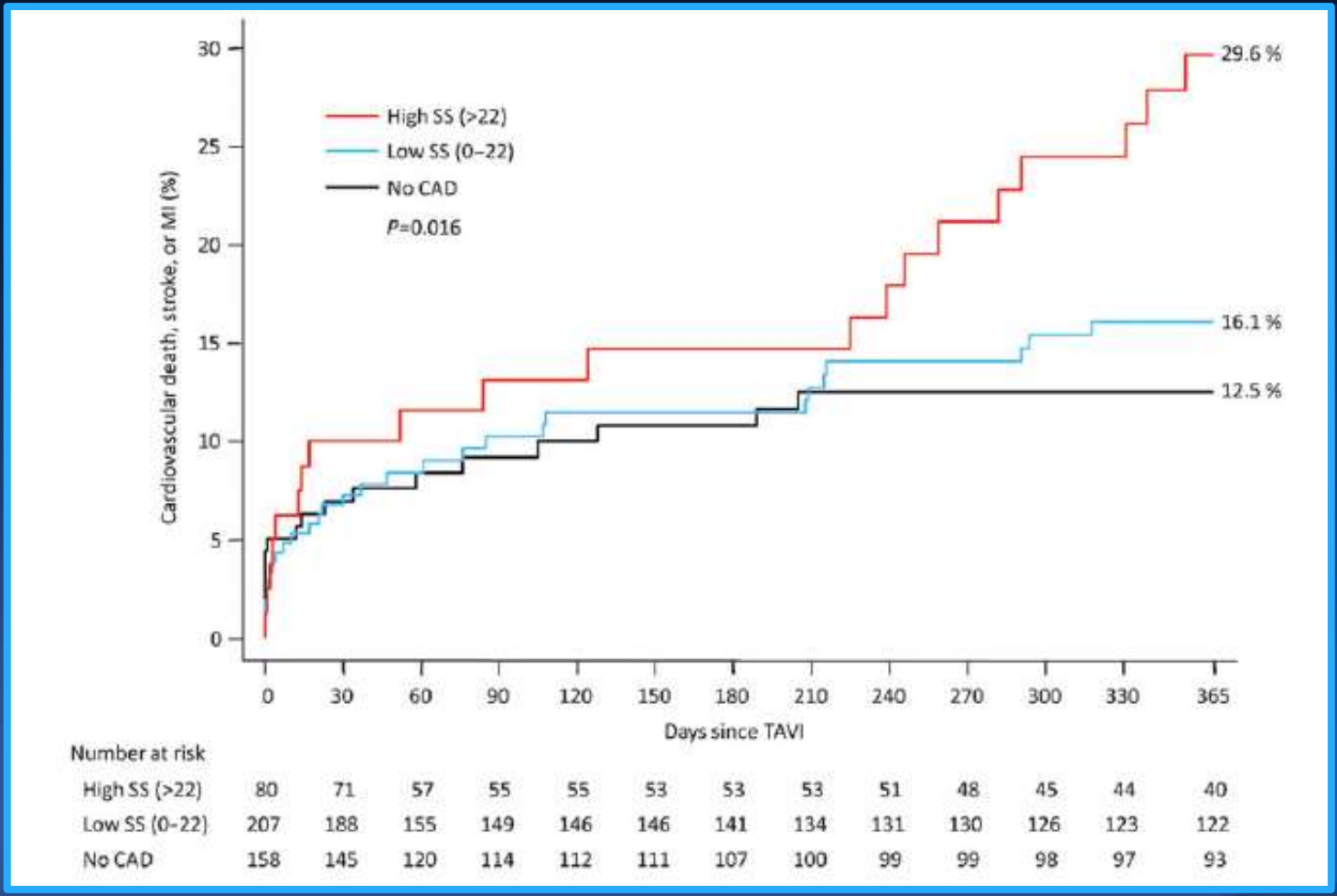


Fig. 2. Pooled adjusted OR for all cause death.

D'Ascenzo et al. Int J Cardiol 2013

Effect of CAD Burden by SYNTAX in TAVR Patients



CAD Treatment in patients undergoing TAVR

Medical Therapy

PCI + staged TAVR

Same Setting PCI + TAVR

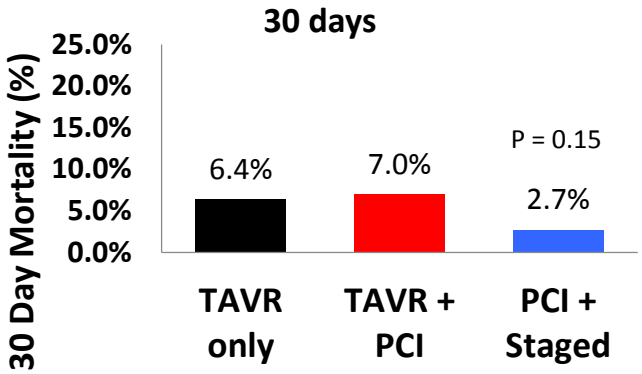
Timing of PCI And TAVR: No Relevant Data

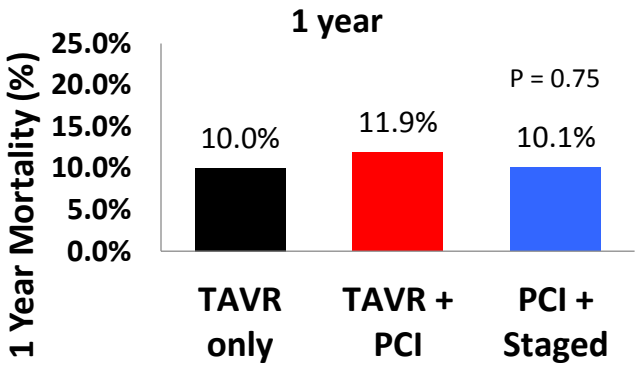
	Advantage	Disadvantage
Prior PCI before TAVR	• Easy access • [illegible] • [illegible]	• DAPT after PCI • [illegible]ular access • [illegible] severe AS • [illegible] <30%) • Less convenient
Same-stage PCI during TAVR	• Treatment of both pathology at the same time • [illegible] • [illegible] during TAVR	• More lengthy procedure • Contrast nephropathy

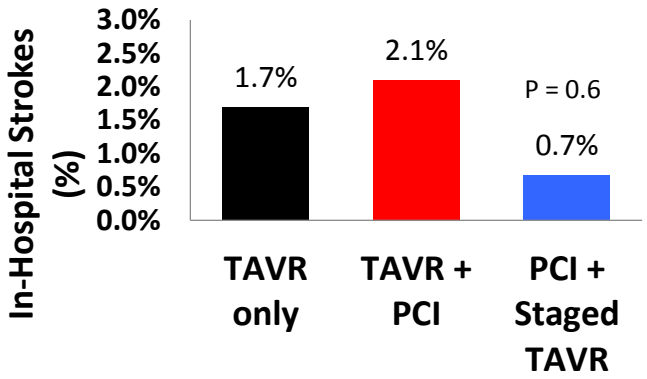
Relatively Complex Lesion

Relatively Simple Lesion

Columbia Experience with Same Setting PCI (2012-2017, 2071 patients)







Reasonable Incomplete Revascularization: Revisited for TAVR Patients

Reasonable Incomplete Revascularization

Focus on the proximal stenosis supplying large myocardium based on the physiologic guidance: e.g. Left Min or proximal LAD

- Very small vessels
- Only 1-vessel IR
- Jailed asymptomatic side branch
- Not culprit artery (thrombus)

- Non-viable myocardium
- < 5% residual ischemic area expected
- Small ischemic area

- FFR > 0.80

Dauerman HL. Circulation. 2011;123:2337

Key Message I

- CAD is common in TAVR patients
- TAVR outcomes are mostly affected by high complexity of CAD
- Selective incomplete revascularization seems reasonable
- Lower risk AS patients with significant CAD may benefit from surgery
- RCT data guiding revascularization in TAVR patients is still awaited

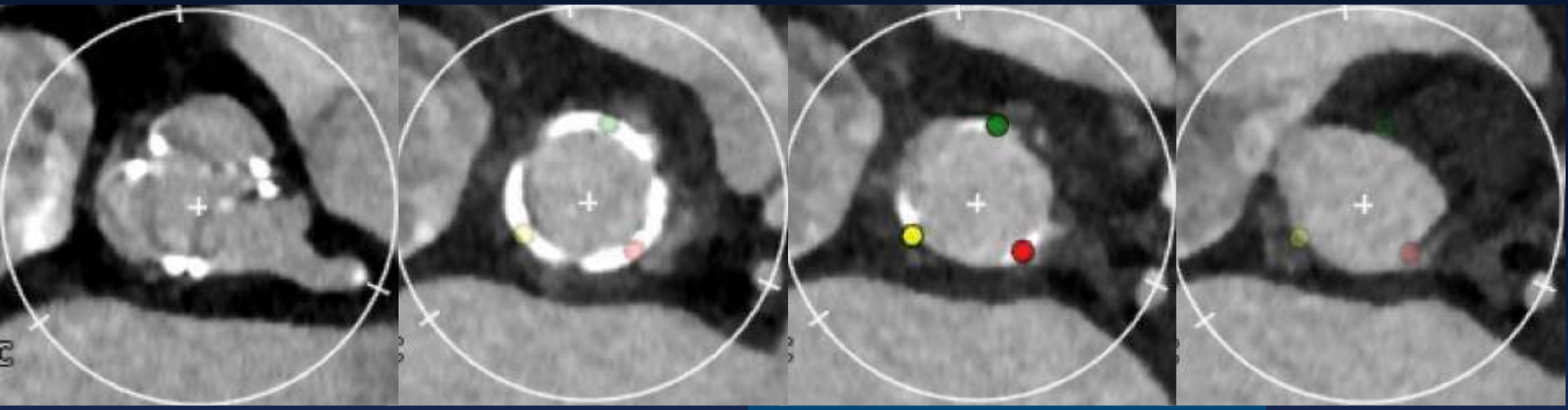
TAVR and PCI

- Concomitant CAD
- Coronary Obstruction

Catastrophic Cases of Coronary Obstruction Associated with TAVR

- 80/F, 148.6 cm, 47.7 kg, BMI 21.60, BSA 1.40
- Chief complaints
  - DOE (NYHA II)
- Medical history
  - HT, DM
  - HCV LC
  - s/p CABG and AVR(C-E 19mm) (2009)
- ECG : NSR
- Serum Cr : 0.86 (GFR 63)
- PFT : FEV1 70% / FVC 67% = 72%
- STS score = 9.371%
- Euroscore I = 7.94%, Euroscore II = 1.65%

Bioprosthetic valve basal plane

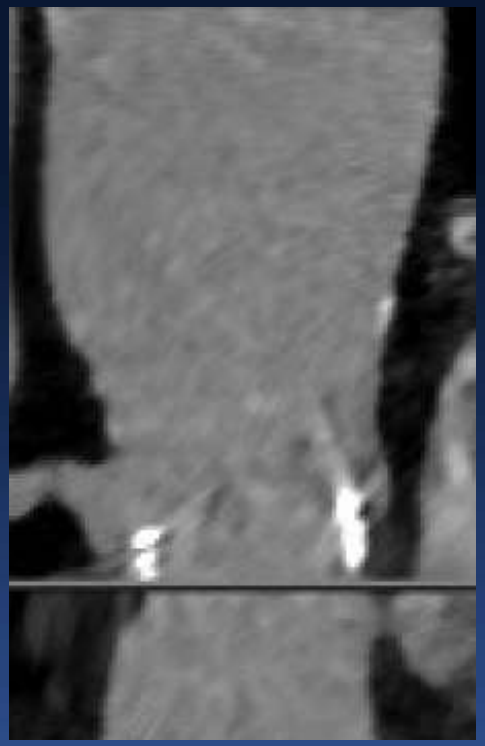


Base of the surgical valve

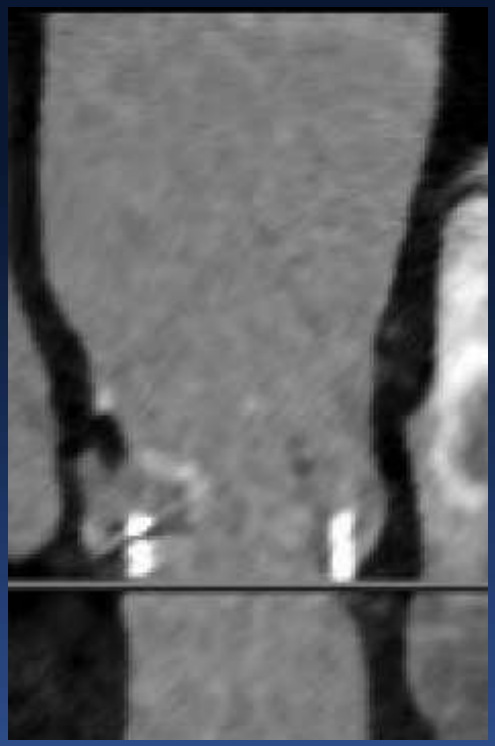
Bioprosthetic valve parameters	
Valve internal short diameter	16.6 mm
Valve internal long diameter	18.1 mm
Valve internal mean diameter	17.3 mm
Valve internal area	238 mm^2
Valve internal area-derived diameter	17.4 mm
Valve internal perimeter	54.9 mm
Valve internal perimeter-derived diameter	17.5 mm

CT – Coronary heights

LCA



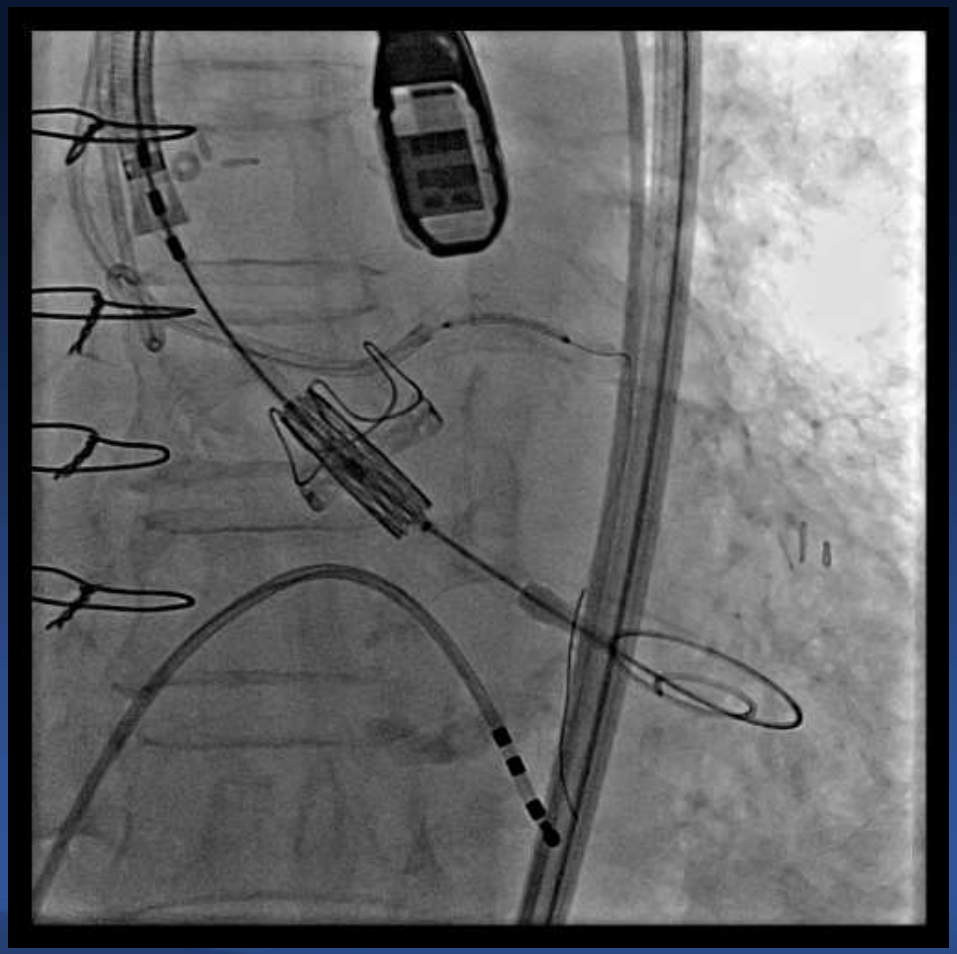
RCA



Coronary Height	
LCA	6.8 mm
RCA	8.8 mm

TAVR procedure

SAPIEN 3: 20mm with coronary protection

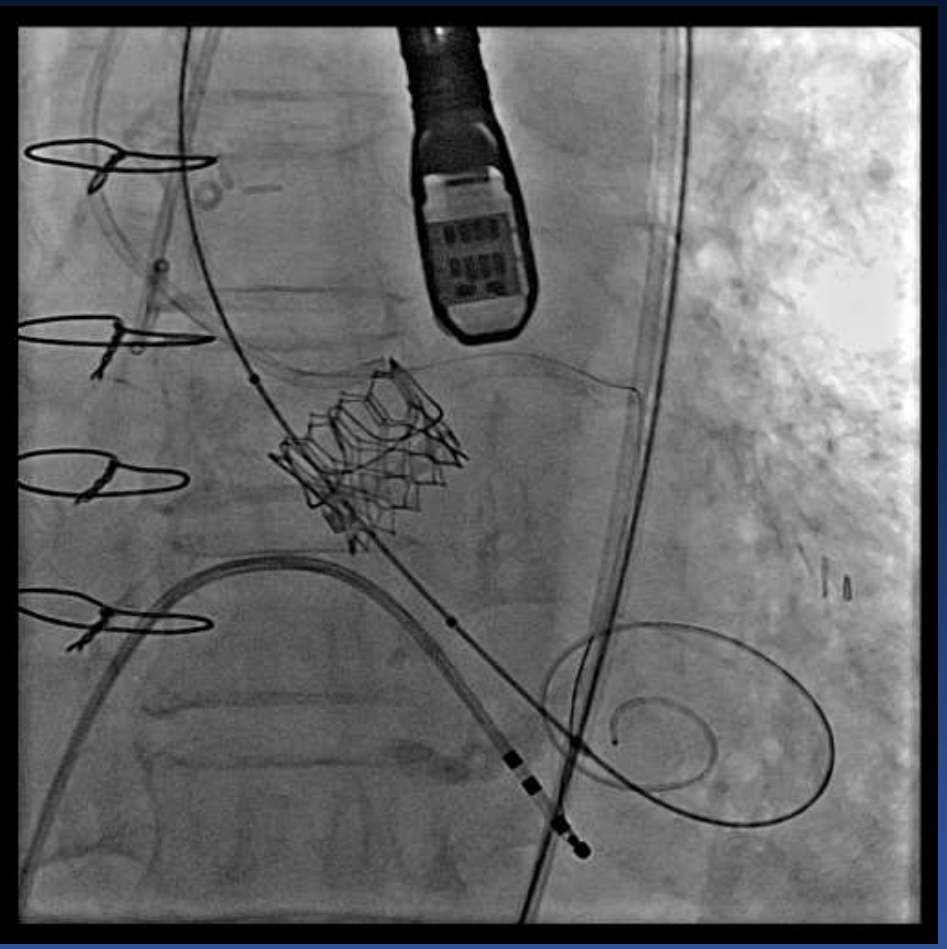


At least moderate PVR

Z-Med Post-dilation with 20mm

PVR did not reduce

Valve Fracture with 20mm ATLAS GOLD

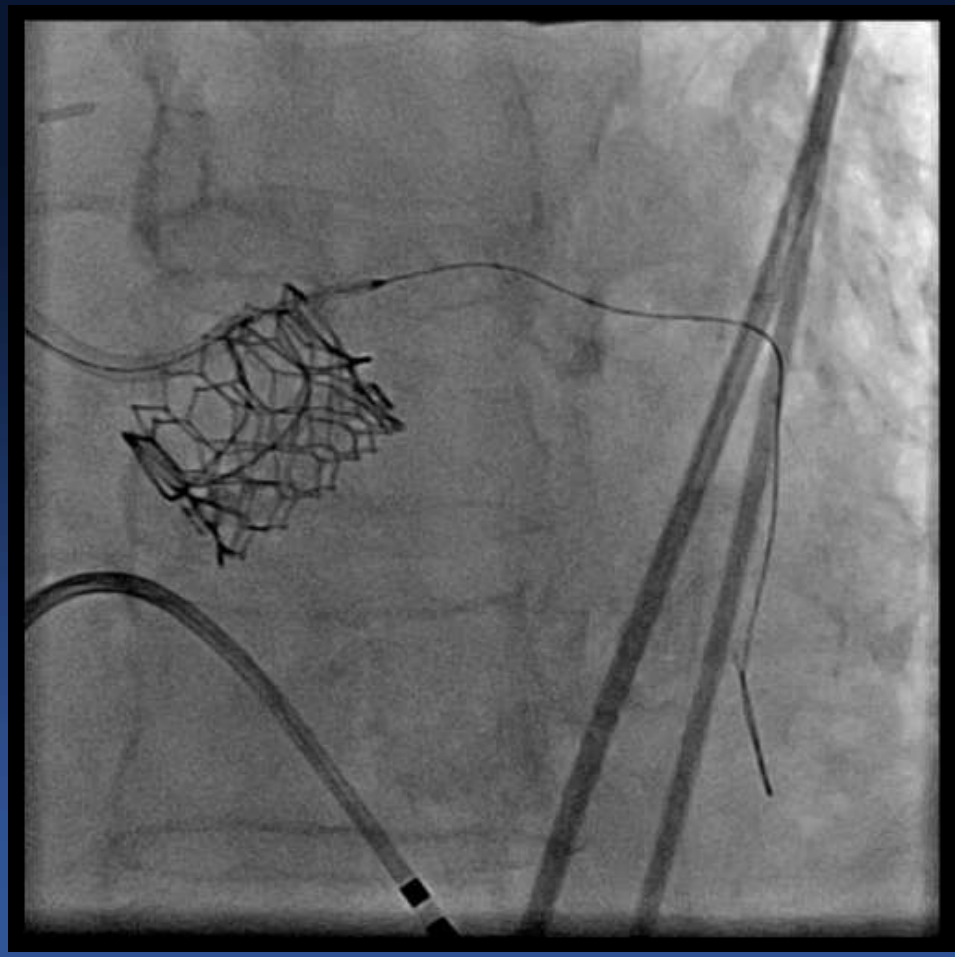


Tight stenosis between S3 and STJ by surgical leaflet

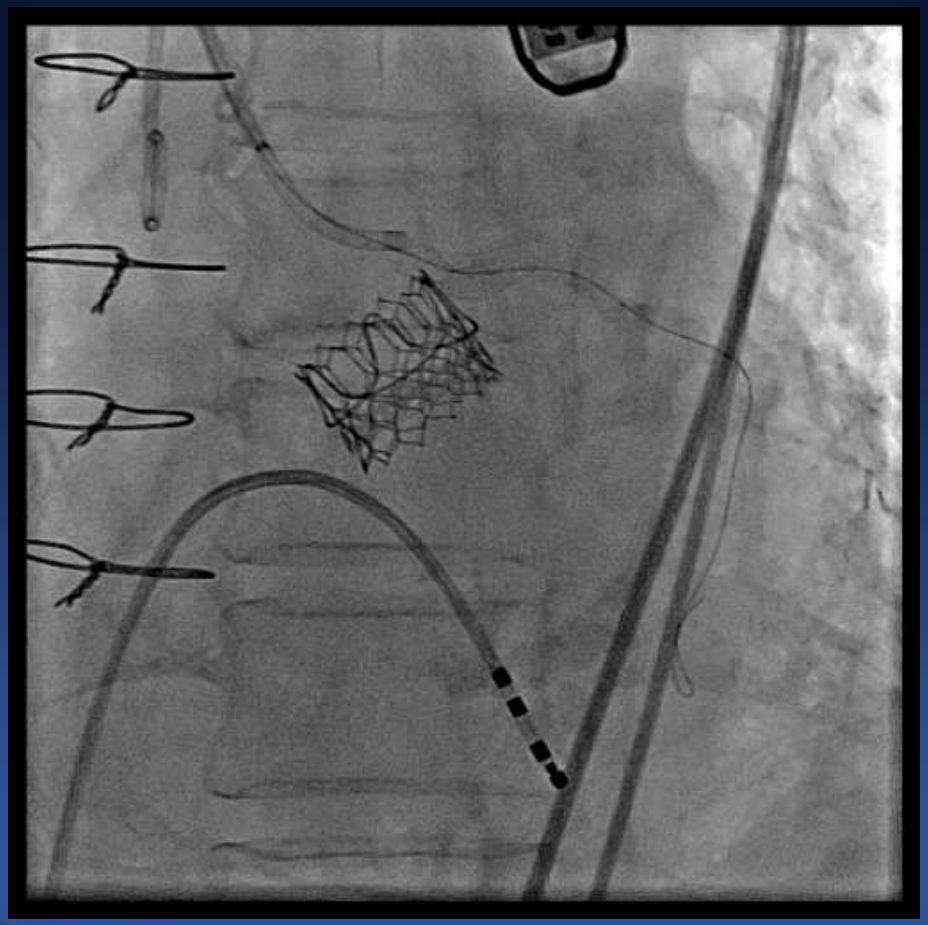
Dilation with several size of balloon under Guidzilla support

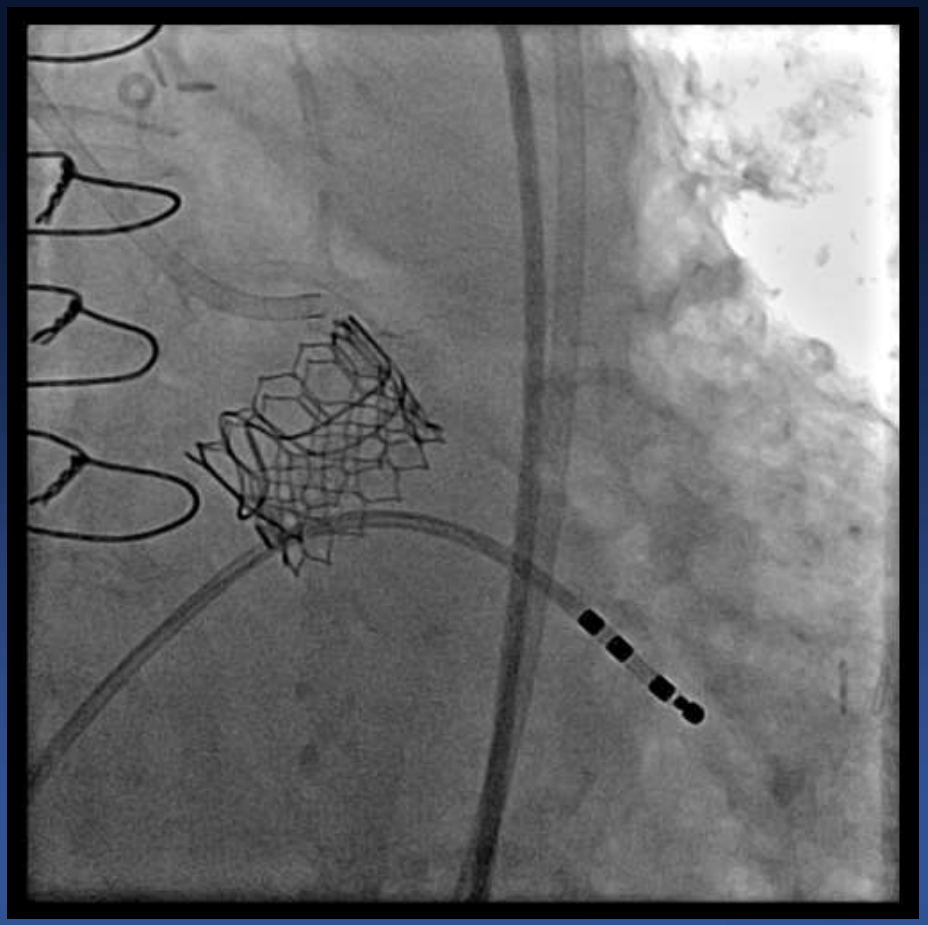
Acute recoil after 1st stent

Stent-in-Stent to increase radial force



Final angiography





Coronary obstruction: results from large multicenter registry

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CLINICAL RESEARCH — Interventional Cardiology

Predictive Factors, Management, and Clinical Outcomes of Coronary Obstruction Following Transcatheter Aortic Valve Implantation

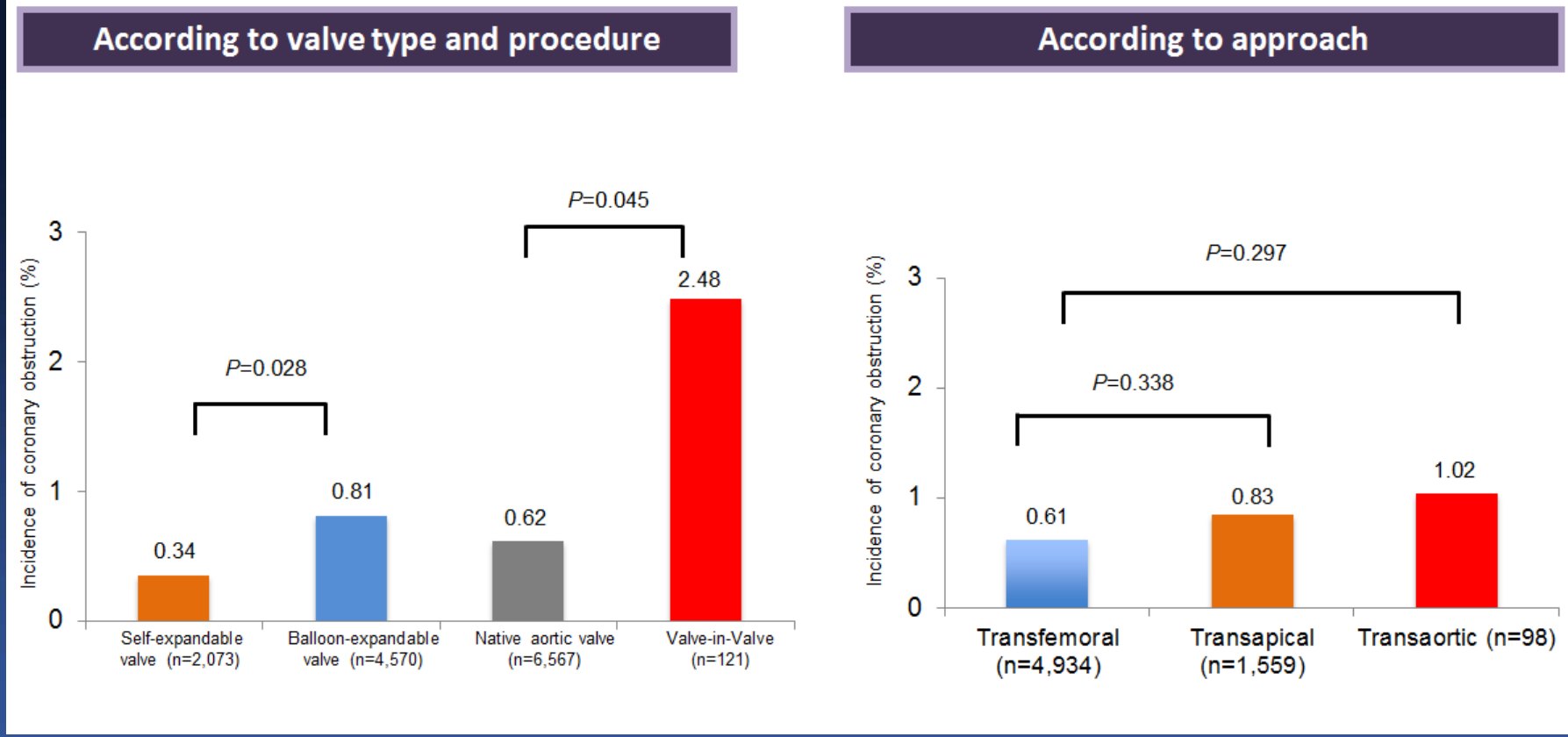
Insights From a Large Multicenter Registry

Henrique B. Ribeiro, MD,* John G. Webb, MD,† Raj R. Makkar, MD,‡ Mauricio G. Cohen, MD,§

6,688 patients
44 cases of coronary obstruction (0.66%)

Ribeiro et al. J Am Coll Cardiol 2013;62:1552–62

Incidence of coronary obstruction



Ribeiro et al. J Am Coll Cardiol 2013;62:1552–62

Mortality 30-day (40.9%)

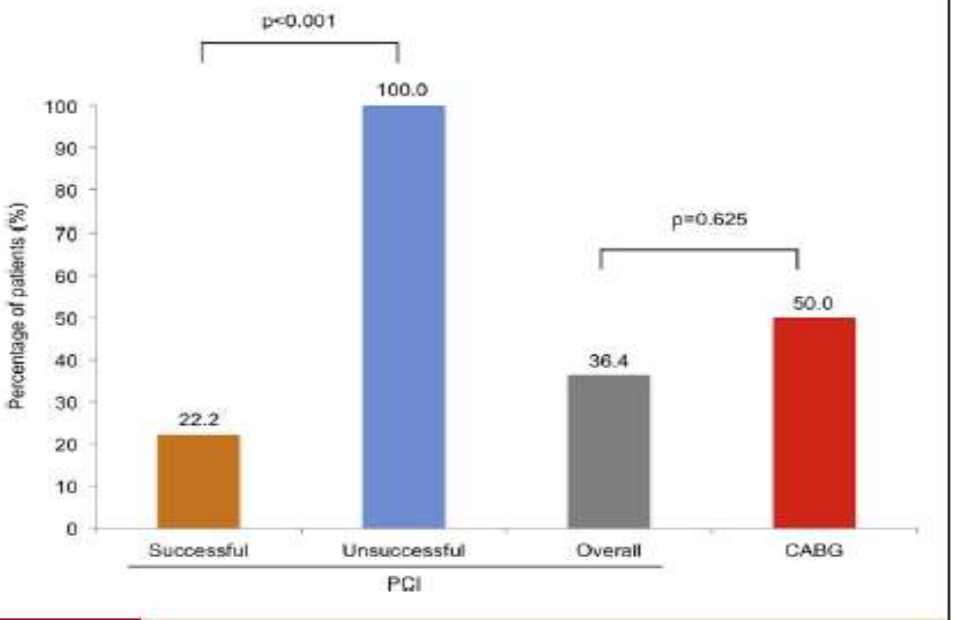


Figure 4 **Mortality Rate at 30 Days According to the Type and Results of the Treatment for Coronary Obstruction**

Mortality at 30 days following successful percutaneous coronary intervention (PCI), unsuccessful PCI, or coronary artery bypass graft (CABG) after the occurrence of coronary obstruction.

Predictors

1) Female
2) Balloon Expandable
3) Small aortic root (<30 mm)
4) Coronary height (<12mm LM)

Prevention:

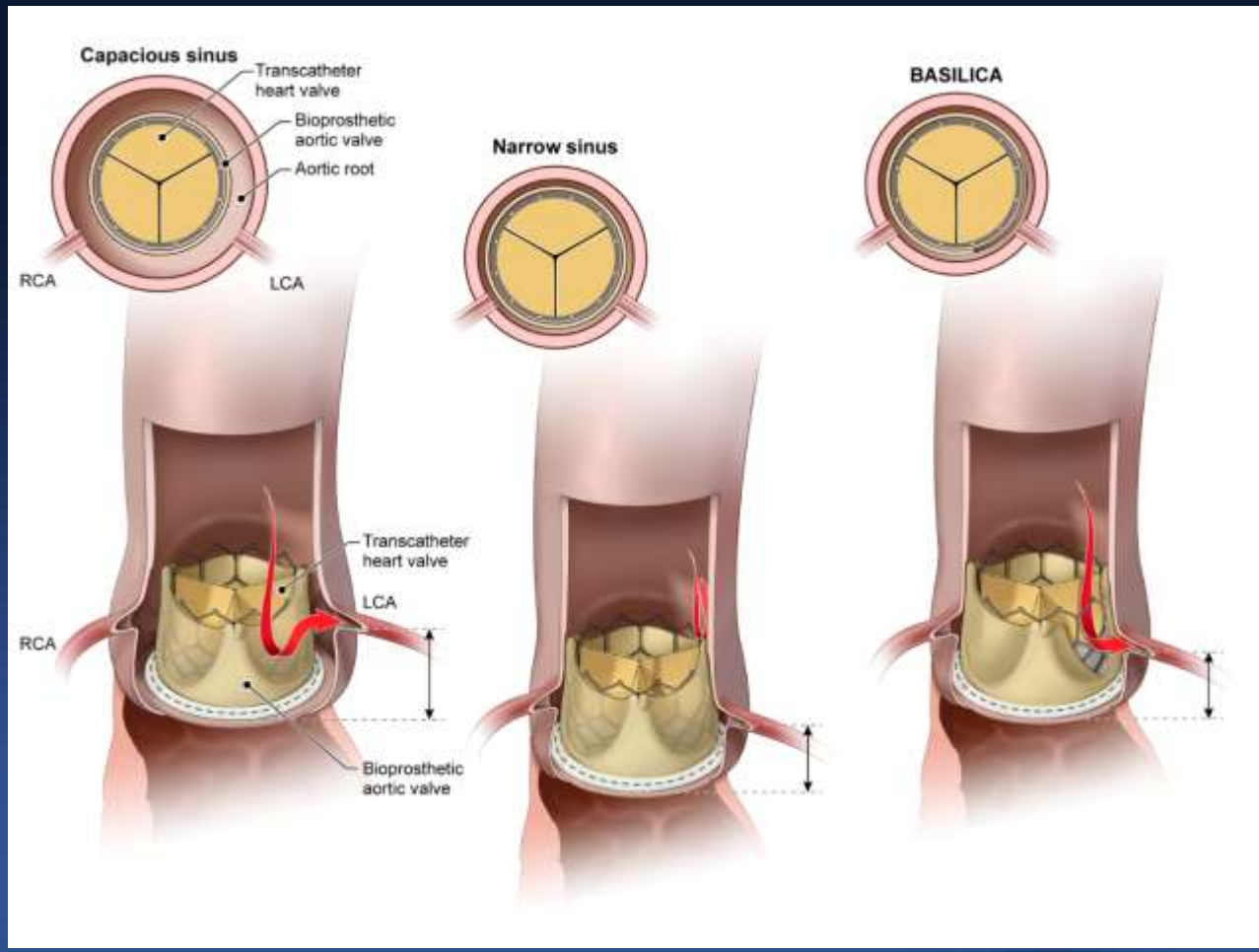
1) Coronary wire/balloon/Stent in coronary pre-TAVR
2) BAV pre TAVR +/- abortion of TAVR
3) Repositionable valve?
4) Off pump LIMA pre-TAVR?

Ribeiro et al. J Am Coll Cardiol 2013;62:1552–62

How To Rescue TAVR-Associated Coronary Obstruction?

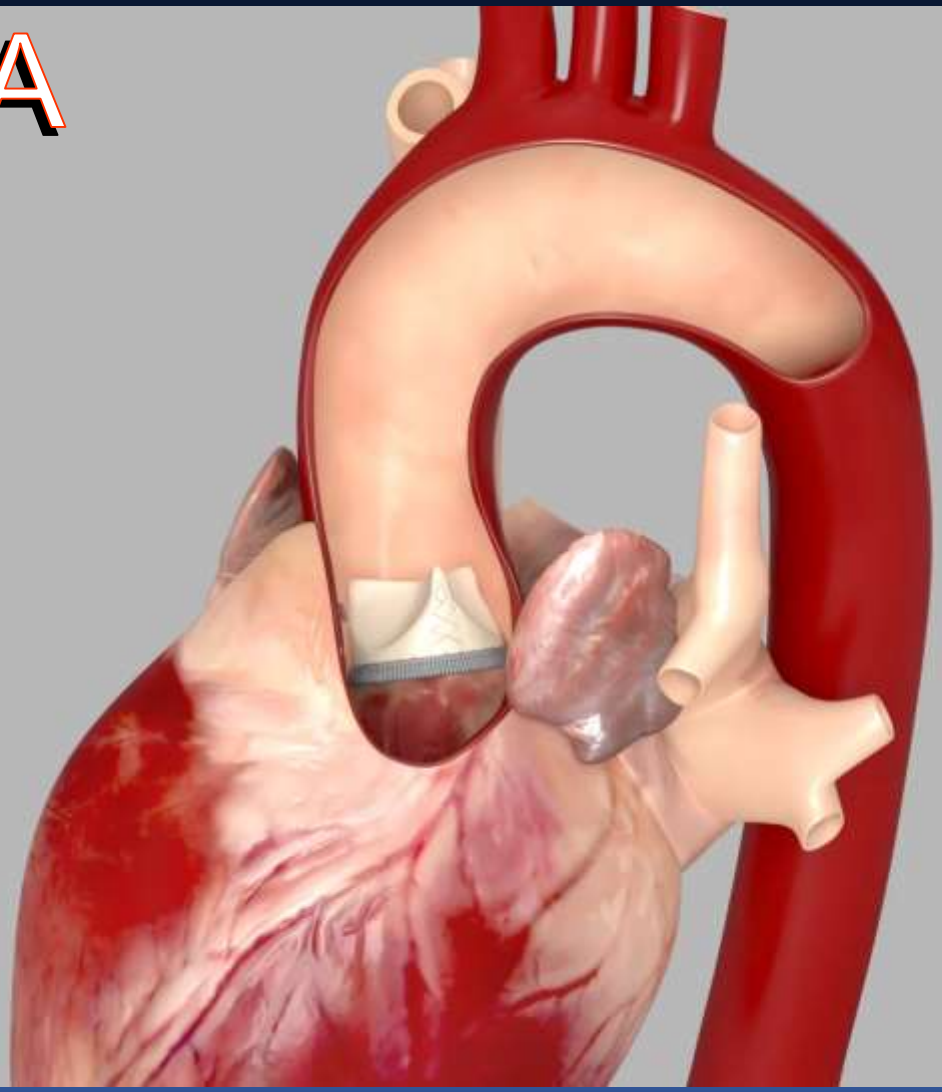
CLINICAL PREDICTORS

- Older age
- Female sex
- No prior CABG
- Low coronary height
  - (<12mm)
- Narrow sinus
  - (<30mm)
- Valve-in-valve



Ribeiro et al. *JACC* 2013
Khan… Lederman *JACC Int 2018*

BASILICA



Optimizing Electrosurgery

Key Message II

- Coronary obstruction after TAVR is rare, but catastrophic.
- Understanding the mechanism and preventive thoughts are important.
- PCI following coronary obstruction may be optimized by using IVUS and deploying two concentric layers of stents to improve radial strength.
- Novel option (i.e. BASILICA) is under the investigation.
- Finally, patient selection, increased operator experience and improved devices technology are key to prevent such catastrophic complication.