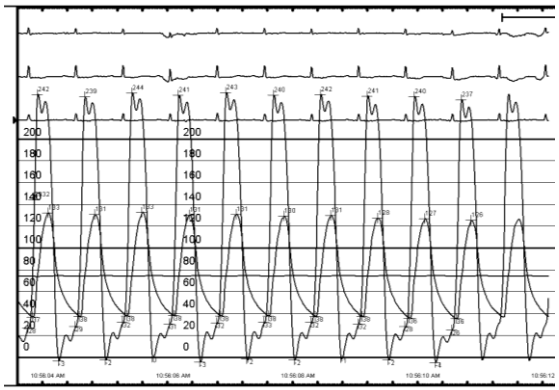
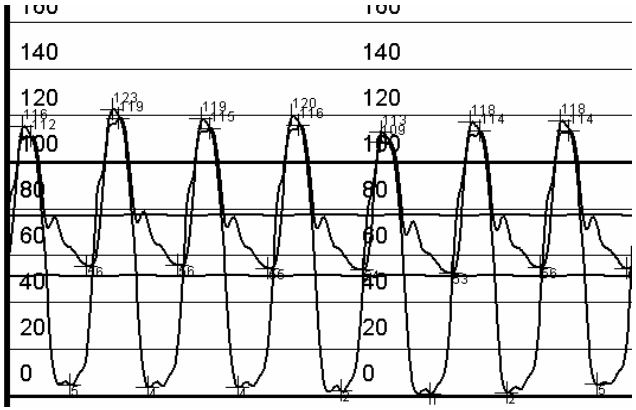




Aortální stenóza

pohledem intervenčního kardiologa

Viktor Kočka

Kardiocentrum FNKV a 3.LF UK

Praha

Úvod

ESC European Society of Cardiology

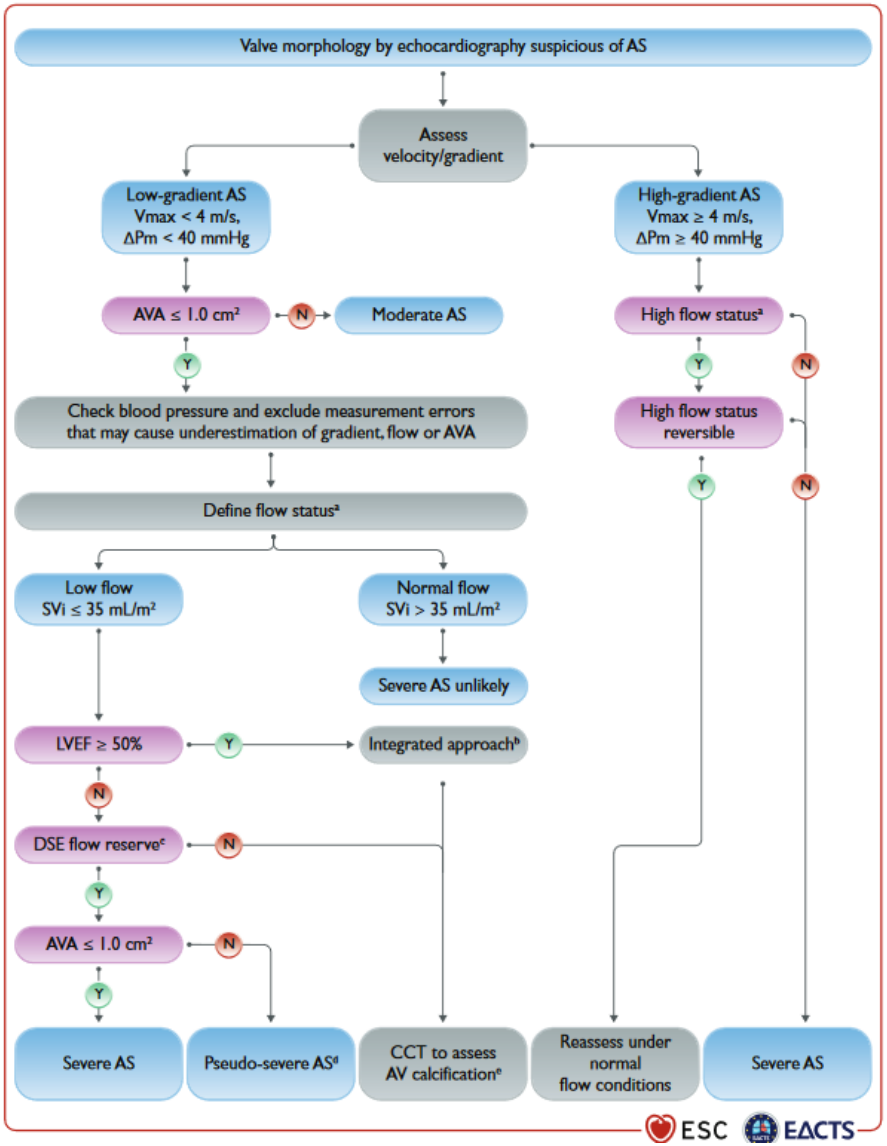
European Heart Journal (2022) **43**, 561–632
https://doi.org/10.1093/eurheartj/ehab395

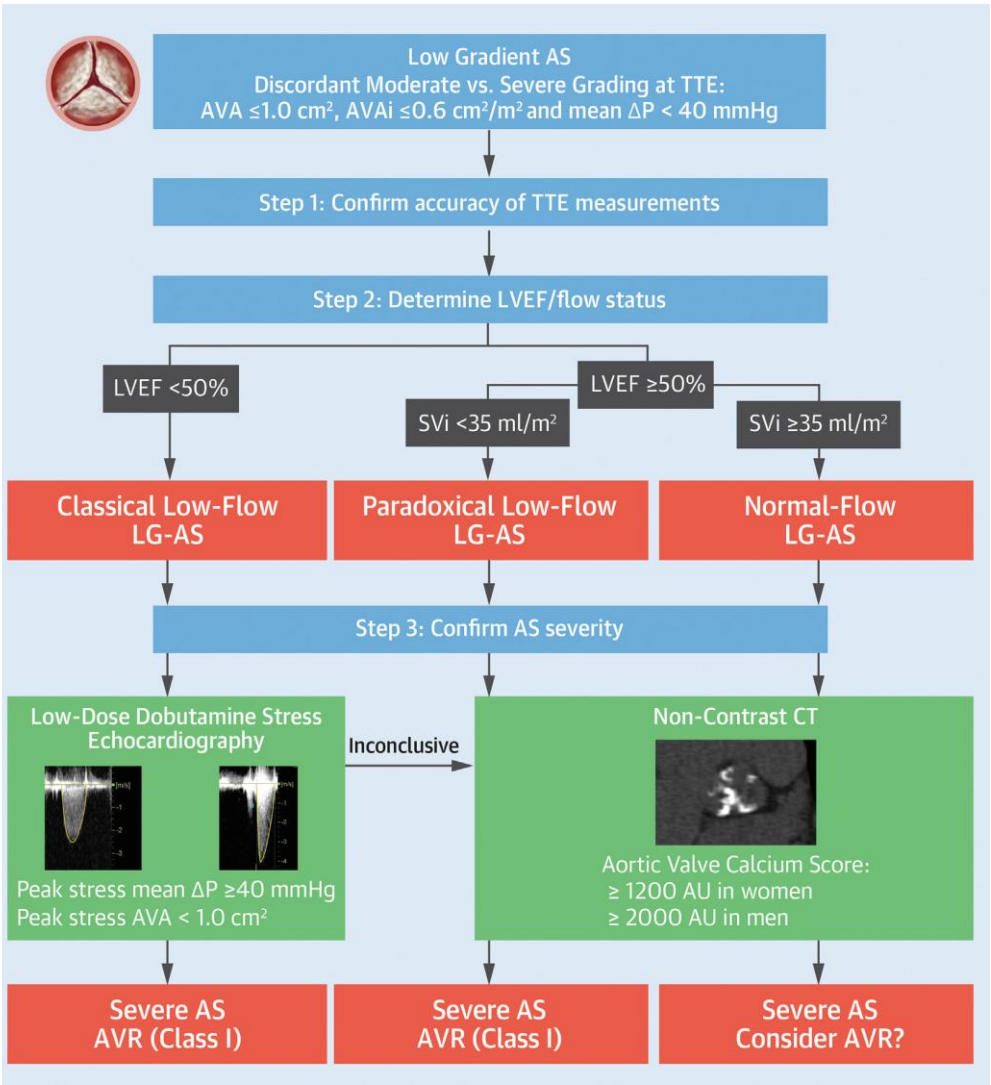
ESC/EACTS GUIDELINES

2021 ESC/EACTS Guidelines for the management of valvular heart disease

Co je i v roce 2024 nejasné?

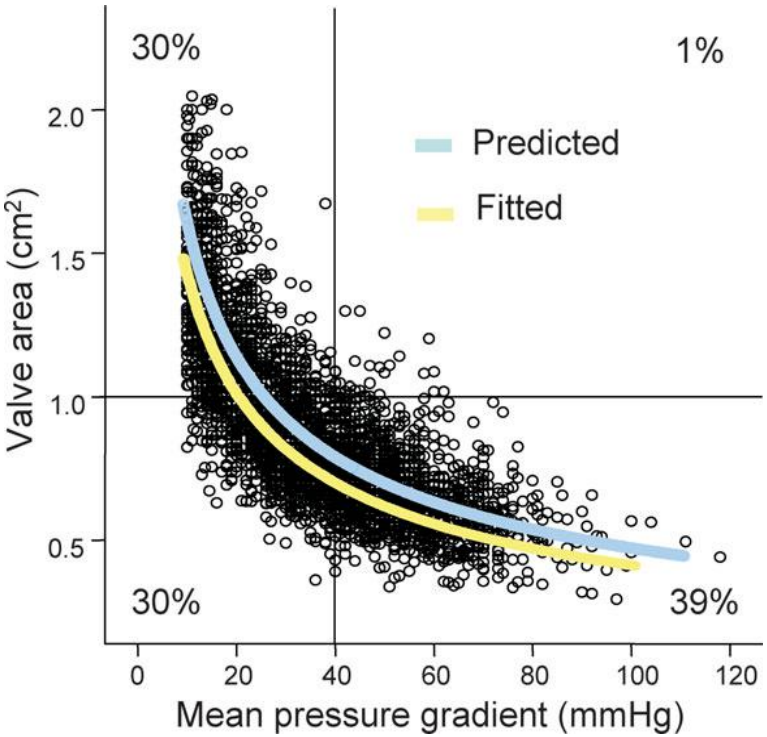
Evaluace AoS – problém je s LFLG





LFLG Aortic Stenosis – what is it ?

SVi under 35ml/m2 or FR under 200ml/s

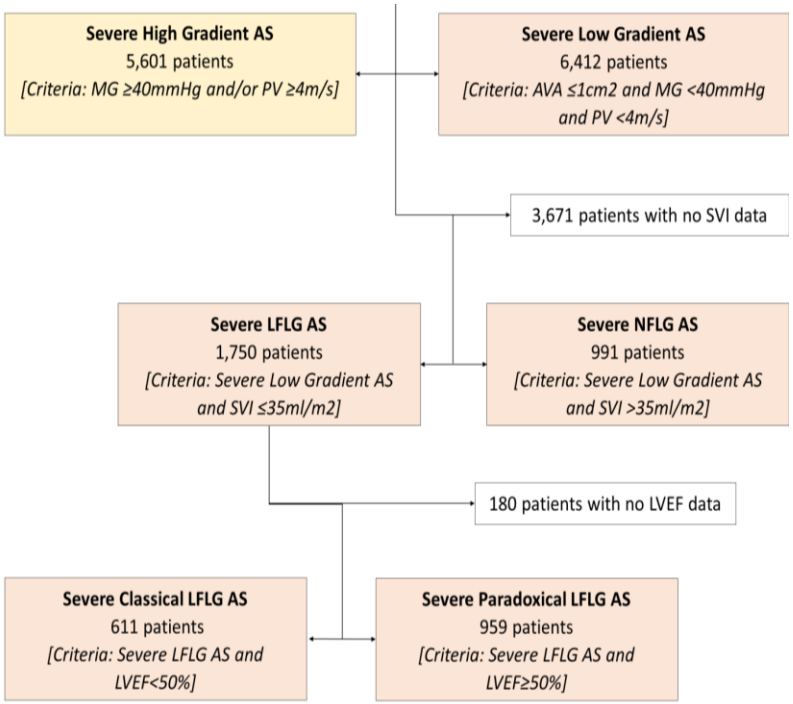


European Heart Journal (2008) 29, 1043–1048

Angel Falls can be a dangerous Class IV rapids
or
just a trickle

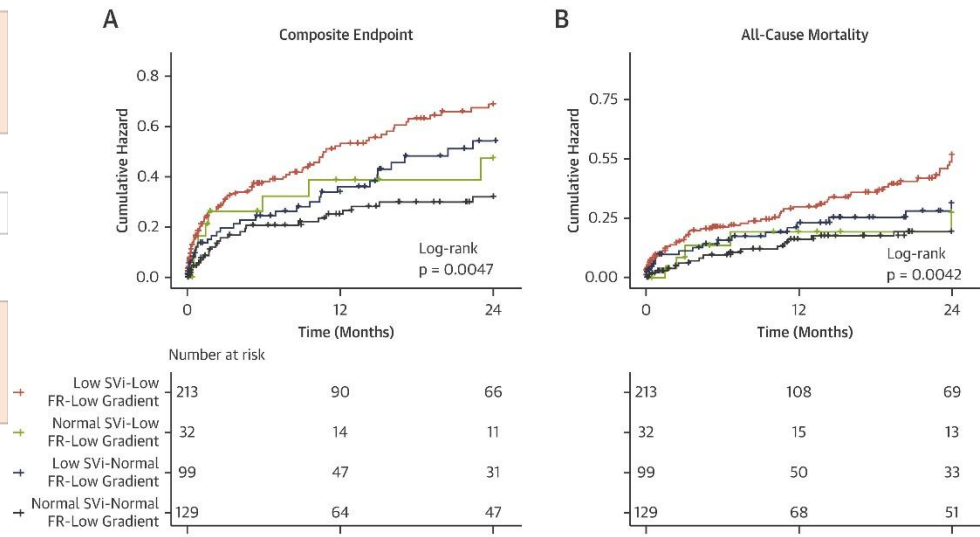
Big South Fork national River in Texas

LFLG Aortic Stenosis – how common is it? And is it bad news?



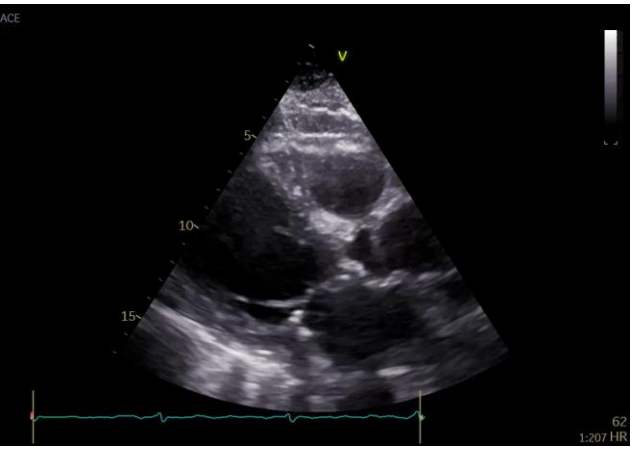
J Am Heart Assoc. 2021;10:e021126 – NEDA analysis

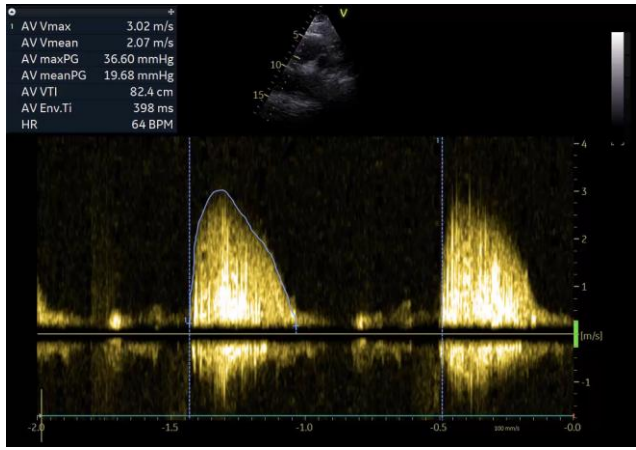
- JACC:

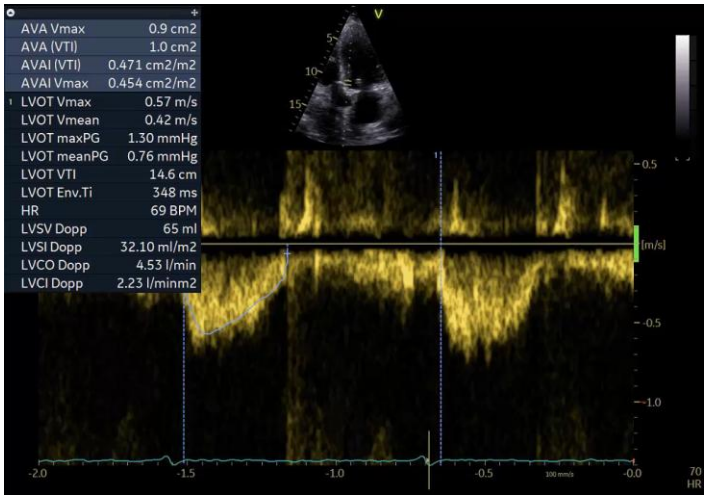


JACC: CARDIOVASCULAR IMAGING VOL. 14, NO. 5, 2021

CASE - All fine for ECHO Imager



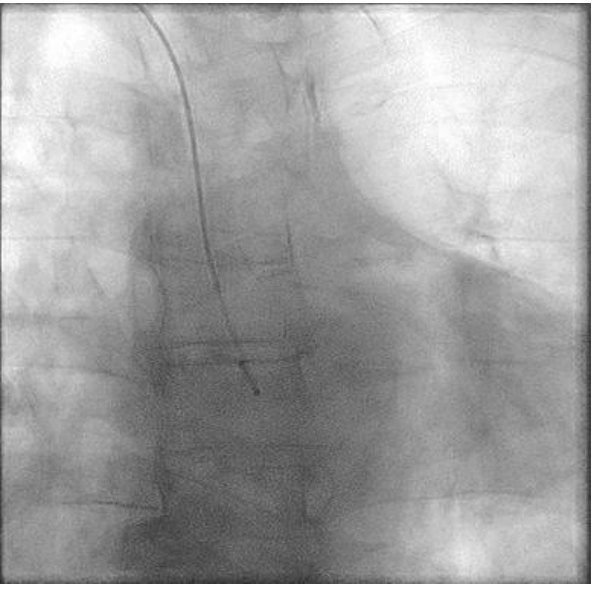




AV mean PG 20mmHg
LVOT VTI 15cm, AV VTI 82cm
SVi 32ml/m2
LVOT area = 452mm2

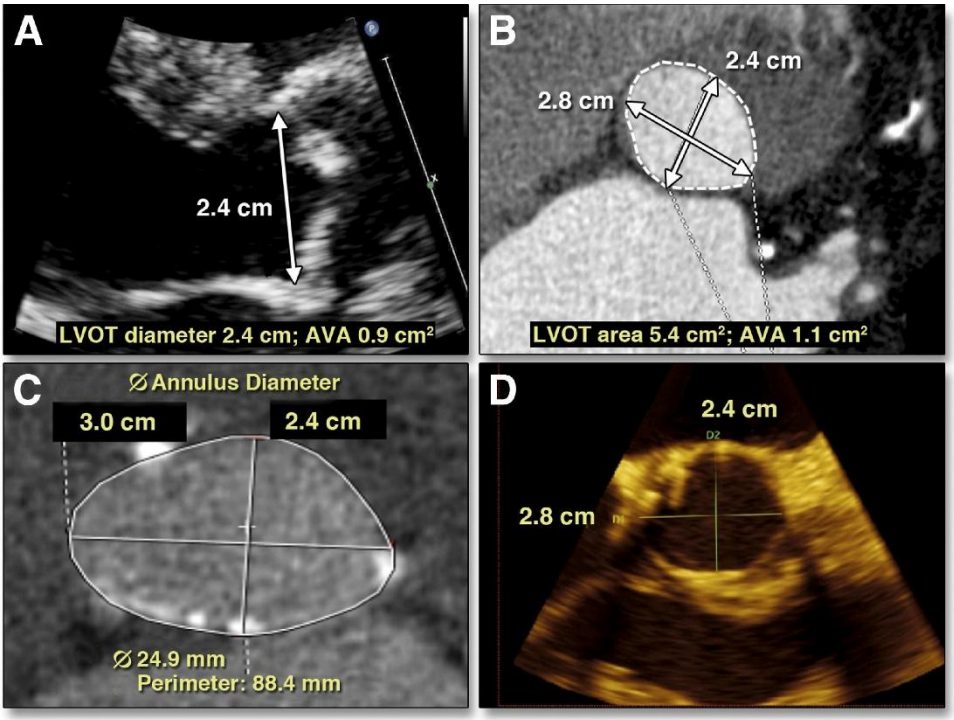
AVAi = 0,47cm2/m2
Dyspnoe NYHA III
Age = 83
Heart Team – TAVI, Tx Fem

CASE - BUT I see the gradient……..TAVI cancelled !!

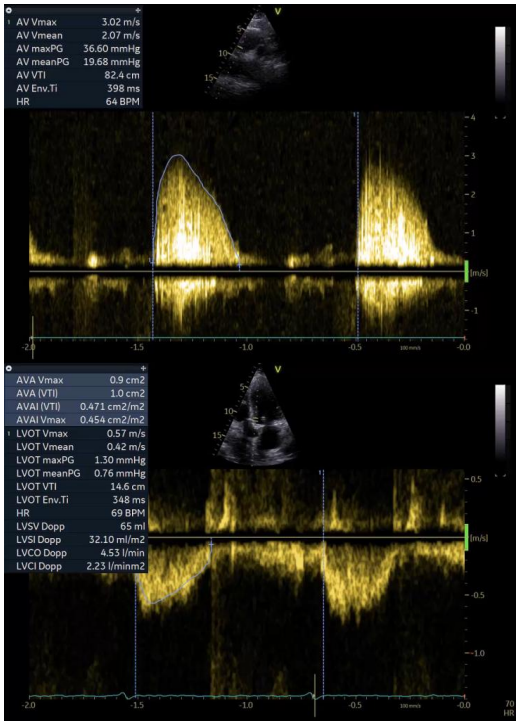


GORLIN: CO = 4.6 L/min, AVAi = 0.8cm2/m2

Where is the error ?



JACC: Cardiovascular Imaging Volume 6, Issue 2, February 2013, Pages 184-195



R parasternal view
Higher AV gradient

Apical view
Lower AV gradient
BUT used for LVOT flow

CT calcifications, rheumatic, cut offs….

LGLF Aortic Stenosis

- Not to be missed – poor prognosis + underdiagnosed !!
- Not easy to evaluate
- Use ESC/ACC algorithms
- Pay attention to details
- Combine ECHO, DSE, CT and ….haemodynamics
- If in doubt, haemodynamic study
- Do not open TAVI prosthesis until AoS severity is certain

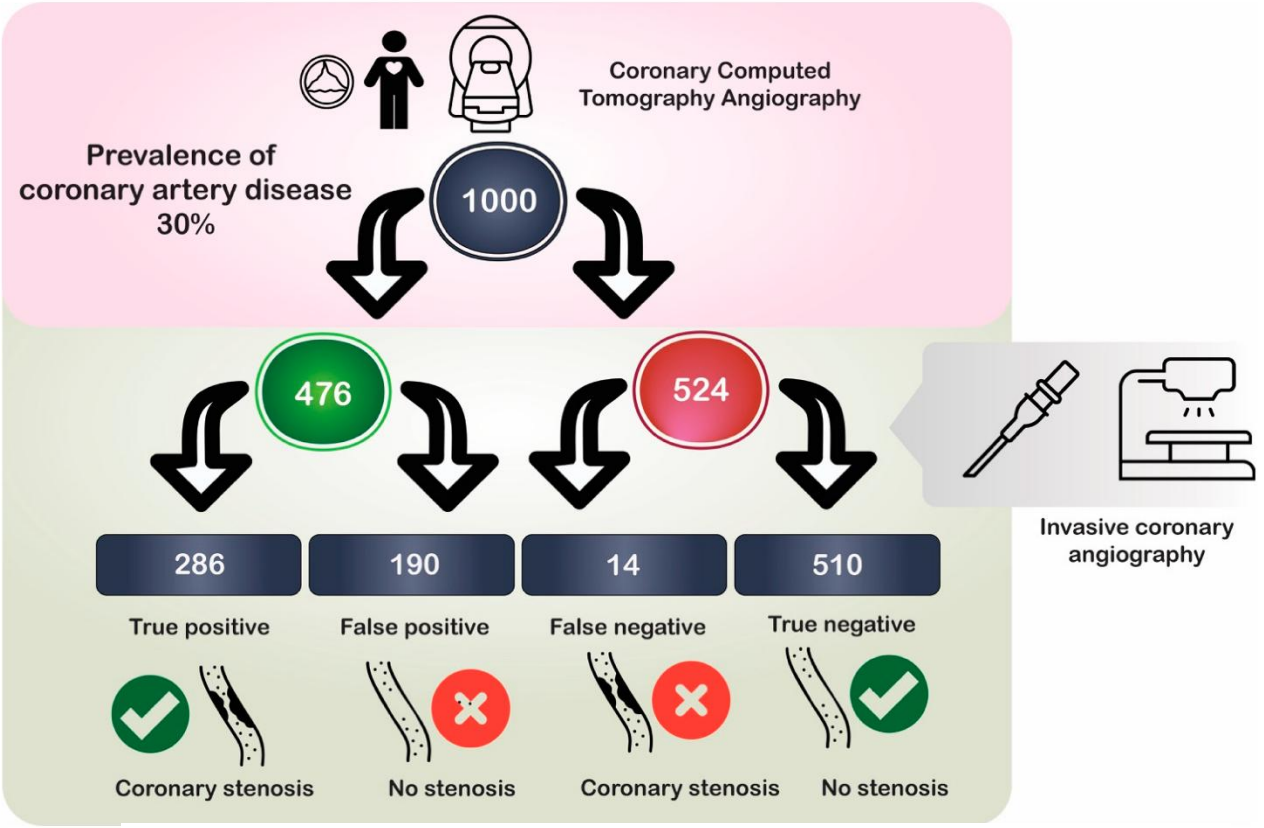
Should we still do invasive CAG before AVR/TAVI?

Coronary CT angiography should be considered as an alternative to coronary angiography before valve surgery in patients with severe VHD and low probability of CAD.[d]	IIa	C

Can we use CT for coronary angiography before TAVI?

CT angiography BEFORE HeartTeam meeting for ALL ?

Porcelain aorta?
Sizing of AVR prosthesis ?
PPM prediction ?
Bicuspid anatomy ?
Is TAVI safe?
Can TAVI be done Ts-femoral ?



J. Clin. Med. **2024**, *13*(2), 631; https://doi.org/10.3390/jcm13020631

REVASC TAVI registry

Costa et al., Circ Cardiovasc Interv. 2022;15:e012417.

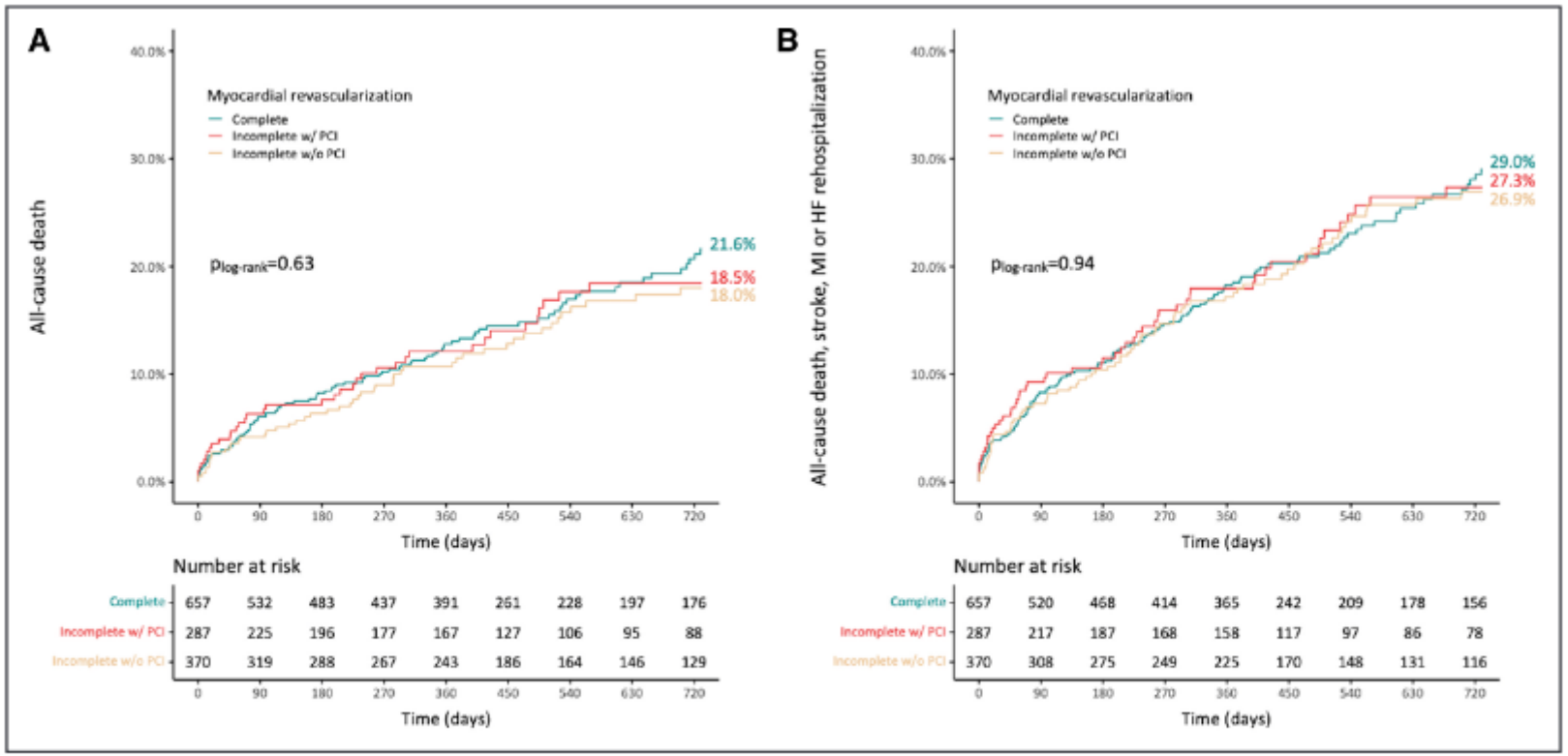


Figure 3. Time-to-event curves of registry outcomes considering patients receiving percutaneous coronary intervention (PCI) or medical therapy among those achieving incomplete myocardial revascularization.

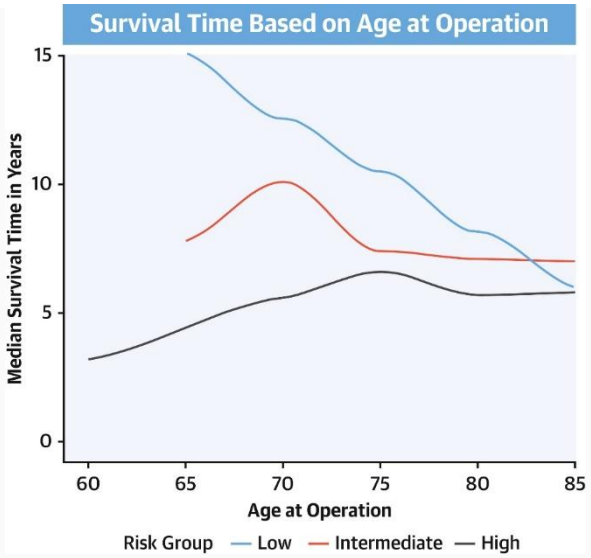
A, Primary outcome; **B**, co-primary outcome. HF indicates heart failure; and MI, myocardial infarction.

Indications for Interventions

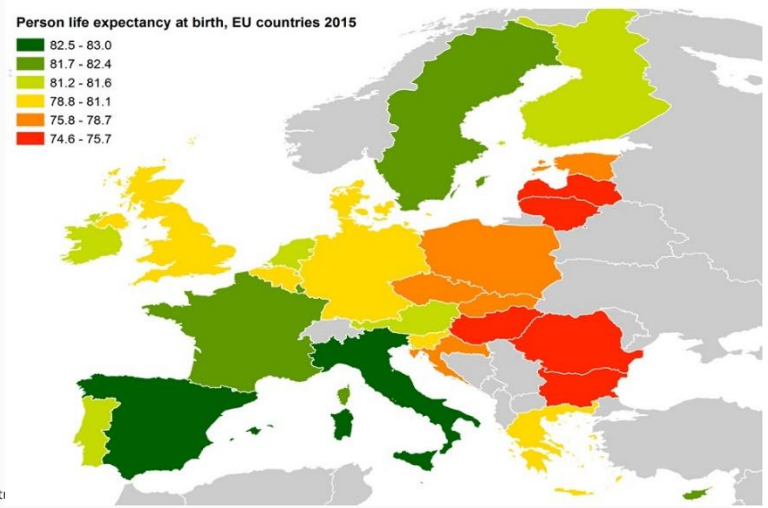
Change – no absolute age cut-off

Table 6
Clinical, anatomical and procedural factors that influence the choice of treatment modality for an individual patient

	Favours TAVI	Favours SAVR
Clinical characteristics		
Lower surgical risk	–	+
Higher surgical risk	+	–
Younger age[a]	–	+
Older age[a]	+	–
Previous cardiac surgery (particularly intact coronary artery bypass grafts at risk of injury during repeat sternotomy)	+	–
Severe frailty[b]	+	–
Active or suspected endocarditis	–	+
Anatomical and procedural factors		
TAVI feasible via transfemoral approach	+	–
Transfemoral access challenging or impossible and SAVR feasible Transfemoral access challenging or impossible and SAVR inadvisable	– + [c]	+ –
Sequelae of chest radiation	+	–
Porcelain aorta	+	–
High likelihood of severe patient–prosthesis mismatch (AVA <0.65 cm^2/m^2 BSA)	+	–
Severe chest deformation or scoliosis	+	–
Aortic annular dimensions unsuitable for available TAVI devices	–	+
Bicuspid aortic valve	–	+
Valve morphology unfavourable for TAVI (e.g. high risk of coronary obstruction due to low coronary ostia or heavy leaflet/LVOT calcification)	–	+
Thrombus in aorta or LV	–	+
Concomitant cardiac conditions requiring intervention		
Significant multi-vessel CAD requiring surgical revascularization[d]	–	+
Severe primary mitral valve disease	–	+
Severe tricuspid valve disease	–	+
Significant dilatation/aneurysm of the aortic root and/or ascending aorta	–	+
Septal hypertrophy requiring myectomy	–	+



Martinsson et al, J Am Coll Cardiol. 2021 Nov, 78 (22) 2147–2157



AVA=aortic valve area, BSA=body surface area, CAD=coronary artery disease; ESC=European Society of Cardiology; LV=left ventricle/left ventricular; LVOT=left ventr

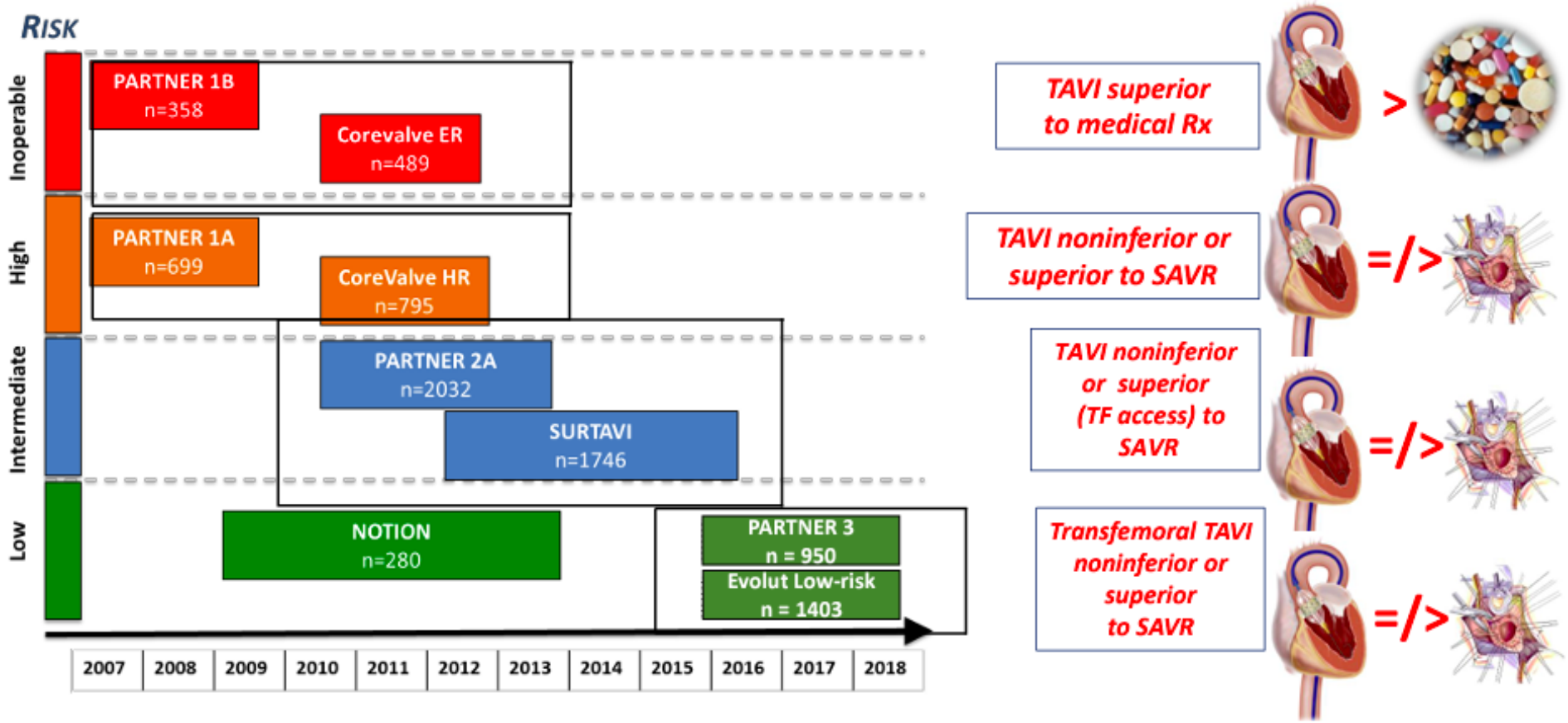
a Life expectancy is highly dependent on absolute age and frailty, differs between men and women, and may be a better guide than age alone. There is wide variation across Europe and elsewhere in the world (http://ghdx.healthdata.org/record/ihme-data/gbd-2017-life-tables-1950-2017).

b Severe frailty = ≥2 factors according to Katz Index[59] (see section 3.3 for further discussion).

c Via non-transfemoral approach.

d According to the 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes.

TAVI je v 2024 velmi úspěšná a zavedená metoda



Courtesy S. Windecker

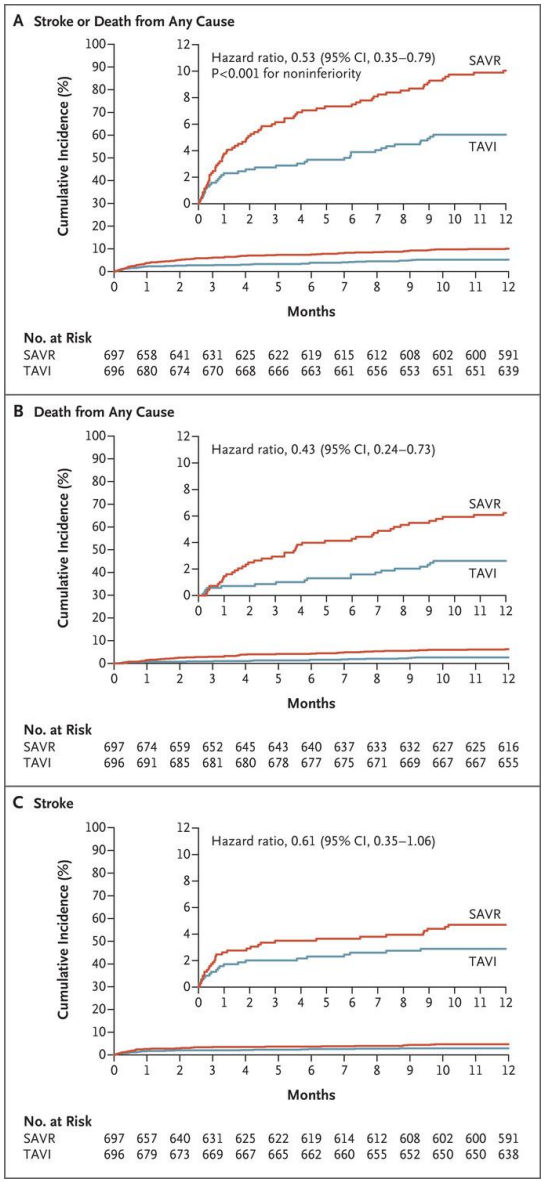
Transcatheter or Surgical Treatment of Aortic-Valve Stenosis

Authors: Stefan Blankenberg, M.D., Moritz Seiffert, M.D., Reinhard Vonthein, Ph.D., Helmut Baumgartner, M.D., Sabine Bleiziffer, M.D., Michael A. Borger, M.D., Ph.D., Yeong-Hoon Choi, M.D., +31, for the DEDICATE-DZHK6 Trial Investigators* Author Info & Affiliations

Published April 8, 2024 | **DOI: 10.1056/NEJMoa2400685**

Table 1. Characteristics of the Patients at Baseline (Intention-to-Treat Population).*

Characteristic	TAVI (N=701)	SAVR (N=713)
Demographic		
Age — yr	74.3±4.6	74.6±4.2
Male sex — no./total no. (%)	390/696 (56.0)	400/698 (57.3)
Medical history		
Median body-mass index (IQR)†	28.1 (25.3–31.9)	28.1 (25.4–31.2)
Median STS-PROM score (IQR) — %‡	1.8 (1.2–2.4)	1.9 (1.2–2.5)
Score on EuroSCORE II — %§	2.1±1.4	2.1±1.8
Median frailty score (IQR)¶	3.0 (2.0–4.0)	3.0 (2.0–3.0)
Left ventricular ejection fraction — %	57.8±9.8	57.7±9.3
Cardiovascular risk factors — no./total no. (%)		
Hypertension	588/694 (84.7)	605/694 (87.2)
Dyslipidemia	378/691 (54.7)	383/689 (55.6)
Diabetes mellitus	235/695 (33.8)	229/698 (32.8)
Coexisting illness — no./total no. (%)		
Coronary artery disease	238/694 (34.3)	266/697 (38.2)
Cerebrovascular disease	27/676 (4.0)	31/693 (4.5)
Peripheral vascular disease	34/694 (4.9)	45/697 (6.5)
Previous myocardial infarction	36/696 (5.2)	52/697 (7.5)
Previous stroke	42/692 (6.1)	42/696 (6.0)
Atrial fibrillation	201/695 (28.9)	191/697 (27.4)
COPD	101/695 (14.5)	118/697 (16.9)
Pulmonary hypertension	84/693 (12.1)	73/686 (10.6)
NYHA class ≥3	321/695 (46.2)	318/697 (45.6)
Permanent pacemaker	37/696 (5.3)	35/698 (5.0)
Left bundle-branch block	53/678 (7.8)	54/682 (7.9)
Right bundle-branch block	65/678 (9.6)	65/682 (9.5)



EuroIntervention
2024;20:e117-e119
published online e-edition January 2024
DOI: 10.4244/EIJ-E-23-00065

Aortic stenosis management: current evolution and future challenges

Andrea Scotti[1,2]*, MD; Azeem Latib[1], MD

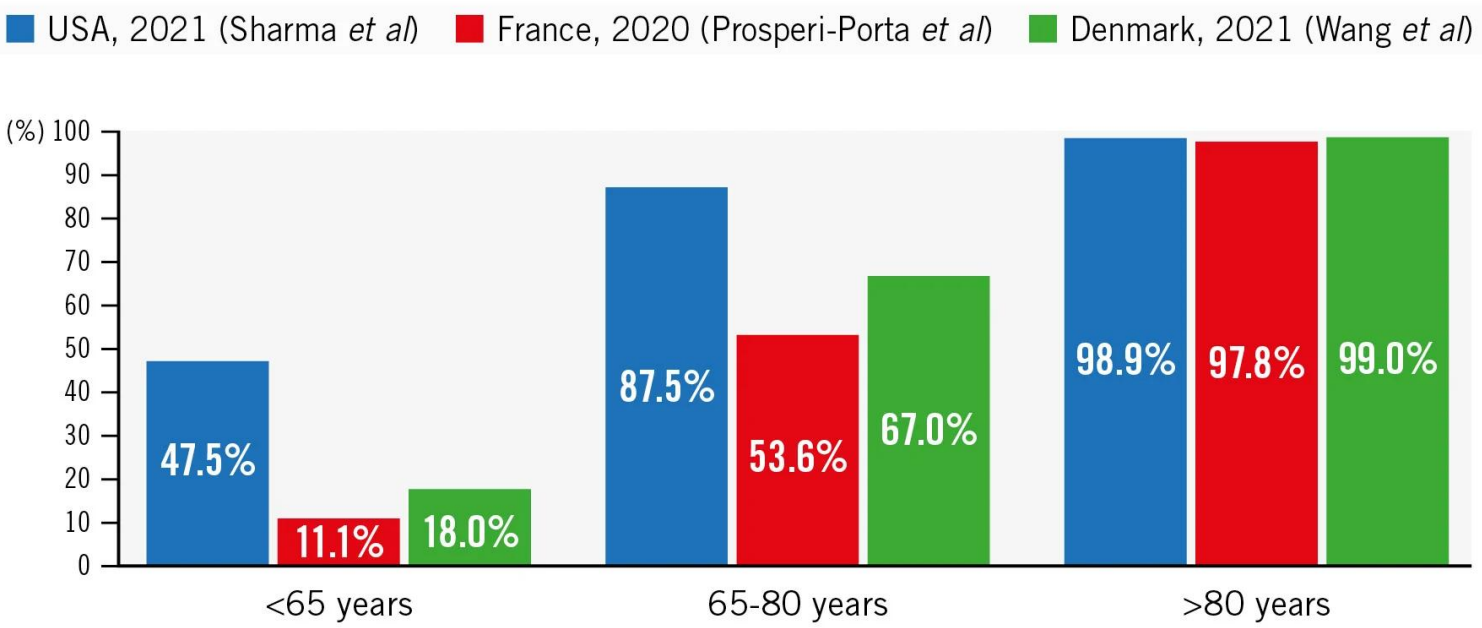
SEVERE AORTIC STENOSIS

Informed patient preference

Multislice CT

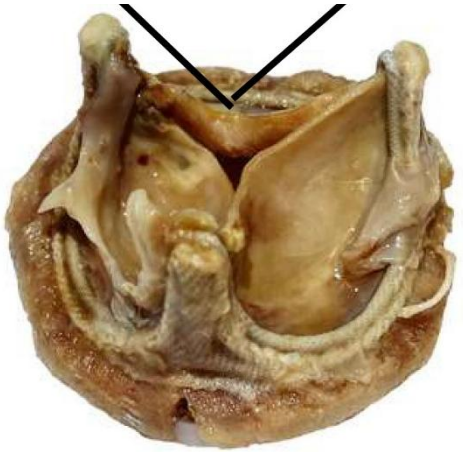
HEART TEAM

TAVI adoption



Durabilita TAVI protéz je špatná
nebo naopak vydrží déle než AVR?

BVD definition[1,2]	
SVD [3]	Mean gradient increase ≥10 mmHg from discharge/30-day to last echo AND ≥20 mmHg at last echo OR new onset/increase of ≥ moderate intraprosthetic aortic regurgitation*
NSVD	Severe prosthesis-patient mismatch PPM (VARC-3) at 30-day/discharge[1] OR severe paravalvular regurgitation (PVL) through 5 years *
Thrombosis†	Clinical valve thrombosis
Endocarditis†	Modified Duke criteria



Explanted failed BHV

NOTION 10 years data

Key Question

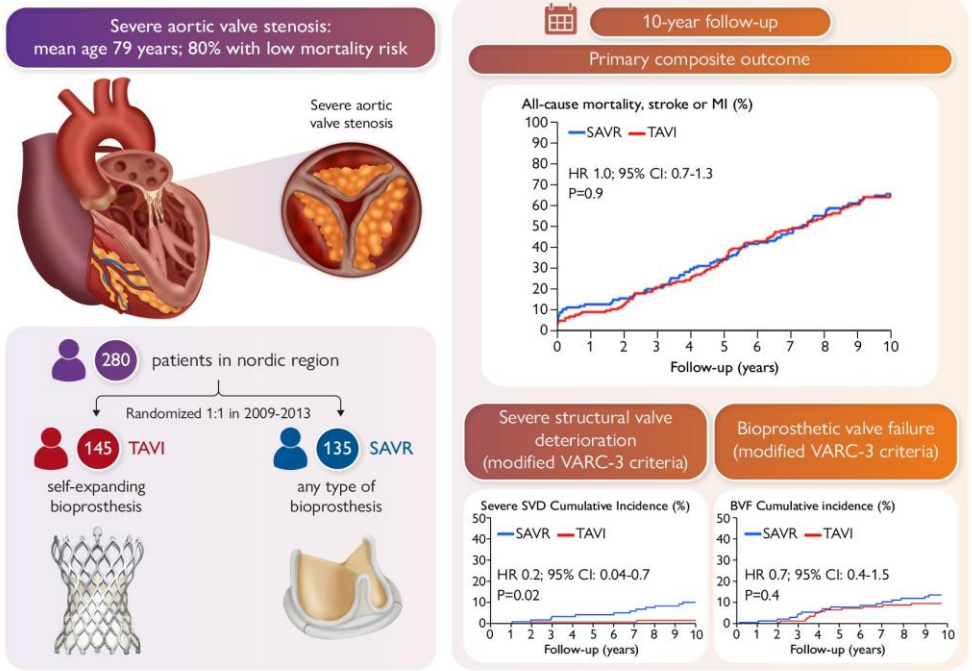
Are there differences in long-term clinical outcomes and durability of transcatheter versus surgical bioprosthetic aortic valves in patients with symptomatic, severe aortic valve stenosis who are at lower surgical risk?

Key Finding

In the NOTION trial at ten years, major clinical outcomes including all-cause mortality, stroke or myocardial infarction were sim
transcatheter aortic valve implantation (TAVI) or surgical aortic valve replacement (SAVR). More SAVR patients had severe struc
valve deterioration, while the rates of bioprosthetic valve failure were similar.

Take Home Message

Long-term data for a first generation self-expanding transcatheter aortic valve are comparable to surgical bioprosthetic aortic va
However, larger studies, including different types of bioprosthetic aortic valves, are warranted to generalize these findings.



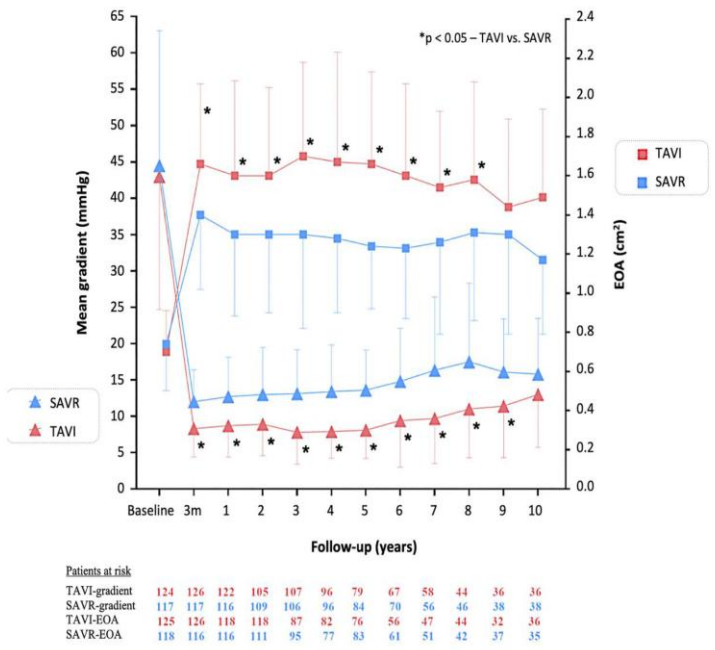
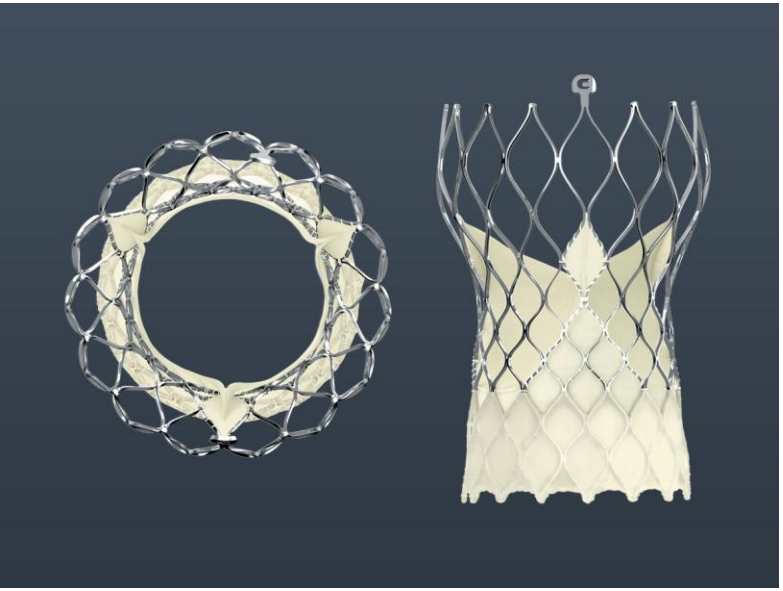
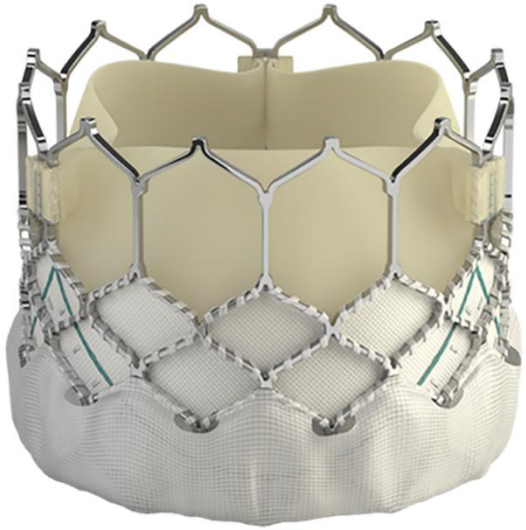


Figure 2 NOTION—aortic valve haemodynamics up to 10 years of follow-up: transprosthetic gradient and effective orifice area (EOA). EOA, effective orifice area; TAVI, transcatheter aortic valve implantation; SAVR, surgical aortic valve replacement. *$P < .05$ for inter-group comparison

Eur Heart J, Volume 45, Issue 13, 1 April 2024, Pages 1116–1124, https://doi.org/10.1093/eurheartj/ehae043

Všechny TAVI protézy jsou stejné
nebo se významně liší ?

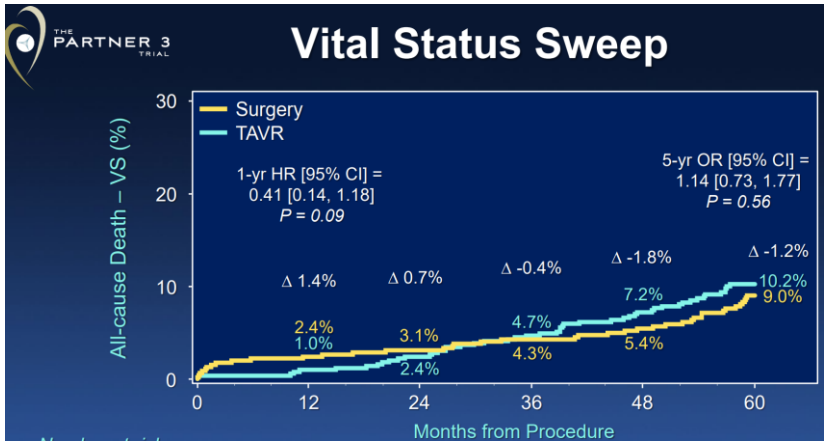


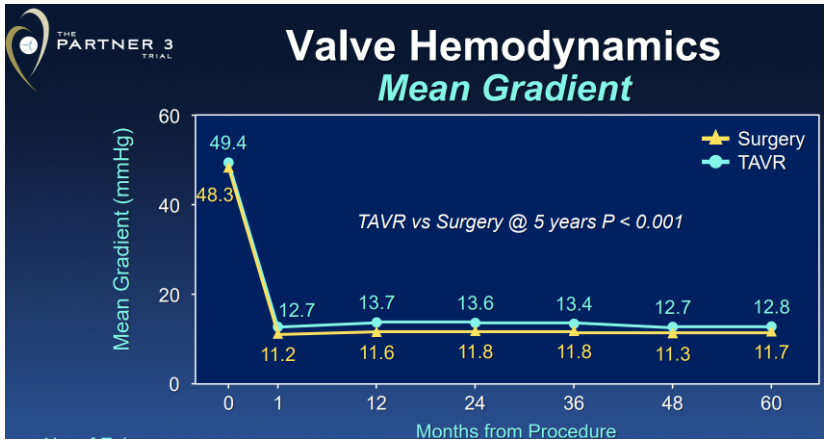


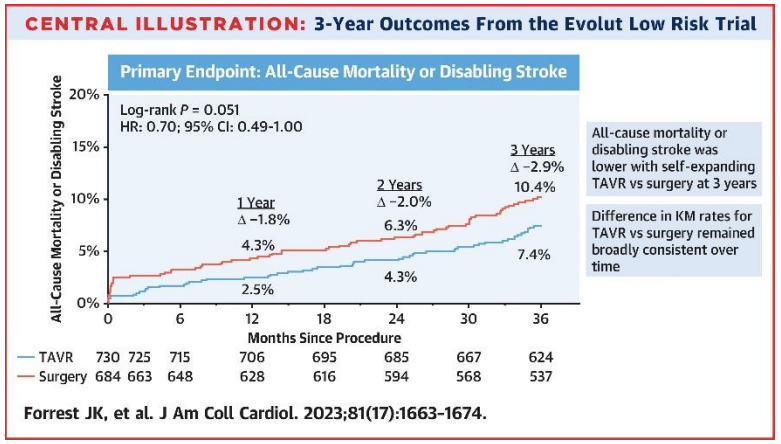
Možnost repozice
Větší plocha ústí = menší gradient = durabilita ?
Bez rizika ruptury anulu

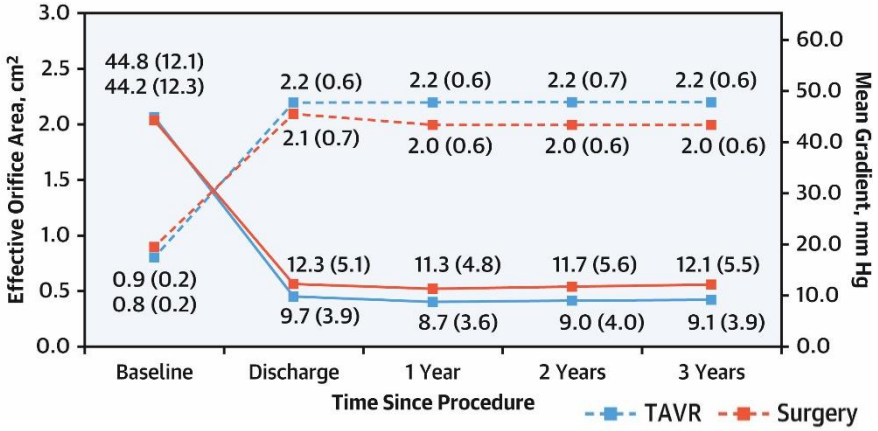
Rychlá a jednoduchá implantace
Menší riziko potřeby kardiostimulace
Snazší přístup do koronárních tepen

Randomized data Low risk AoS







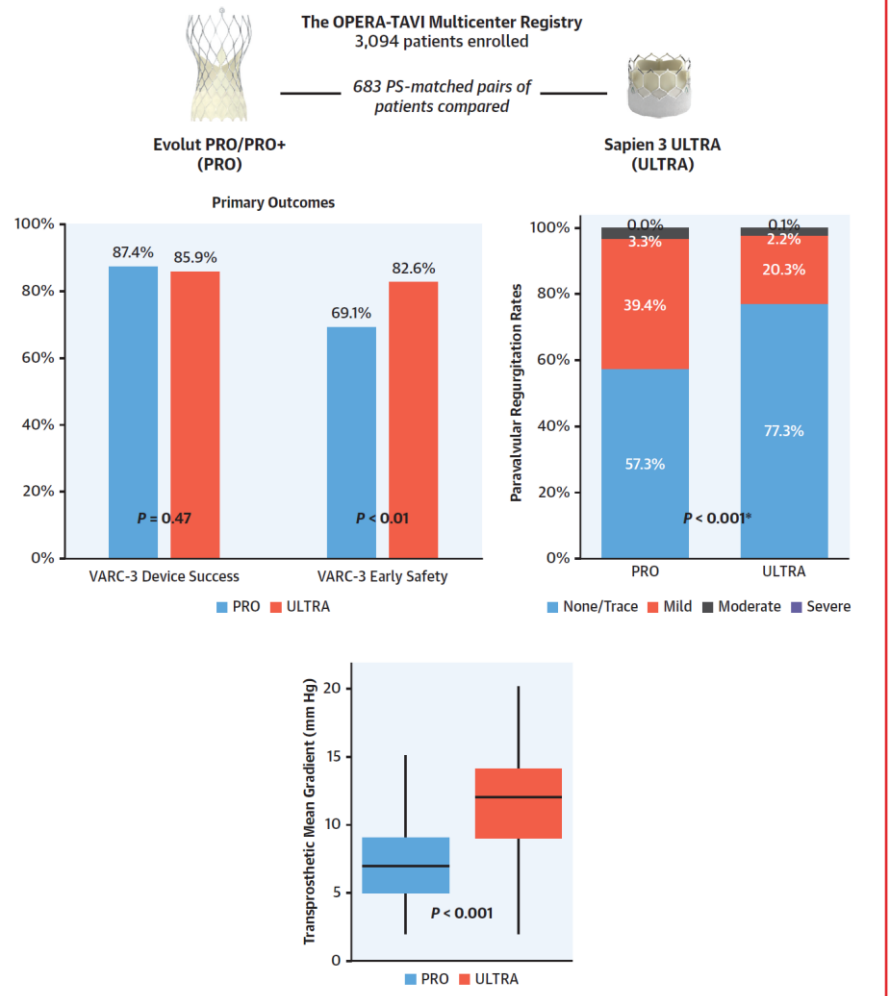


PARTNER 3

Evolut Low risk

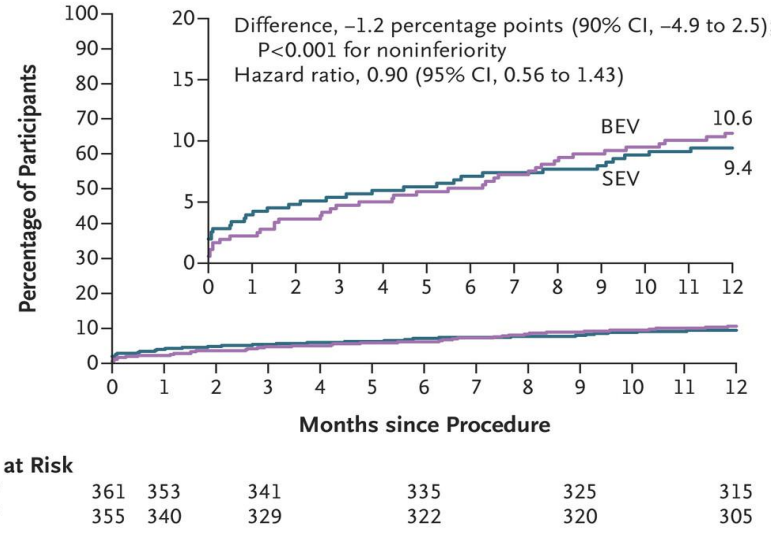
BE or SE ?

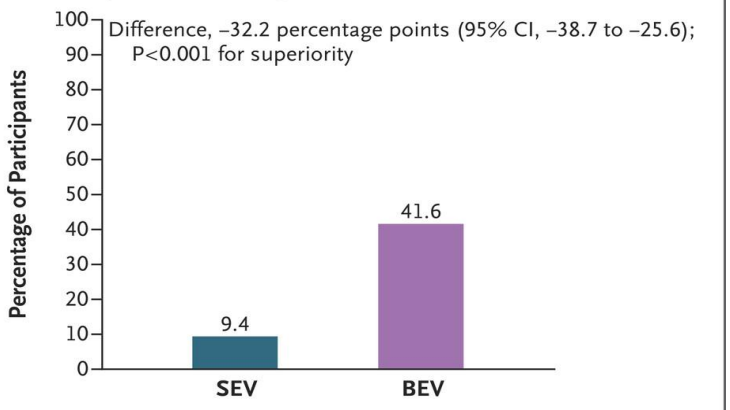
CENTRAL ILLUSTRATION Comparison of Transcatheter Aortic Valve Replacement Outcomes With Self-Expanding or Balloon-Expandable Valves in the Comparative Analysis of Evolut PRO vs Sapien 3 Ultra Valves for Transfemoral Transcatheter Aortic Valve Implantation Registry



Costa G, et al. J Am Coll Cardiol Intv. 2022;15(23):2398-2407.

Box = IQR; central line = median; upper whisker = maximum value to quartile 3; lower whisker = quartile 1 to minimum value. *P = 0.41 comparing moderate to severe grades. PS = propensity score; VARC-3 = Valve Academic Research Consortium-3.





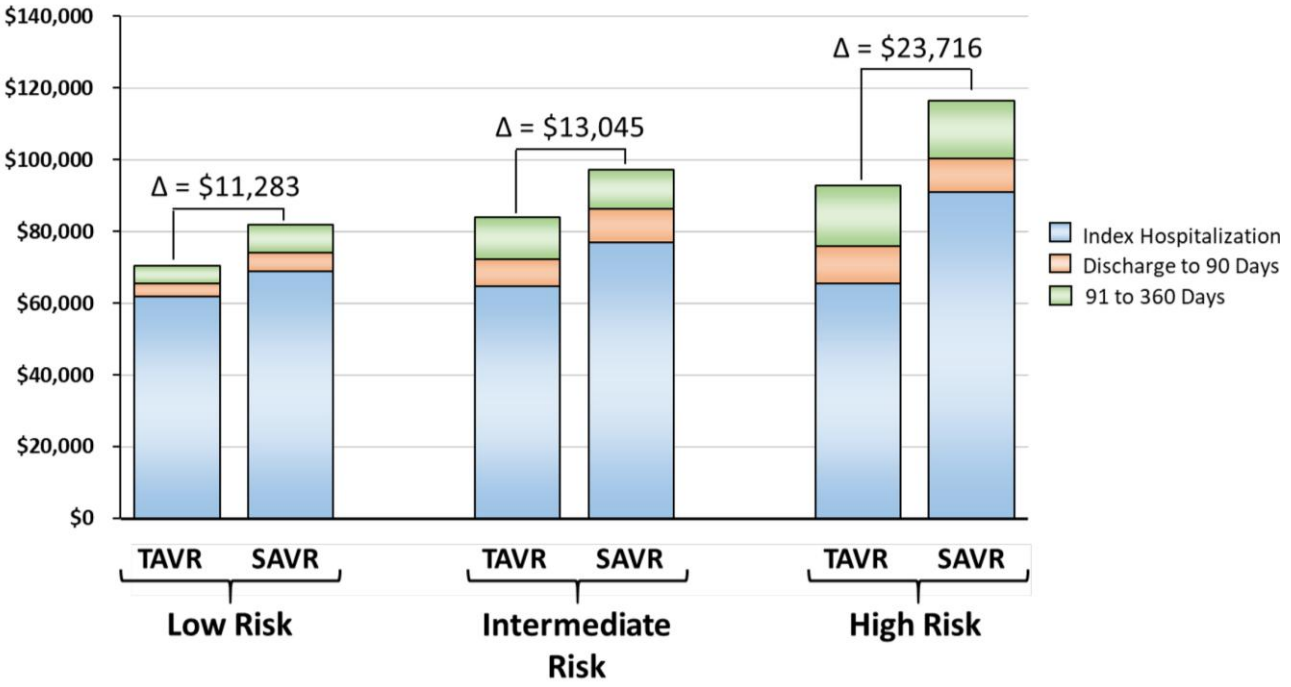
Self-Expanding or Balloon-Expandable TAVR in Patients with a Small Aortic Annulus, ACC 2024,

TAVI je drahá, dražší než AVR

nebo má pojišťovna dobré počty?

Suzanne Baron et al., Circ Cardiovasc Interv. 2022;15:e011295.

8,590 patients undergoing TAVR or SAVR between 2016 and 2018 identified by Medicare Fee For Service Database and stratified into low, intermediate and high risk groups based on the Hospital Frailty Risk Score

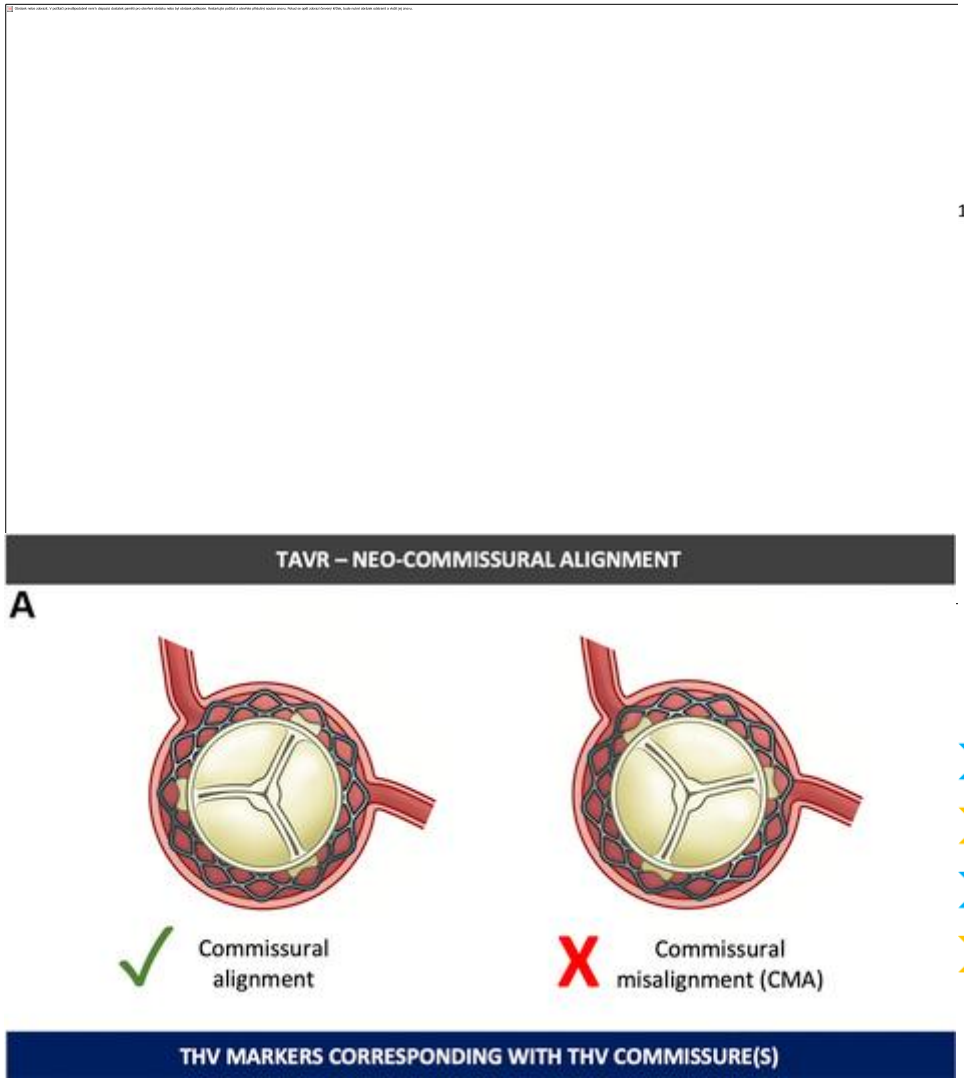


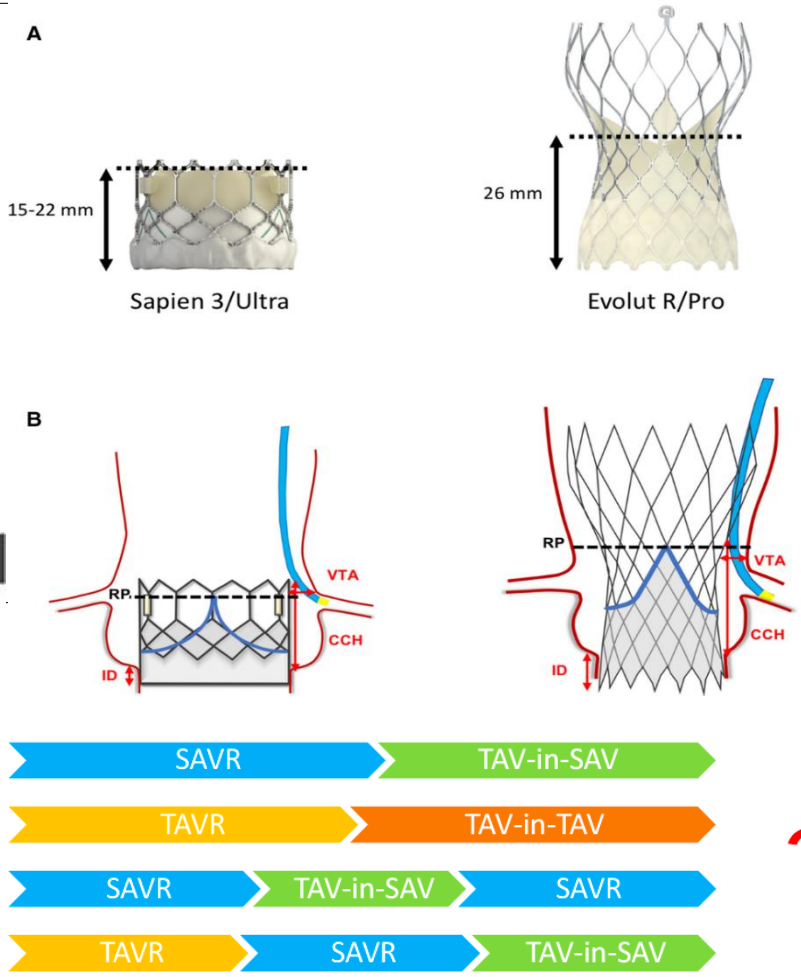
Costs were *lower* with TAVR at index hospitalization, 90 days and 1 year compared with SAVR in all risk strata

Degenerace TAVI protéz nebude problém

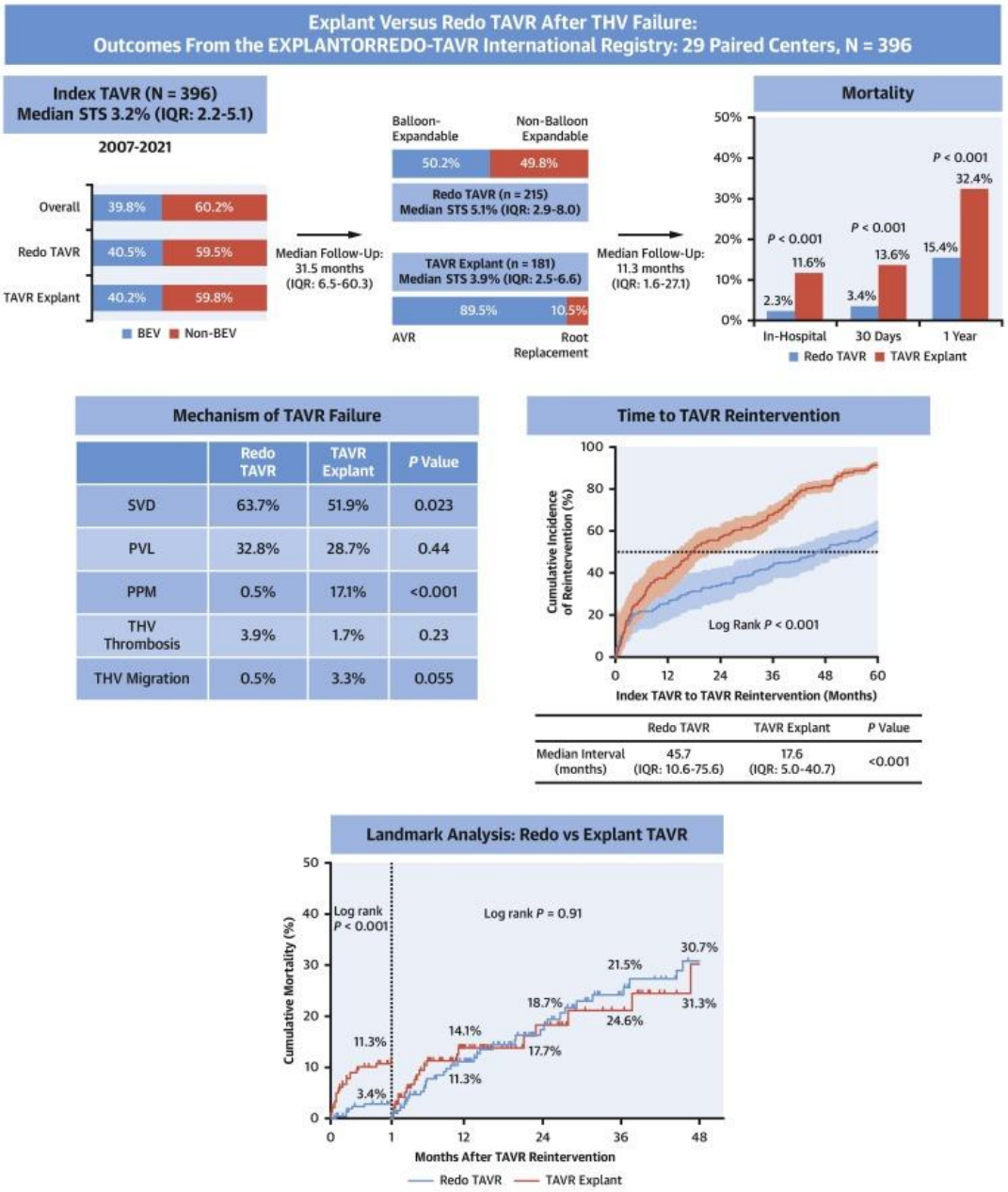
nebo naopak ano?

Každá bioprotéze degeneruje, ano, TAVI protézy také.





CENTRAL ILLUSTRATION: Summary of the EXPLANTORREDO-TAVR International Registry



Mechanism of TAVR Failure

	Redo TAVR	TAVR Explant	*P* Value
SVD	63.7%	51.9%	0.023
PVL	32.8%	28.7%	0.44
PPM	0.5%	17.1%	<0.001
THV Thrombosis	3.9%	1.7%	0.23
THV Migration	0.5%	3.3%	0.055

Time to TAVR Reintervention

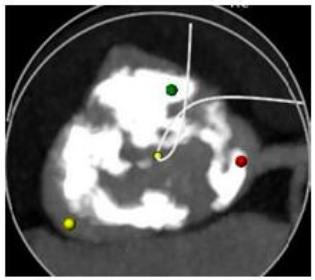
	Redo TAVR	TAVR Explant	*P* Value
Median Interval (months)	45.7 (IQR: 10.6-75.6)	17.6 (IQR: 5.0-40.7)	<0.001

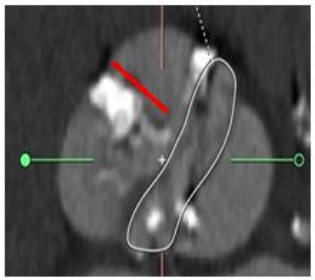
Landmark Analysis: Redo vs Explant TAVR

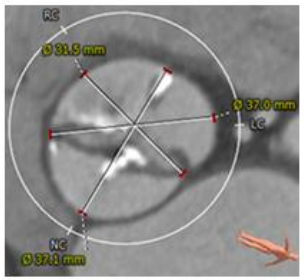
Tang GHL., et al. J Am Coll Cardiol Intv. 2023;16(8):927-941.

TAVI je vhodná pro Bikuspidální anatomii nebo nevíme?

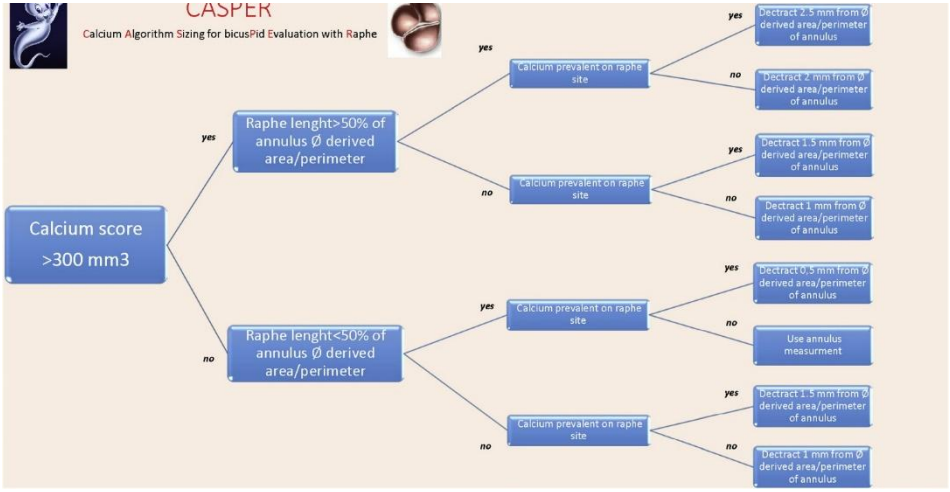
B-AoV byly vyloučeny z randomizovaných studií – tedy data nemáme
Větší eliptický anulus s větším množstvím kalcifikací
Nejasný sizing
Observační registry nutno brát s rezervou – selektovaná populace s anatomií vhodnou pro TAVI







Některé studie vyloučily pacienty s LVOT Ca++, s potřebou jiného KCH výkonu atd.



More TAVI to come
ATLAS TAVI registry

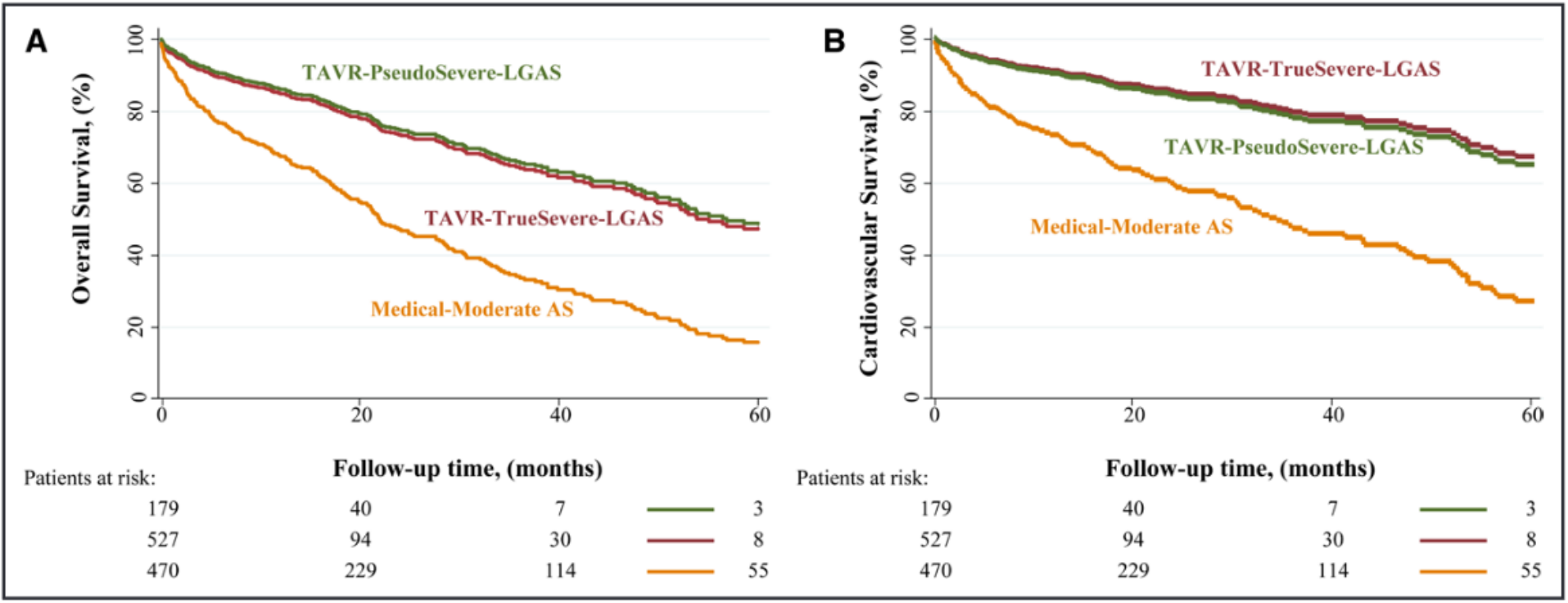


Figure 2. Cox proportional hazard regression curves for patients with reduced left ventricular ejection fraction (LVEF) undergoing transcatheter aortic valve replacement (TAVR) for true-severe aortic stenosis (AS), TAVR for pseudo-severe AS, and medical therapy for moderate or pseudo-severe AS.

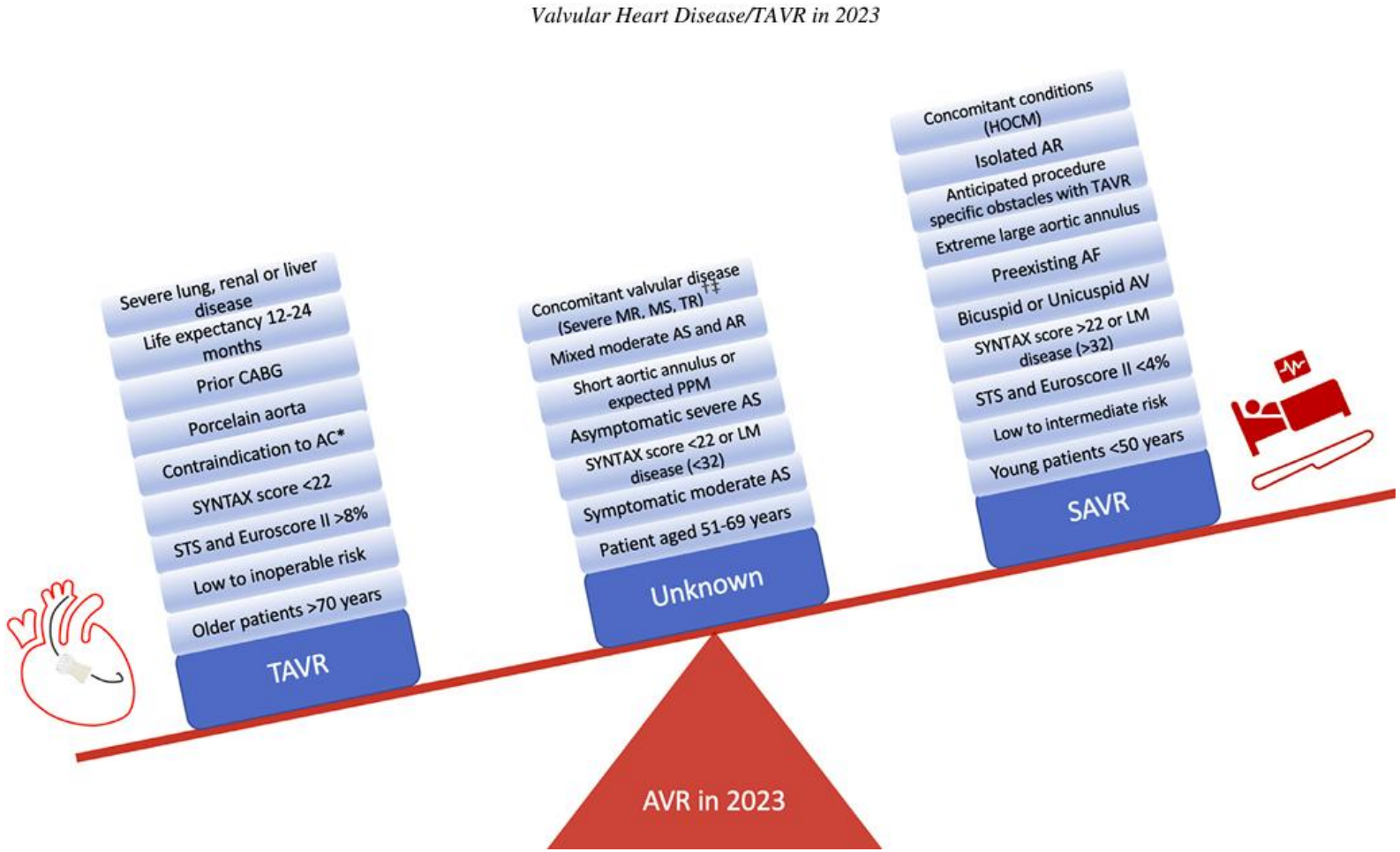
A, Cox proportional hazard regression curves for overall survival. **B**, Cox proportional hazard regression curves for cardiovascular survival. LGAS indicates low-gradient aortic stenosis.

Circ Cardiovasc Interv. 2023;16:e012768. DOI: 10.1161/CIRCINTERVENTIONS.122.012768 May 2023 282

Co dále v roce 2024

1. TAVI je velmi úspěšná metoda, která počtem již převýšila AVR, má velmi povzbudivá střednědobá data o durabilitě a indikace se dále rozšiřují
2. Věk 75 let již není dogma, individualizace dle předpokládané délky života a u malých anulů (23mm a méně) preferovat SE TAVI
3. Pokud je pravděpodobné, že pacient bude žít déle než 15 let, tak bychom v 2024 měli mít pro pacienta dlouhodobý plán, který často bude zahrnovat AVR a možnost TAVI do AVR v budoucnosti
4. Známe anatomie (bikuspidální chlopeň, masivní kalcifikace, …) kde výsledky TAVI nejsou jasně prokázané a preferujeme AVR
5. TAVI je levnější než AVR
6. Počty TAVI budou i dále stoupat….durabilita, střední vady, asympt. ..

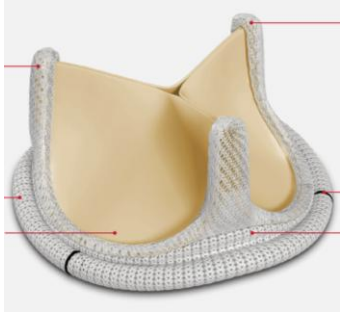
TAVI nebo AVR v roce 2023



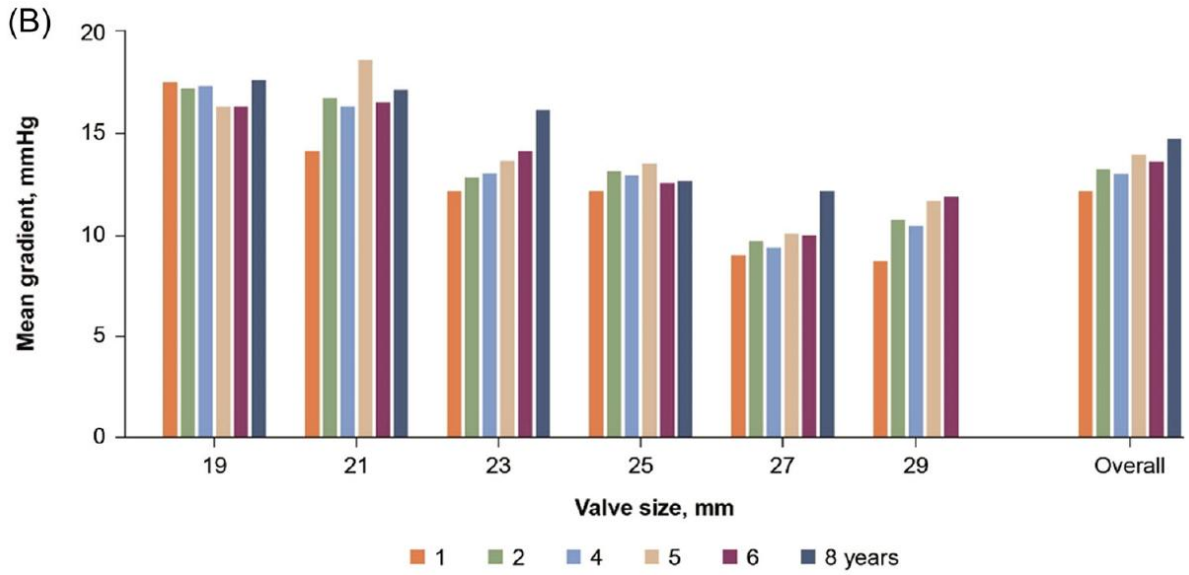
AmJCardiol2023;193:1–18

Thank you

CE Magna Ease je dokonalá nebo nevíme?



Vývoj z CE Perimount, zavedena v roce 2005. Randomizovaná klinická studie 0
Nejdelší follow-up: *Rajab et al. Journal of Cardiothoracic Surgery (2020) 15:209; Tsui et al., Journal of Cardiothoracic Surgery 2022 Dec;37(12):4999-5010; Piperata et al., Eur J Cardiothorac Surg. 2022 Mar 24;61(4):888-896.*
Important changes include a lower profile, lower cusp height, as well as a scalloped and compliant sewing ring. While the earlier iterations in the Perimount valve series have a proven track record of excellent outcomes, only short term data has been published for the CEPME valve and it is not known if these design modification affect the results with this valve beyond short-term follow-up [12,17]. The current study represents the first description of mid-term results with this prosthesis, with a median duration of follow-up of over 5 years.
- 518 pacientů OP 2007-2011, retrospektivní analýza po 3 letech = zařazeni jen živí pacienti (109 pacientů zemřelo do 2015), z finančních důvodů analýza jen 100 pacientů.
- 258 pacientů zařazeno, 108 mělo 8-leté sledování, střední gradient po 8 letech 15mmHg, mortalita 19% po 8 letech
- 2012 pacientů, 10 leté sledování 91 pacientů, velmi pěkné výsledky, střední gradient ?



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