Severe Aortic Valve Disease:
TAVR in Four Ages and Four Etiologies
Age 25 y/o Congenital, 50 y/o Bicuspid, 75 y/o Rheumatic, 100 y/o Degenerative

Samin K. Sharma, MD, FACC, FSCAI
Director Clinical & Interventional Cardiology
President Mount Sinai Heart Network
Dean, International Clinical Affliliations
Anandi Lal Sharma Professor of Medicine (Cardiology)

Cardiovascular Institute
Mount Sinai Hospital, New York

COI: No relationship to disclose for this presentation

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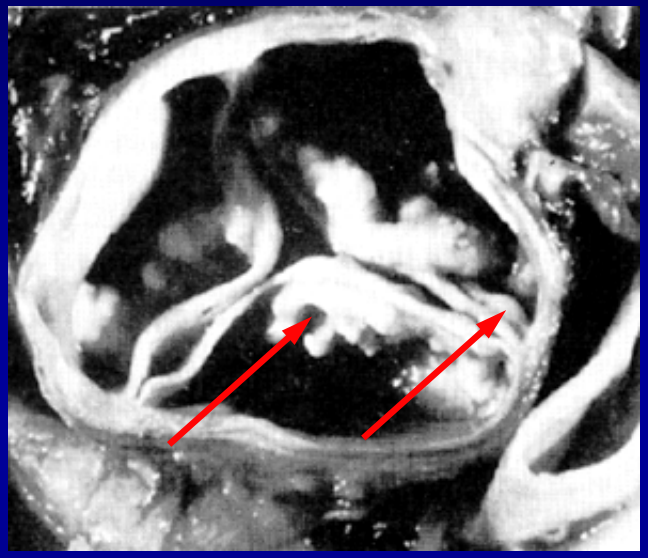
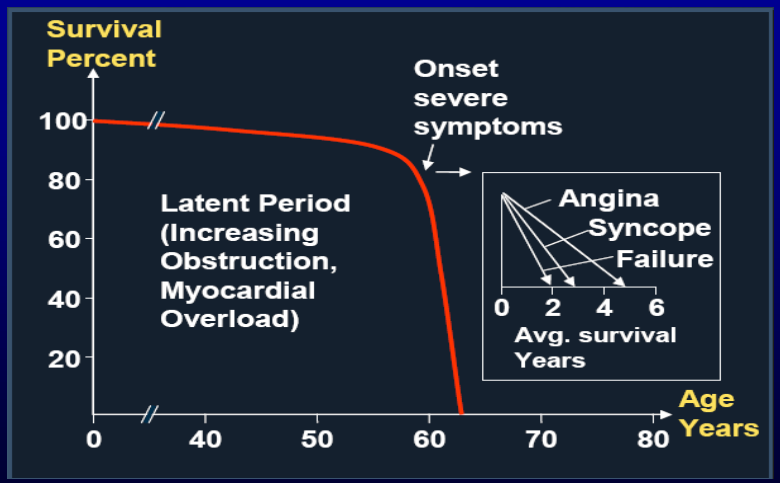
Aortic Stenosis

Aortic valve area: Normal 3-4 cm^2

AS: - mild >1.5 cm^2
- moderate 1.0-1.5 cm^2
- severe <1.0 cm^2
- critical <0.7 cm^2





Ross J, Braunwald E. Circulation 1968; 38: 61-67.

Etiology:

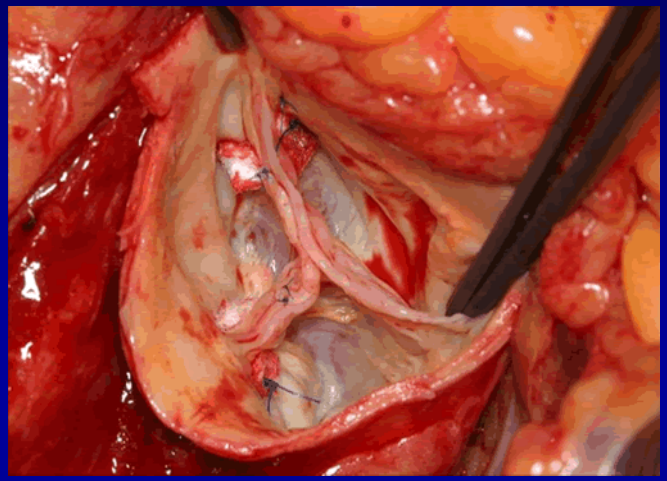
Congenital: unicuspid (25 y/o)
bicuspid (50 y/o)
tricuspid

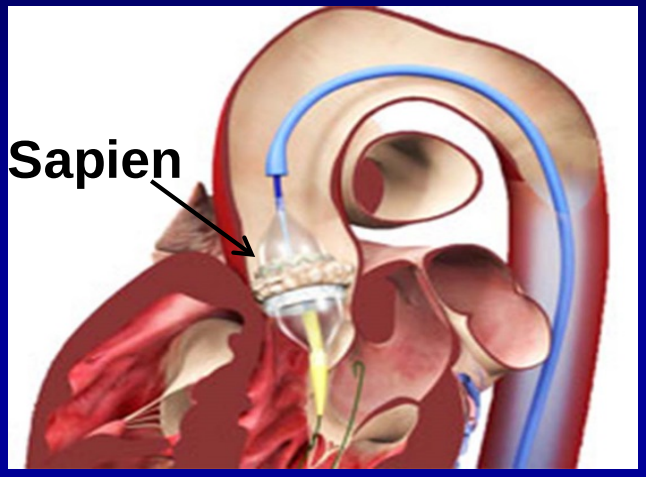
Acquired: rheumatic (75 y/o)
calcific deg (100y/o)
↑cholesterolemia
rheumatoid

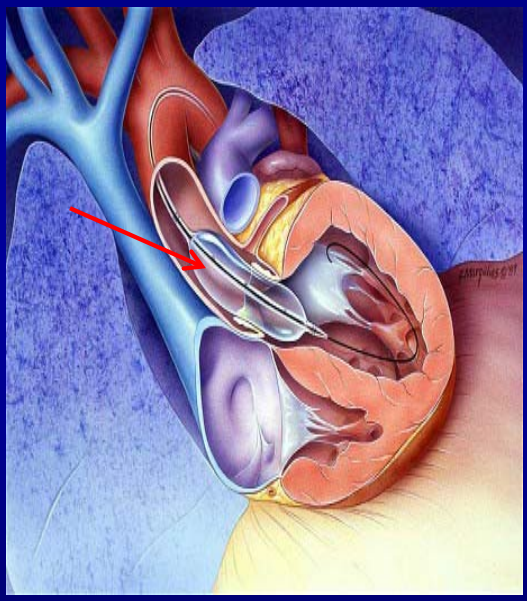
5% at 70 yrs
10% at 80 yrs
18% at 90 yrs

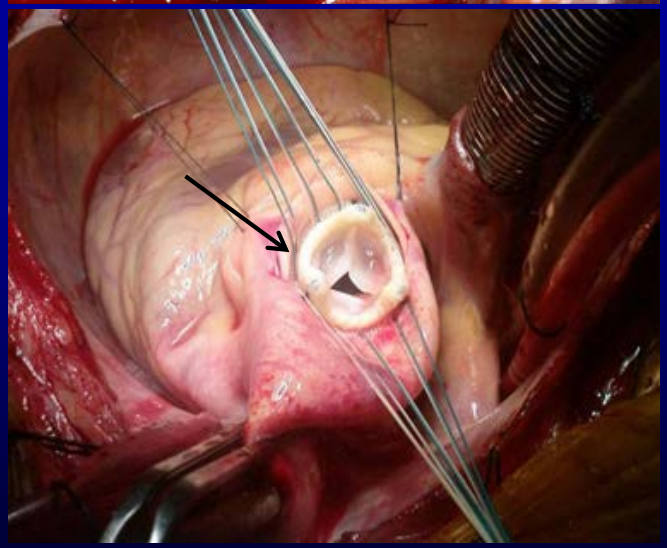
Treatment Choices for AS:

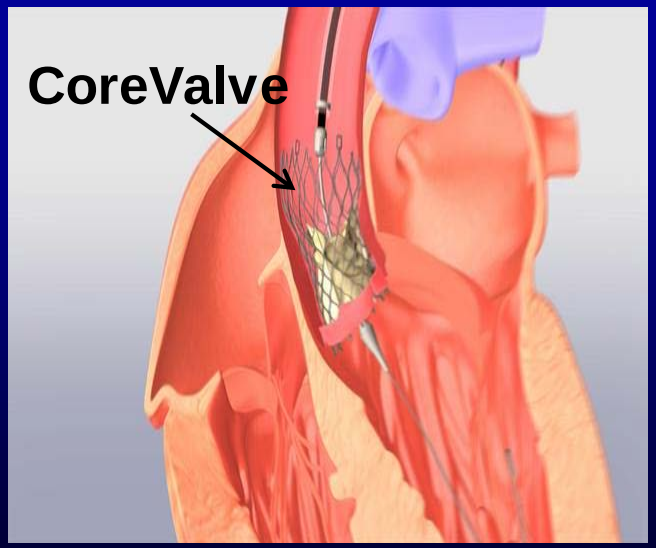
SAVR	TAVR	BAV











Online STS Risk Calculator

Dataset: 2.73

Definitions

Support

Help | More about Risk Calculator | New | Print

Today's Date 4/19/2013

Procedure

Coronary Artery Bypass ○Yes ○No ◉Missing

Valve Surgery ○Yes ○No ◉Missing

VAD Implanted or Removed
- ○No
- ○Yes, implanted
- ○Yes, explanted
- ○Yes, implanted and explanted
- ◉Missing

Other Non-Cardiac Procedure ○Yes ○No ◉Missing

Unplanned Procedure
- ○No
- ○Yes, unsuspected patient disease or anatomy
- ○Yes, surgical complication
- ◉Missing

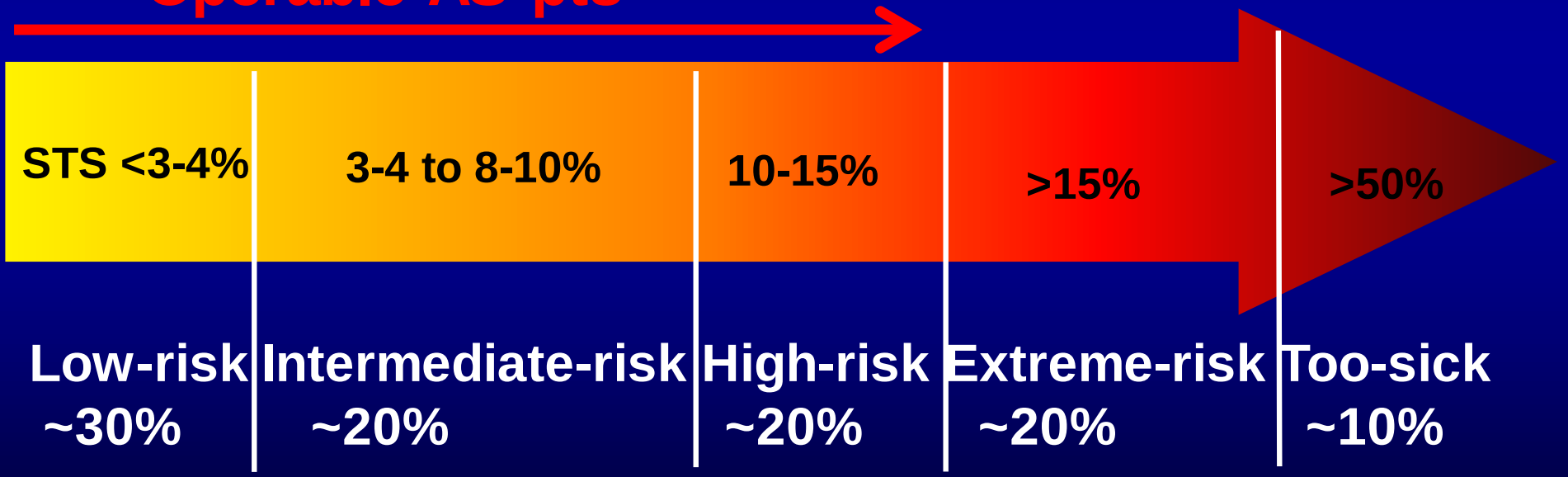
Other Cardiac Procedure ○Yes ○No ◉Missing

Calculations

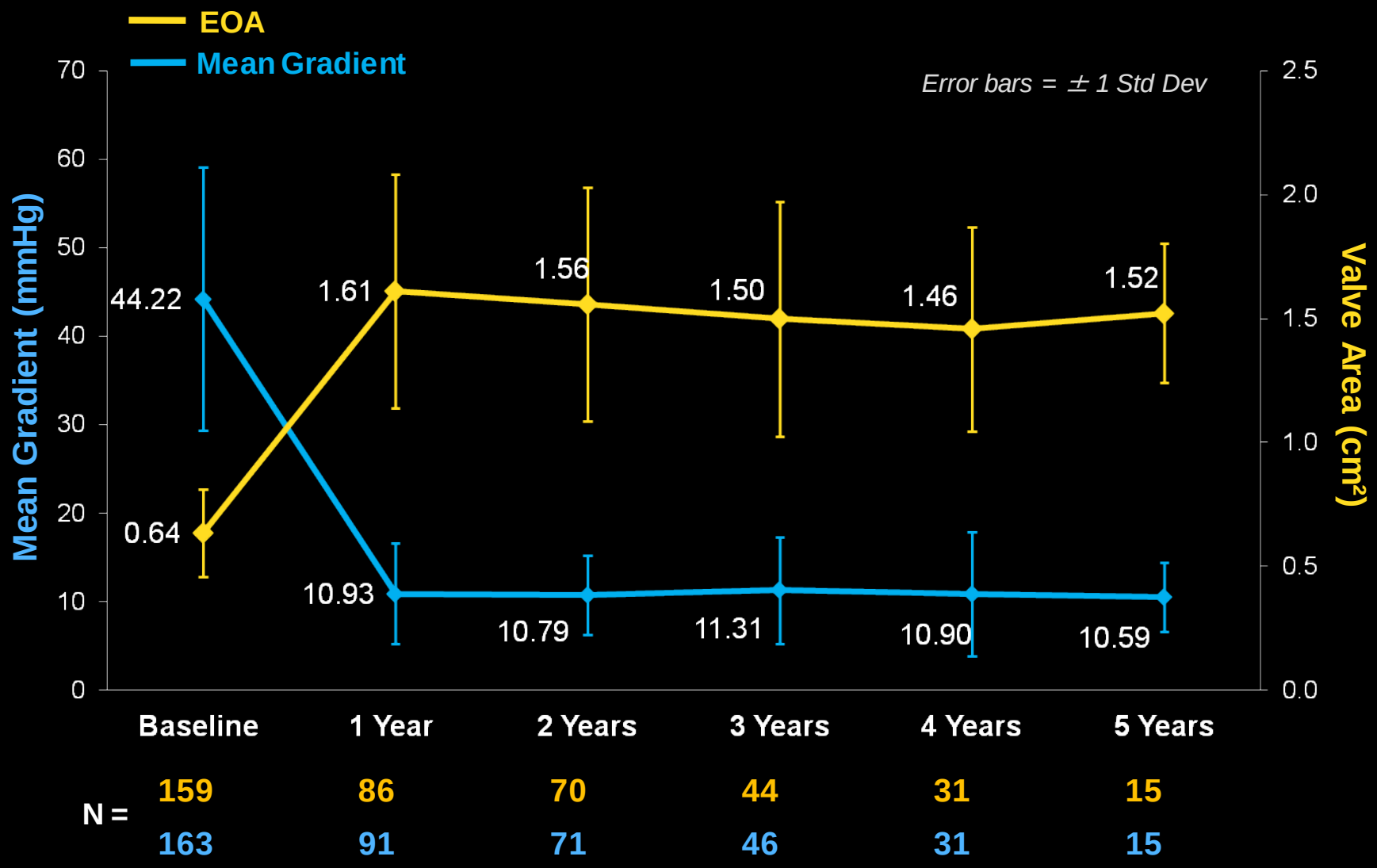
- Procedure Name
- Risk of Mortality
- Morbidity or Mortality
- Long Length of Stay
- Short Length of Stay
- Permanent Stroke
- Prolonged Ventilation
- DSW Infection
- Renal Failure
- Reoperation

Transcatheter Aortic Valves Intervention: TAVR vs SAVR

Surgical risk is a continuum (STS risk score)

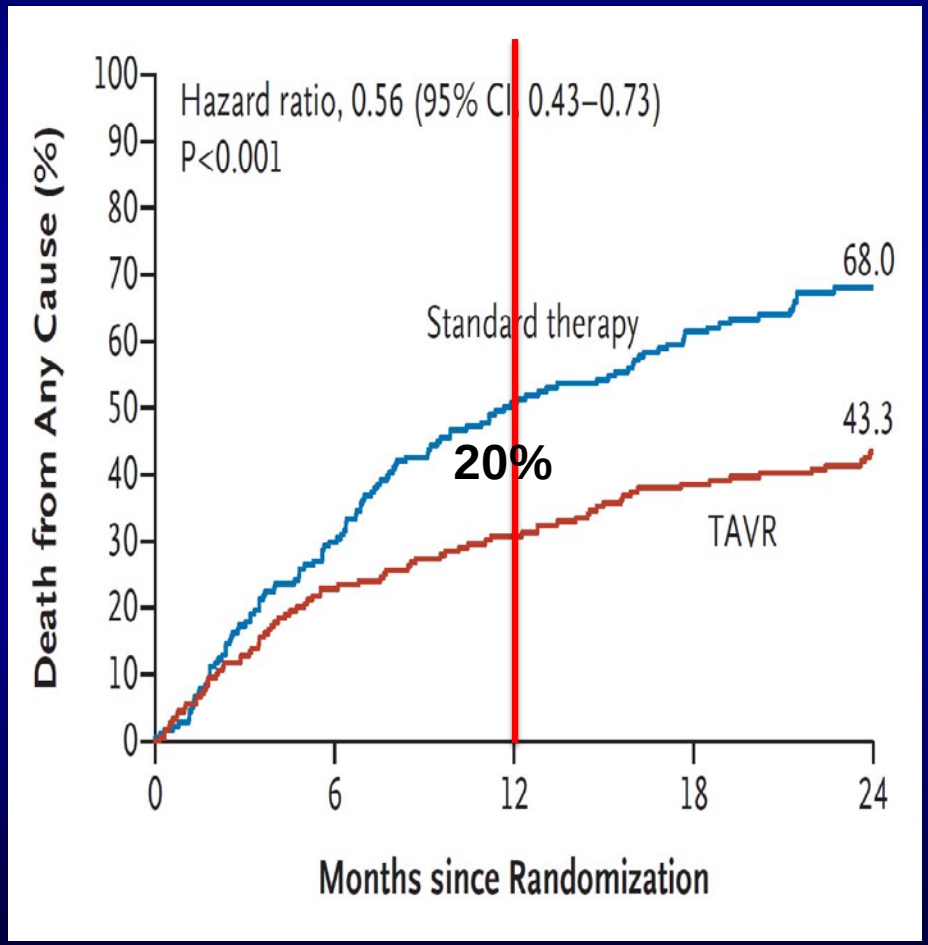


PARTNER Trial: Aortic Mean Gradient & Valve Area



PARTNER Trial Cohort B: Inoperable Extreme Risk

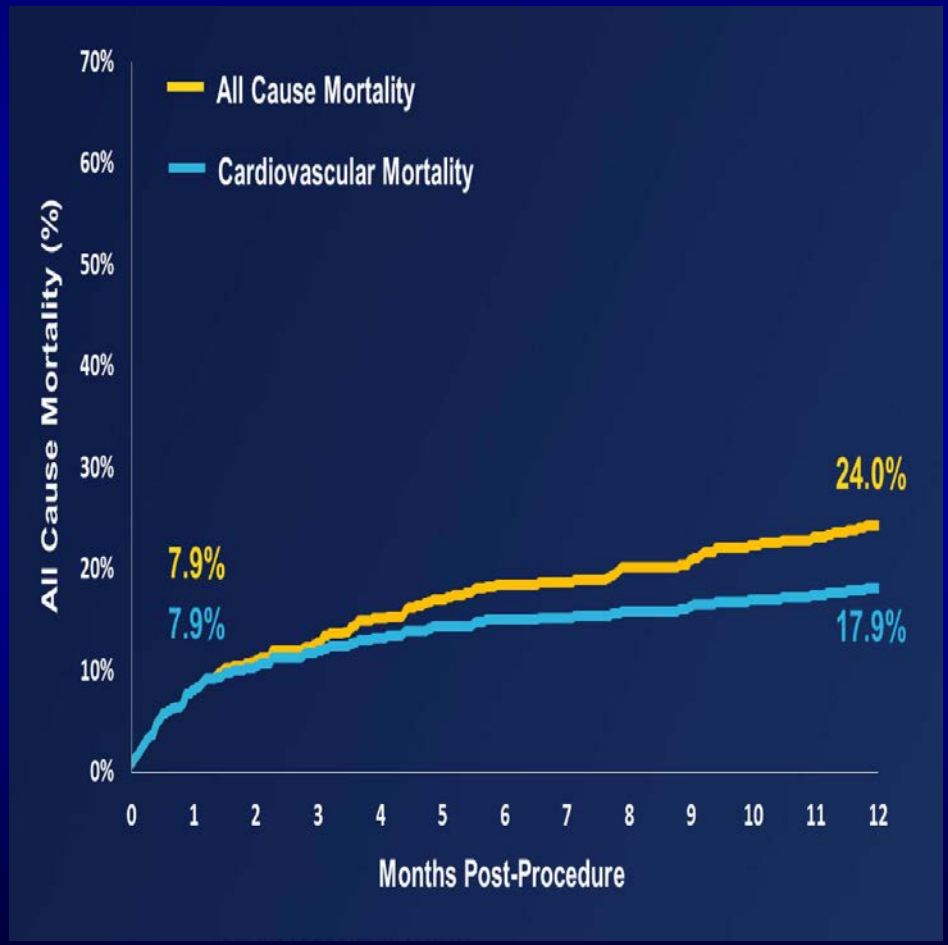
Rate of Death (N=358)



Makkar et al., NEJM 2012;366:1696

CoreValve Extreme Risk: No Randomization

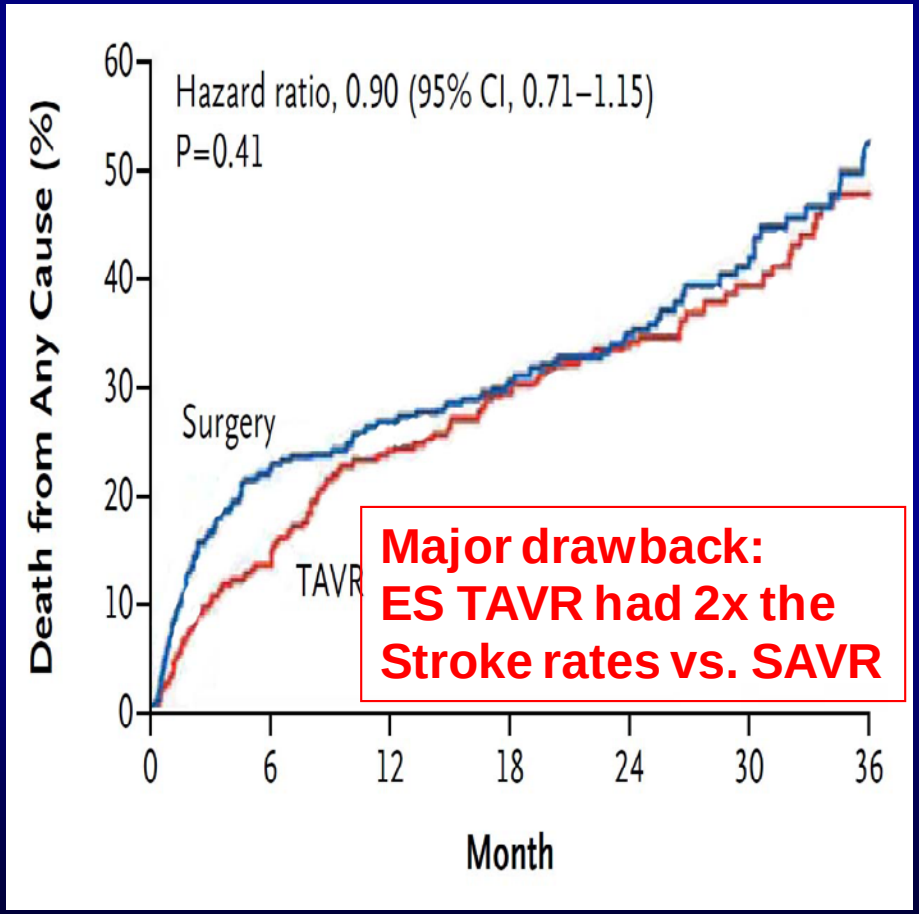
1 Year Mortality (N=487)



Popma et al, JACC 2014;63:1972

PARTNER Trial Cohort A: Primary Endpoints at 3-Yr

Death from Any Cause

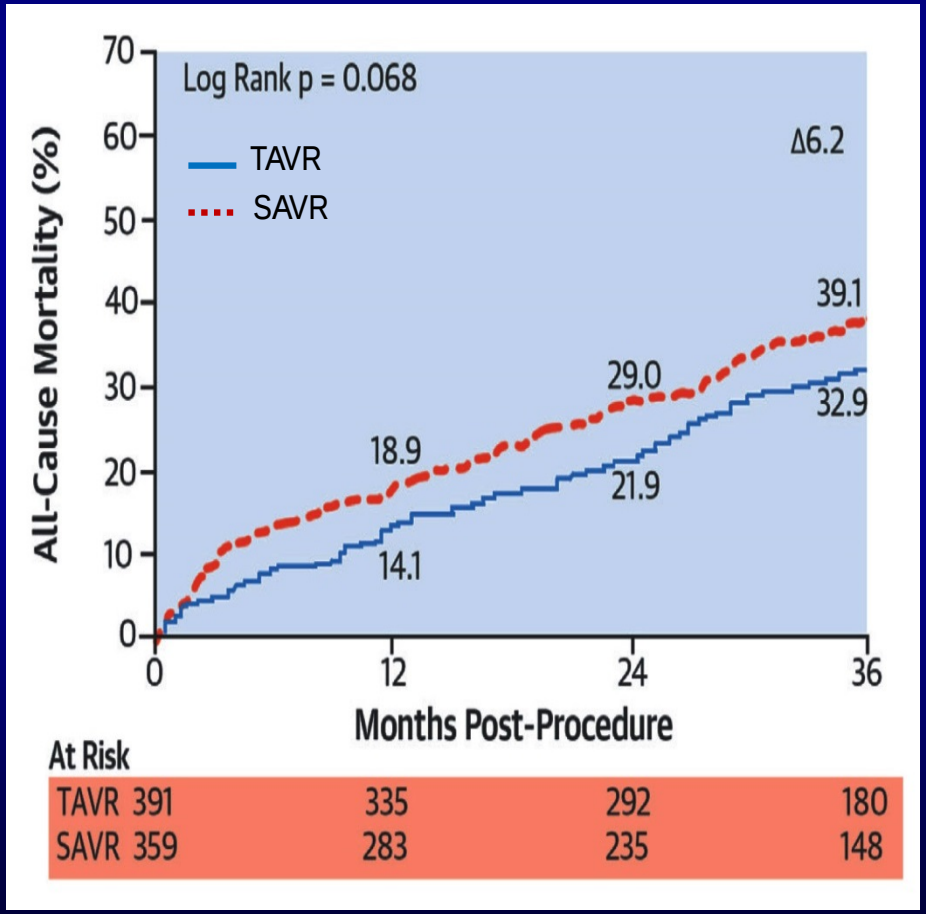


Major drawback:
ES TAVR had 2x the Stroke rates vs. SAVR

Kodali et al., NEJM 2012;366:1686

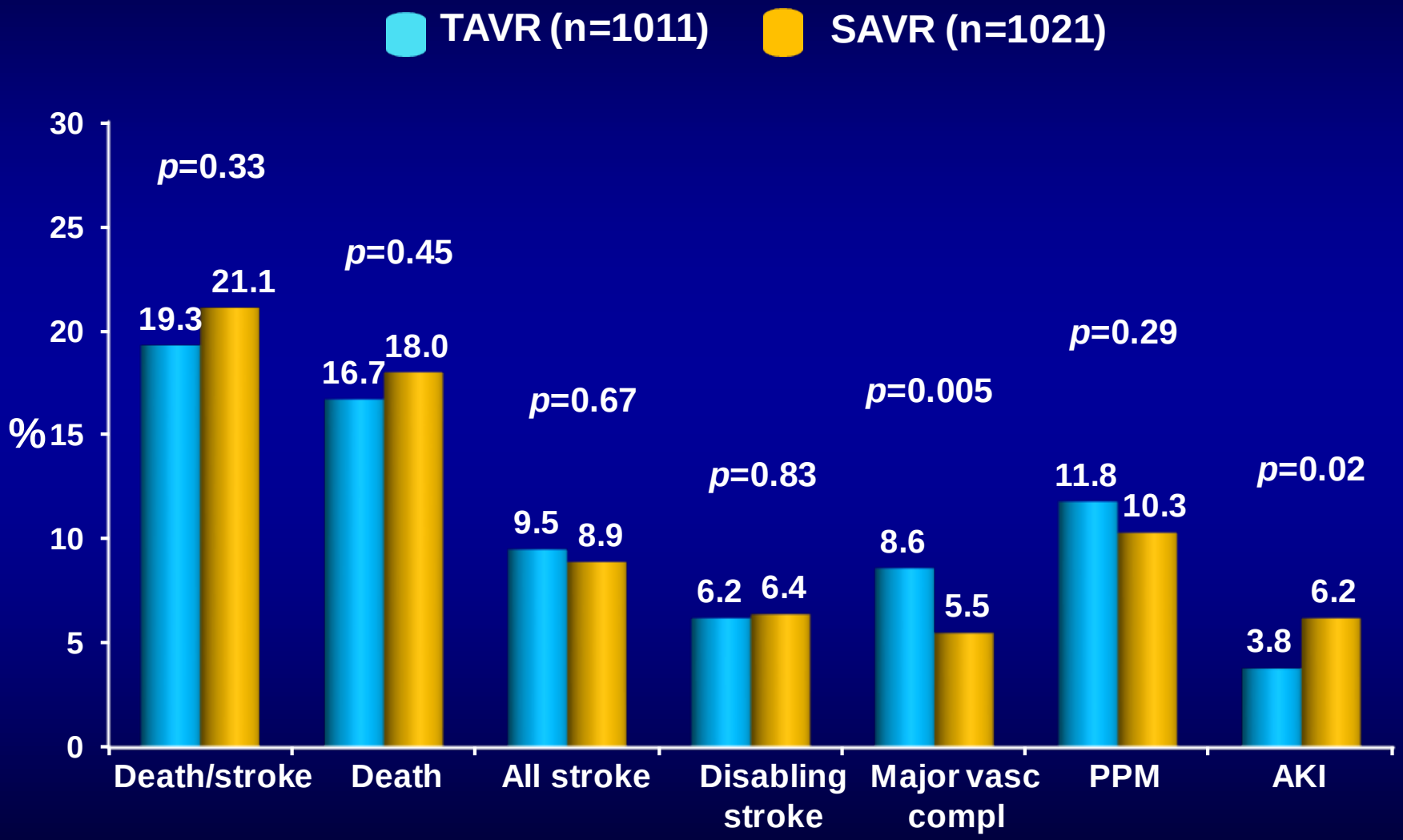
CoreValve Trial High Risk: Primary Endpoints at 3-Yr

Death from Any Cause



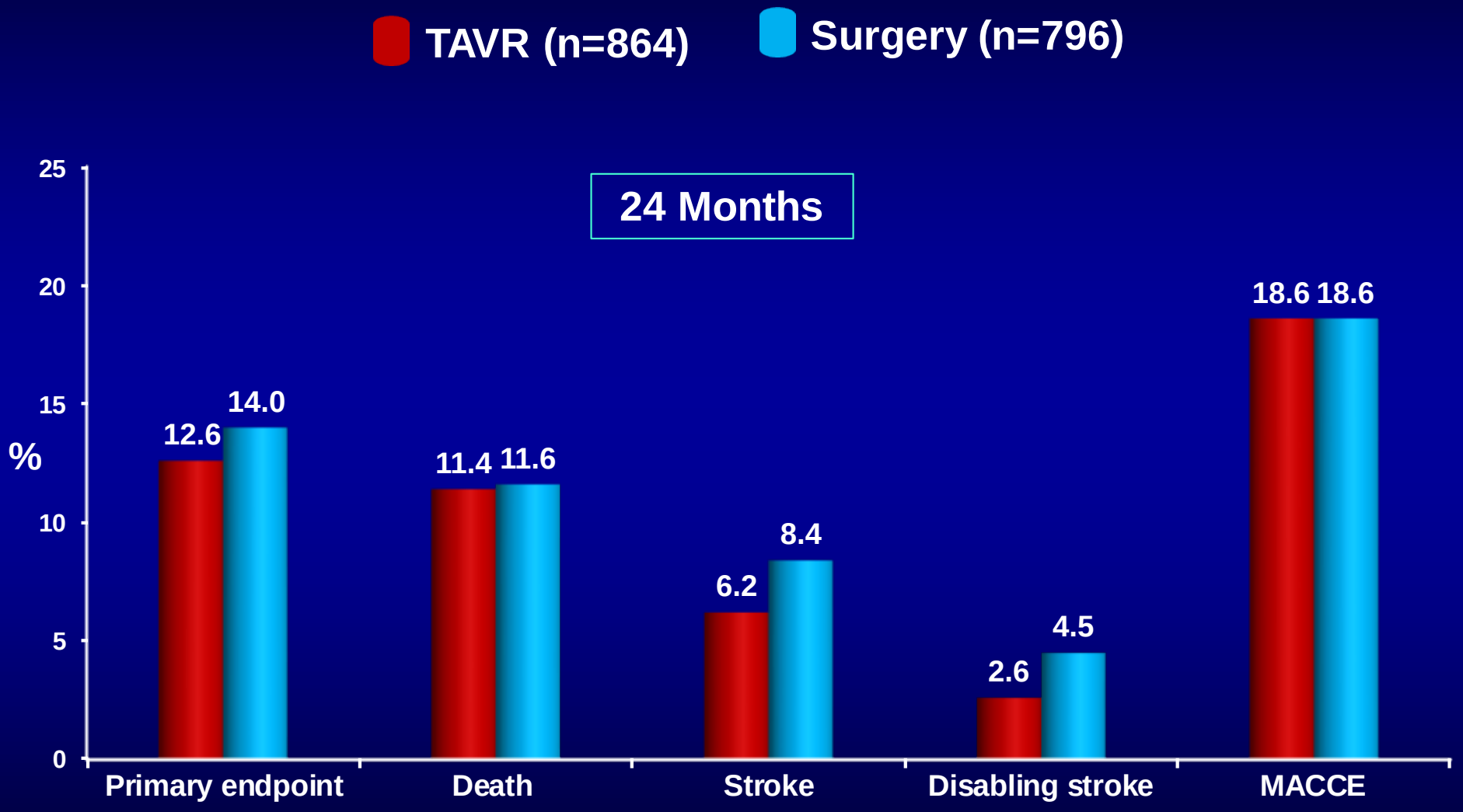
Deeb et al., JACC 2016;67:2565

PARTNER 2A Trial: Clinical Endpoints (ITT) at 2 Years



Leon et al., N Engl J Med 2016;374:1609

SURTAVI Trial: Clinical Outcomes



Reardon et al., N Engl J Med 2017;376:1321

TAVR for Low Risk AS patients

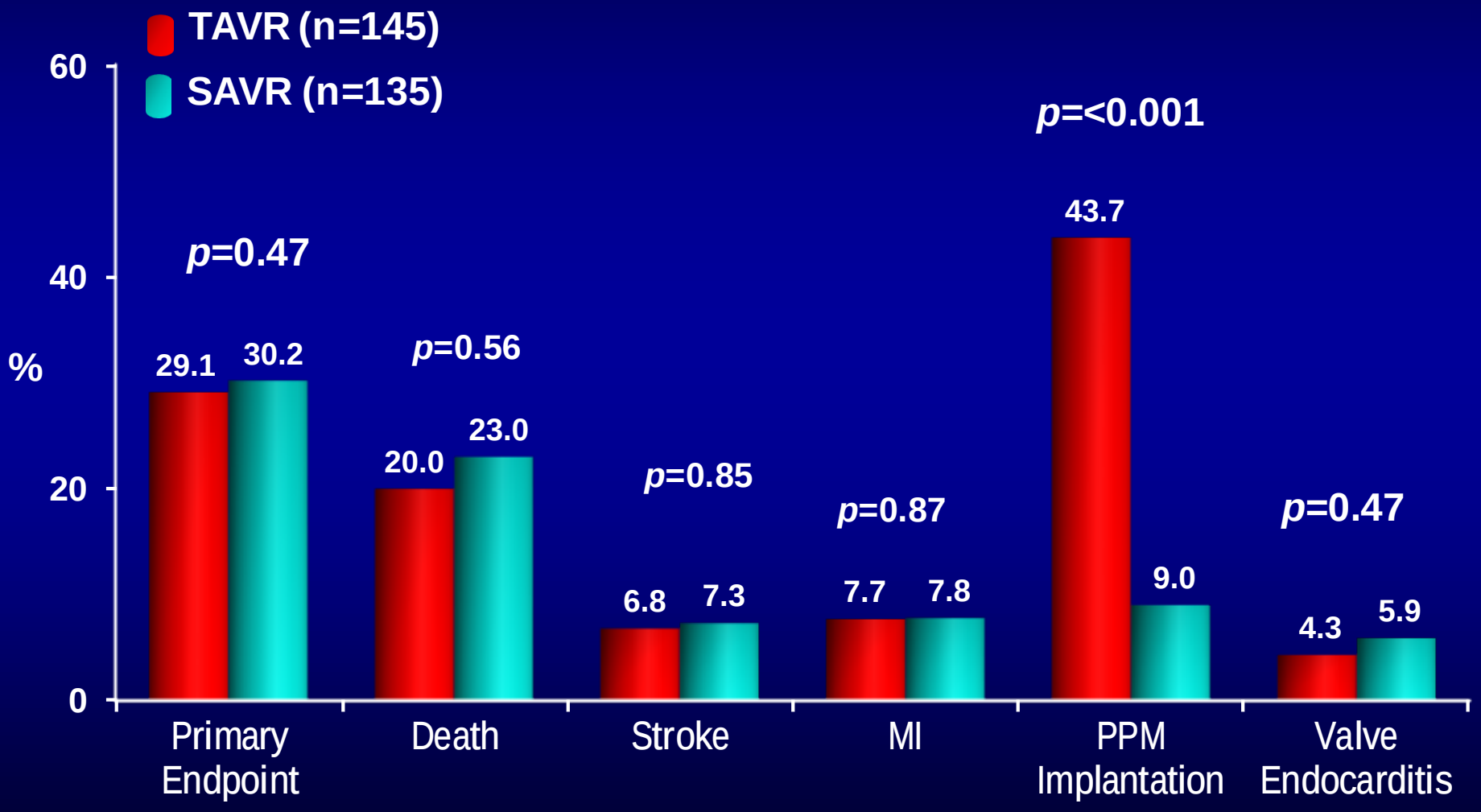
STS mortality risk of <3%

One Trial OUS: Notion Trial (Completed)- CoreValve

Two Trials in US have started:
PARTNER-3 of Sapien-3 vs SAVR (n=1228)
Evolut-R CoreValve vs SAVR (n=1200)
Trials

NOTION Trial: Clinical Outcomes at 4-5 Years

280 patients with severe AS at low surgical risk for SAVR or TAVR with self-expanding CoreValve



Sondergaard, ePCR, ESC 2017

The PARTNER 3 Trial:

Study Design

Symptomatic Severe Calcific Aortic Stenosis

~~**Age <65yrs**~~

Low Risk ASSESSMENT by Heart Team
(STS ≤ 3%, TF only)

1:1 Randomization
(n=1228)

TF - TAVR (SAPIEN 3)	Surgery (Bioprosthetic Valve)
CT Imaging Sub-Study (n=200)	CT Imaging Sub-Study (n=200)
Actigraphy/QoL Sub-Study (n=100)	Actigraphy/QoL Sub-Study (n=100)

PRIMARY ENDPOINT:
Composite of all-cause mortality, all strokes, or re-hospitalization at 1 year post-procedure

PARTNER 3 Registries

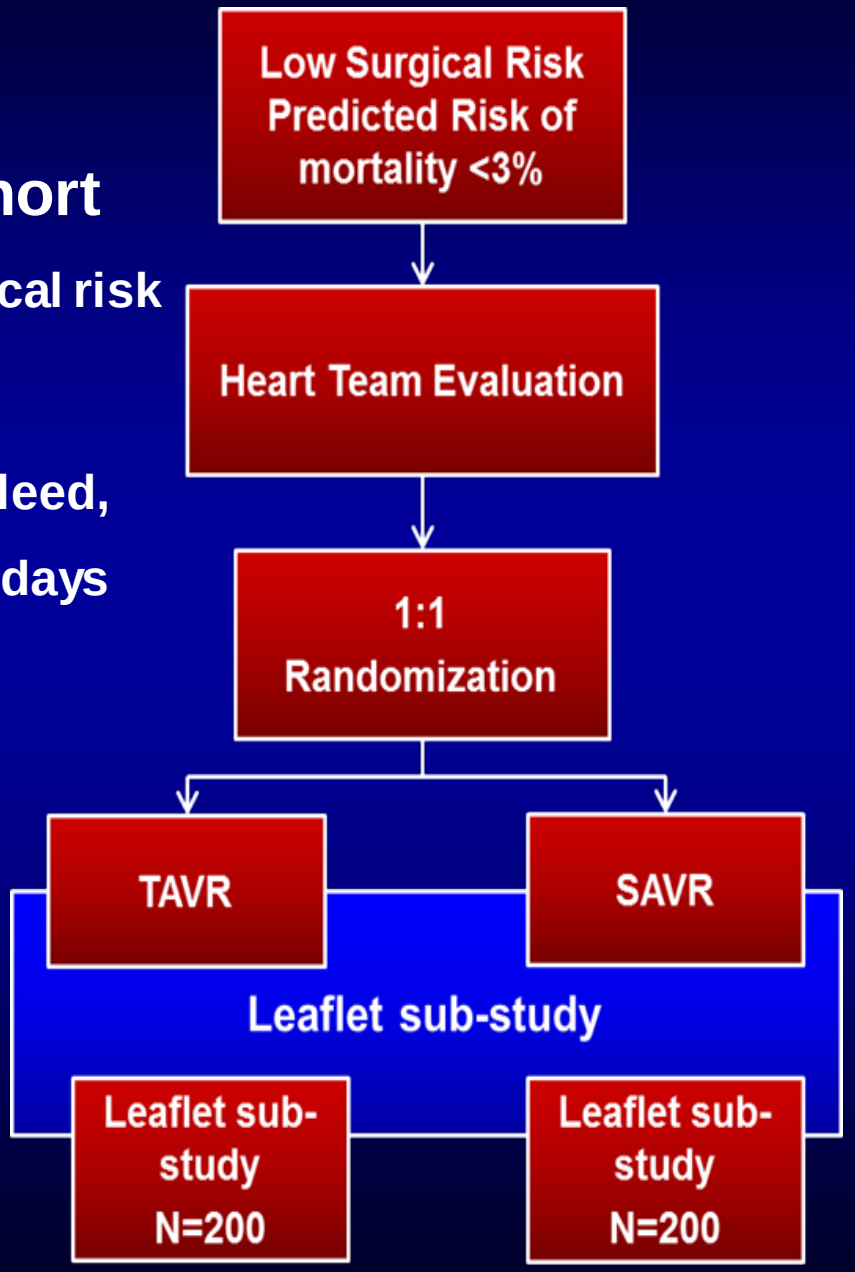
- **Alternative Access (n=100) (TA/TAo/Subclavian)**
- **Bicuspid Valves (n=100)**
- **ViV (AV and MV) (n=100)**

Follow-up: 30 days, 6 mos, 1 year and annually through 10 years

Medtronic TAVR in Low Risk Patients

Trial Design & leaflet Sub-study

- **Patient Population: Low Risk Cohort**
  - Determined by Heart Team to be low surgical risk
- **Primary Endpoint:**
  - Safety: Death, all stroke, life-threatening bleed, major vascular complications or AKI at 30 days
  - Efficacy: Death or major stroke at 2 yrs
- **Sample Size: ~1200 Subjects**
- **Follow-up Evaluations:**
  - 30-days, 6-month , 18-month, and 1 through for 5 years
- **Number of Sites: Up to 80 sites**



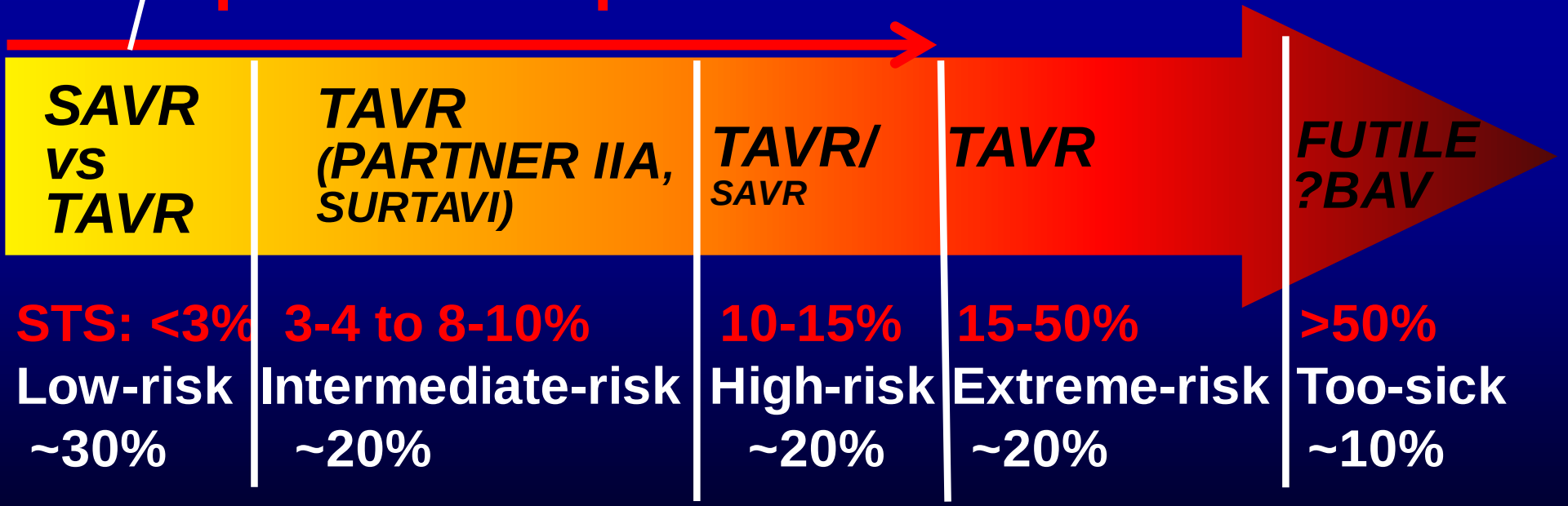
Transcatheter Aortic Valves Replacement (TAVR)

Current Indications: Symptomatic AS

FDA approved two RCT of low risk AS for both Sapien-3 and Evolut-R vs SAVR are ongoing

Pt with prohibitive surgical risk are appropriate For TAVR even with low STS risk:
- hostile mediastinum, egg-shell aorta, RT
- prior CABG with IM stuck to mediastinum
- severe COPD, extreme frailty

Operable AS pts



Recommendations for Choice of Interventions in AS

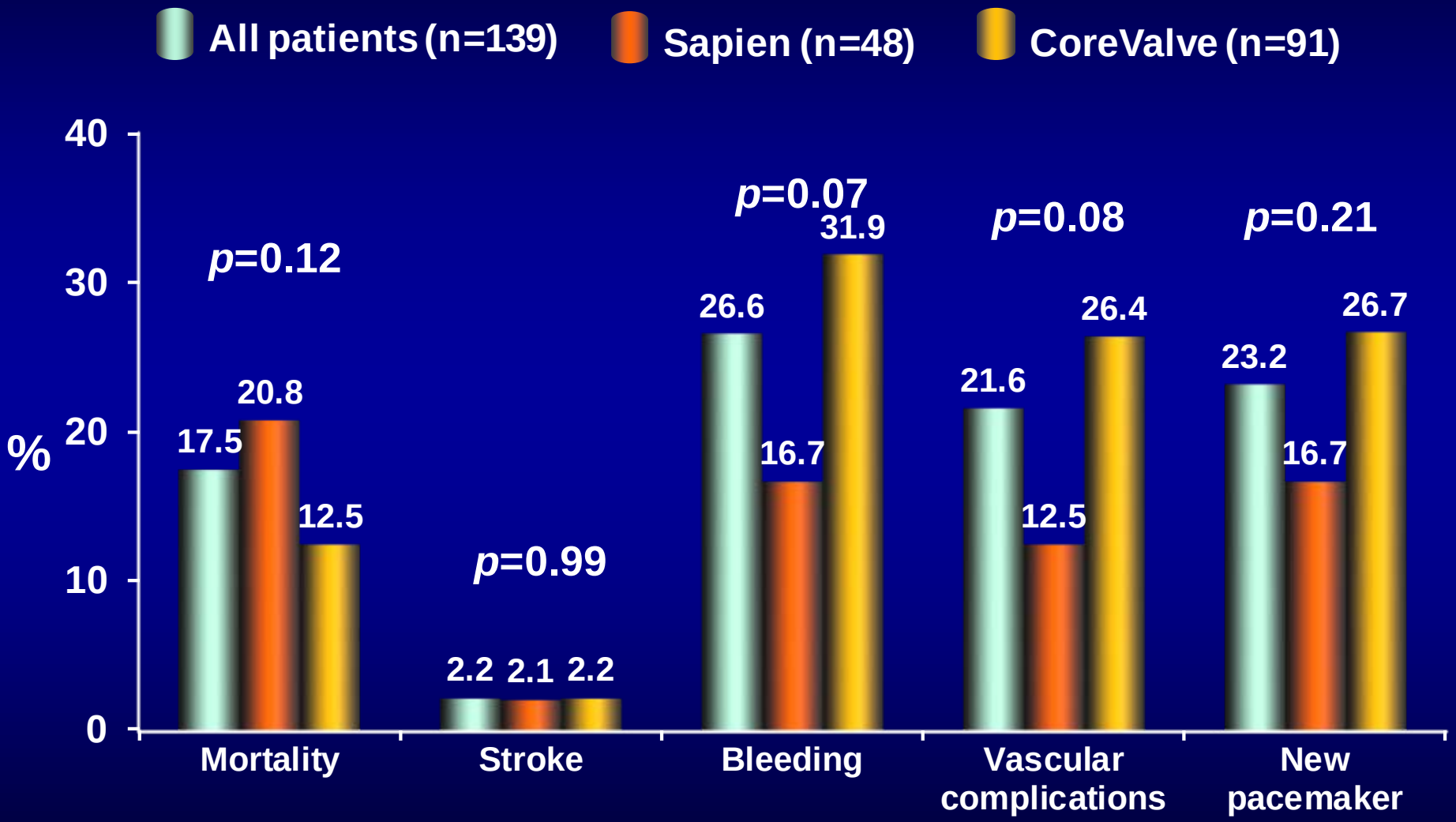
COR	LOE	RECOMMENDATIONS	COMMENT/RATIONALE
I	C	For patients in whom TAVR or high-risk surgical AVR is being considered, a heart valve team consisting of an integrated, multidisciplinary group of healthcare professionals with expertise in VHD, cardiac imaging, interventional cardiology, cardiac anesthesia, and cardiac surgery should collaborate to provide optimal patient care.	2014 recommendation remains current.
I	B-NR	Surgical AR is recommended for symptomatic patients with severe AS (Stage D) and asymptomatic patients with severe AS (Stage C) who meet an indication for AVR when surgical risk is low or intermediate.	MODIFIED: LOE updated from A to B-NR. Prior recommendations for intervention choice did not specify patient symptoms. The patient population recommended for surgical AVR encompasses both symptomatic and asymptomatic patients who meet an indication for AVR with low-to-intermediate surgical risk. This is opposed to the patient population recommended for TAVR, in whom symptoms are required to be present. Thus, all recommendations for type of intervention now specify the symptomatic status of the patient.
		See Online Data Supplements 5 and 9 (Updated From 2014 VHD Guideline)	
I	A	Surgical AVR or TAVR is recommended for symptomatic patients with severe AS (Stage D) and high risk for surgical AVR, depending on patient-specific procedural risks, values, and preferences.	MODIFIED: COR updated from IIa to I, LOE updated from B to A. Longer-term follow-up and additional RCTs have demonstrated that TAVR is equivalent to surgical AVR for severe symptomatic AS when surgical risk is high.
		See Online Data Supplement 9 (Updated From 2014 VHD Guideline)	
I	A	TAVR is recommended for symptomatic patients with severe AS (Stage D) and a prohibitive risk for surgical AVR who have a predicted post-TAVR survival greater than 12 months.	MODIFIED: LOE updated from B to A. Longer-term follow-up from RCTs and additional observational studies has demonstrated the benefit of TAVR in patients with a prohibitive surgical risk.
		See Online Data Supplements 5 and 9 (Updated From 2014 VHD Guideline)	
I	B-R	TAVR is a reasonable alternative to surgical AVR for symptomatic patients with severe AS (Stage D) and an intermediate surgical risk, depending on patient-specific procedural risks, values, and preferences.	NEW: New RCT showed noninferiority of TAVR to surgical AVR in symptomatic patients with severe AS at intermediate surgical risk.
		See Online Data Supplements 5 and 9 (Updated From 2014 VHD Guideline)	
IIb	C	Percutaneous aortic balloon dilation may be considered as a bridge to surgical AVR or TAVR for symptomatic patients with severe AS.	2014 recommendation remains current.
III: No Benefit	B	TAVR is not recommended in patients in whom existing comorbidities would preclude the expected benefit from correction of AS.	2014 recommendation remains current.

SURTAVI

Nishimura et al., J Am Coll Cardiol 2017;70:252

TAVR in Bicuspid Aortic Valve Disease

Clinical Outcomes



Mylotte et al., J Am Coll Cardiol 2014;63:2330

TAVR in Evolution (2017+)
Future Clinical Indications

- Valve-in-valve for bio-prosthetic AV failure
- Predominant Aortic regurgitation (AR, AI)
- Bicuspid aortic valve stenosis
- Low flow-low gradient AS
- Asymptomatic severe AS *(Early TAVR)*
- Moderate AS with CHF Class III-IV *(Unload TAVR)*

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