Considerations for TAVR-First or SAVR-First Strategies in Young Patients

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Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Institutional Research Grant Support.	• Edwards Lifesciences

Learning Objectives

- To review anatomic considerations when choosing TAVR-First or SAVR-First
- To describe factors to optimize index TAVR or SAVR procedure
- To compare pros and cons of both TAVR-First or SAVR-First approach

"Isolated AS and favorable anatomy for both TAVR or SAVR"

Assuming low surgical risk and long-life expectancy

Main Factors to Consider for Index AVR

- Safety first
- Bioprosthetic Valve Performance (optimize index AVR)
- Durability

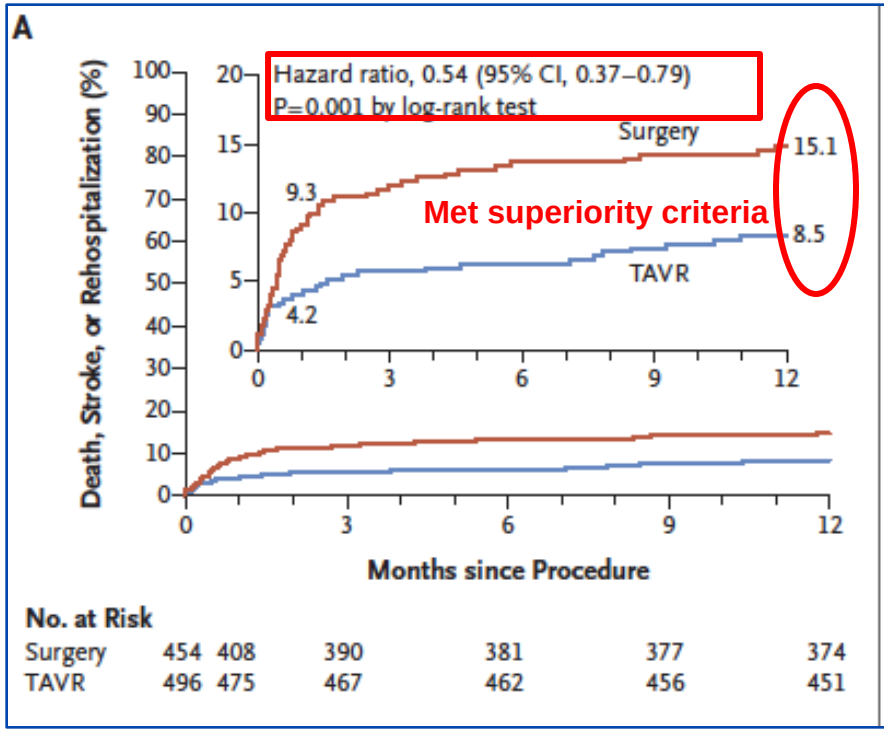
"When bioprosthesis fails years later…

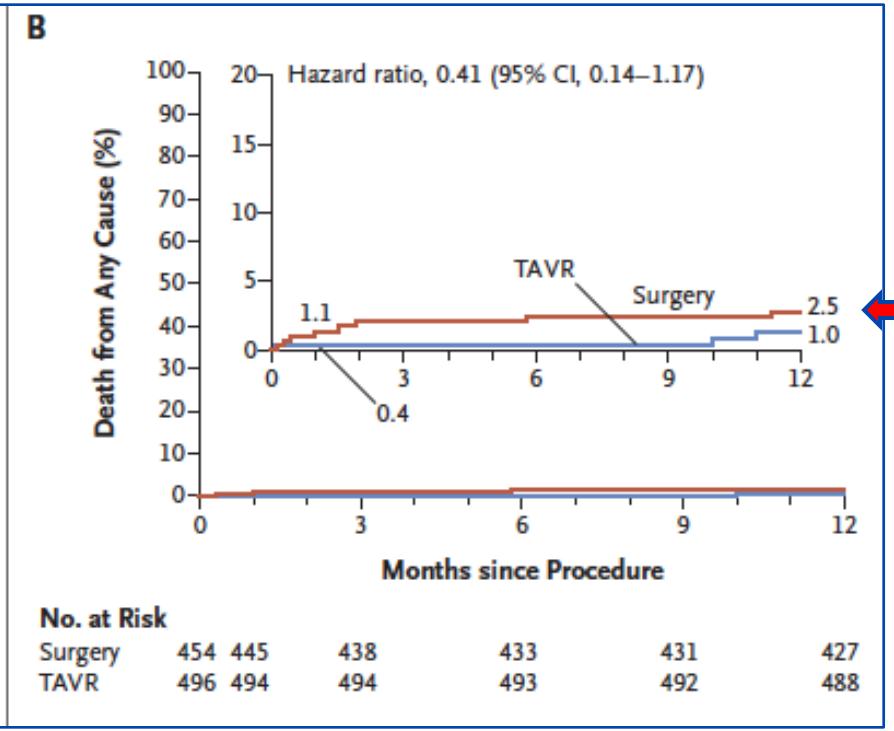
…Options for subsequent AVR procedures (TAV-in-SAV, TAV-in-TAV or SAVR).

Safety…

PARTNER 3 Low Risk

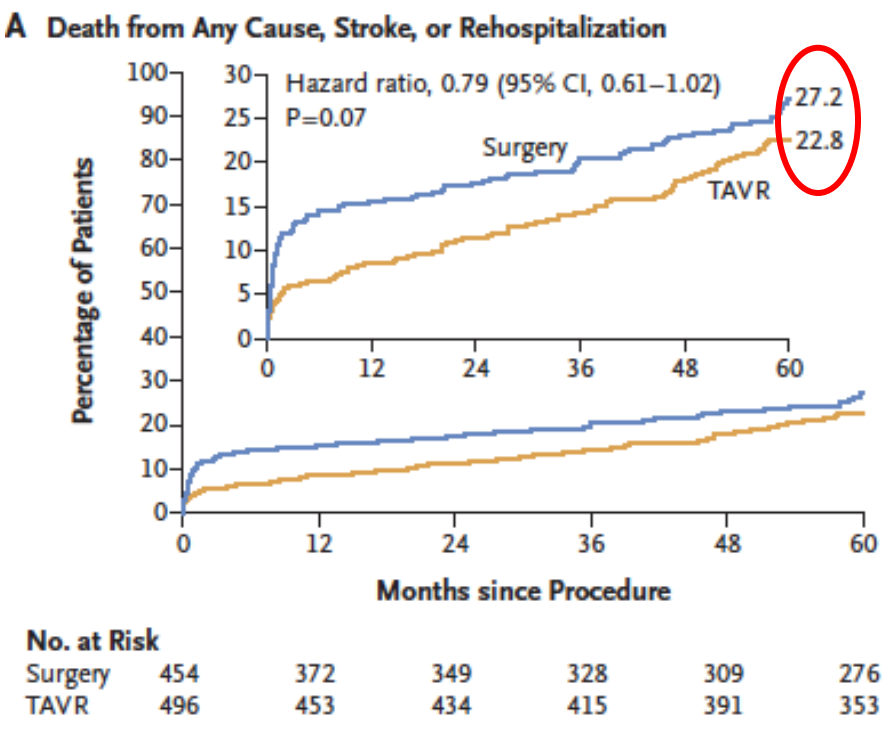
Primary Endpoint: Death, stroke or CV hospitalization at 1 year 8.5% vs 15.5% (superiority met)

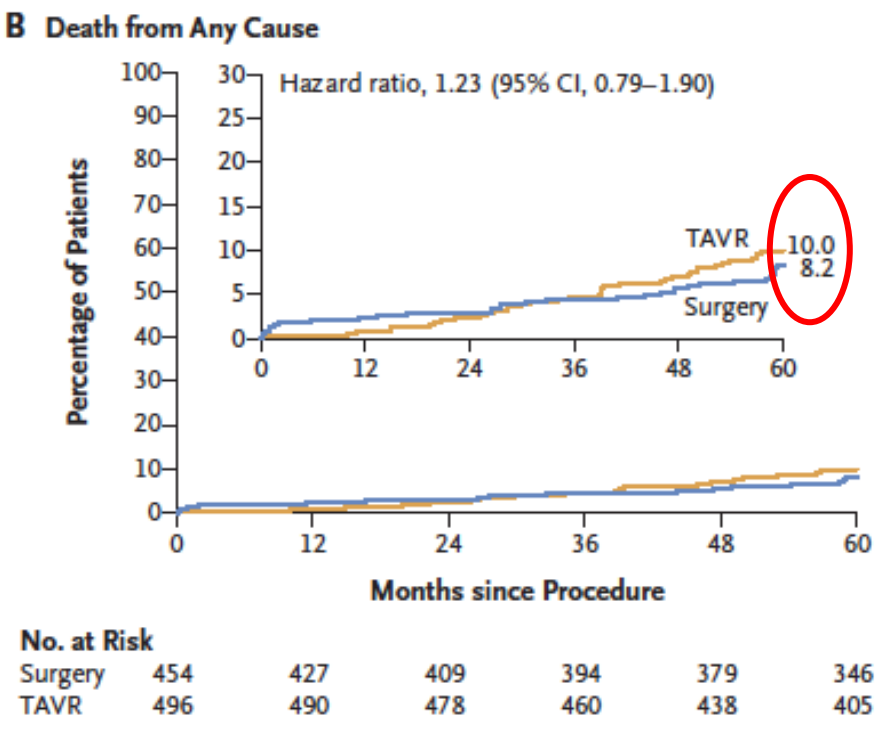




Safety…

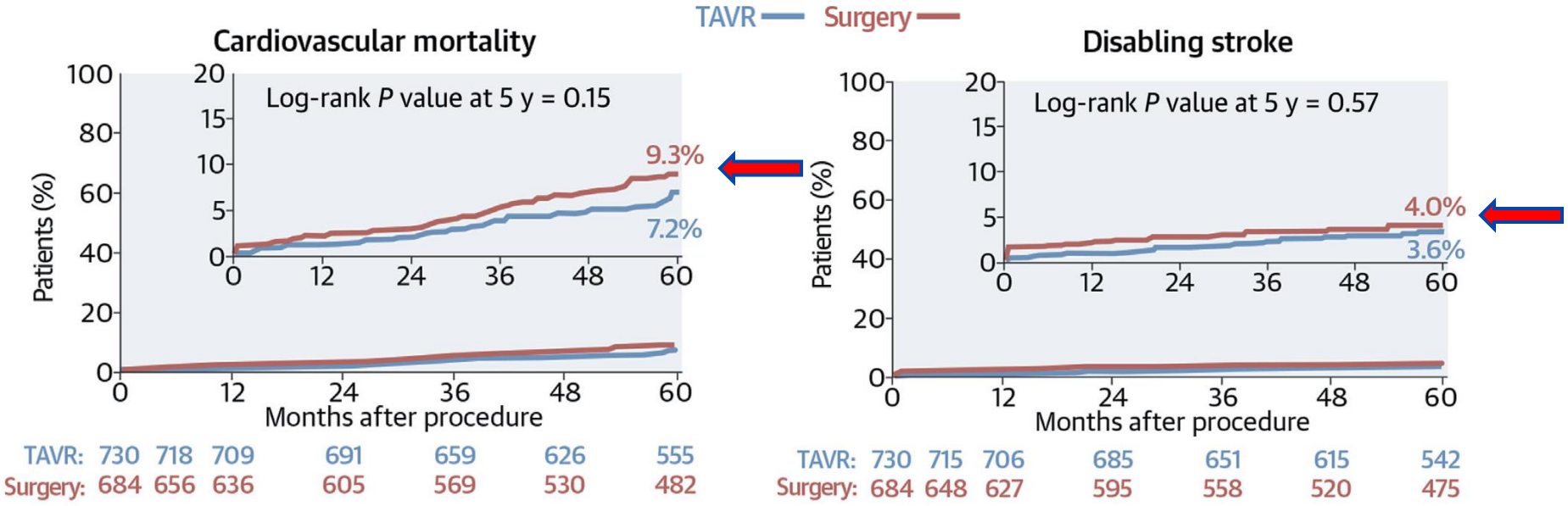
PARTNER 3 Low Risk 5-Year Outcomes





Safety…

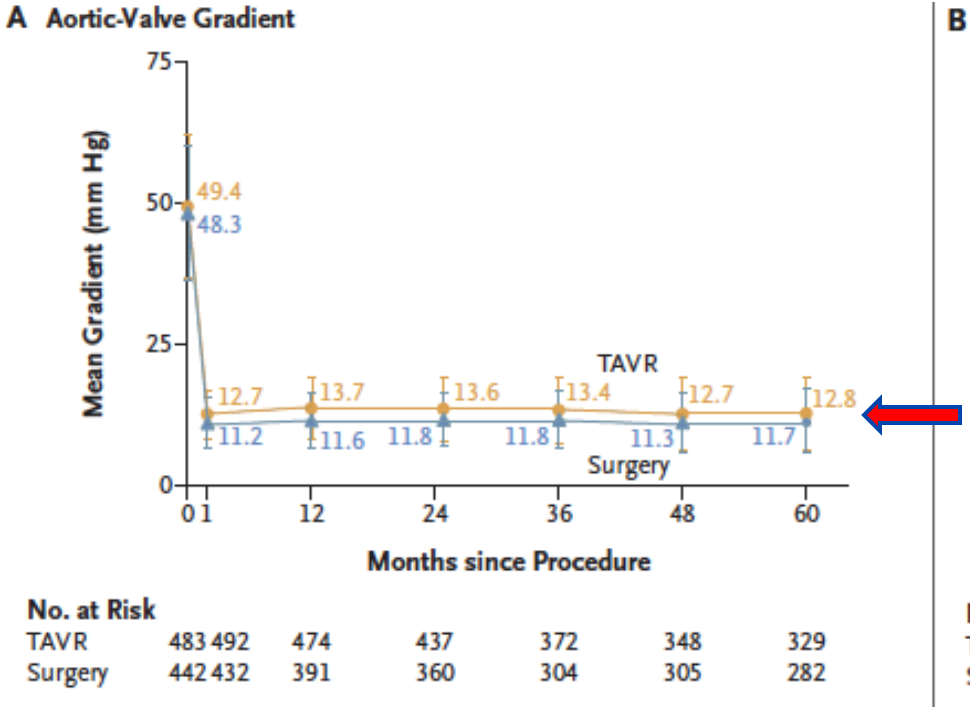
Evolut Low Risk Trial 5-Year Outcomes

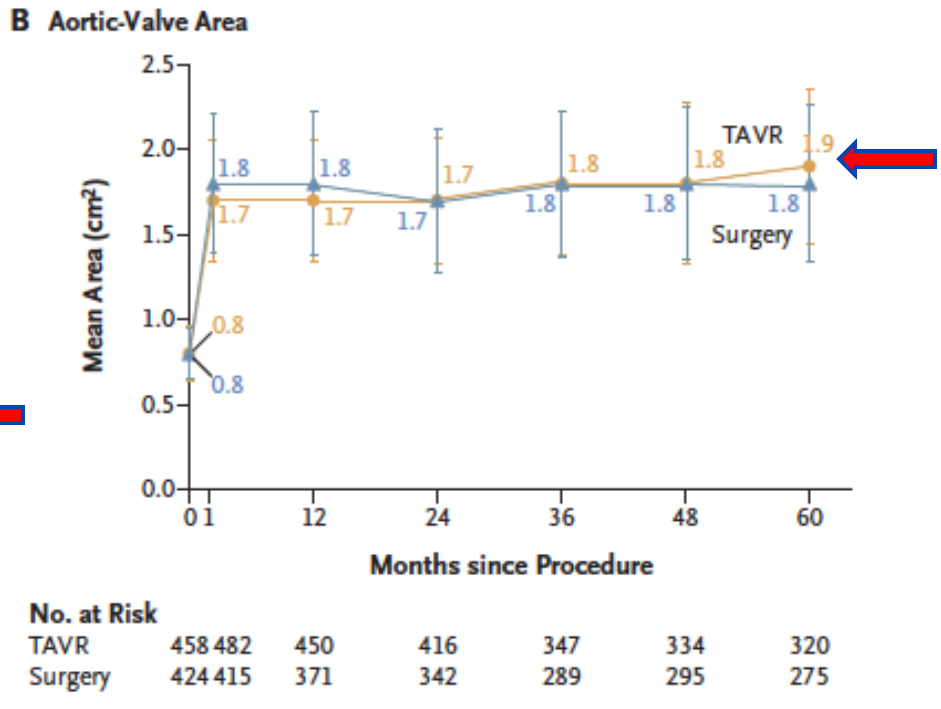


TAVR is at least as safe as SAVR

Bioprosthesis Performance…

PARTNER 3 Low Risk 5-Year Outcomes

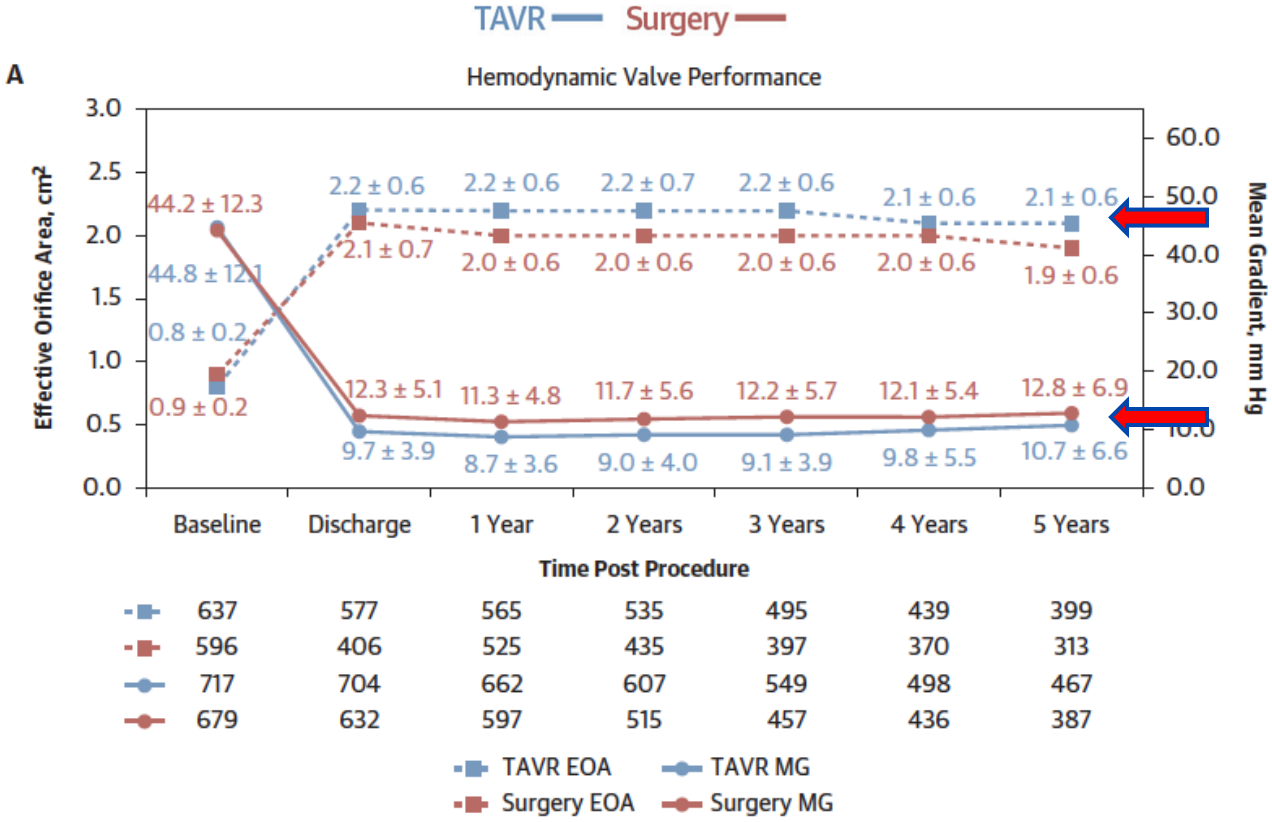




Mack M et al, *NEJM 2023*;389:1949-1960.

Bioprosthesis Performance…

Evolut Low Risk Trial 5-Year Outcomes



P <0.001

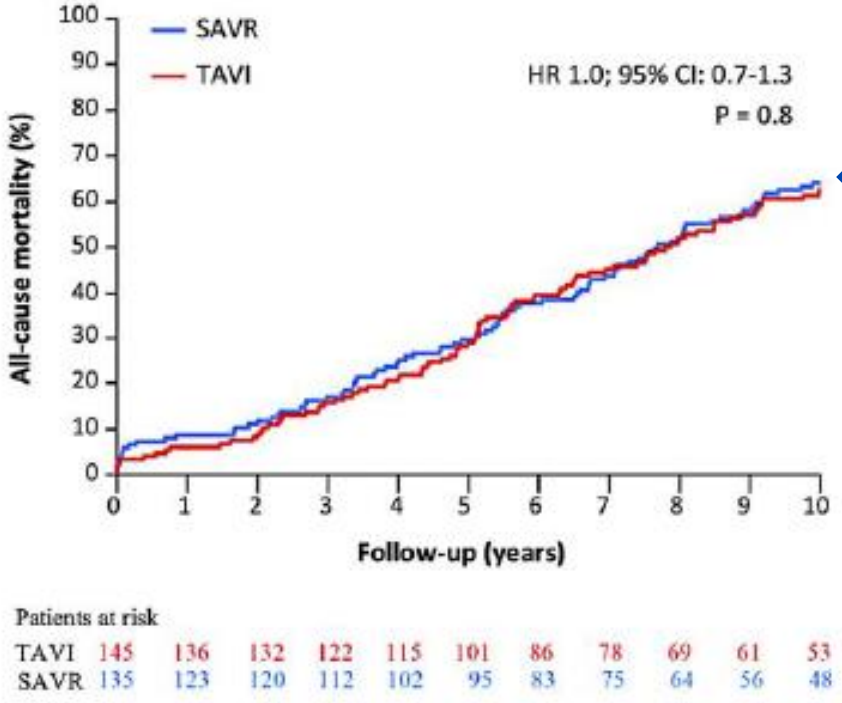
P <0.001

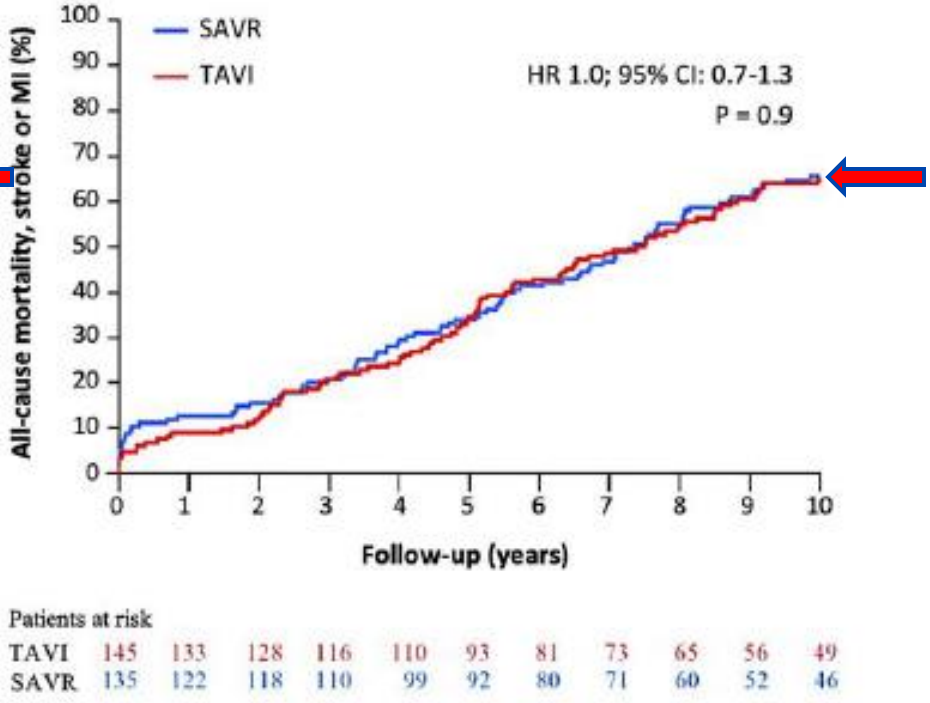
Durability…

10-Year Outcomes of the NOTION Trial

280 patients (STS 3.0±1.7%) randomized to TAVR (n=145 mean age 79±4.9) vs SAVR (n=135 mean age 79±4.7)

Primary Endpoint: All-cause mortality, stroke or myocardial infarction.

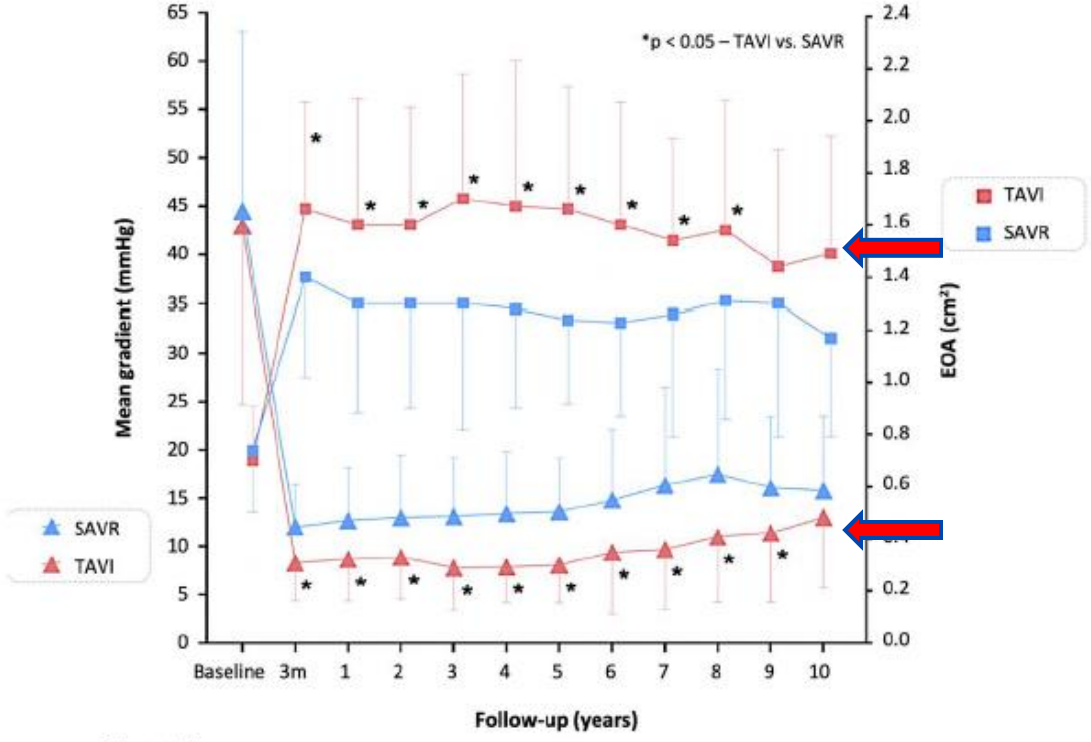




Horsted Thyregod et al, *EHJ 2024*;45:116-1124.

Durability…

10-Year Outcomes of the NOTION Trial



Patients at risk

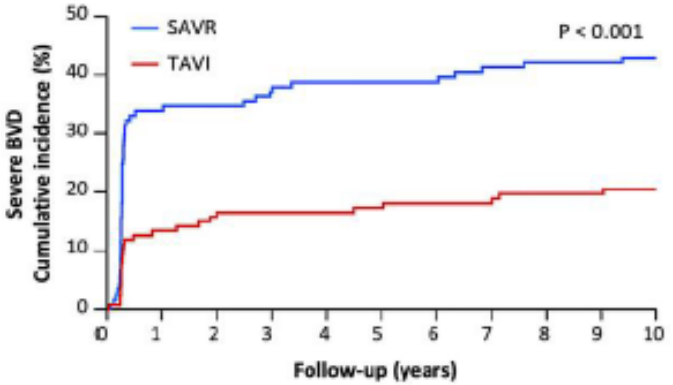
TAVI-gradient	124	126	122	105	107	96	79	67	58	44	36	36
SAVR-gradient	117	117	116	109	106	96	84	70	56	46	38	38
TAVI-EOA	125	126	118	118	87	82	76	56	47	44	32	36
SAVR-EOA	118	116	116	111	95	77	83	61	51	42	37	35

Horsted Thyregod et al, *EHJ 2024*;45:116-1124.

Durability…

10-Year Outcomes of the NOTION Trial

Bioprosthetic Valve Dysfunction

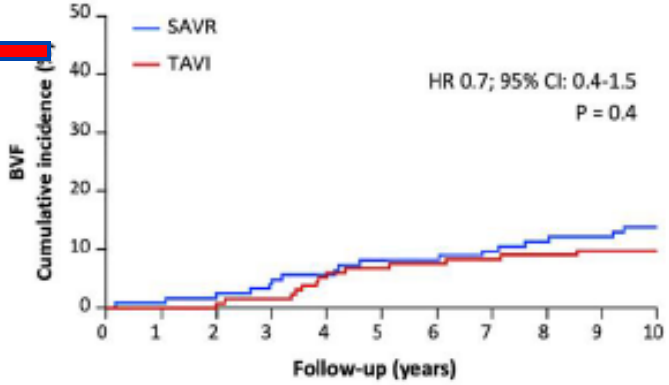


Patients at risk

TAVI	127	108	102	95	91	79	69	62	53	46	40
SAVR	121	80	79	74	68	65	58	50	42	37	33

	TAVI	SAVR	p value
Severe BVD	**20.5%**	**43.0%**	**<0.001**
Severe SVD	1.5%	10.0%	0.004
Severe non-SVD	12.6%	31.9%	<0.001
Severe paravalvular leak	2.6%	0	0.08
Severe patient-prosthesis mismatch	10.2%	31.9%	<0.001
Clinical valve thrombosis	0	0	-
Endocarditis	7.2%	7.4%	0.95

Bioprosthetic Valve Failure



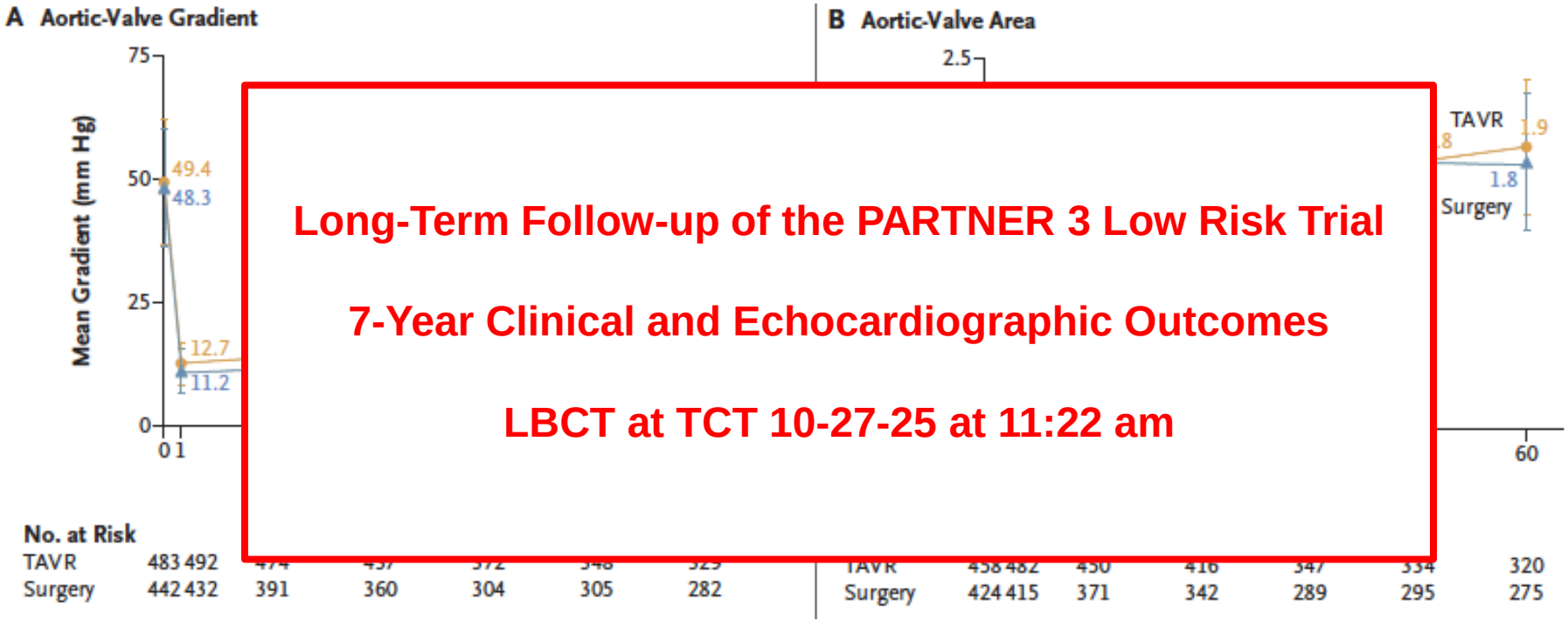
Patients at risk

TAVI	134	132	128	118	109	96	82	73	63	54	47
SAVR	124	123	120	111	102	93	81	72	60	52	44

	TAVI	SAVR	p value
BVF	**9.7%**	**13.8%**	**0.3**
Valve-related death	5.0%	3.7%	0.6
Severe SVD	1.5%	10.0%	0.004
Aortic valve re-intervention	4.3%	2.2%	0.3

Horsted Thyregod et al, *EHJ 2024*;45:116-1124.

PARTNER 3 Low Risk 5-Year Outcomes



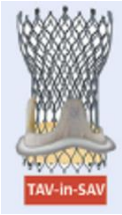
Long-Term Follow-up of the PARTNER 3 Low Risk Trial

7-Year Clinical and Echocardiographic Outcomes

LBCT at TCT 10-27-25 at 11:22 am

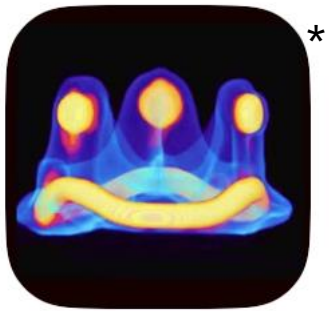
Mack M et al, *NEJM 2023*;389:1949-1960.

Considerations for SAVR-First



- Mechanical valve is more durable. But if it fails, surgery is the only option.
- If you choose a bioprostheses… choose a device favorable for TAV-in-SAV
- New expandable surgical valve designs?
- The ValvePPM App can facilitate the detection of patients at risk of PPM

If high PPM risk detected…root enlargement is recommended to improve hemodynamics.



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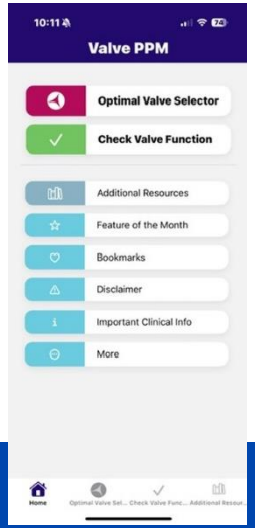


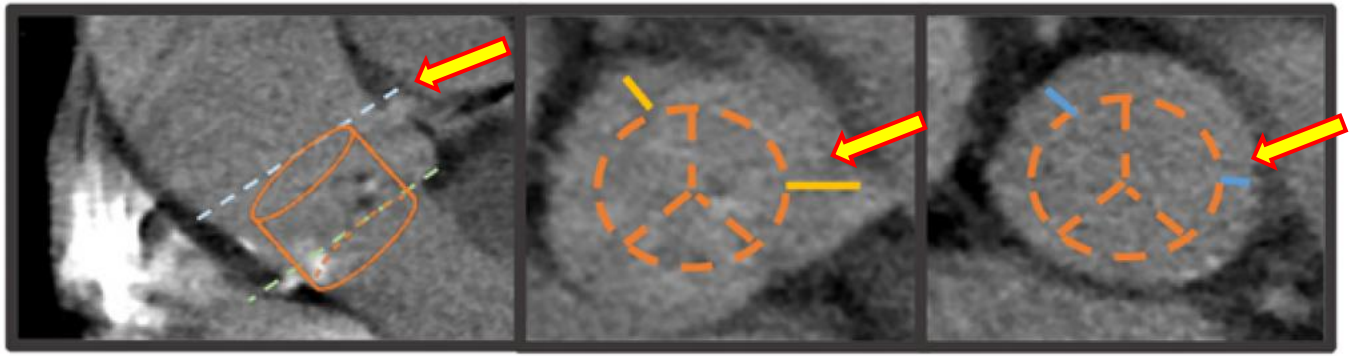
*Dr. Vratika Aharwal
Dr. Vinnie Bapat

Considerations for TAVR-First…

- Coronary obstruction during subsequent TAV-in-TAV
- Risk of patient prosthesis mismatch during future TAV-in-TAV
- Can we do TAVR again safely? And what are those outcomes?

Favorable Anatomy for TAVR-First

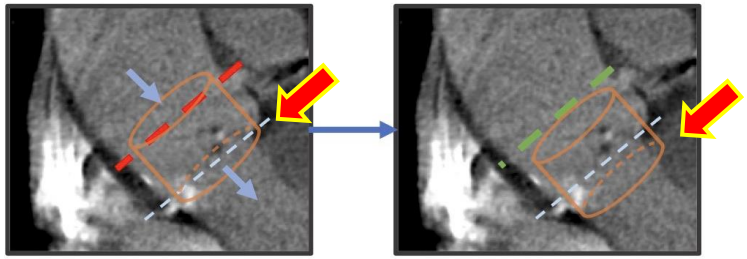
- High coronary ostia or large VTC (valve to coronary distance)
- High STJ or large VTA (valve to aorta distance)
- Patent coronary grafts
- Large annulus (lower risk of patient prothesis mismatch)



Reddy et al, *Circ Interv 2025*; *18:e014882. DOI: 10.1161/CIRCINTERVENTIONS.124.014882.*

Optimizing technique of index TAVR to facilitate TAV-in-TAV

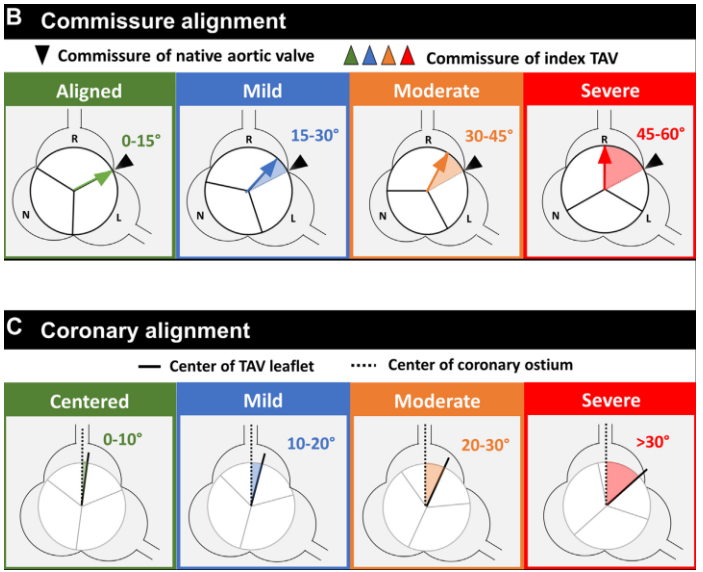
Higher vs Lower Implant

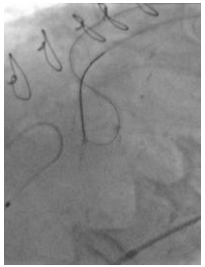


More aortic ➡ less conduction abnormalities

More Ventricular ➡ less coronary obstruction

Commissural Alignment

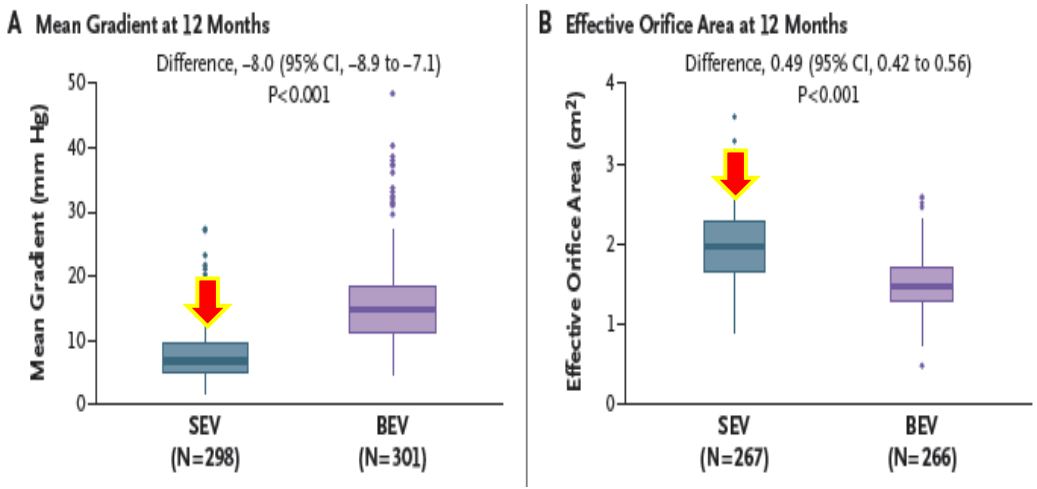




Reddy et al, *Circ Interv 2025*; *18:e014882. DOI: 10.1161/CIRCINTERVENTIONS.124.014882.*
Bapat et al, *JACC Interv 2024;*17-1631-1651.

Optimizing technique of index TAVR to facilitate TAV-in-TAV

Small Annulus (<430mm2)



Self-expandable THV in SMART Trial*

Associated with better hemodynamic results

Or expandable SAPIEN X4?

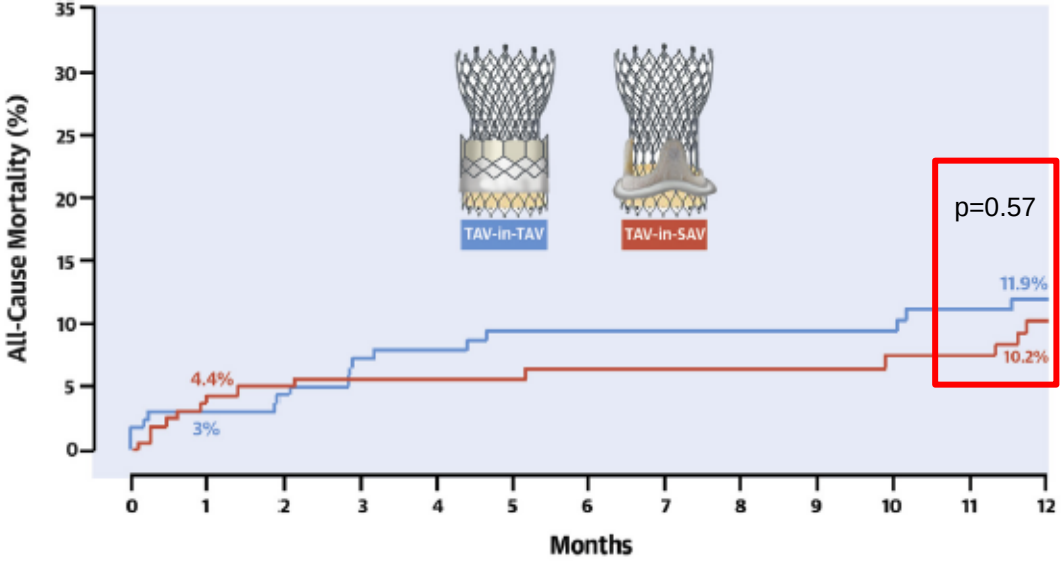
Hermann et al, *NEJM 2024.*DOI:10.1056/NEJMoa2312573.

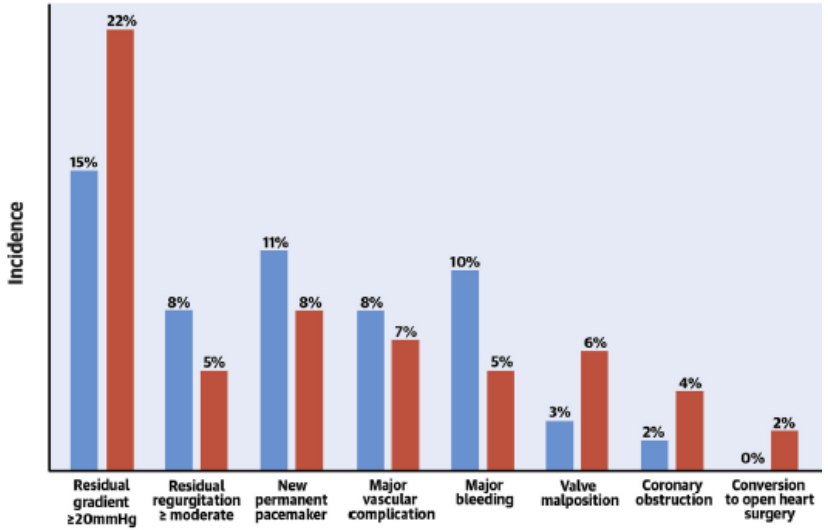
TAV-in-TAV in Outcomes…

Redo-TAVR International Registry

TAV-in-TAV vs TAV-in-SAV

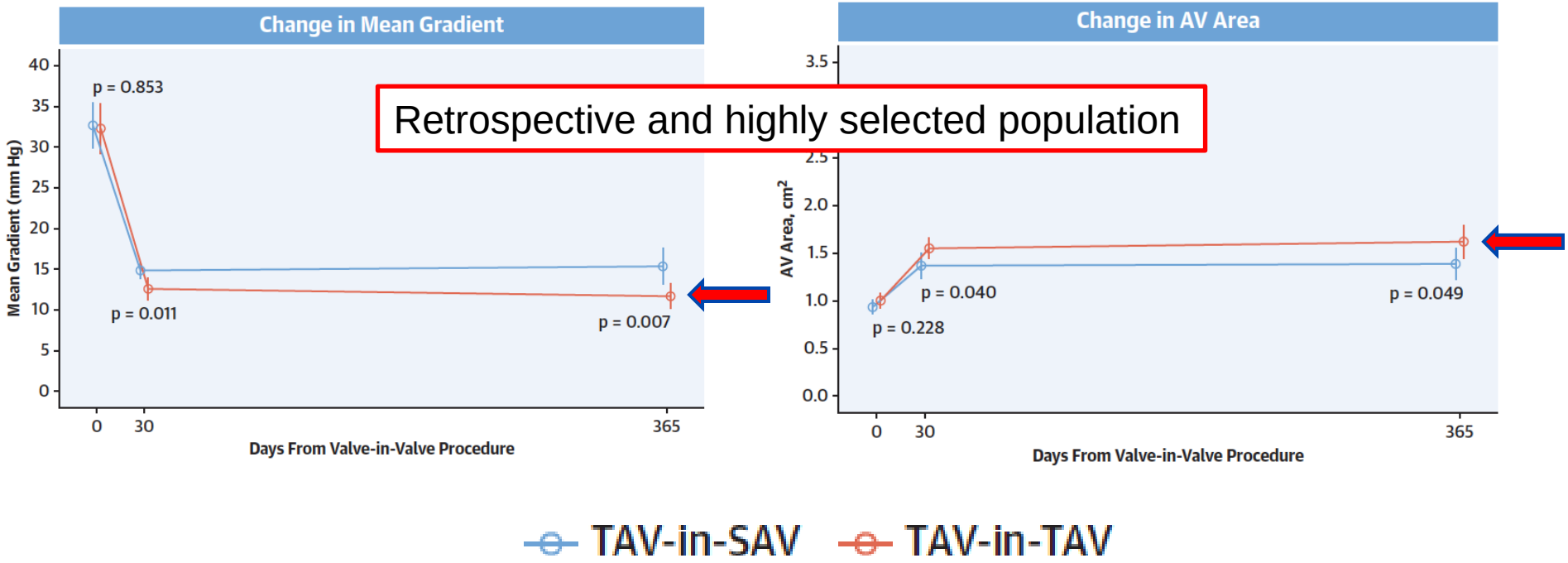
434 TAV-in-TAV and 624 TAV-in-SAV. Propensity Score Matching applied: 330 matched (165:165), age 80 (75-84).





Landes et al, et al, *JACC 2021*;77(1):1-14.

TAV-in-TAV vs TAV-in-SAV

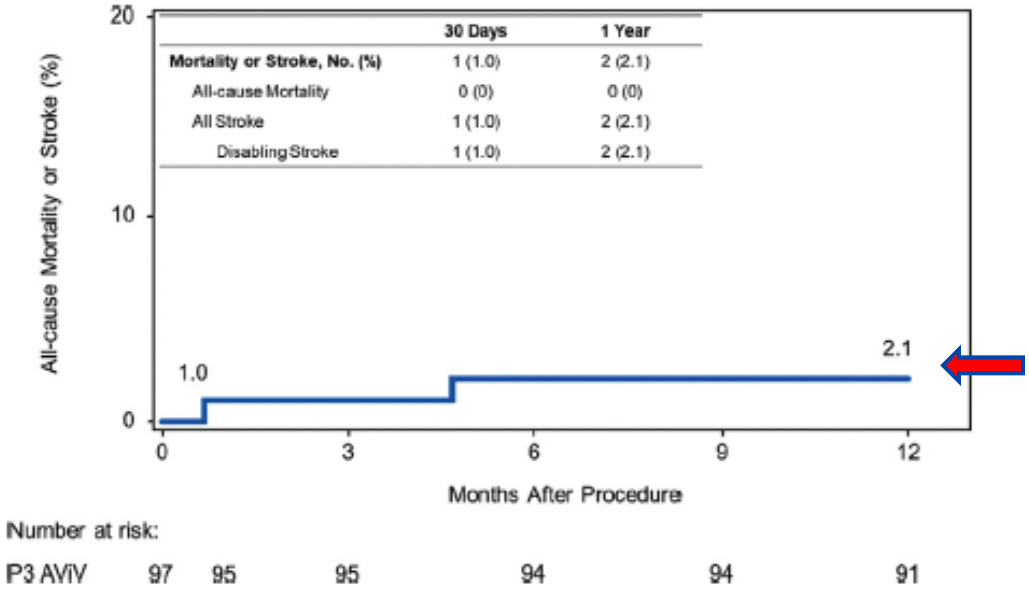


Retrospective and highly selected population

PARTNER 3 Trial AViV Registry

Placement of **A**o**R**tic **T**ra**N**scathet**ER** valves

Prospective, 100 patients, 29 sites, mean age 67.1±11.7 years, **79.4% male**, STS Score 2.9±1.8%
Primary Endpoint= All-cause mortality and stroke at 1 year.



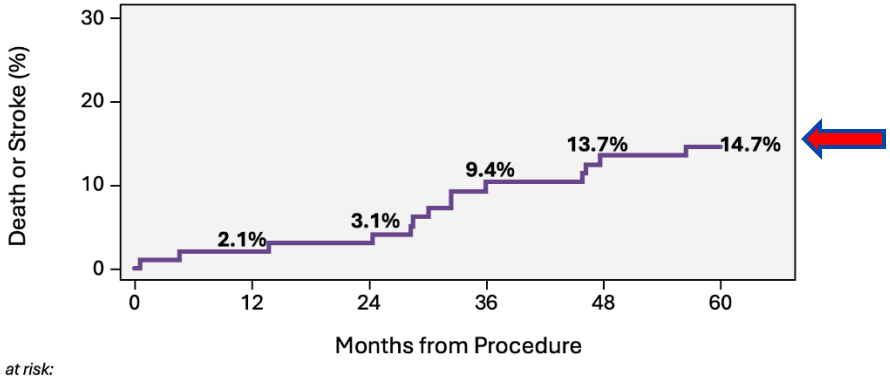
All-cause Mortality= Zero

PARTNER 3 Trial

Placement of AoRtic TraNscathetER valves

Prospective, 100 patients, 29 sites, mean age 67.1±11.7 years, **79.4% male**, STS Score 2.9±1.8%
Primary Endpoint= All-cause mortality and stroke at 1 year.

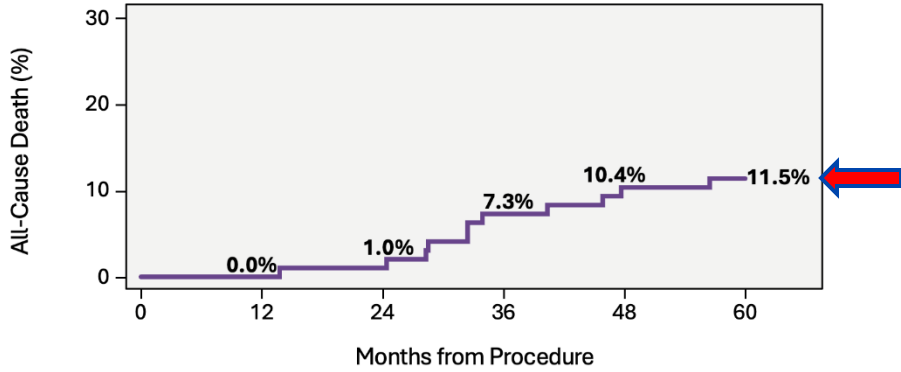
Death or Stroke



No. at risk:

P3 AViV	97	94	93	86	81	75

All-Cause Death



No. at risk:

P3 AViV	97	96	95	89	86	85

Malaisre, Guerrero et al, *CRT 2025.*

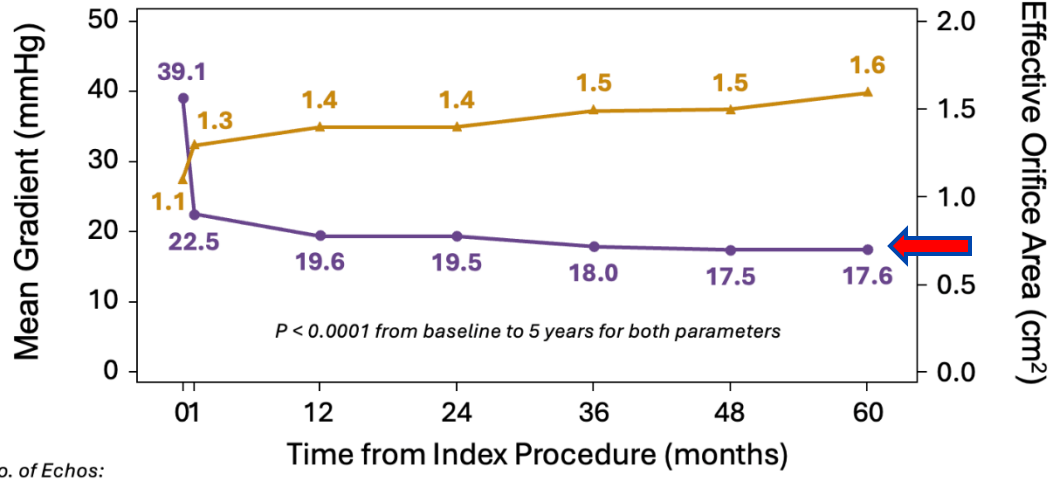
PARTNER 3 Trial

Placement of **A**o**R**tic **T**ra**N**scathet**ER** valves

Prospective, 100 patients, 29 sites, mean age 67.1±11.7 years, **79.4% male**, STS Score 2.9±1.8%

Primary Endpoint= All-cause mortality and stroke at 1 year.

Mean Gradient and EOA



No. of Echos:						
Mean Gradient	95 94	87	71	66	64	52
Effective Orifice Area	92 92	82	65	60	62	50

CRT25 THE PARTNER 3 TRIAL

MAYO CLINIC Malaisre, Guerrero et al, *CRT 2025.*


Pros and Cons


TAVR-First

- Lower or equal mortality at 1 year, 5 and 10 years
- Lower or equal short-term stroke rates
- Lower rehospitalization rates
- Lower rates of Atrial Fibrillation
- Shorter length of stay
- Similar reintervention rates
- Similar or better hemodynamics
- Durability uncertain in young patients
- Redo TAVR not always feasible
- TAVR explant may be associated with high risk

SAVR-First

- Root enlargement can be done if needed
- More data on durability
- More data on TAV-in-SAV than TAV-in-TAV
- Lower pacemaker rates

- More invasive and longer recovery
- May have worse hemodynamics than TAVR
- Higher short-term risk of stroke in low-risk pts
- TAV-in-SAV not always feasible
- Redo SAVR may be associated with high risk

Mack M et al, *NEJM 2019*;380:1695-1705.
Mack M et al, *NEJM 2023*;389:1949-1960.
Popma J et al, *NEJM 2019*;380:1706-1915.
Forrest JK et al, *JACC 2025* Mar 21:S0735-1097(25)05335-5.
Horsted Thyregod et al, *EHJ 2024*;45:116-1124.

Summary

- Data on TAVR outcomes in young patients remain limited.

- When choosing TAVR-First or SAVR-First approach, factors to consider include:
  - Life-expectancy
  - Safety of index AVR
  - Bioprosthetic Valve performance (optimize index AVR, SAVR or TAVR)
  - Durability
  - Anatomic features associated with feasibility of subsequent AVR procedures

- Prospective clinical trials are needed to better understand and inform optimal strategies for index and subsequent AVR procedures in the lifetime management of young patients with aortic stenosis.

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