Centre for
Heart Valve Innovation
St. Paul's Hospital, Vancouver

It Is Still Too Early to Tell TAVR in Low-risk and Young Patients

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AP VALVES, Seoul, August 9-11, 2018

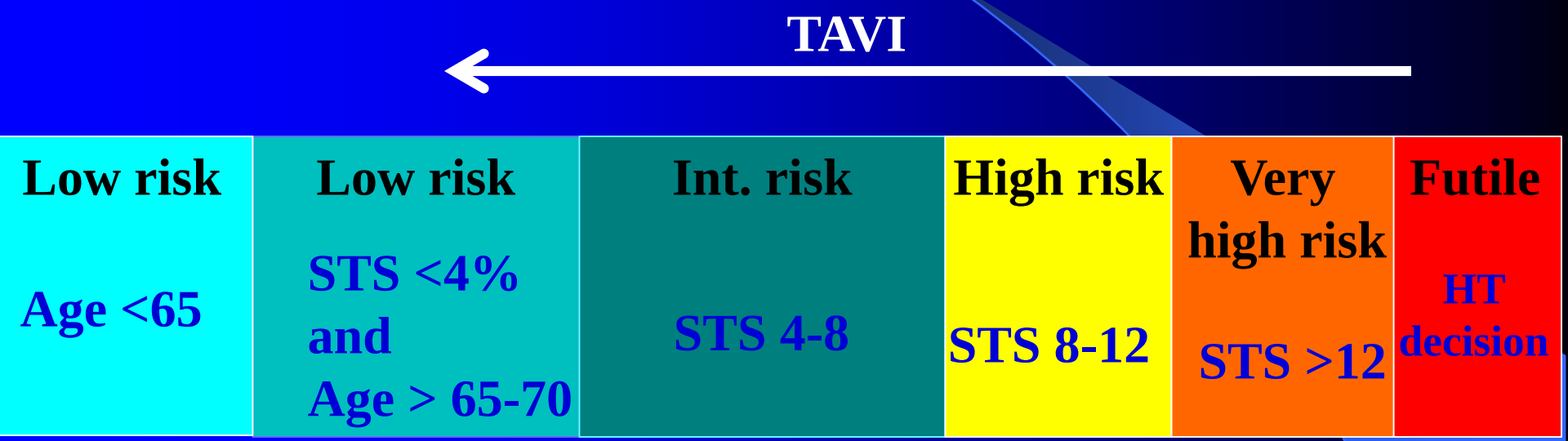
UBC

Disclosure

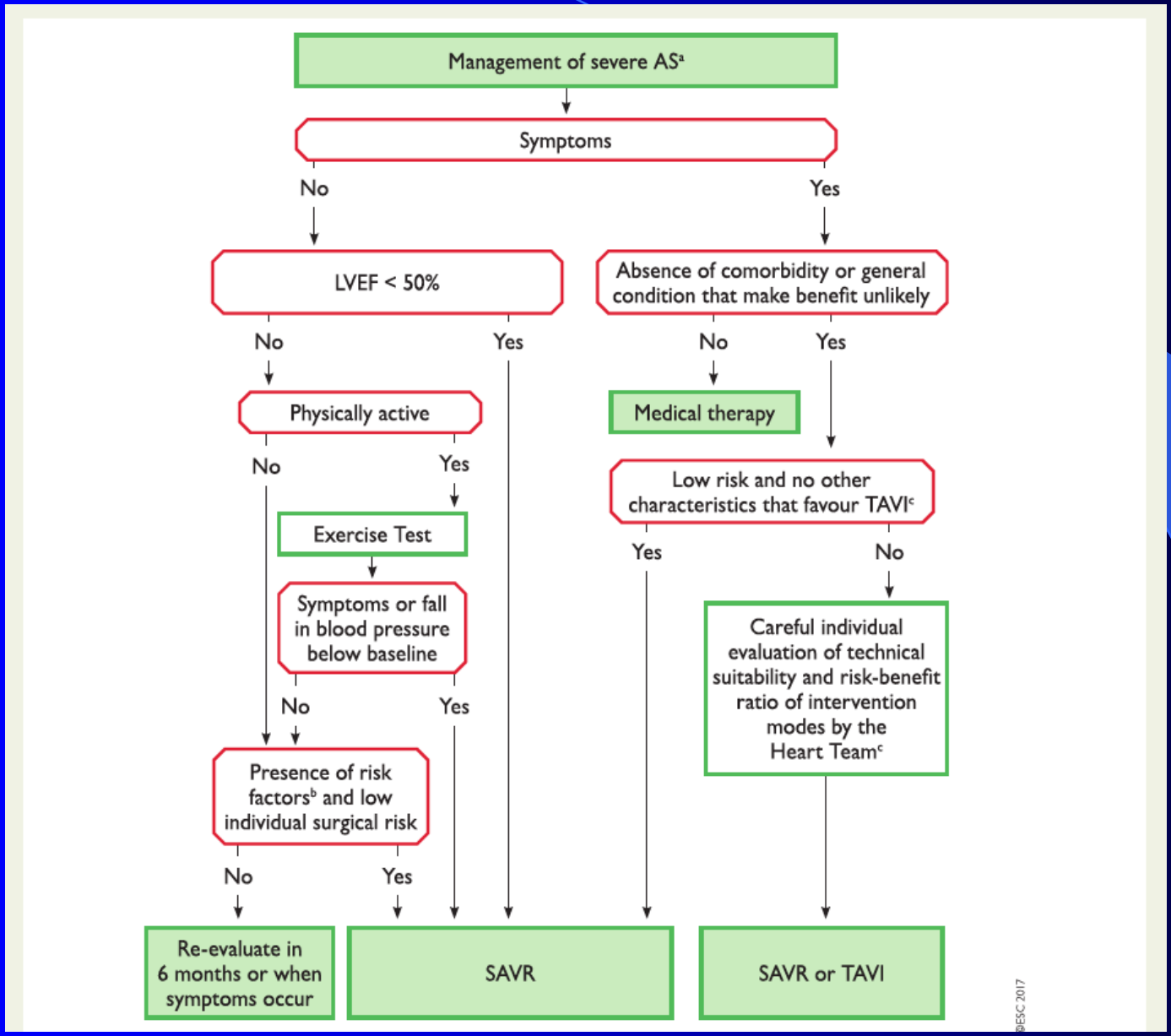
Consultant: **Edwards Lifesciences**

JC Medical Inc.

Evolution of Indication



2017 ESC/EACTS Guidelines



2017 ESC/EACTS Guidelines

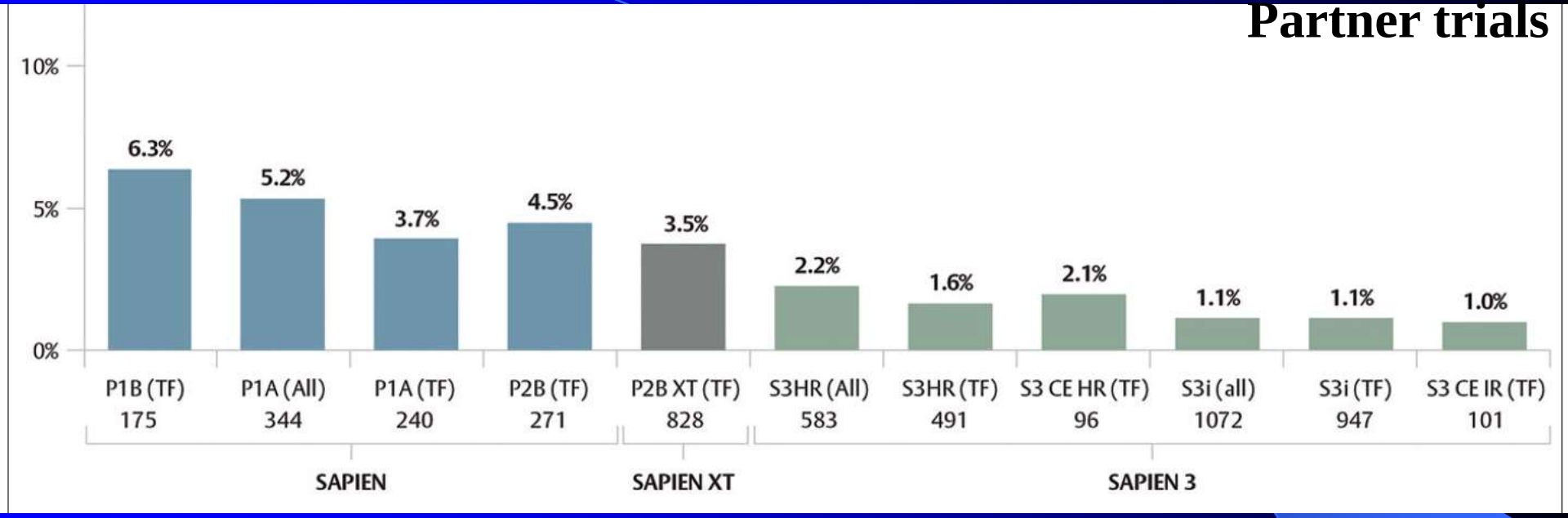
	Favours TAVI	Favours SAVR
Clinical characteristics		
STS/EuroSCORE II <4% (logistic EuroSCORE I <10%)[a]		+
STS/EuroSCORE II ≥4% (logistic EuroSCORE I ≥10%)[a]	+	
Presence of severe comorbidity (not adequately reflected by scores)	+	
Age <75 years		+
Age ≥75 years	+	
Previous cardiac surgery	+	
Frailty[b]	+	
Restricted mobility and conditions that may affect the rehabilitation process after the procedure	+	
Suspicion of endocarditis		+

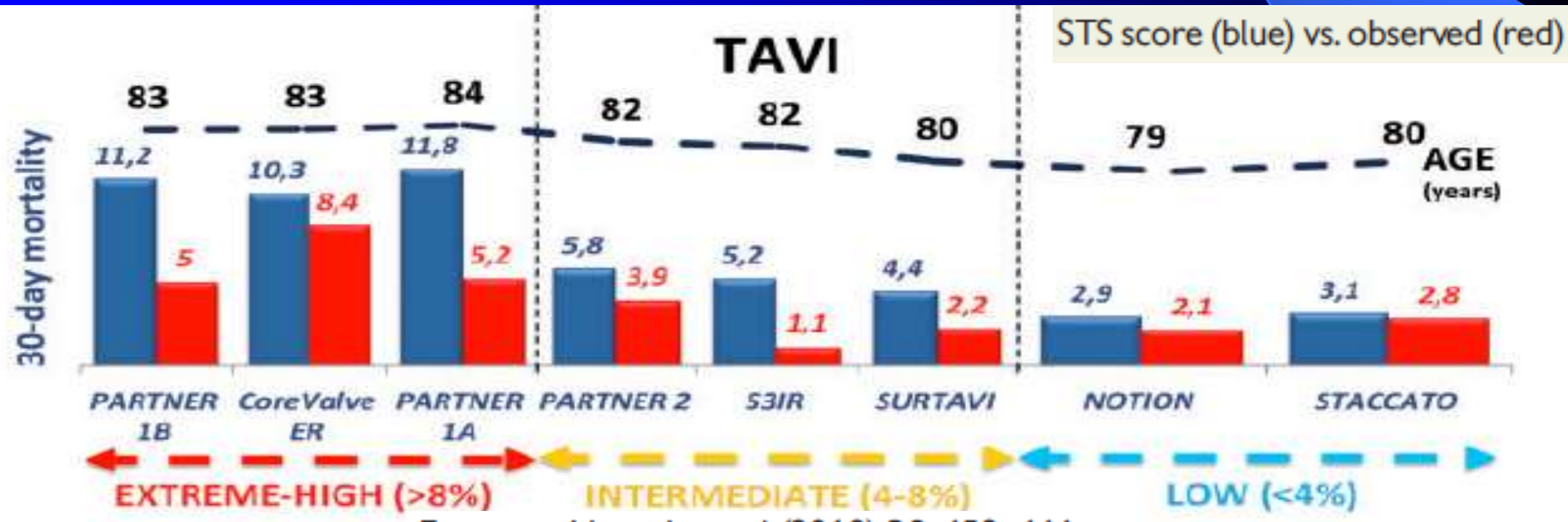
	Favours TAVI	Favours SAVR
Anatomical and technical aspects		
Favourable access for transfemoral TAVI	+	
Unfavourable access (any) for TAVI		+
Sequelae of chest radiation	+	
Porcelain aorta	+	
Presence of intact coronary bypass grafts at risk when sternotomy is performed	+	
Expected patient–prosthesis mismatch	+	
Severe chest deformation or scoliosis	+	
Short distance between coronary ostia and aortic valve annulus		+
Size of aortic valve annulus out of range for TAVI		+
Aortic root morphology unfavourable for TAVI		+
Valve morphology (bicuspid, degree of calcification, calcification pattern) unfavourable for TAVI		+
Presence of thrombi in aorta or LV		+

Potential Pitfalls of TAVI in Young Patients

- Mortality
- Stroke
- "Silent" embolic event
- Major vascular complication
- Paravalvular leak
- Pacemaker
- Bicuspid valve
- Valve thrombosis
- Valve durability

30-day Mortality



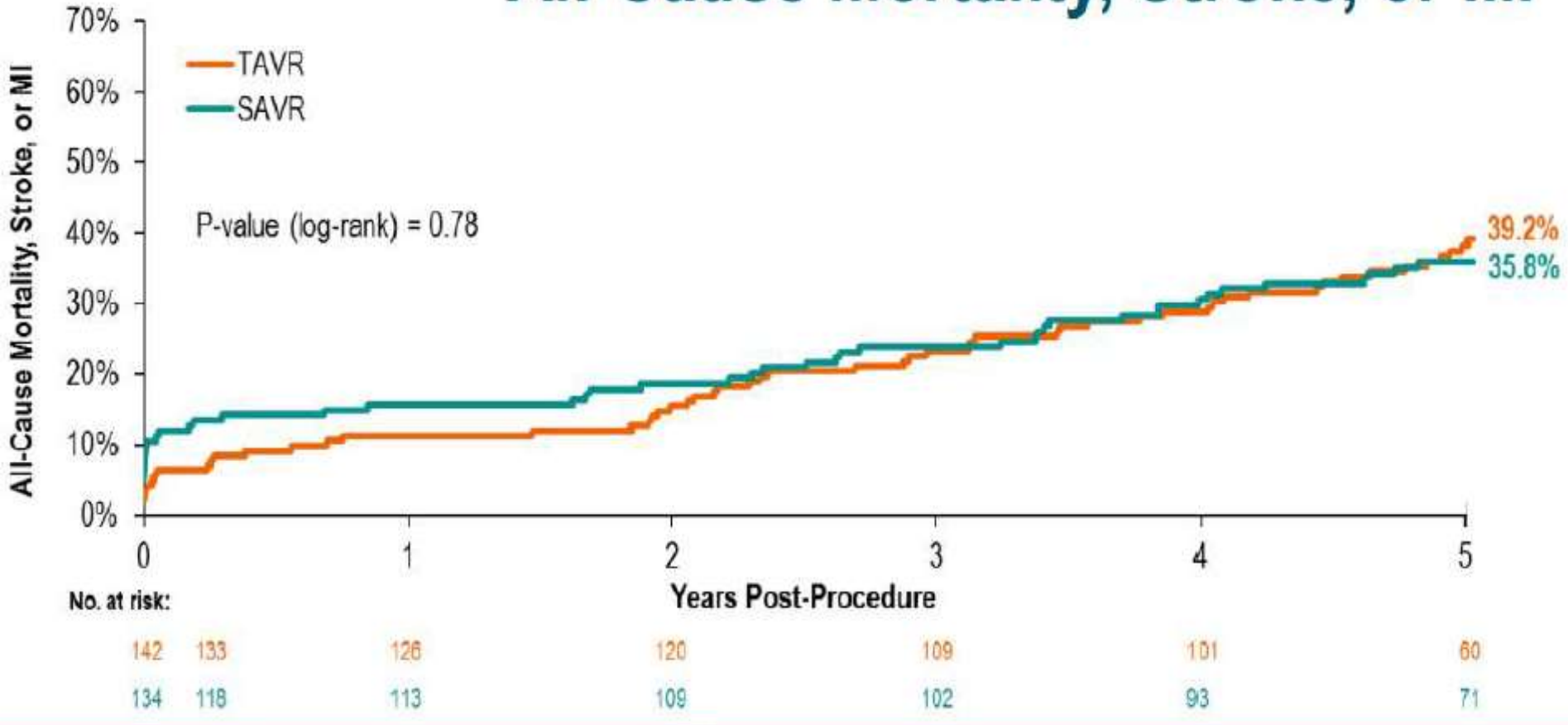


European Heart Journal (2018) **39**, 658–666

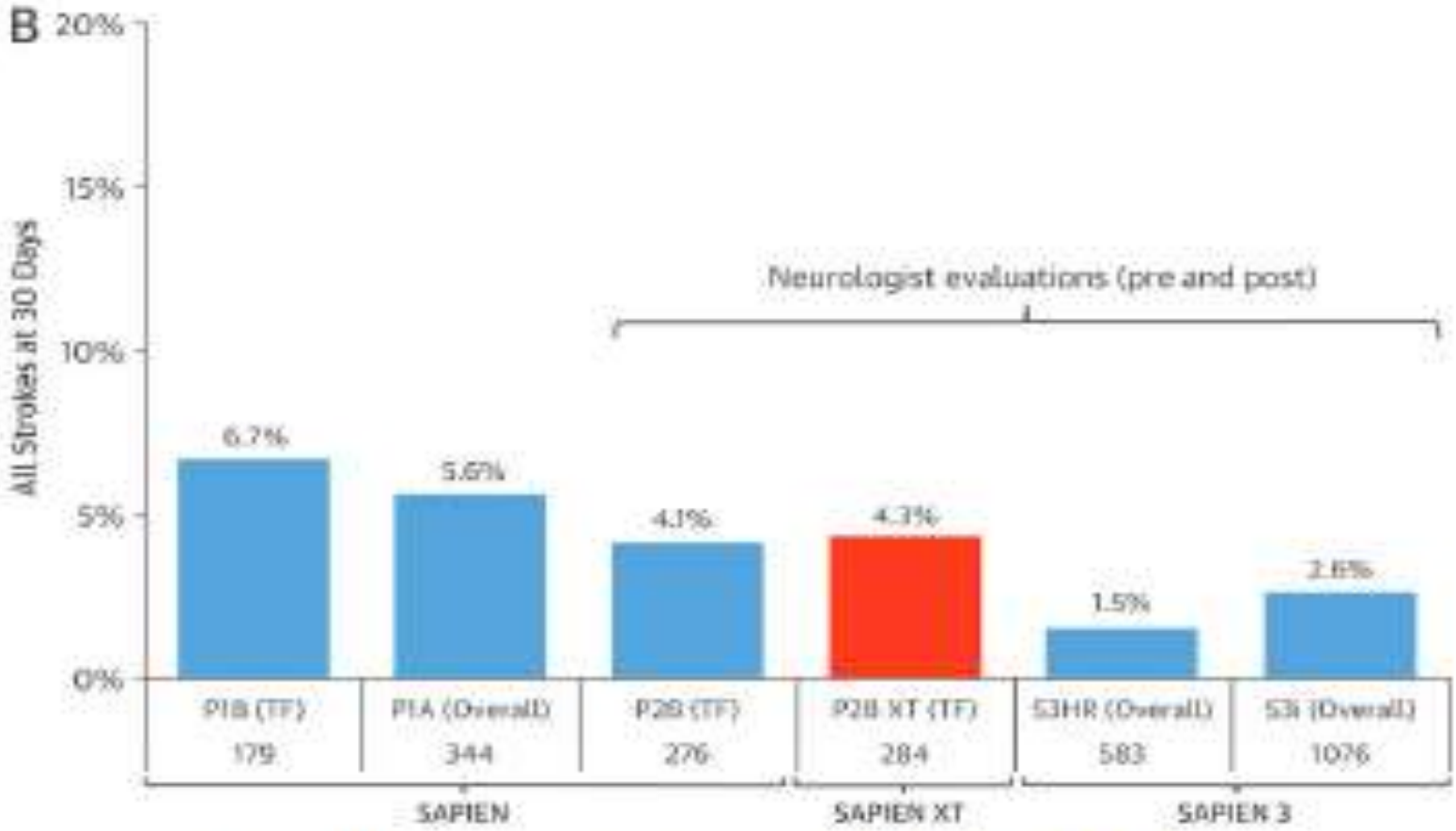
NOTION Trial

Characteristic, % or mean ± SD	TAVR n=145	SAVR n=135
Age (yrs)	79.2 ± 4.9	79.0 ± 4.7

All-Cause Mortality, Stroke, or MI



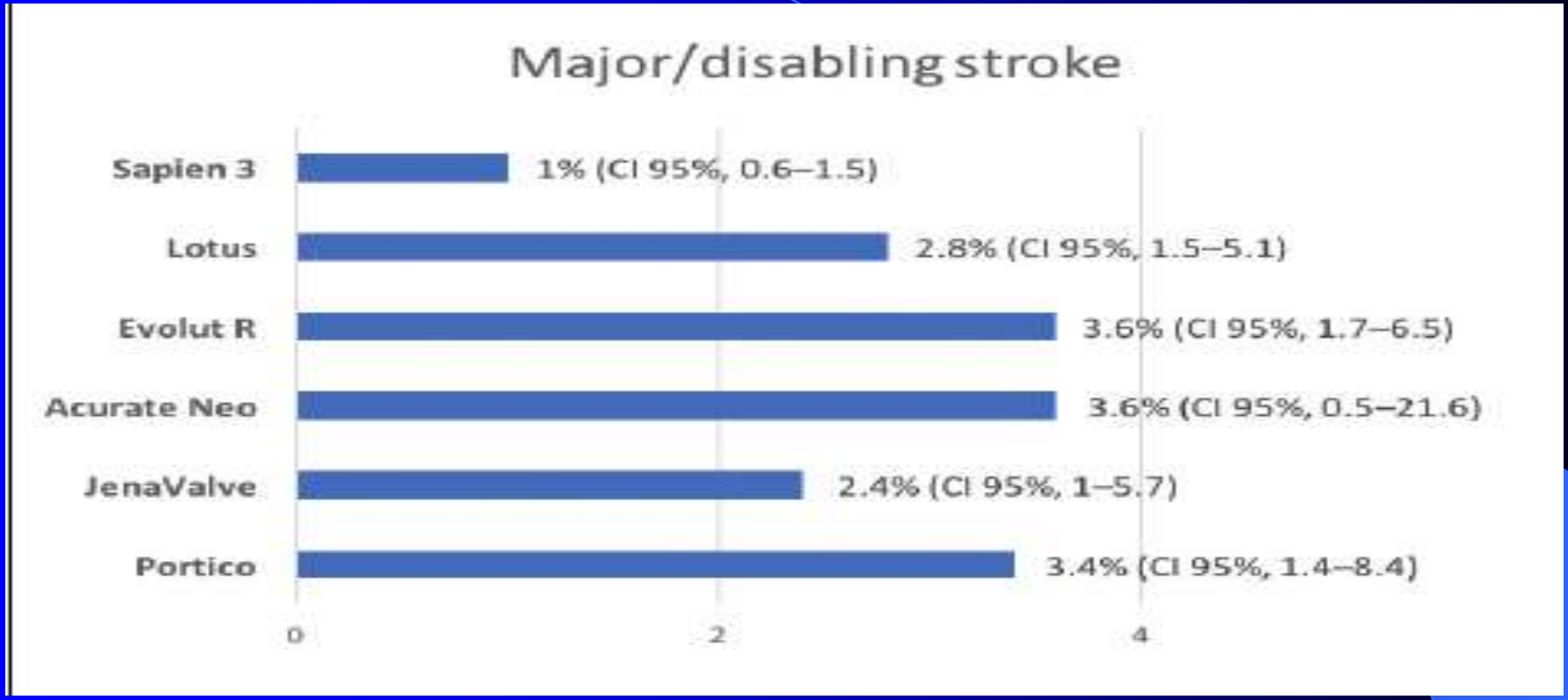
Stroke in PARTNER Trials



Torsten P. Vahl et al. JACC 2016;67:1472-1487

Current stroke rate with newer generation devices is still ~1% in low-intermediate risk patients

Incidence of Stroke



Outcomes from a weighted meta-analysis of 30 studies including 5,923 patients achieved with a comprehensive search of multiple Database from January 2011 to March 2016.

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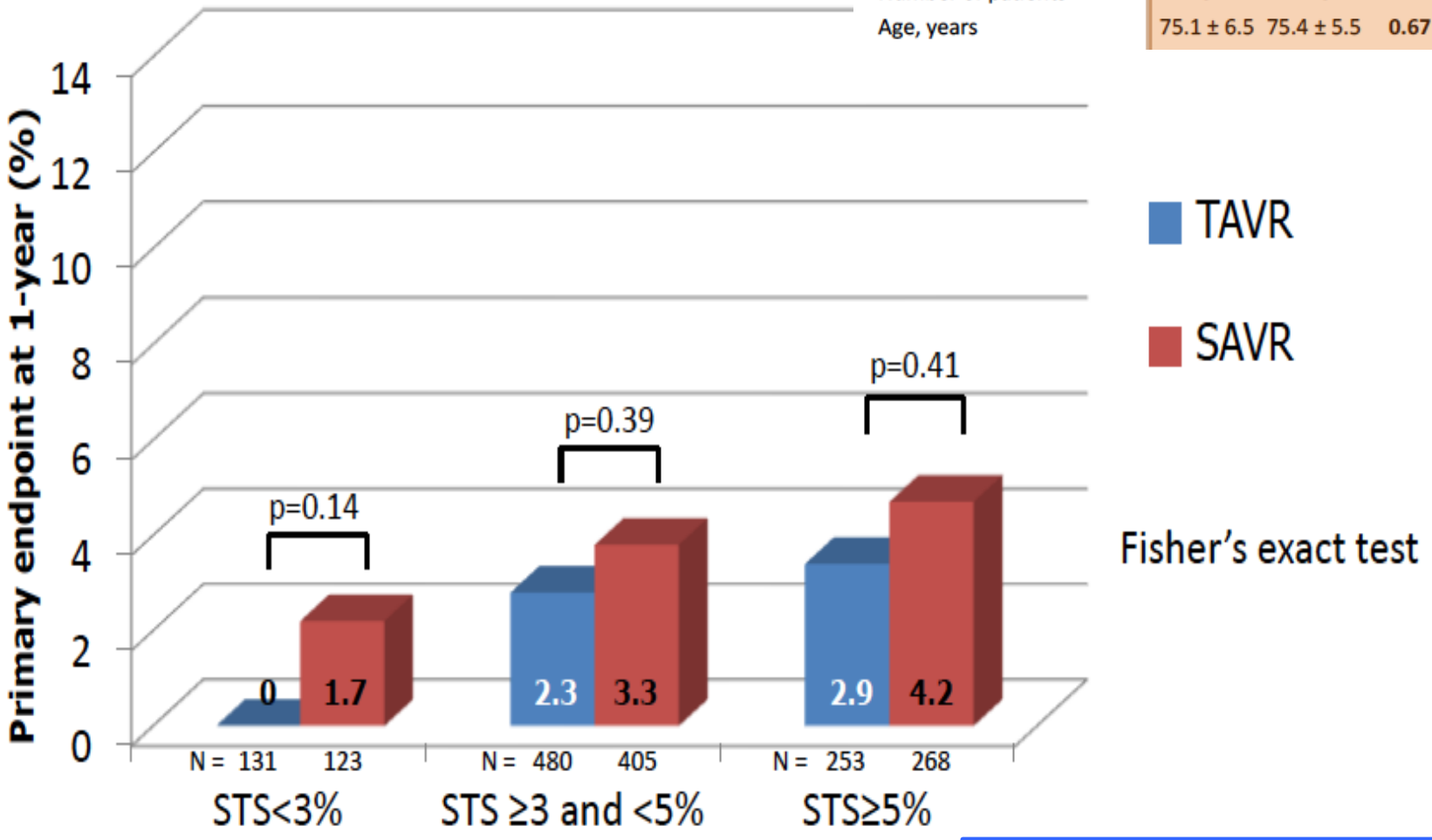
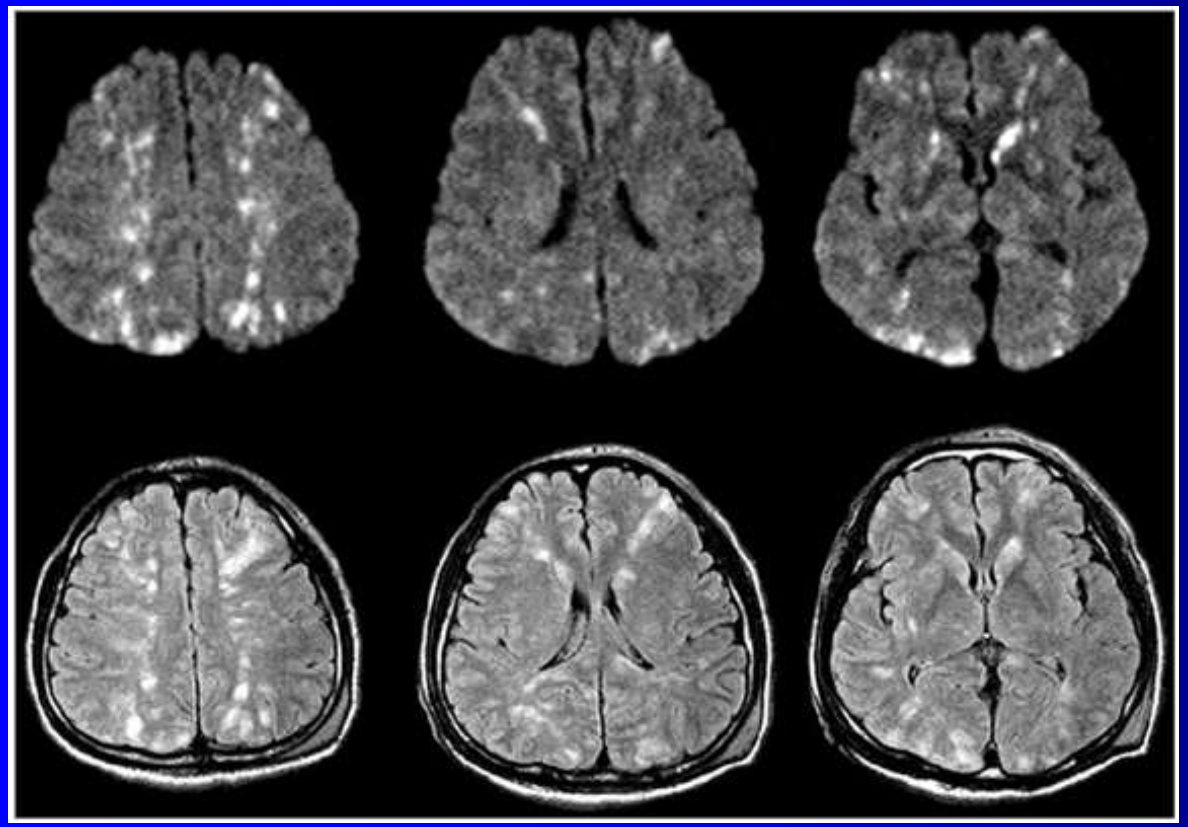
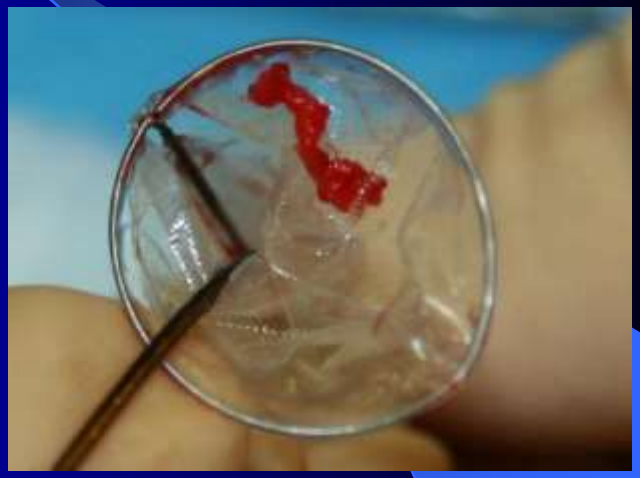
Disabling stroke at 1-year (SURTAVI)

	STS <3%		
	TAVR	SAVR	p-value
Number of patients	131	123	-
Age, years	75.1 ± 6.5	75.4 ± 5.5	0.67



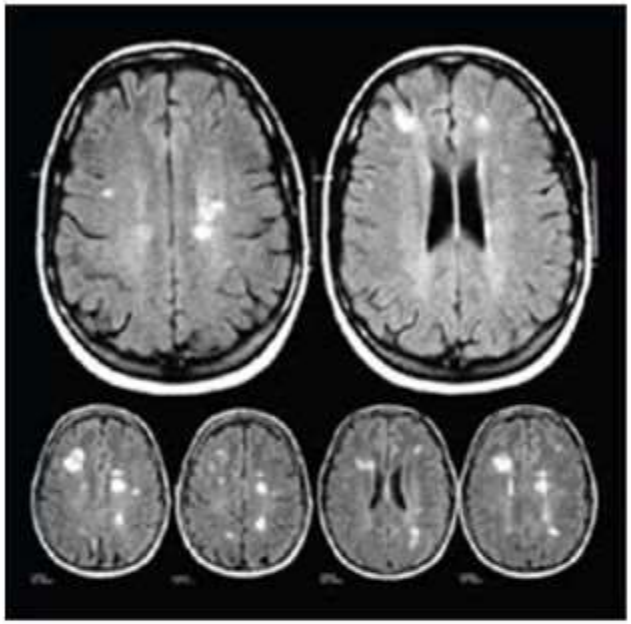
“Silent” stroke will be a major concern in young patients

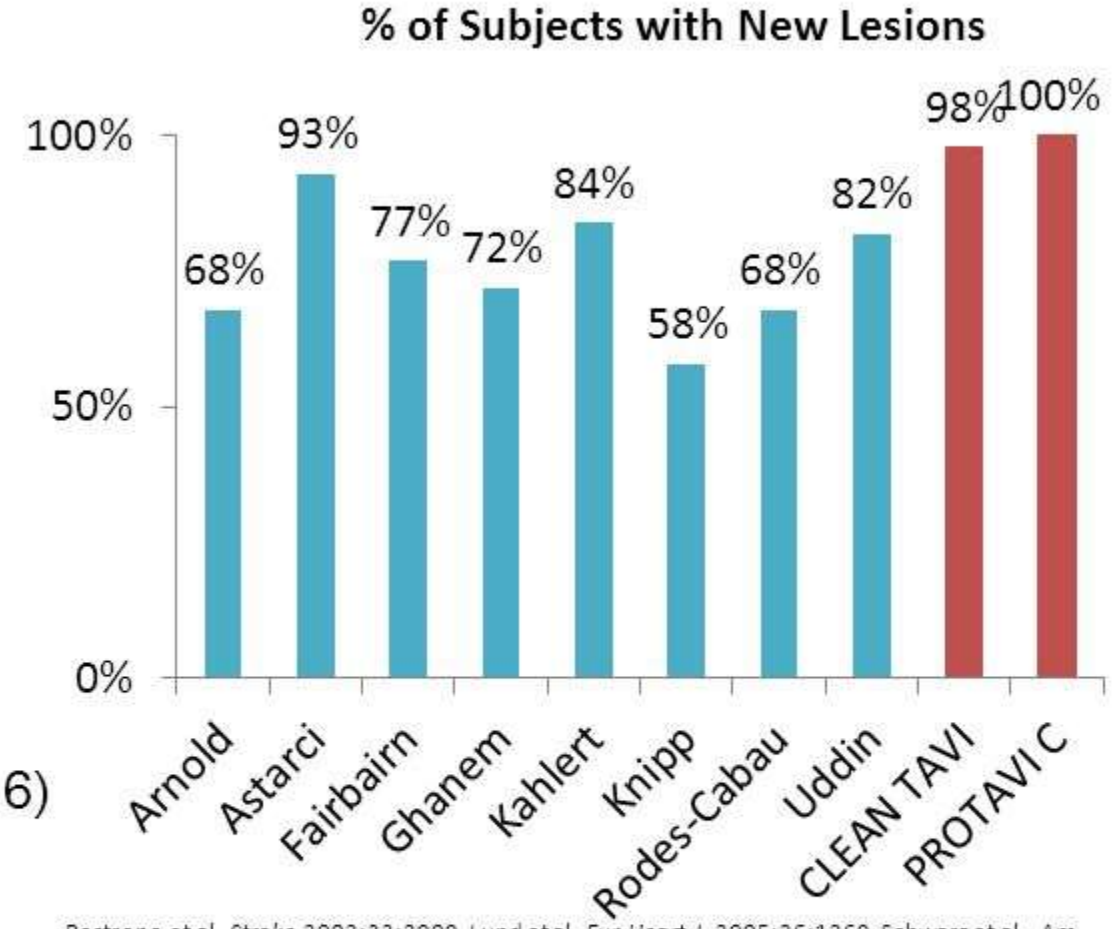




Captured by embolic protection devices in 80-85% TAVI patients

Silent Embolic Events on DW-MRI after TAVR





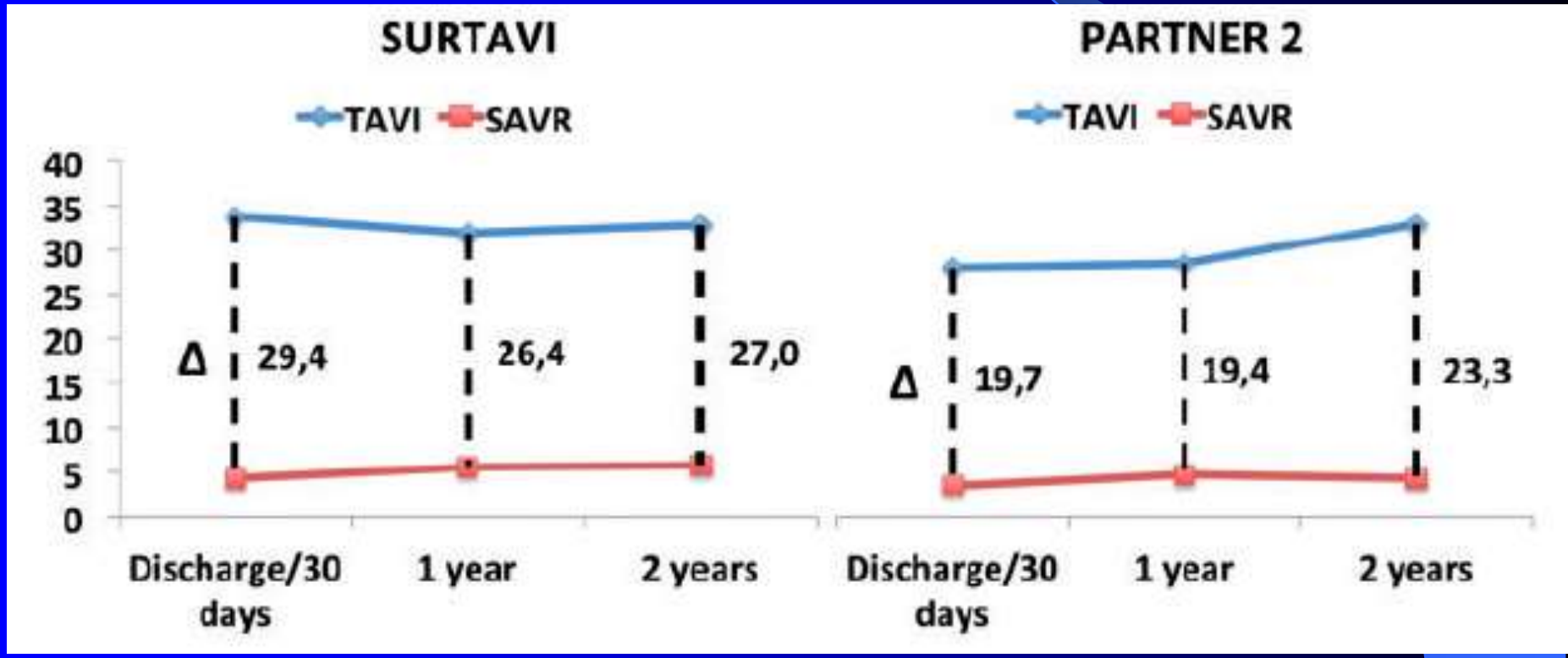
- Affect 58-100% of patients
- Multiple infarcts (≤36, $\bar{x}$ = 4.6)
- Associated with:
  - Neurocognitive decline
  - >2 fold risk of dementia
  - **>3 fold risk of stroke**

Restrepo et al. *Stroke* 2002;33:2909, Lund et al. *Eur Heart J.* 2005;26:1269, Schwarz et al. *Am Heart J* 2011;162:756, Knipp et al. *Ann Thorac Surg* 2008;85:872, Vermeer et al. *NEJM* 2003; 348:1215, Vermeer et al. *Stroke* 2003; 34:1126, Arnold et al. *JACC Cardiovasc Interv.* 2010;3:1126, Astarci et al. *J Heart Valve Dis.* 2013;22:79, Fairbairn et al. *Heart* 2012;98:18, Ghanem et al. *EuroIntervention.* 2013;8:1296, Kahlert et al. *Circ.* 2010;121:870, Knipp et al. *Interact Cardiovasc Thorac Surg.* 2013;16:116, Linke et al. TCT 2014, Rodes-Cabau et al. *JACC Cardiovasc Interv* 2014;7:1146

Paravalvular leak is still higher in TAVI

Is mild PVL a concern in young patient?

Incidence of mild PVL in intermediate-risk patients undergoing SAVR or TAVI



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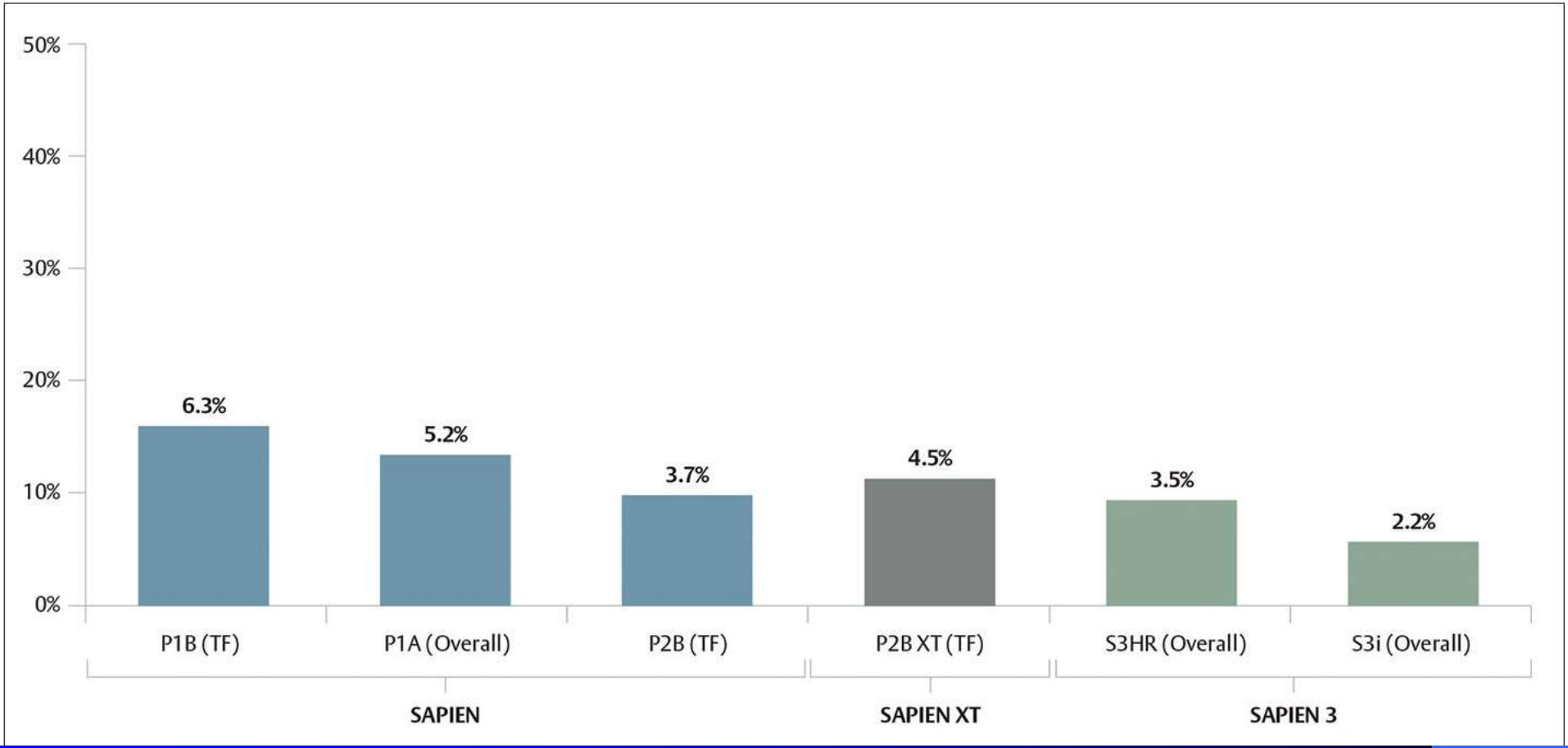
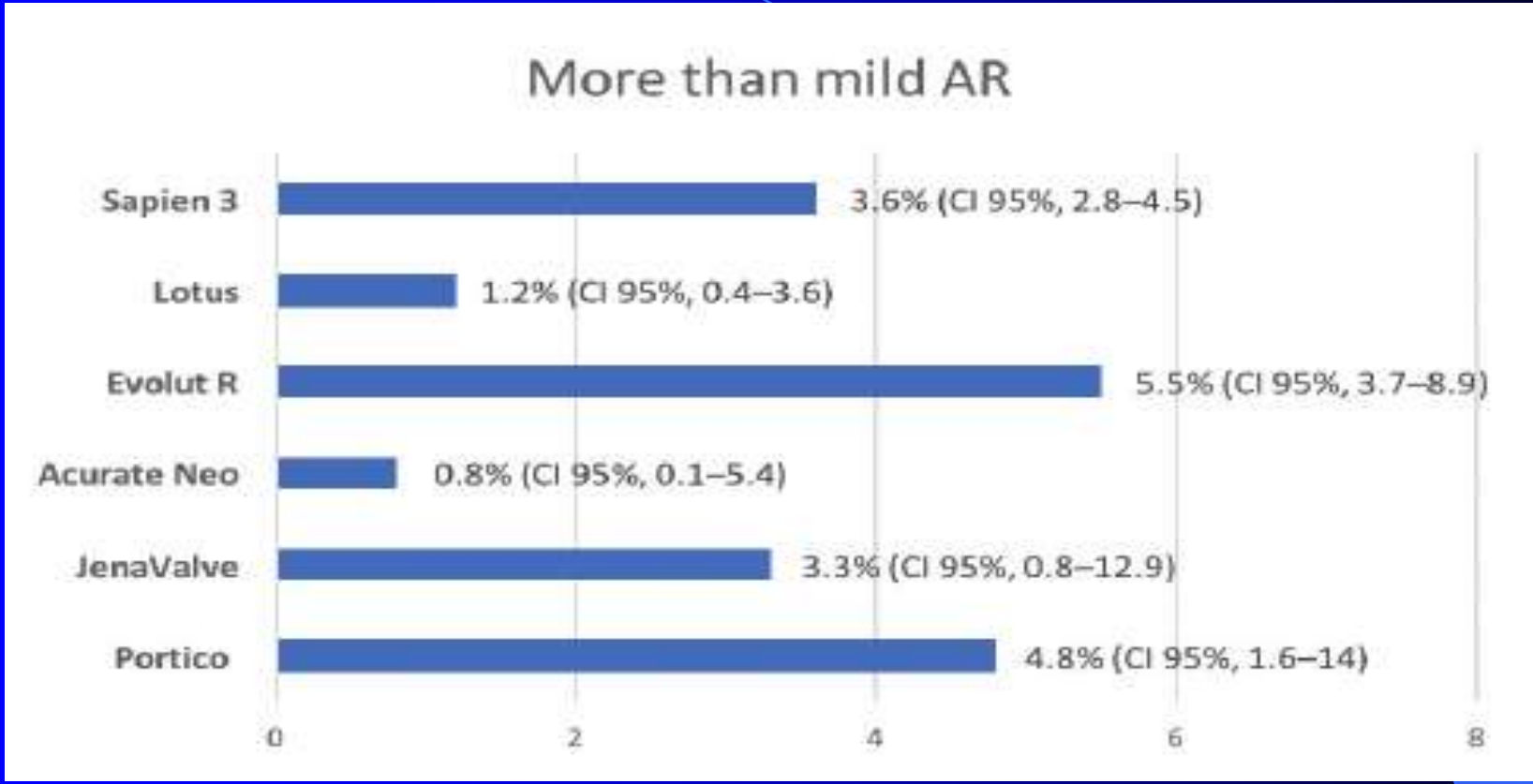
Paravalvular Leak (>mild) in PATNER Trials



Paravalvular Leak (>mild)



Outcomes from a weighted meta-analysis of 30 studies including 5,923 patients achieved with a comprehensive search of multiple Database from January 2011 to March 2016.

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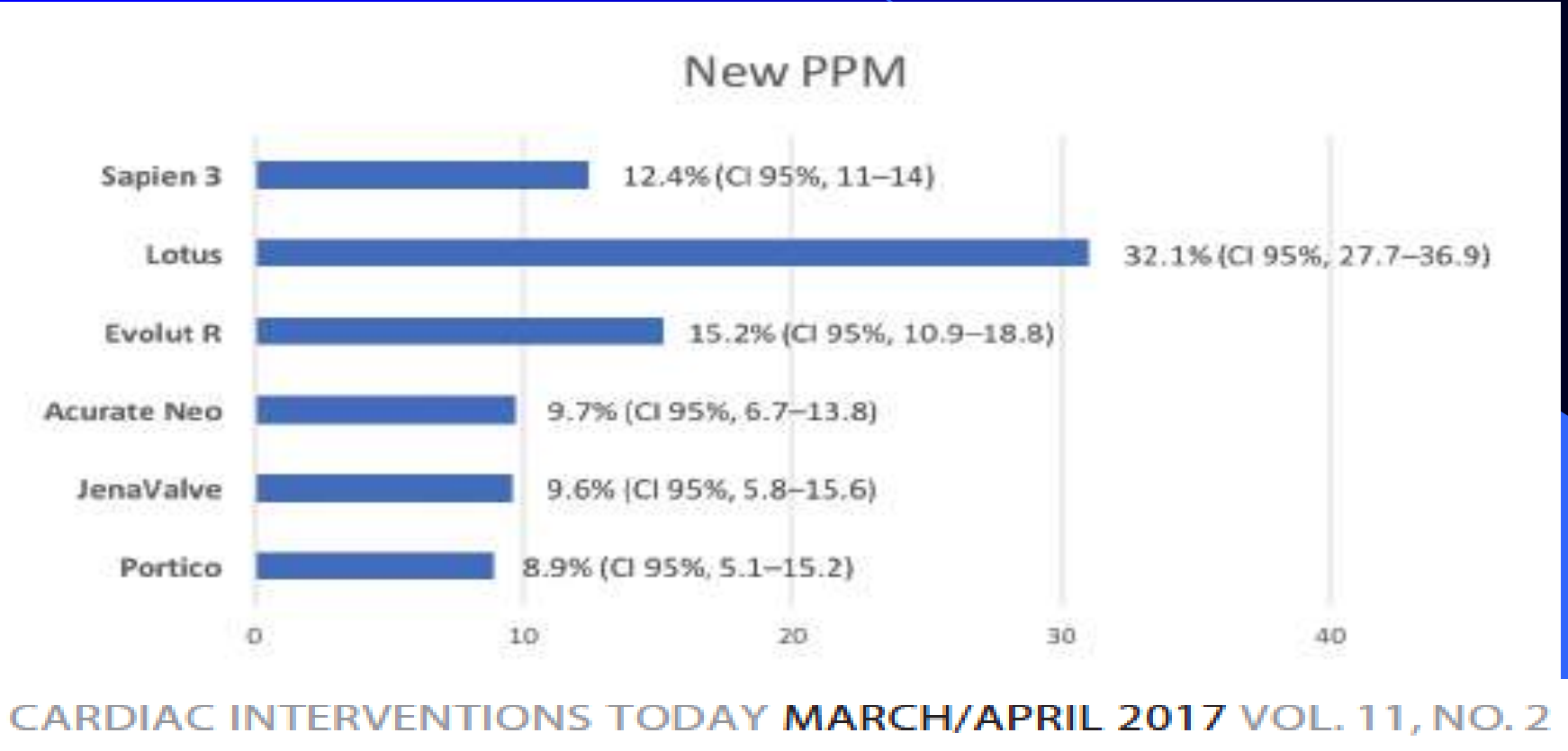
Pacemaker will be a biggest concern in young patients



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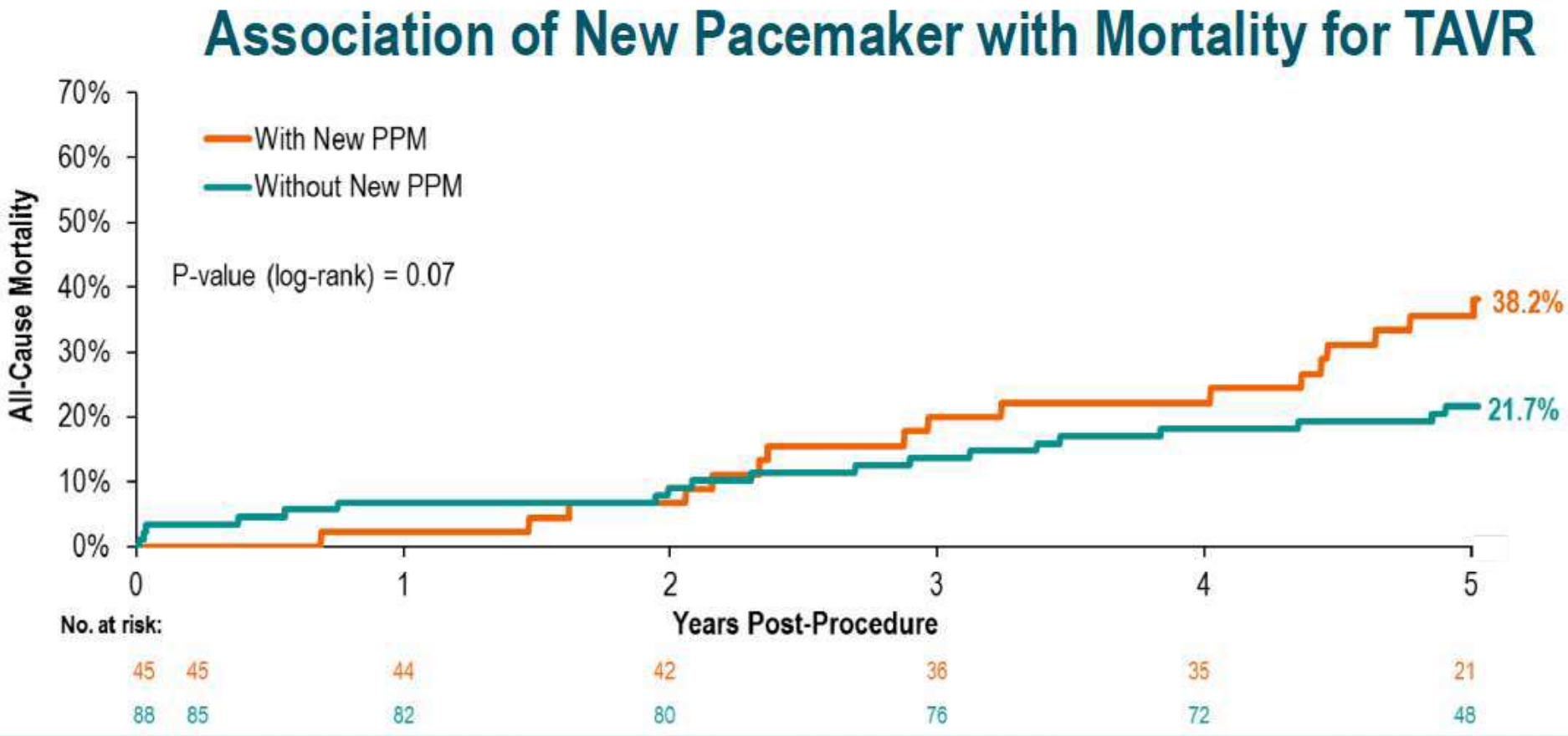
Outcomes from a weighted meta-analysis of 30 studies including 5,923 patients achieved with a comprehensive search of multiple Database from January 2011 to March 2016.

NOTION Trial

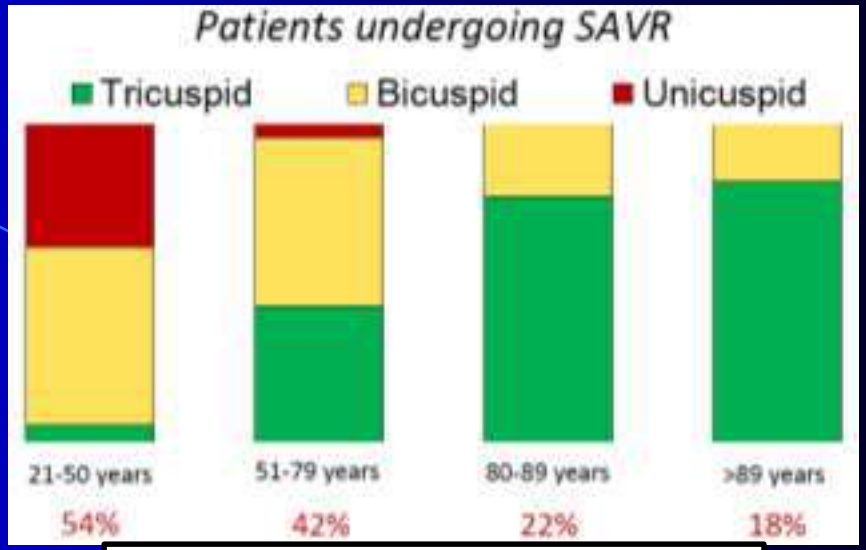
Secondary Outcomes

5-Year Outcome, Kaplan-Meier %	TAVR	SAVR	p-value
Death, any cause	27.7	27.7	0.90
Death, cardiovascular	21.0	22.5	0.75
Stroke	10.5	8.2	0.67
TIA	6.8	4.1	0.35
Myocardial infarction	8.6	8.7	0.87
Atrial fibrillation	25.2	62.2	<0.001
Pacemaker	41.8	8.4	<0.001
Aortic valve re-intervention	2.5	0.0	0.09
Valve endocarditis	11.3	5.8	0.10

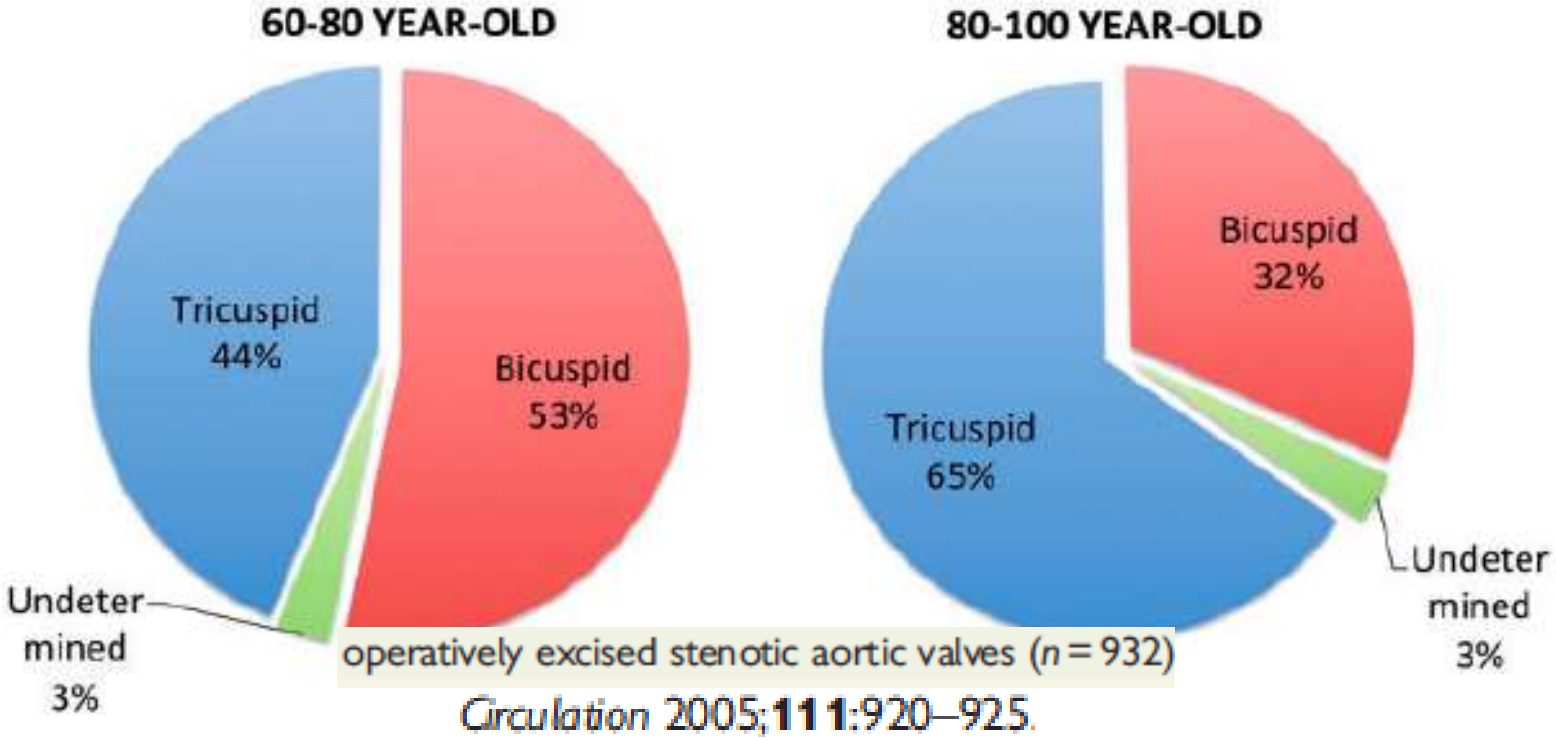
NOTION Trial



Incidence of bicuspid valve



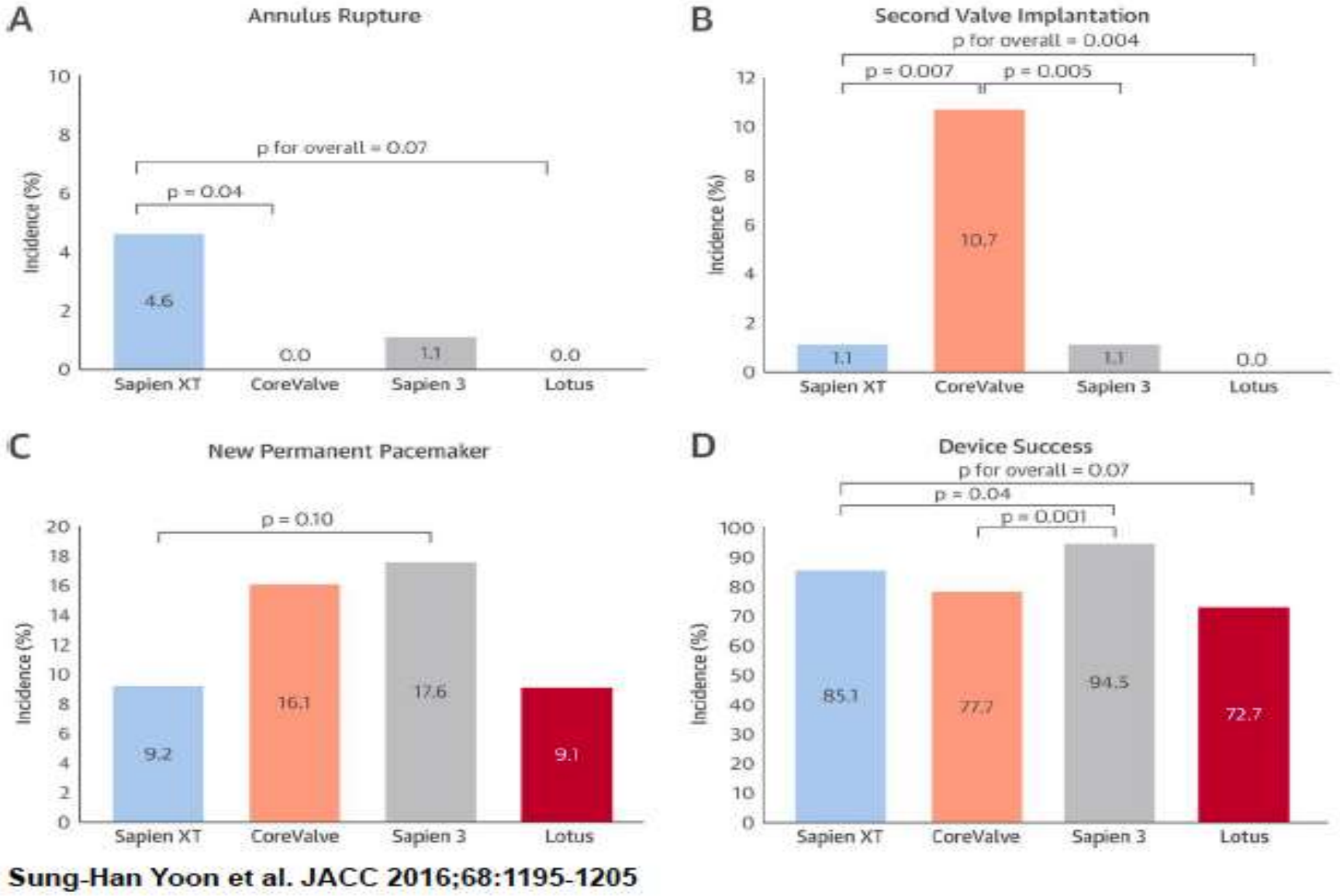
Roberts et al. AJC 2012;109:1632-6



operatively excised stenotic aortic valves ($n = 932$)

Circulation 2005;**111**:920–925.

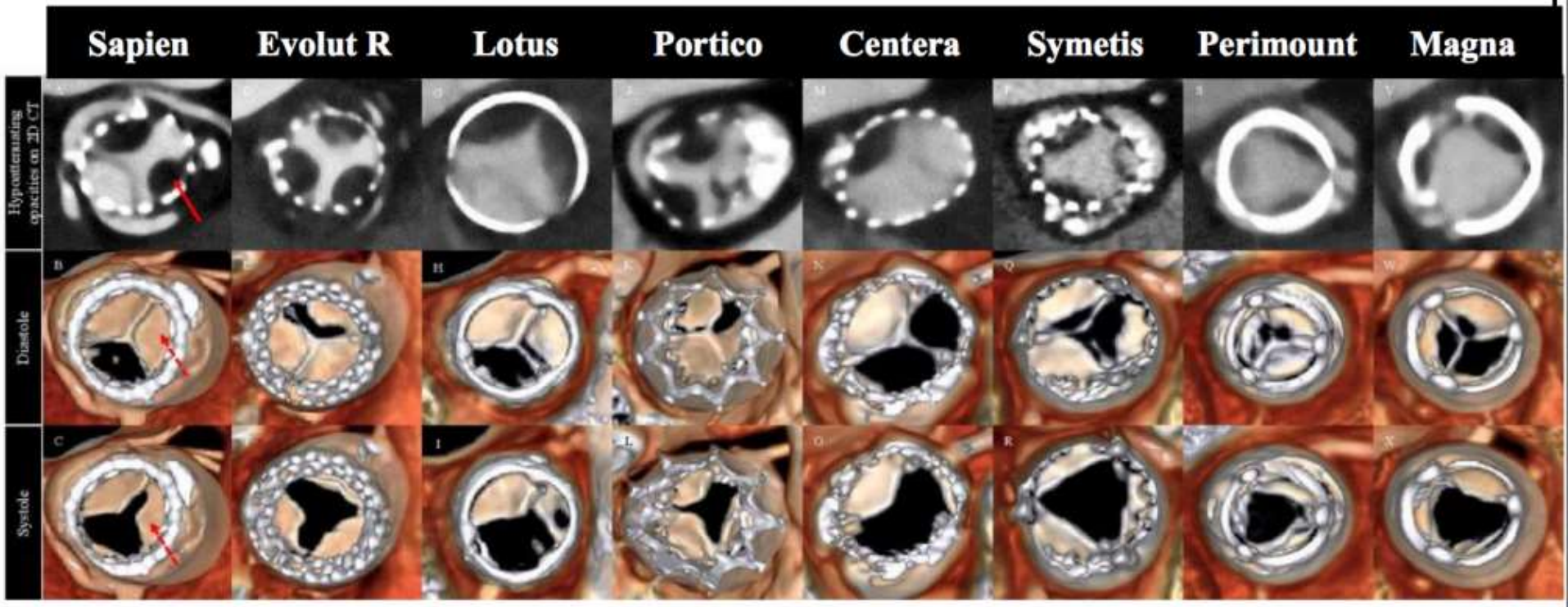
Higher complications in patients with bicuspid valves



Sung-Han Yoon et al. JACC 2016;68:1195-1205

Valve Thrombosis

TAVR ~13% SAVR ~5%



Durability of bioprostheses is poor in young patients

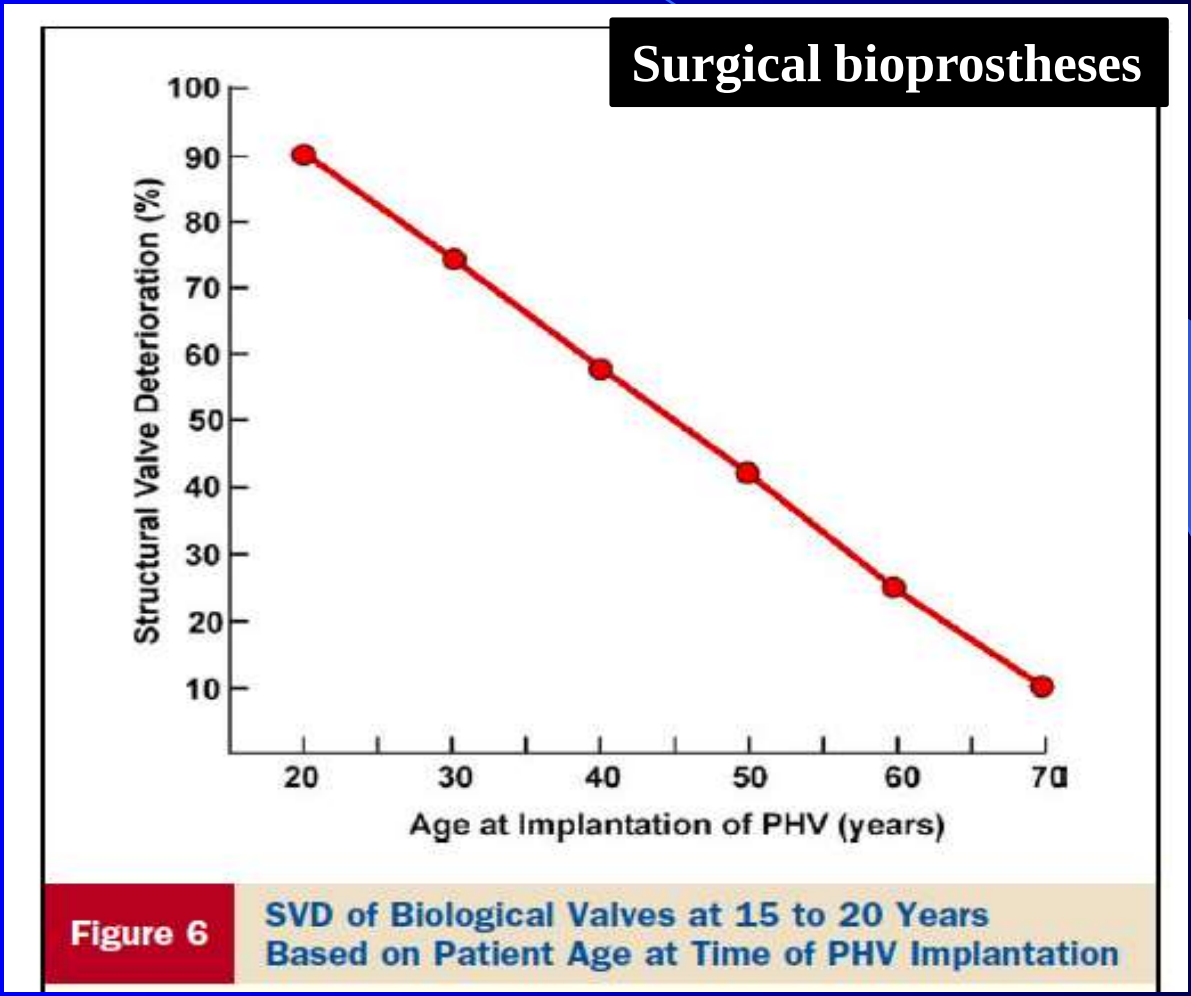
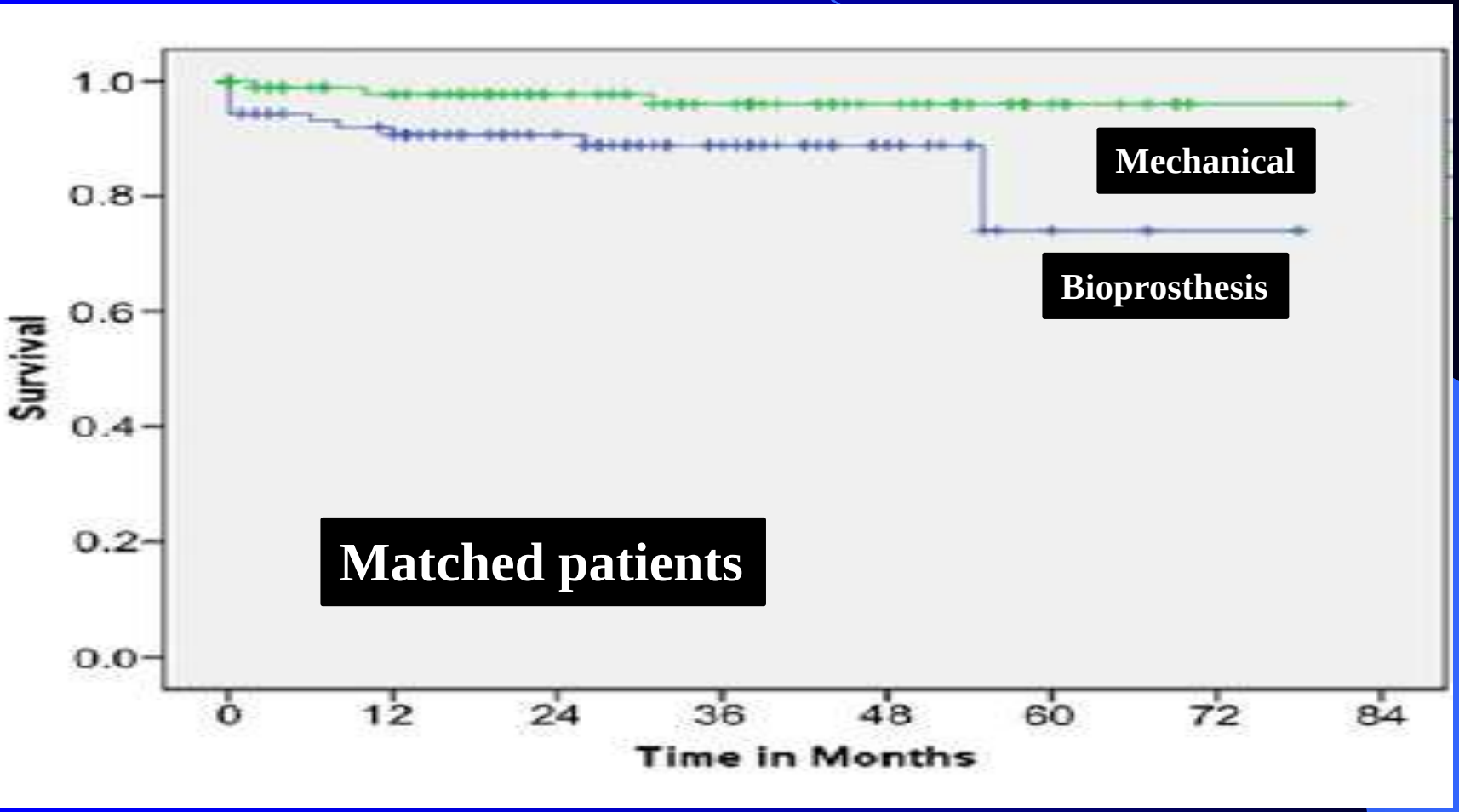


Figure 6 SVD of Biological Valves at 15 to 20 Years Based on Patient Age at Time of PHV Implantation

(J Am Coll Cardiol 2010;55:2413–26)

Better survival with mechanical valve in young patients (<60 y/o)



J Thorac Cardiovasc Surg 2012;144:1075-83

Clinical trials in low-risk patients

Table 4 On-going randomized TAVI vs. SAVR trials in low-risk patients

	PARTNER 3	Evolut R low risk	NOTION 2
Trial ID	NCT02675114	NCT02701283	NCT02825134
No. of patients	1328	1200	992
Design	Non-inferiority	Non-inferiority	Non-inferiority
Definition of low risk	Heart Team predicted peri-operative mortality <2% (STS <4%)	Heart Team predicted 30-day SAVR mortality <3% (STS <3%)	STS <4%Age ≤75 years
THV in TAVI arm	SAPIEN 3 Only TF approach	Evolut R or Corevalve	Any CE approved THV Only TF approach
Follow-up	Up to 10 years	Up to 5 years	Up to 5 years
Primary endpoint	All cause mortality, all stroke and re-hospitalization at 1 year	All-cause mortality or disabling stroke at 2 years	All-cause mortality, myocardial infarction and stroke at 1 year

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Is it still too early to tell TAVR in low-risk and young patients?

- Yes, it is still too early to tell TAVI in low-risk and young patients.
- Mechanical valves is still a viable option in very young (<50 yrs) patients.
- Patient involvement in clinical decision-making is essential, and informed consent is more critical in the future.


THANKS!