

Great Debate: TAVR for younger patients

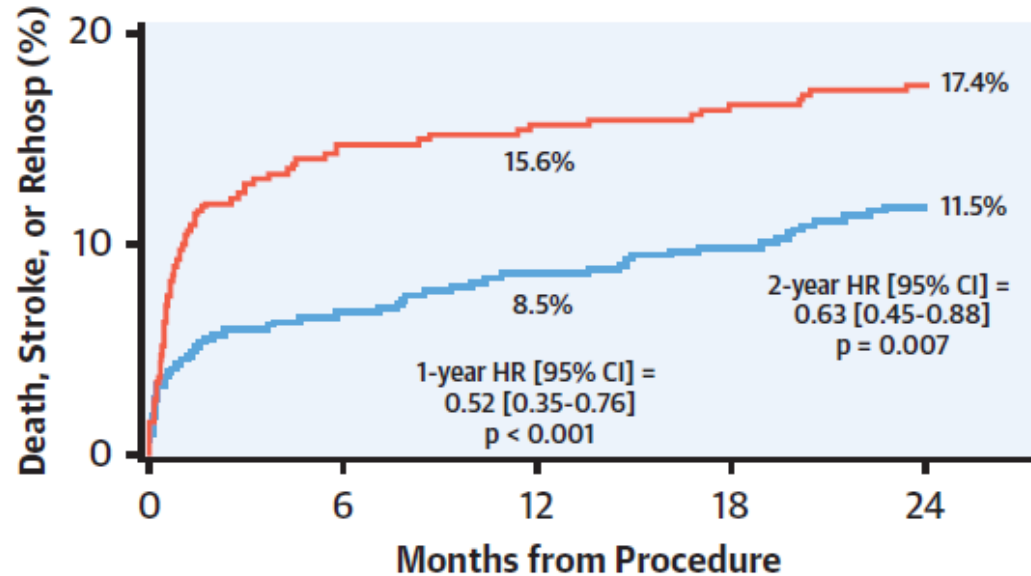
Tullio Palmerini

Alma Mater Studiorum, University of Bologna

Italy

TAVI in younger patients: are we ready?

PARTNER 3

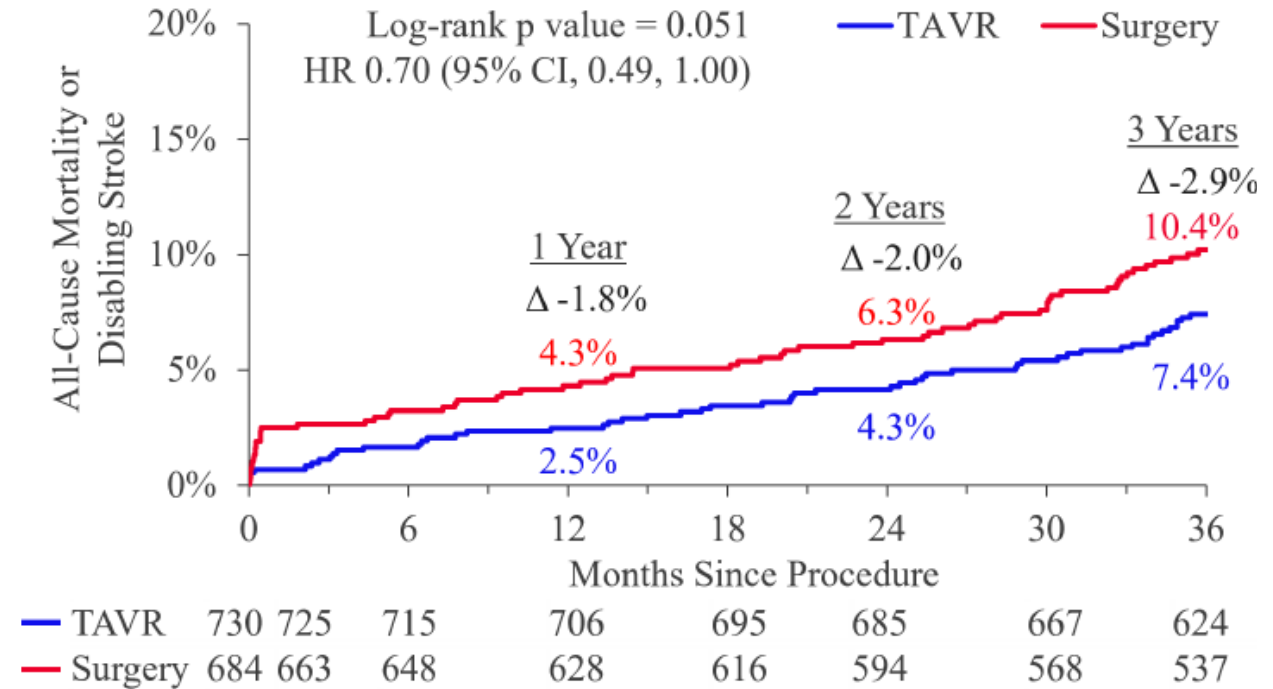


Number at risk:

— Surgery	454	379	371	357	345
— TAVR	496	462	453	444	431

Leon et al; JACC 2021

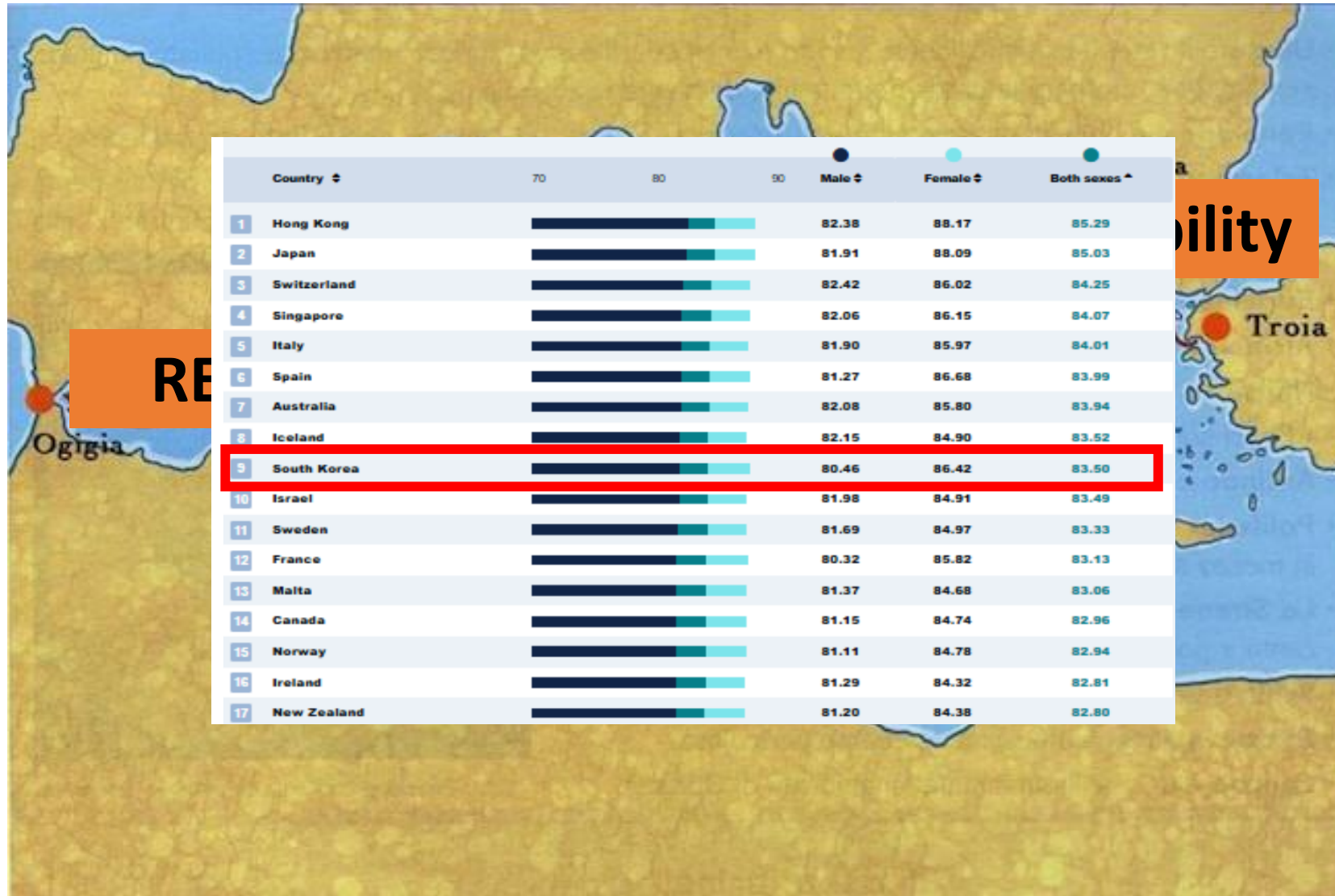
EVOLUTE LOW RISK



— TAVR	730	725	715	706	695	685	667	624
— Surgery	684	663	648	628	616	594	568	537

Forrest et al; JACC 2023

Life time journey of young patients with severe AVS



A two-stage journey



60 years

25 years

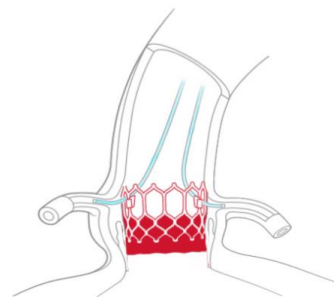
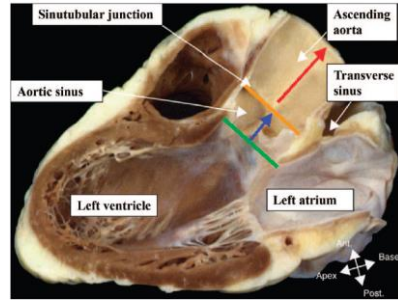
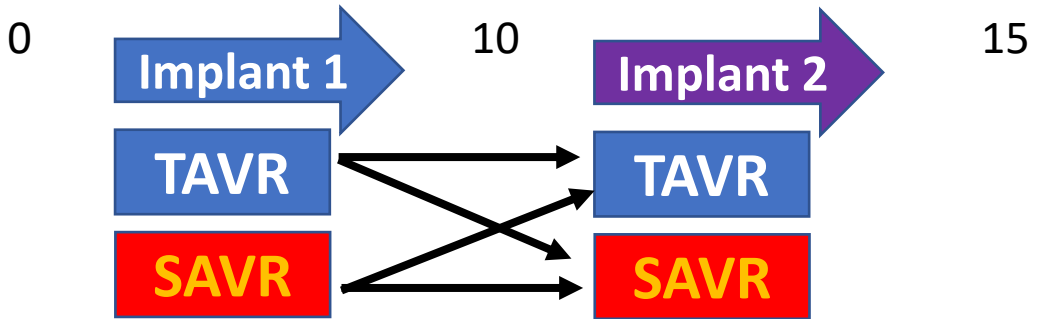


Life expectancy



Valve durability

13-15 years



Valve Name	Magna Ease	Mosaic	Bicor Supra	Mitroflow
Manufacturer	Edwards Lifesciences	Medtronic Inc.	St. Jude Medical	St. Jude Medical
Valve Size (mm)	19 21 23	19 21 23	19 21 23	19 21 23
Mean EOA (cm ²)	1.5 1.5 1.5	1.5 1.5 1.5	1.5 1.5 1.5	1.5 1.5 1.5
1.5	0.81	0.81	0.81	0.81
1.8	0.81	0.81	0.81	0.81
2.1	0.81	0.81	0.81	0.81
2.3	0.81	0.81	0.81	0.81
2.5	0.81	0.81	0.81	0.81
2.7	0.81	0.81	0.81	0.81

EOA < 0.85 cm² EOA > 0.85 cm² EOA < 0.85 cm²

First implant



Second implant



Contemporary operative mortality in re-AVR is 4% to 9% in reports from large-volume institutions

Contemporary Outcomes of Repeat Aortic Valve Replacement: A Benchmark for Transcatheter Valve-in-Valve Procedures

Tsuyoshi Kaneko, MD, Christina M. Vassileva, MD, Brian Englum, MD, Sunghee Kim, PhD, Maroun Yammine, MD, Matthew Brennan, MD, MPH, Rakesh M. Suri, MD, DPhil, Vinod H. Thourani, MD, Jeffrey P. Jacobs, MD, and Sary Aranki, MD

Division of Cardiac Surgery, Brigham and Women's Hospital, Boston, Massachusetts; Division of Cardiothoracic Surgery, Southern Illinois University School of Medicine, Springfield, Illinois; Division of Cardiothoracic Surgery, Duke Clinical Research Institute, and Division of Cardiology, Duke University Medical Center, Durham, North Carolina; Department of Cardiac Surgery, Mayo Clinic, Rochester, Minnesota; Division of Cardiothoracic Surgery, Emory University School of Medicine, Atlanta, Georgia; and Division of Cardiothoracic Surgery, Johns Hopkins All Children's Heart Institute, St. Petersburg, Florida

Open access

Cardiac surgery

openheart Surgical Complexity and Outcome of

Età media 51 anni

Renata Greco,¹ Mirko Muretti ,¹ Jasmina Djordjevic,¹ Xu Yu Jin ,^{2,3} Elaine Hill,⁴ Maurizio Renna,⁴ Mario Petrou⁵

Table 3. Postoperative Outcome for Reoperative Aortic Valve Replacement Versus Primary Aortic Valve Replacement

Variable ^a	Previous AVR + Current AVR (n = 3,380)	Primary AVR (n = 54,183)	p Value
Outcomes			
Operative mortality	157 (4.6)	1,200 (2.2)	<.0001
Expected mortality, %	5.4	2.7	
Observed-to-expected ratio	0.86	0.81	
Composite, operative		6,369 (11.8)	<.0001
Stroke		761 (1.4)	0.020
Renal failure		1,339 (2.5)	<.0001
Pacemaker placement	370 (11.0)	2,337 (4.3)	<.0001
Re-op for bleeding/tamponade	133 (3.9)	1,755 (3.2)	0.028
Vascular complication	2 (0.06)	7 (0.01)	0.037
Post-op aortic insufficiency mild or greater	96 (2.8)	902 (1.7)	<.0001
Post-op atrial fibrillation	626 (18.5)	15,739 (29.1)	<.0001
Post-op blood transfusion	1,814 (53.7)	20,692 (38.2)	<.0001
	(n = 3,236)	(n = 53,204)	
Post-op length of stay, d	7 (5–10)	6 (5–8)	<.0001

Età media 66 anni

Acquired Cardiovascular Disease

Chan et al

Long-term evaluation of biological versus mechanical prosthesis use at reoperation

Età media 58 anni

Vincent C. Chan, MD,^a Paul Hendry, MD,^a Roy Masters, MD,^a Thierry G. Mesana, MD, PhD,^a and Marc Ruel, MD, MPH^{a,b}

Reoperation is not an independent predictor of mortality during transcatheter aortic valve replacement

Età media 59 anni

Piroze M. Davierwala, MD, Michael A. Borger, MD, PhD, Thirone E. David, MD, Vivek Rao, MD, PhD, Manjula Maganti, MSc, and Terrence M. Yau, MD, MSc

Small aortic root
Shallow sinuses
Low coronary ostia

First implant

SAVR
 (aortic root enlargement)

Second implant

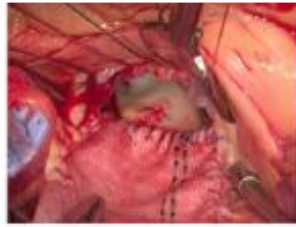
TAVR



Inspiris
Vfit tvechnology



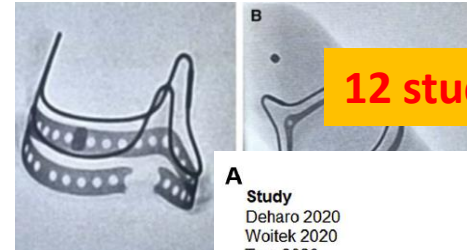
Y-incision



Rectangular patch

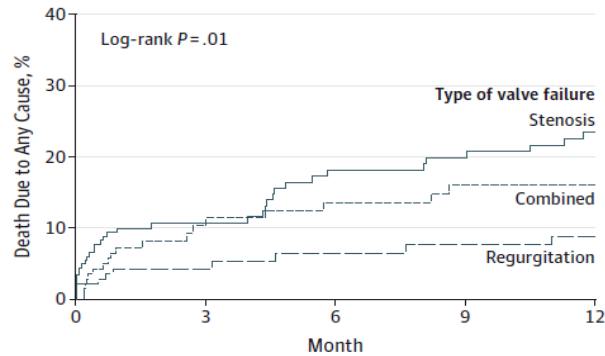


Large BHV



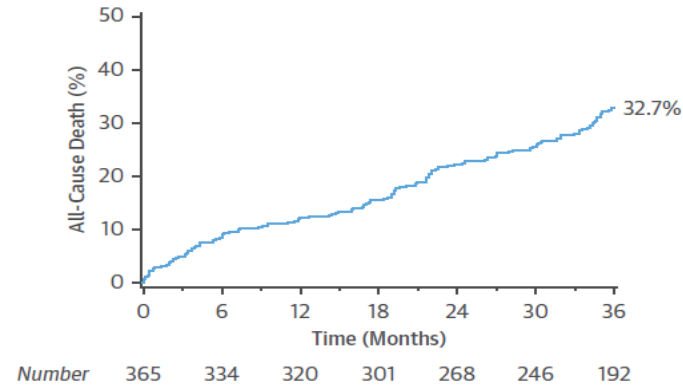
12 studies with 16,207 pts

VIVID registry



Dvir et al; JAMA 2014

PARTNER 2 registry

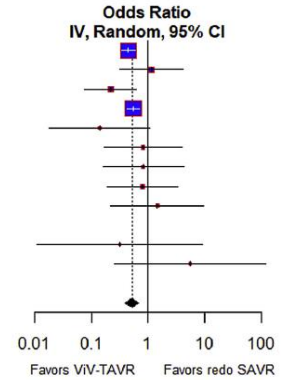


Webb et al; JACC 2020

A

Study	Weight IV, Random, 95% CI	Odds Ratio
Deharo 2020	38.8%	0.45 [0.34; 0.60]
Woitek 2020	3.2%	1.14 [0.31; 4.16]
Tam 2020	4.8%	0.22 [0.08; 0.63]
Hirji 2020	42.3%	0.55 [0.42; 0.72]
Malik 2020	1.4%	0.14 [0.02; 1.05]
Sedeek 2019	2.2%	0.82 [0.17; 3.99]
Silaschi 2017	2.0%	0.82 [0.16; 4.22]
Spaziano 2017	2.7%	0.79 [0.19; 3.27]
Grubitzsch 2017	1.6%	1.44 [0.22; 9.41]
Santarpino 2016	0.0%	
Ejrofor 2016	0.5%	0.32 [0.01; 9.19]
Erlebach 2015	0.6%	5.41 [0.25; 116.32]

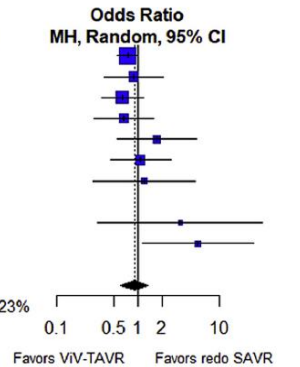
Total (95% CI) 100.0% **0.52 [0.39; 0.68]**
 Heterogeneity: $\tau^2 = 0.0164$; $\chi^2 = 11.16$, $df = 10$ ($P = 0.345$); $I^2 = 10\%$
 Test for overall effect: $t_{10} = -5.39$ ($P < 0.001$)



B

Study	Weight MH, Random, 95% CI	Odds Ratio
Deharo 2020	34.0%	0.75 [0.55; 1.02]
Woitek 2020	10.7%	0.88 [0.38; 2.05]
Tam 2020	17.8%	0.64 [0.35; 1.15]
Sedeek 2019	10.8%	0.67 [0.29; 1.55]
Silaschi 2017	6.7%	1.70 [0.55; 5.21]
Spaziano 2017	10.5%	1.07 [0.46; 2.52]
Grubitzsch 2017	4.2%	1.19 [0.28; 5.06]
Santarpino 2016	0.0%	
Ejrofor 2016	1.7%	3.32 [0.32; 34.65]
Erlebach 2015	3.6%	5.49 [1.12; 26.83]

Total (95% CI) 100.0% **0.90 [0.61; 1.32]**
 Heterogeneity: $\tau^2 = 0.0493$; $\chi^2 = 10.45$, $df = 8$ ($P = 0.235$); $I^2 = 23\%$
 Test for overall effect: $t_8 = -0.63$ ($P = 0.545$)



Large aortic roots
Wide sinuses
High coronary ostia
Others?

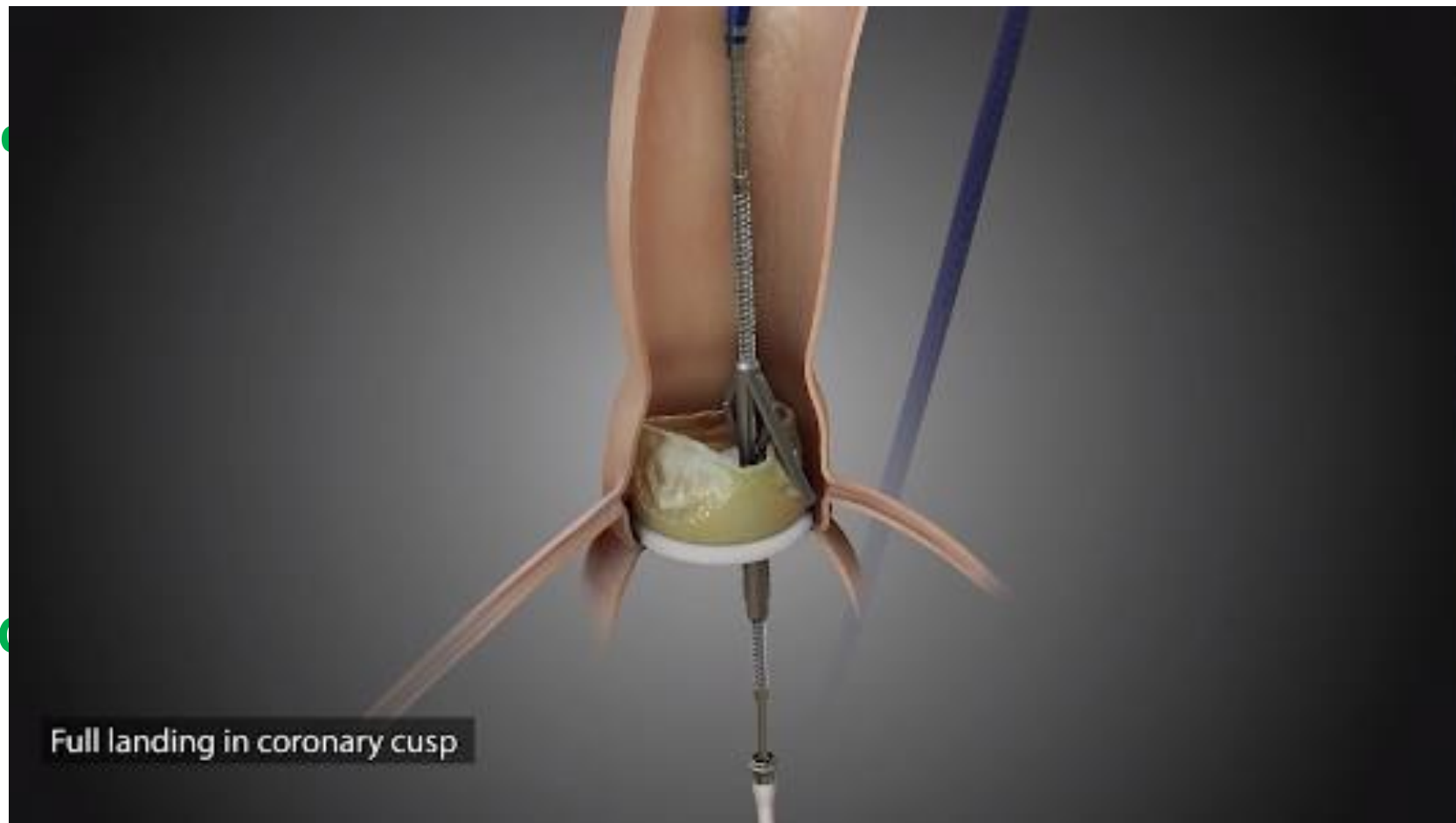
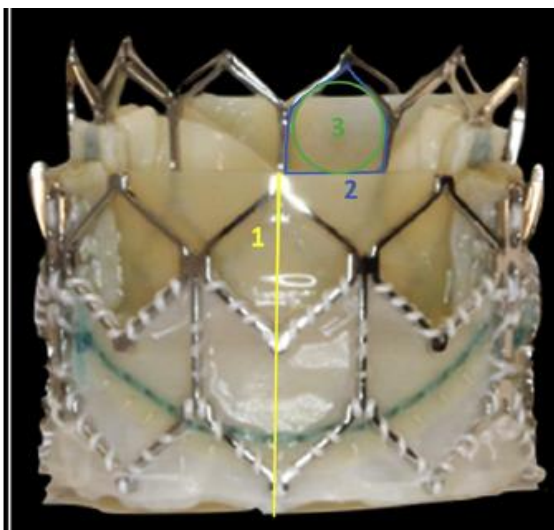
First implant



Second implant

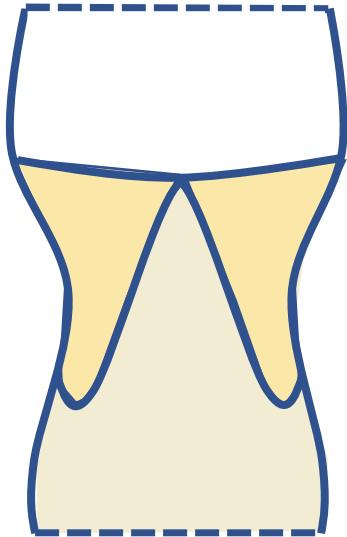


Neoskirt

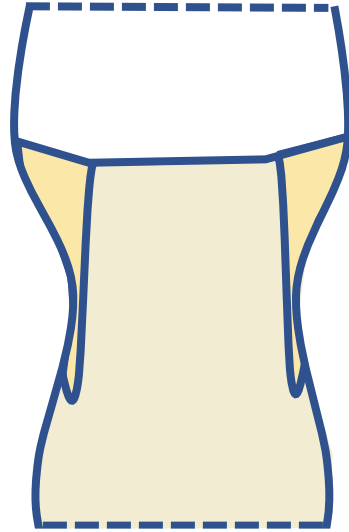


skirt

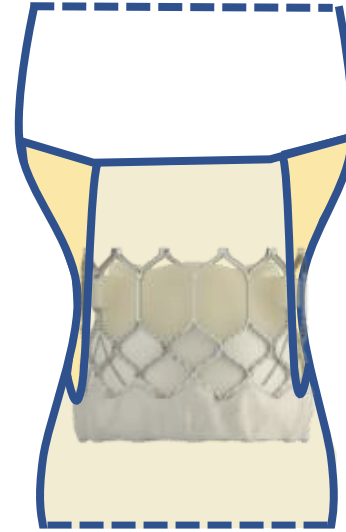
Closed valve



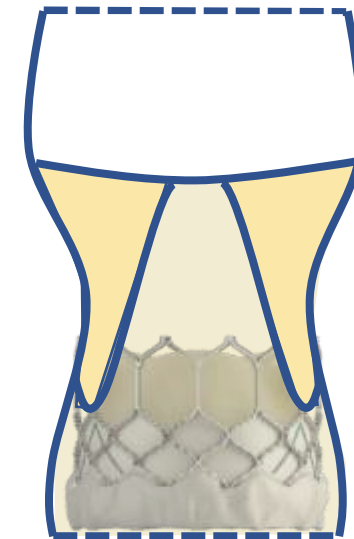
Open valve



THV in THV

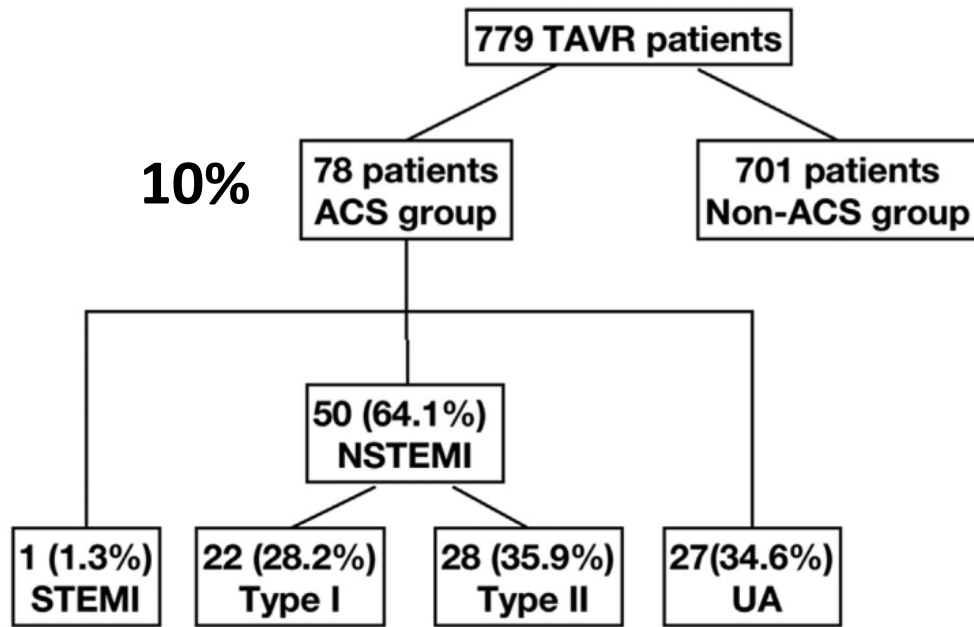


*Covered
stent
effect*



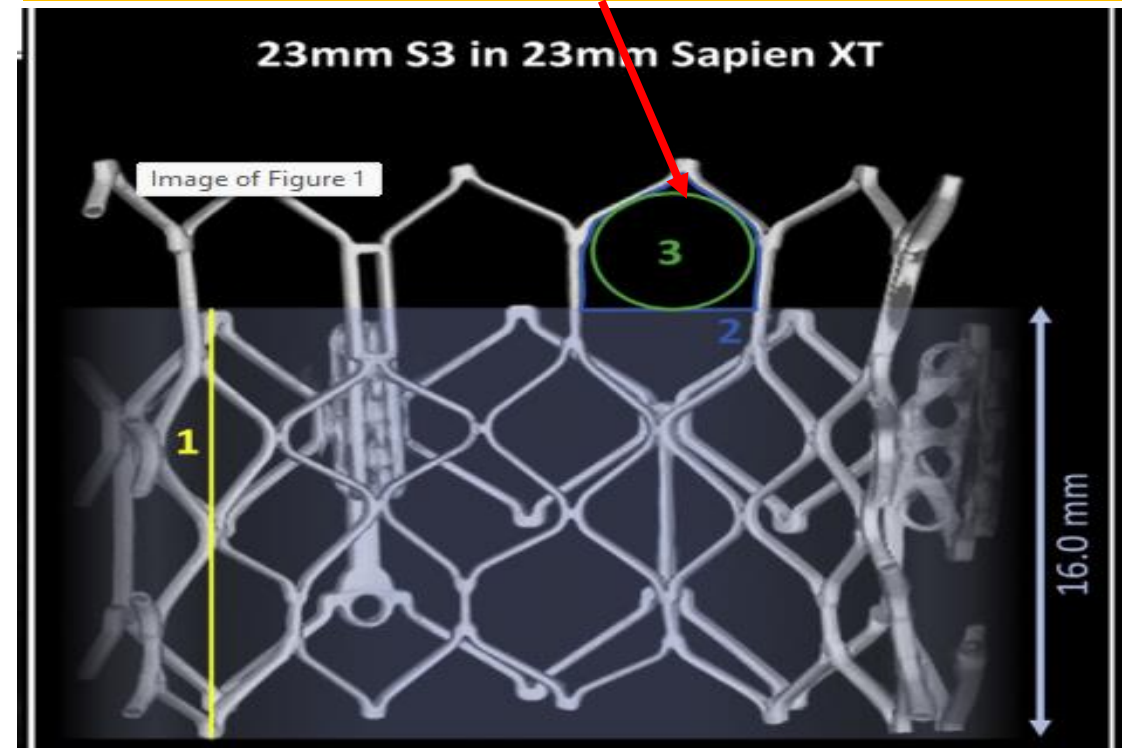
*Leaflet
overhanging
over the S3*

Redo TAVR combination and coronary access



Vilalta et al; JACC Int 2018

First cell above the neoskirt

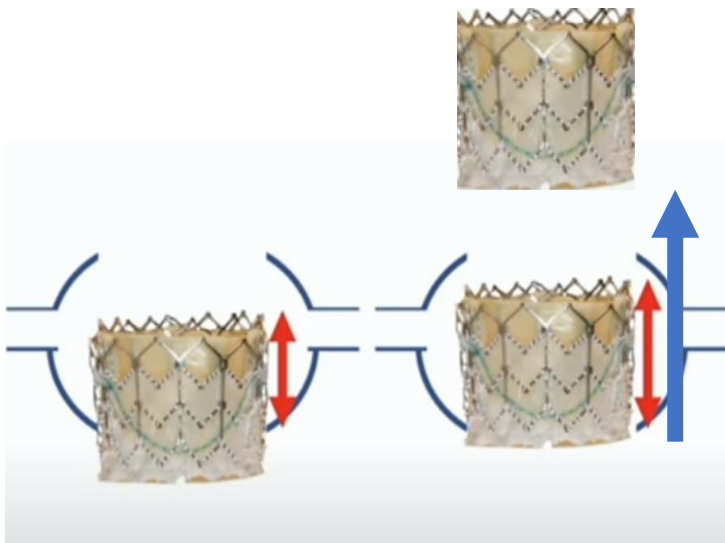


Coronary access: the first cut is the deepest

Functional neoskirt height

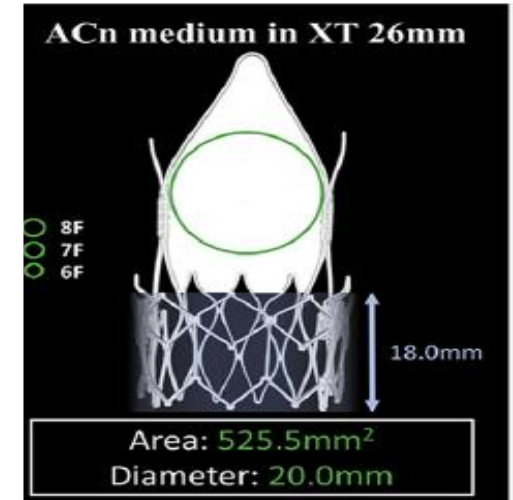
First cell above neoskirt dimension

Implantation depth of first and second valve

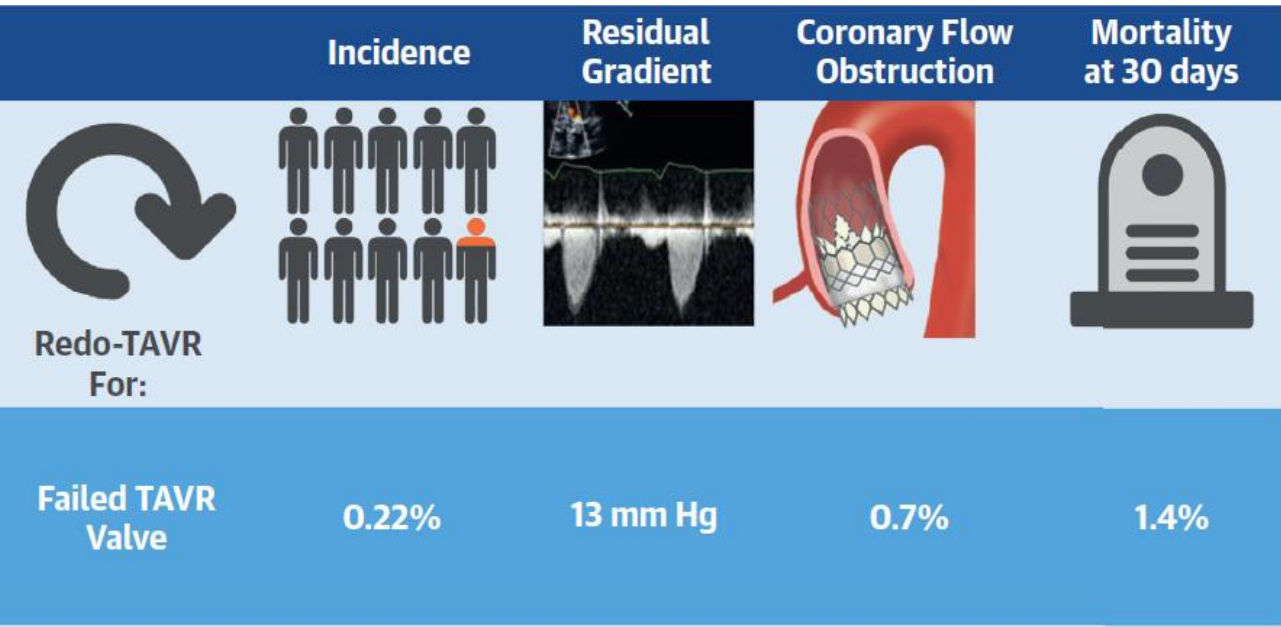


Type of valve combination

Index Valve	Redo Valve	Neoskirt Height (mm)
26-mm Sapien XT	26-mm S3	17.4
	29-mm Evolut R (+4 mm)	22.7
	29-mm Evolut R (0 mm)	18.2
	29-mm Evolut R (-4 mm)	18.2
	Medium ACURATE (+4 mm)	20.7
	Medium ACURATE (0 mm)	18.0
	Medium ACURATE (-4 mm)	18.5
	29-mm Portico (+4 mm)	18.2
	29-mm Portico (0 mm)	18.2
	29-mm Portico (-4 mm)	18.0
26-mm Evolut R	23-mm S3 + 1 cc (high)	29.9
	23-mm S3 (low)	23.5
	26-mm Evolut Pro (+4 mm)	31.6
	26-mm Evolut Pro (0 mm)	25.4
	26-mm Evolut Pro (-4 mm)	26.8



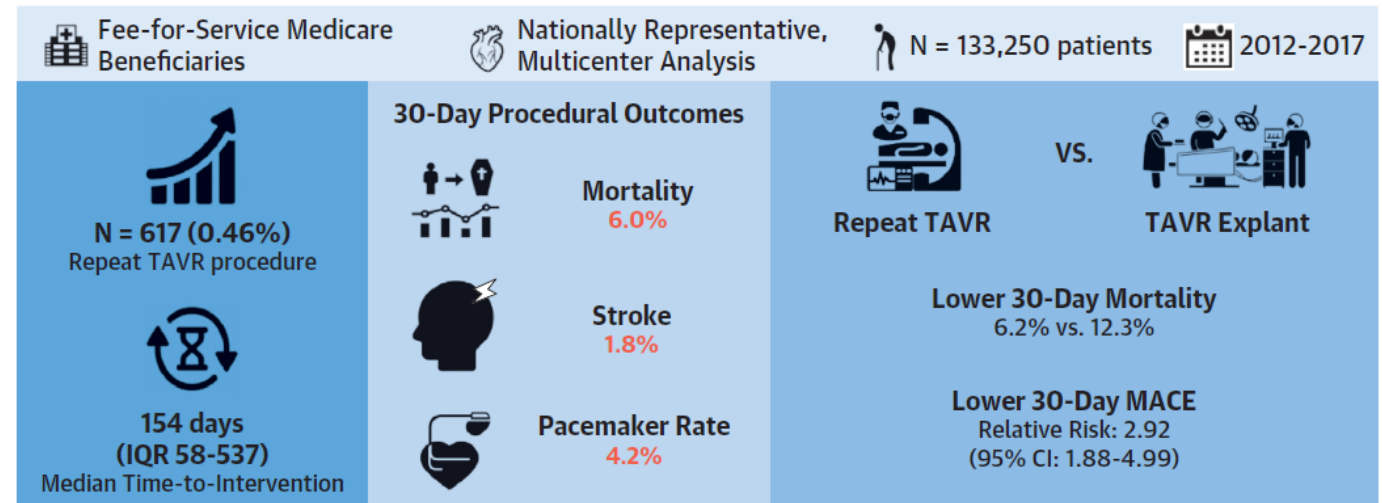
37 international centers
63,876 TAVR procedure
212 redo TAVR



Landes et al; JACC 2020

MEDICARE setting
133,250 TAVR
617 redo TAVR

Contemporary Repeat Transcatheter Aortic Valve Replacement Outcomes in the United States



Repeat TAVR can be performed with acceptable 30-day mortality and may be considered as a potential option in appropriate patients

A three-stage journey



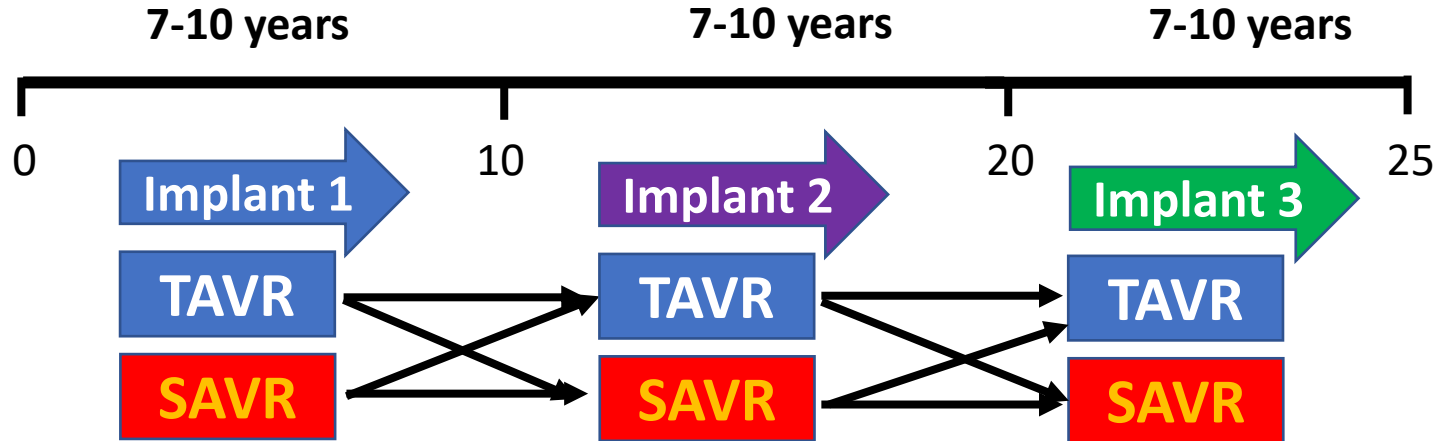
60 years

25 years

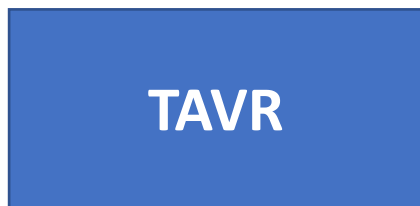
Life expectancy



Valve durability



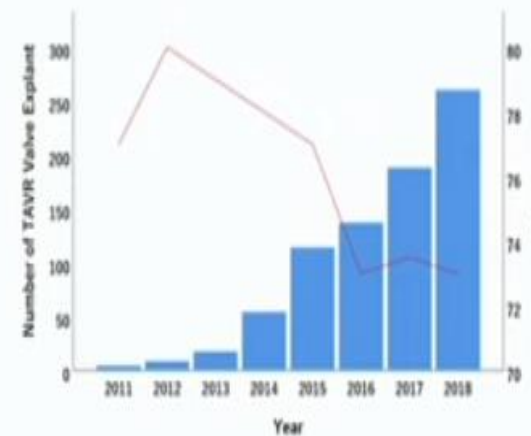
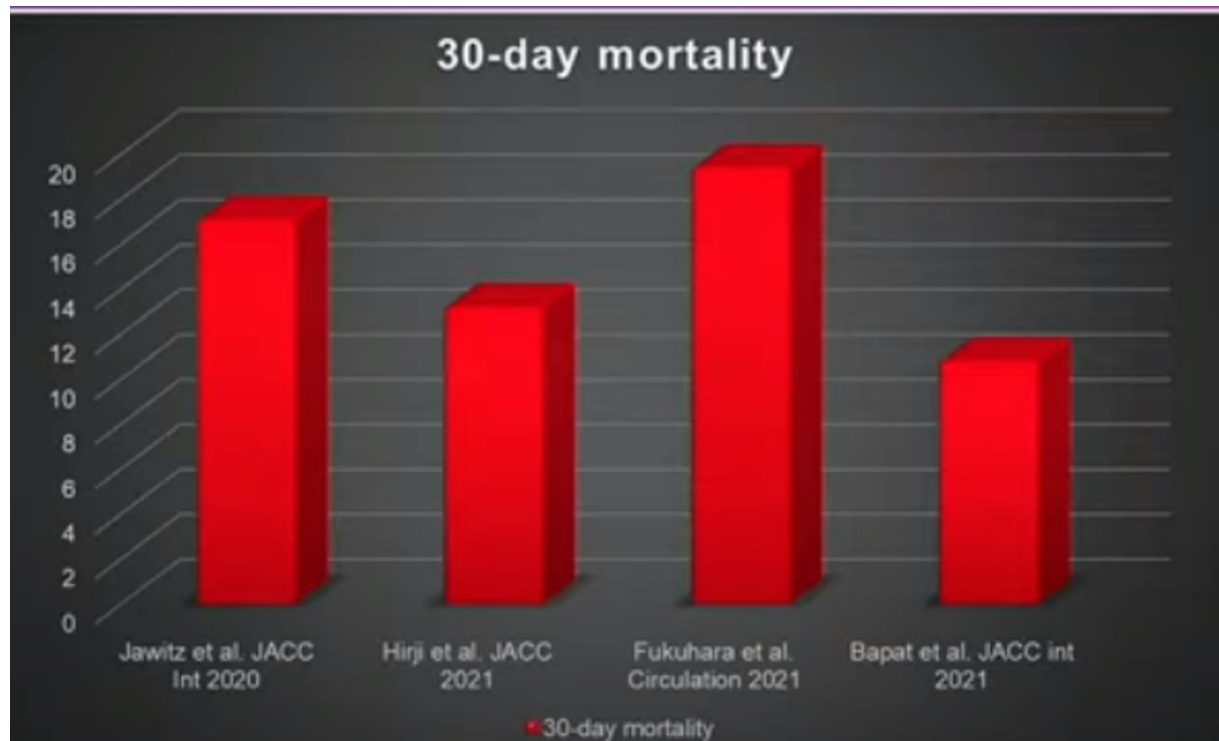
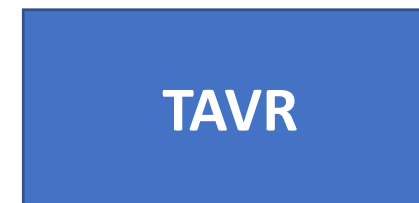
First implant



Second implant



Third implant



*Performed by 483 surgeons (median **1.0 case per surgeon** [IQR 1.0–2.0]) from 313 centers (median **1.0 case per center** [IQR 1.0–3.0]).*

Conclusions

- **A significant proportion of younger patients are being offered TAVI nowadays**
- **Although several issues are still unsettled, iteration of devices with better commissure alignment and leaflet modification devices will likely make REDO-TAVR feasible for a significant proportion of patients**
- **Valve selection will likely depend on patient life expectancy and preference, and patient anatomy in terms of aortic root dimensions, risk of coronary obstruction and possibility to engage coronary arteries**