Postavení chirurgie aortální chlopně v éře TAVI:

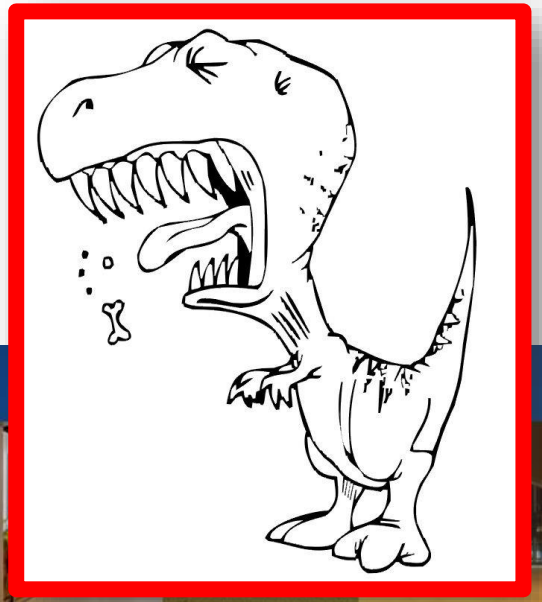
AS

AR

Are we dinosaurs?☺

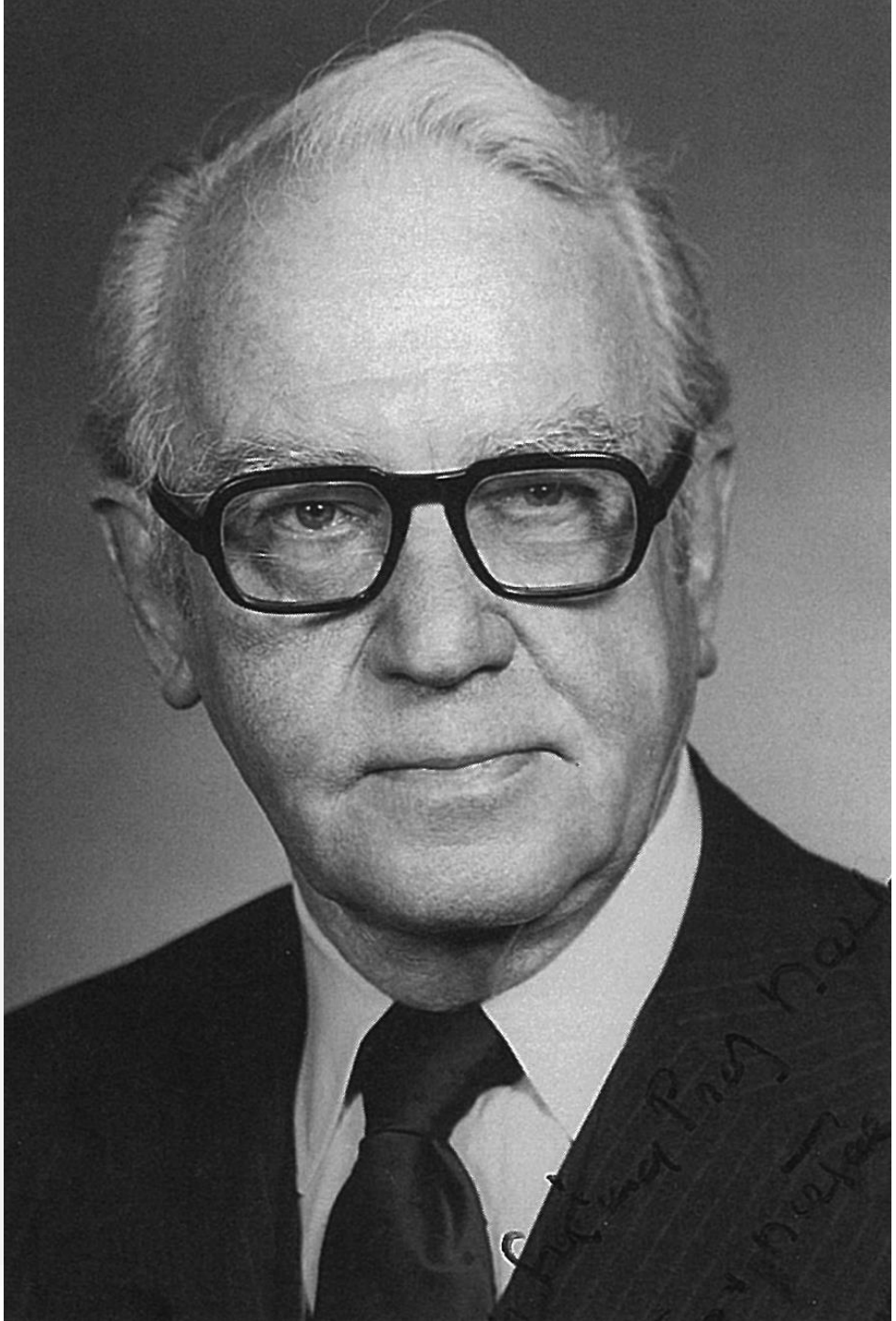
20. Symposium Pracovní skupiny Chlopenní a vrozené srdeční vady v dospělosti

Jan Vojáček
Kardiochirurgická klinika LF UK a FN HK
Komplexní kardiovaskulární centrum FN HK



Dwight Emary Harken /1910-1993/

III/1960 – AVR
(Harken aortic valve)



Chirurgická léčba onemocnění aortální chlopně

1960 - **2002**

42 let

TAVI

16 let

Alain Cribier: First Transcatheter Aortic Valve Implantation (TAVI) April 16, 2002

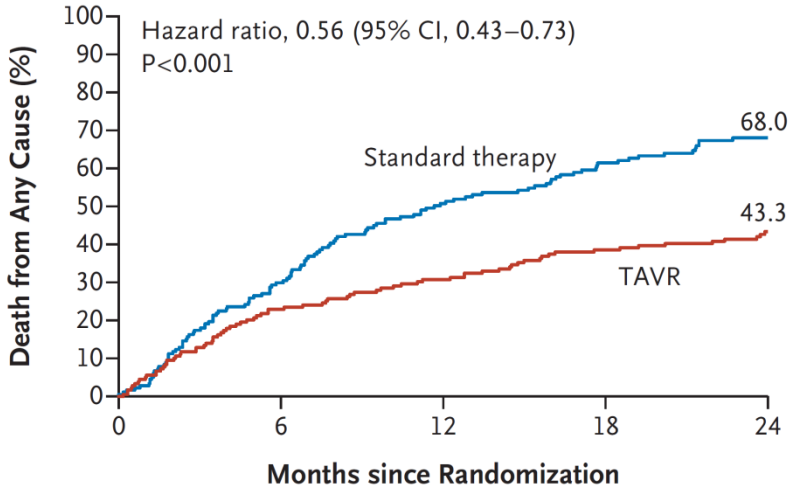
April 16 , 2002

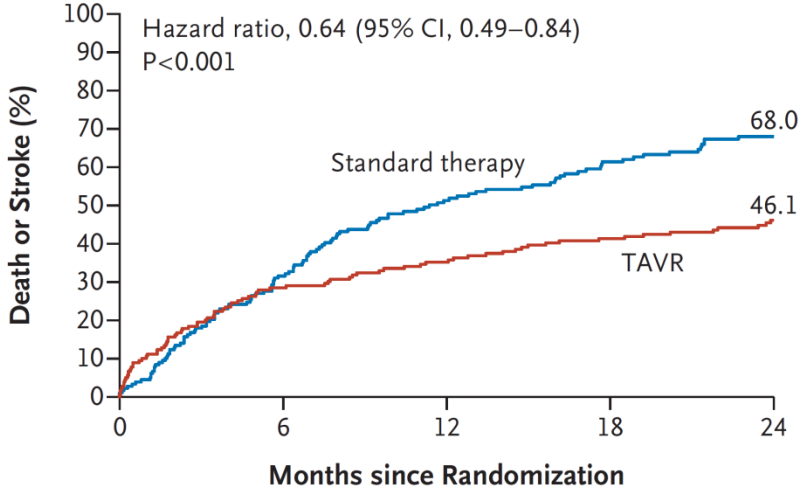
8 days post implantation

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Transcatheter Aortic-Valve Replacement for Inoperable Severe Aortic Stenosis





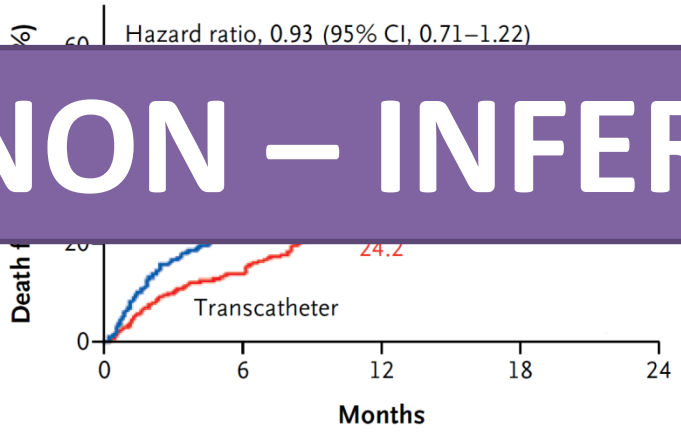
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 9, 2011 VOL. 364 NO. 23

Transcatheter versus Surgical Aortic-Valve Replacement in High-Risk Patients

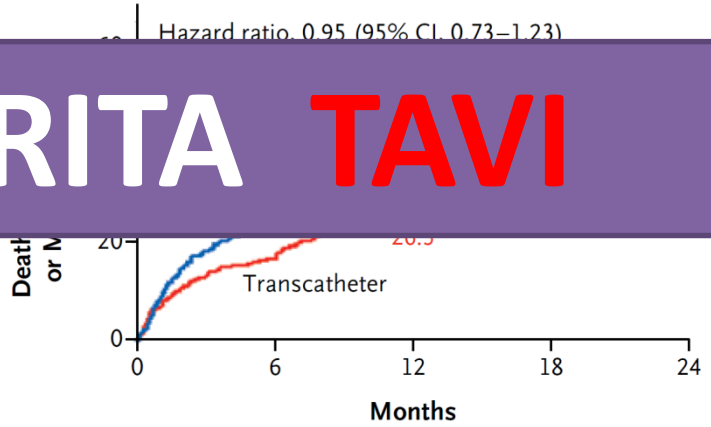
NON – INFERIORITA TAVI

A Death from Any Cause, All Patients



No. at Risk					
Transcatheter	348	298	260	147	67
Surgical	351	252	236	139	65

D Death from Any Cause or Major Stroke

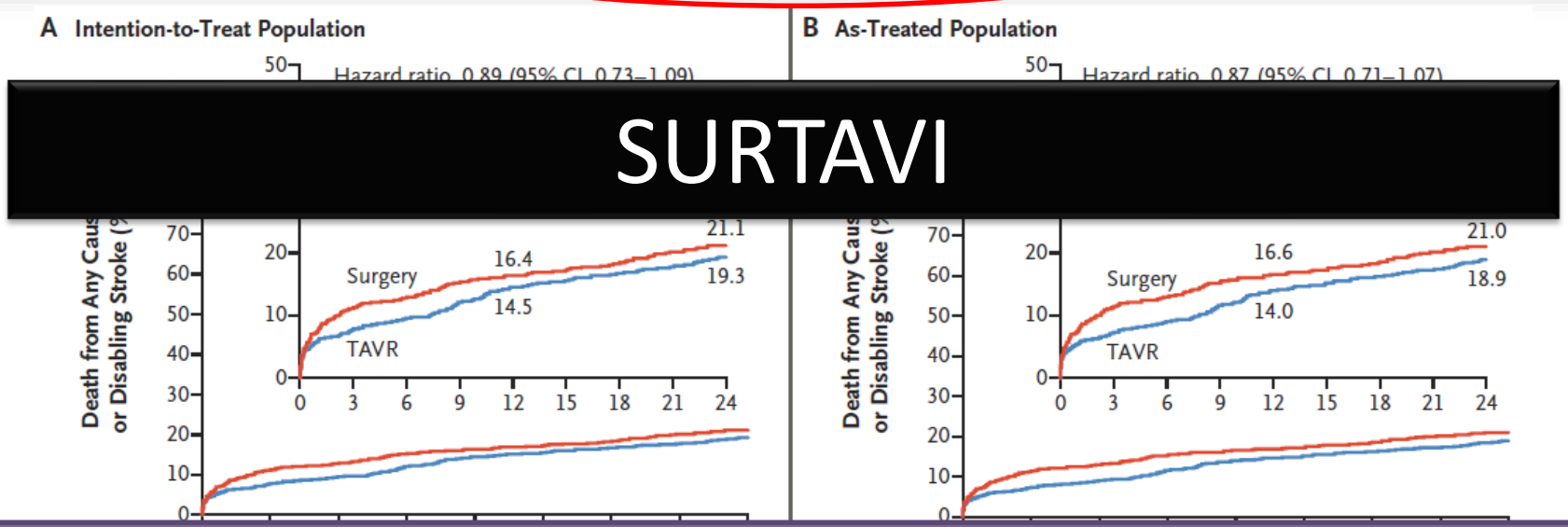


No. at Risk					
Transcatheter	348	289	252	143	65
Surgical	351	247	232	138	63

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 28, 2016 VOL. 374 NO. 17

Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients



SURTAVI

NON – INFERIORITA TAVI

2017 ESC/EACTS Guidelines for the management of VHD

New recommendations for symptomatic patients with severe aortic stenosis

ESC European Heart Journal (2017) 00, 1–53 doi:10.1093/eurheartj/ehx391

ESC/EACTS GUIDELINES

2017 ESC/EACTS Guidelines for the management of valvular heart disease

The Task Force for the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

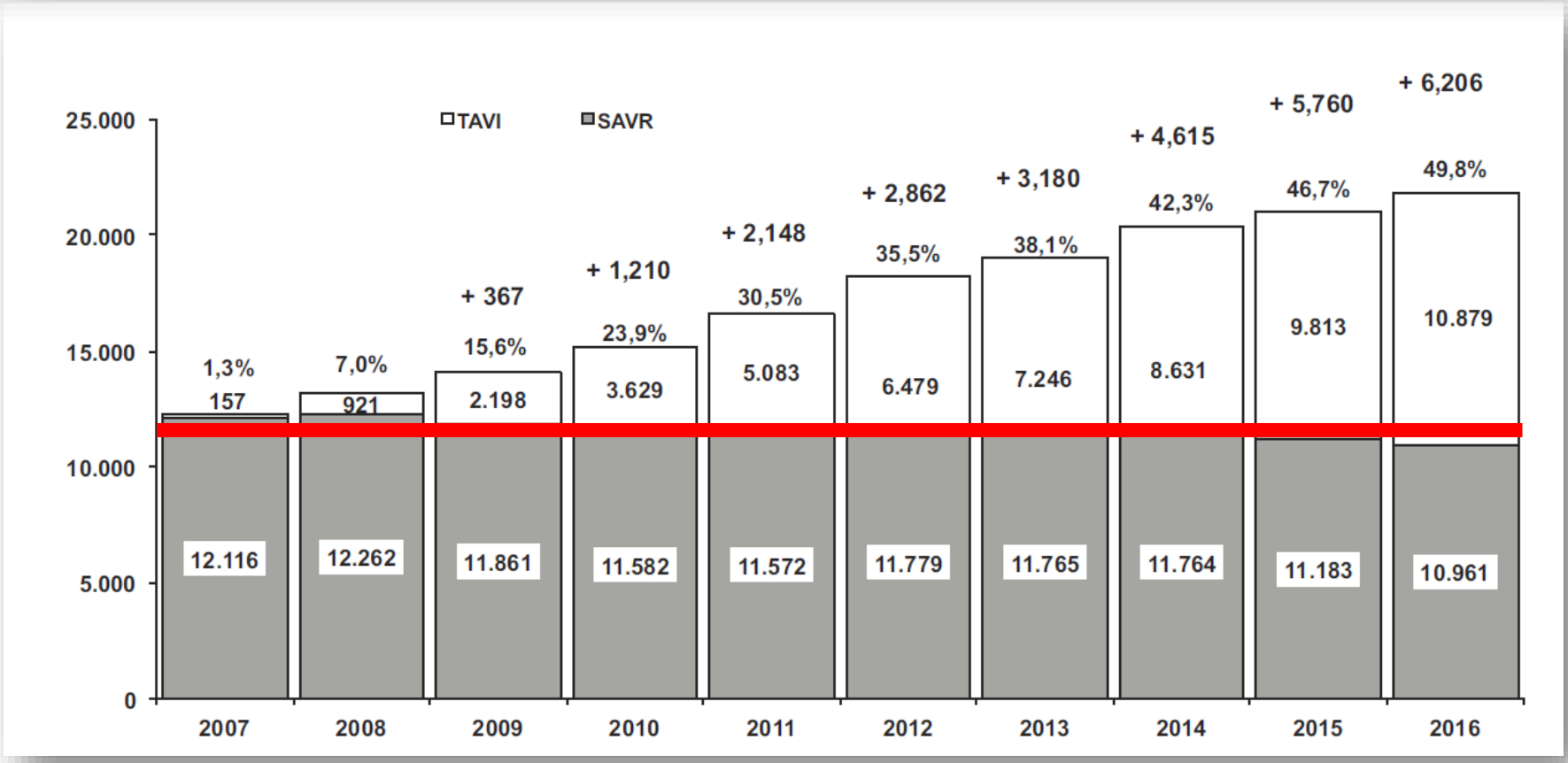
Authors/Task Force Members: Helmut Baumgartner* (ESC Chairperson) (Germany), Volkmar Falk*† (EACTS Chairperson) (Germany), Jeroen J. Bax (The Netherlands), Michele De Bonis‡ (Italy), Christian Hamm (Germany), Per Johan Holm (Sweden), Bernard Iung (France), Patrizio Lancellotti (Belgium), Emmanuel Lansac‡ (France), Daniel Rodriguez Munoz (Spain), Raphael Rosenhek (Austria), Johan Sjögren‡ (Sweden), Pilar Tornos Mas (Spain), Alec Vahanian (France), Thomas Walther‡ (Germany), Olaf Wendler‡ (UK), Stephan Windecker (Switzerland), Jose Luis Zamorano (Spain)

Document Reviewers: Marco Roffi (CPG Review Coordinator) (Switzerland), Ottavio Alfieri‡ (EACTS Review Coordinator) (Italy), Stefan Agewall (Norway), Anders Ahlsson‡ (Sweden), Emanuele Barbato (Italy), Hector Bueno (Spain), Jean-Philippe Collet (France), Ioan Mircea Coman (Romania), Martin Czerny (Germany), Victoria Delgado (The Netherlands), Donna Fitzsimons (UK), Thierry Folliguet‡ (France),

With these new guidelines more patients will benefit from TAVI

- TAVI is now a class I indication for patients at increased surgical risk
  (STS or EuroSCORE II ≥ 4% or logistic EuroSCORE I ≥10%)
- TAVI can be considered in patients ≥75 years, or with previous cardiac surgery,
  or frail or with expected prosthesis-patient mismatch.
- Transcatheter valve-in-valve implantation in aortic position is a class 2 indication

German Heart Surgery Report 2016: The Annual Updated Registry of the German Society for Thoracic and Cardiovascular Surgery



Beckmann A. et al. German Heart Surgery Report 2016: The Annual Updated Registry of the GermanSociety for Thoracic and Cardiovascular Surgery. Thorac Cardiovasc Surg. 2017 Oct;65(7):505-518. doi: 10.1055/s-0037-1606603. **Epub2017 Sep 13.**

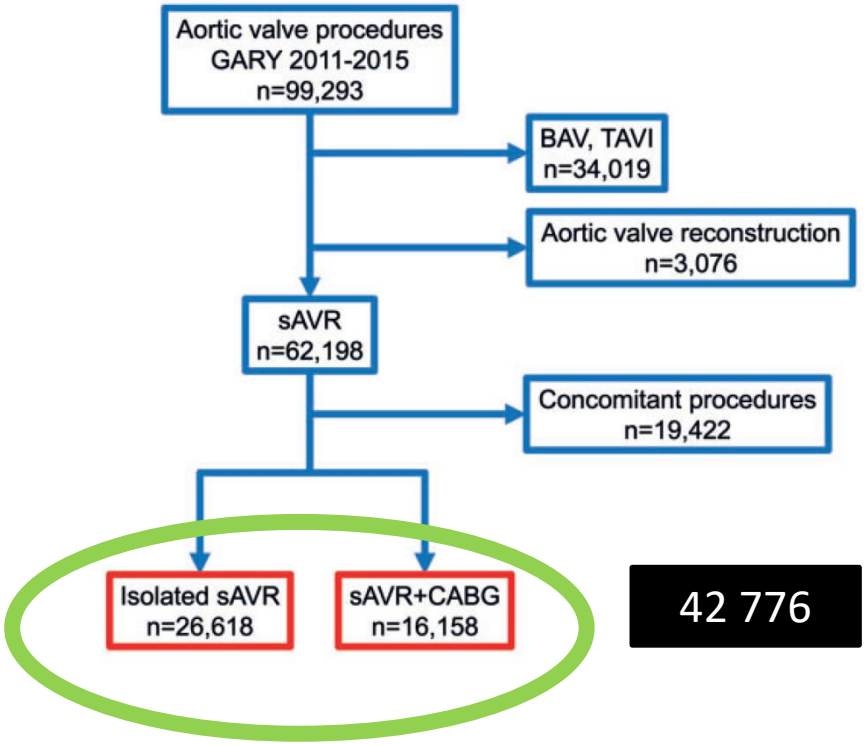
European Journal of Cardio-Thoracic Surgery 53 (2018) 552–559
doi:10.1093/ejcts/ezx408 Advance Access publication 27 November 2017

GARY UPDATE

ORIGINAL ARTICLE

TAVI pozitivně ovlivňuje výsledky SAVR

Trends in practice and outcomes from 2011 to 2015 for surgical aortic valve replacement: an update from the German Aortic Valve Registry on 42 776 patients



42 776

Ø věk:	72 let
ØSTS PROM:	2,3%

Mortalita:	**2,3%**
CMP:	1,3%
AR ≥ 2°	0,4%
PM:	3,9%

STS:	2,4% – 2,2% (p< 0,001)
PH:	9,1% – 3,2% (p< 0,001)
MR≥2°:	10,6% - 7,6% (p< 0,001)
NYHA 3-4:	65% - 59% (p< 0,001)

European Journal of Cardio-Thoracic Surgery 53 (2018) 306–308
doi:10.1093/ejcts/ezx389

Cite this article as: Bonow RO, Brown AS, Gillam LD, Kapadia SR, Kavinsky CJ, Lindman BR, *et al*. ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 appropriate use criteria for the treatment of patients with severe aortic stenosis: a report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, European Association for Cardio-Thoracic Surgery, Heart Valve Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Thoracic Surgeons. Eur J Cardiothorac Surg 2018;53:306–8.

ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate use criteria for the treatment of patients with severe aortic stenosis

A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, European Association for Cardio-Thoracic Surgery, Heart Valve Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Thoracic Surgeons

95 klinických situací u pacientů s AS

ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate use criteria for the treatment of patients with severe aortic stenosis

Table 4: Symptomatic, high-gradient, severe AS[a] with associated CAD

Indication		Appropriate use median score (1–9)				
		TAVR	TAVR + PCI	SAVR	SAVR + PCI	SAVR + CABG
55.	• 1- or 2-vessel CAD, no proximal LAD involvement • High or intermediate surgical risk	A (7)	A (7)	M (4)	M (4)	A (7)
56.	• 1- or 2-vessel CAD, no proximal LAD involvement • Low surgical risk	R (3)	R (3)	M (6)	M (5)	A (8)
57.	• 1- or 2-vessel CAD, including proximal LAD • High or intermediate surgical risk	M (4)	A (7)	R (3)	M (4)	A (7)
58.	• 1- or 2-vessel CAD, including proximal LAD • Low surgical risk	R (2)	R (3)	R (3)	R (3)	A (9)
59.	• 3-vessel disease; SYNTAX <22 • High or intermediate surgical risk	M (4)	A (7)	R (3)	M (4)	A (7)
60.	• 3-vessel disease; SYNTAX <22 • Low surgical risk	R (2)	R (3)	R (2)	M (4)	A (9)
61.	• 3-vessel disease; SYNTAX ≥22 • High or intermediate surgical risk	R (3)	M (6)	R (3)	M (4)	A (7)
62.	• 3-vessel disease; SYNTAX ≥22 • Low surgical risk	R (1)	R (2)	R (2)	R (3)	A (9)
63.	• Left main; SYNTAX <33 • High or intermediate surgical risk	R (2)	A (7)	R (2)	R (3)	A (8)
64.	• Left main; SYNTAX <33 • Low surgical risk	R (1)	R (2)	R (2)	R (3)	A (9)
65.	• Left main; SYNTAX ≥33 • High or intermediate surgical risk	R (2)	M (6)	R (2)	R (3)	A (8)
66.	• Left main; SYNTAX ≥33 • Low surgical risk	R (1)	R (2)	R (1)	R (2)	A (9)

ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate use criteria for the treatment of patients with severe aortic stenosis

Indication		Appropriate use median score (1–9)					
		BAV (as bridge to decision)	TAVR alone	TAVR + PBMV	TAVR + mitraClip	SAVR alone	SAVR + other valve or ascending aortic surgery or myectomy
Symptomatic AS and mitral valve disease							
67.	• Severe symptomatic AS • Severe primary MR • High surgical risk	M (4)	M (4)		M (6)	R (3)	A (7)
68.	• Severe symptomatic AS • Severe primary MR • Intermediate surgical risk	R (2)	R (3)		R (3)	R (3)	A (8)
69.	• Severe symptomatic AS • Severe primary MR • Low surgical risk	R (1)	R (1)		R (2)	R (2)	A (9)
70.	• Severe symptomatic AS • Severe secondary MR • High surgical risk	M (4)	M (5)		M (5)	M (4)	A (7)
71.	• Severe symptomatic AS • Severe secondary MR • Intermediate surgical risk	R (3)	M (4)		M (4)	R (3)	A (8)
72.	• Severe symptomatic AS • Severe secondary MR • Low surgical risk	R (1)	R (1)		R (2)	R (3)	A (9)
73.	• Severe symptomatic AS • Severe rheumatic MS (no absolute contraindications to MBV) • High surgical risk	M (4)	M (4)	A (7)		R (3)	A (7)
74.	• Severe symptomatic AS • Severe calcific MS or severe rheumatic MS (with absolute contraindications to MBV) with extensive mitral annular calcification • High surgical risk	M (4)	M (5)	R (2)		R (3)	A (7)

ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate use criteria for the treatment of patients with severe aortic stenosis

Indication		Appropriate use median score (1–9)					
		BAV (as bridge to decision)	TAVR alone	TAVR + PBMV	TAVR + mitraClip	SAVR alone	SAVR + other valve or ascending aortic surgery or myectomy
Symptomatic AS and tricuspid valve disease							
75.	• Severe symptomatic AS • Severe secondary TR • Dilated right ventricle and/or tricuspid valve annulus ≥40 mm • Minimal to no right ventricular dysfunction • Minimal pulmonary hypertension • Intermediate surgical risk	R (2)	M (5)			R (3)	A (8)
76.	• Severe symptomatic AS • Severe secondary TR • Dilated right ventricle and/or tricuspid valve annulus ≥40 mm • Moderate-to-severe right ventricular dysfunction • Minimal pulmonary hypertension • Intermediate surgical risk	R (2)	M (5)			R (3)	A (7)
77.	• Severe symptomatic AS • Severe secondary TR • Dilated right ventricle and/or tricuspid valve annulus ≥40 mm • Moderate-to-severe right ventricular dysfunction • Severe pulmonary hypertension • High surgical risk	M (4)	A (7)			R (2)	M (5)

ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate use criteria for the treatment of patients with severe aortic stenosis

	Indication	BAV (as bridge to decision)	TAVR alone	TAVR + PBMV	TAVR + mitraClip	SAVR alone	SAVR + other valve or ascending aortic surgery or myectomy
Symptomatic AS, bicuspid aortic valve, and ascending aorta							
78.	• Severe symptomatic AS • Bicuspid aortic valve • High surgical risk • Ascending aorta <4.5 cm	R (2)	M (5)			A (7)	M (5)
79.	• Severe symptomatic AS • Bicuspid aortic valve • High surgical risk • Ascending aorta ≥4.5 cm	R (2)	M (4)			R (3)	A (8)
80.	• Severe symptomatic AS • Bicuspid aortic valve • Intermediate surgical risk • Ascending aorta <4.5 cm	R (1)	R (3)			A (7)	M (5)
81.	• Severe symptomatic AS • Bicuspid aortic valve • Intermediate surgical risk • Ascending aorta ≥4.5 cm	R (1)	R (2)			R (3)	A (8)
82.	• Severe symptomatic AS • Bicuspid aortic valve • Low surgical risk • Ascending aorta <4.5 cm	R (1)	R (2)			A (8)	M (5)
83.	• Severe symptomatic AS • Bicuspid aortic valve • Low surgical risk • Ascending aorta ≥4.5 cm	R (1)	R (1)			R (2)	A (9)
Symptomatic AS, basal septal hypertrophy, flow acceleration, and narrowed LVOT							
84.	• Symptomatic severe AS • Prominent basal septal hypertrophy with flow acceleration and narrowing in the LVOT • High or intermediate surgical risk	R (3)	M (6)			M (4)	A (7)
85.	• Symptomatic severe AS • Prominent basal septal hypertrophy with flow acceleration and narrowing in the LVOT • Low surgical risk	R (1)	R (3)			M (4)	A (8)

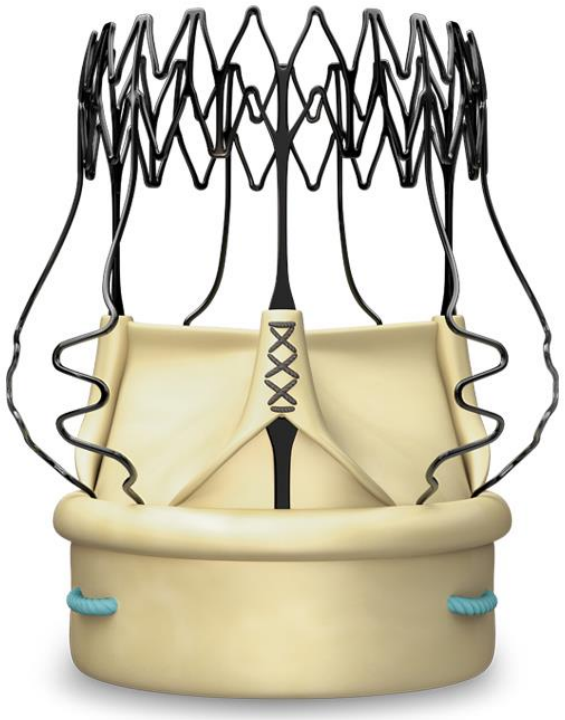
TAVI versus SAVR

Table 7: Failing aortic valve bioprosthesis

	Indication	Appropriate use median score (1-9)		
		BAV	TAVR	SAVR
90.	• Severe symptomatic AS or AR • Degenerative surgical bioprosthesis—size ≥23 mm • High surgical risk	R (1)	A (8)	A (7)
91.	• Severe symptomatic AS or AR • Degenerative surgical bioprosthesis—size ≥23 mm • Intermediate surgical risk	R (1)	A (7)	A (8)
92.	• Severe symptomatic AS or AR • Degenerative surgical bioprosthesis—size 21 mm • High surgical risk	R (1)	M (6)	A (7)
93.	• Severe symptomatic AS or AR • Degenerative surgical bioprosthesis—size 21 mm • Intermediate surgical risk	R (1)	M (5)	A (8)
94.	• Severe symptomatic AS or AR • Degenerative surgical bioprosthesis—size ≤19 mm • High surgical risk	R (1)	M (5)	A (7)
95.	• Severe symptomatic AS or AR • Degenerative surgical bioprosthesis—size ≤19 mm • Intermediate surgical risk	R (1)	R (3)	A (8)

ACC/AATS/AHA/ASE/EACTS/HVS/SCA/SCAI/SCCT/SCMR/STS 2017 Appropriate use criteria for the treatment of patients with severe aortic stenosis

RDP – BEZSTEHOVÉ CHLOPNĚ



Perceval, LIVANOVA

Edwards Intuity

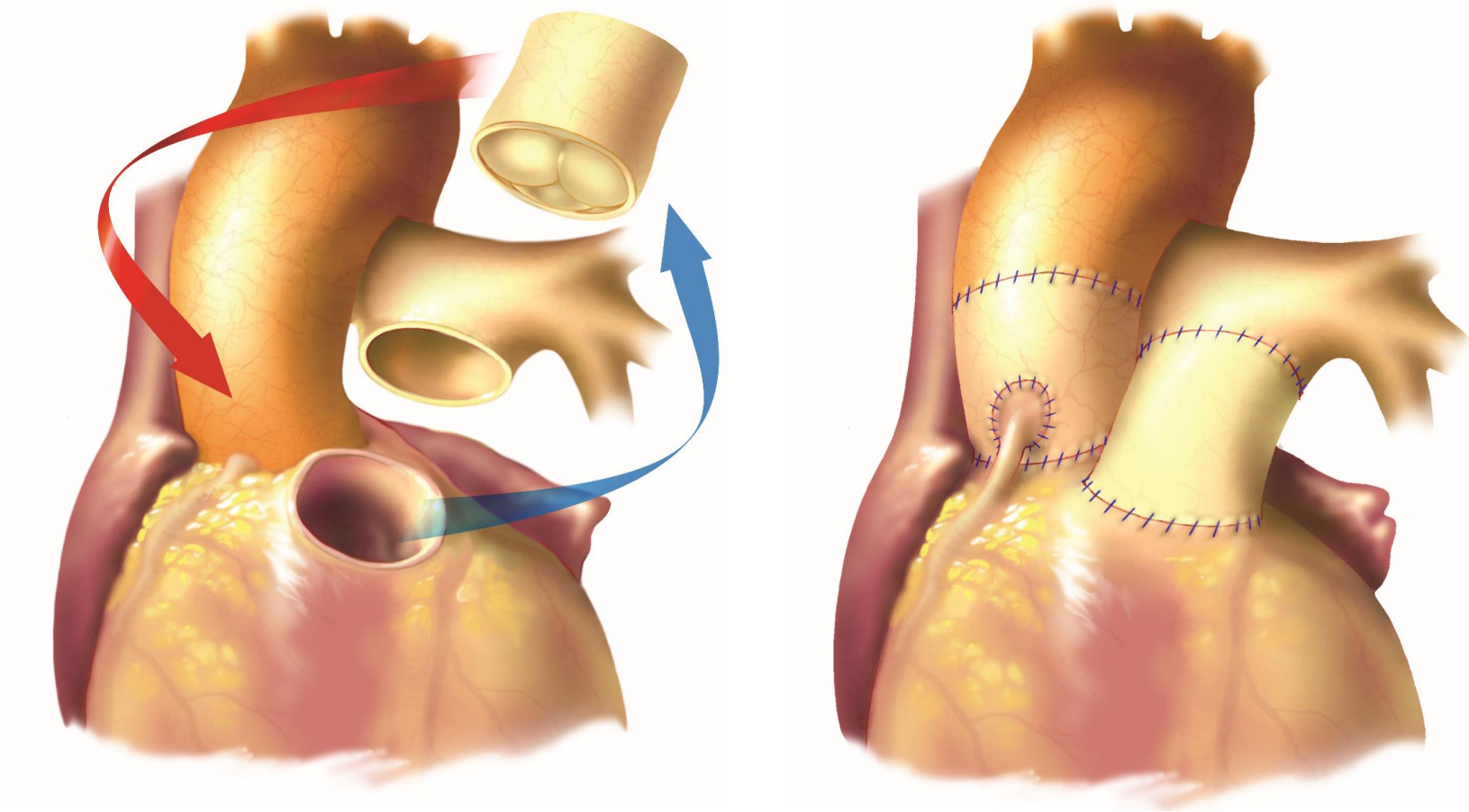
Mini AVR

Right Anterior Thoracotomy

Hemi-sternotomy

A Randomized Multicenter Trial of Minimally Invasive Rapid Deployment Versus Conventional Full Sternotomy Aortic Valve Replacement

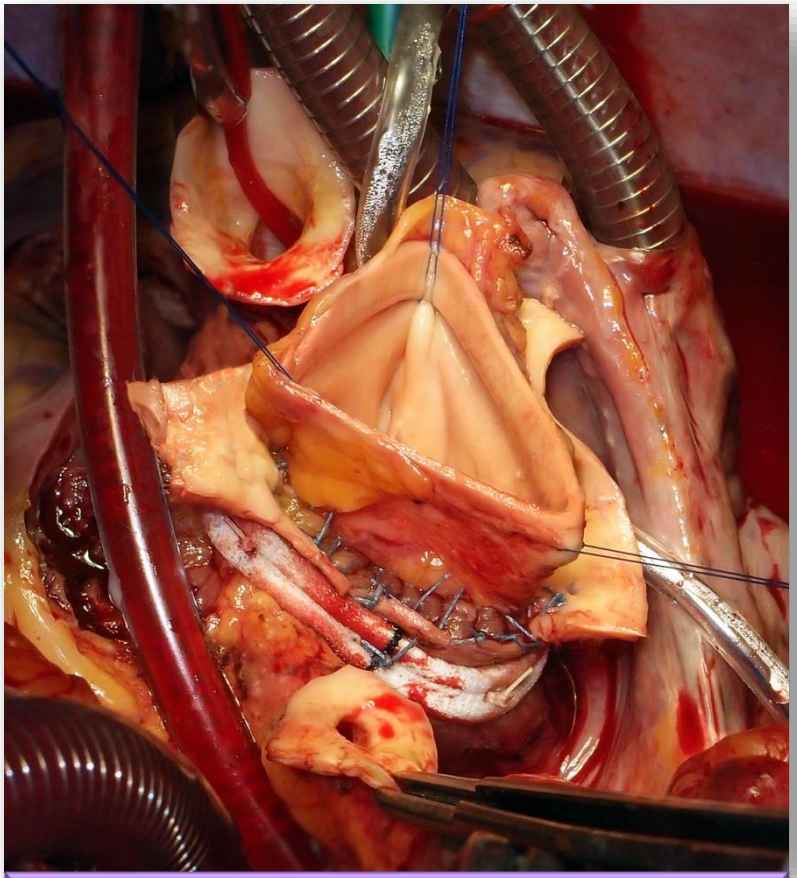
ROSSOVA OPERACE



ROSSOVA OPERACE

Výhody

„Living valve“
Potenciál růstu
Není antikoagulace
Bez krvácivých komplikací
Bez TEK
Odolnost vůči infekce



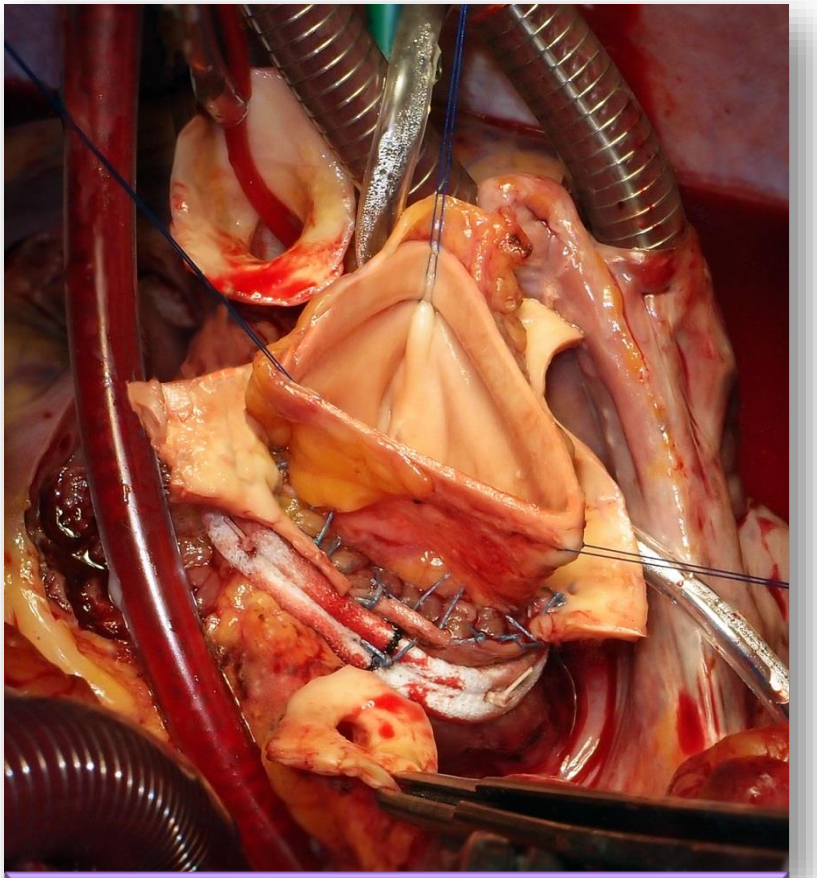
Pulmonální autograft v aortální pozici

ROSSOVA OPERACE

Nevýhody

Komplexní výkon
Vyšší riziko
Riziko reoperace PA + PH

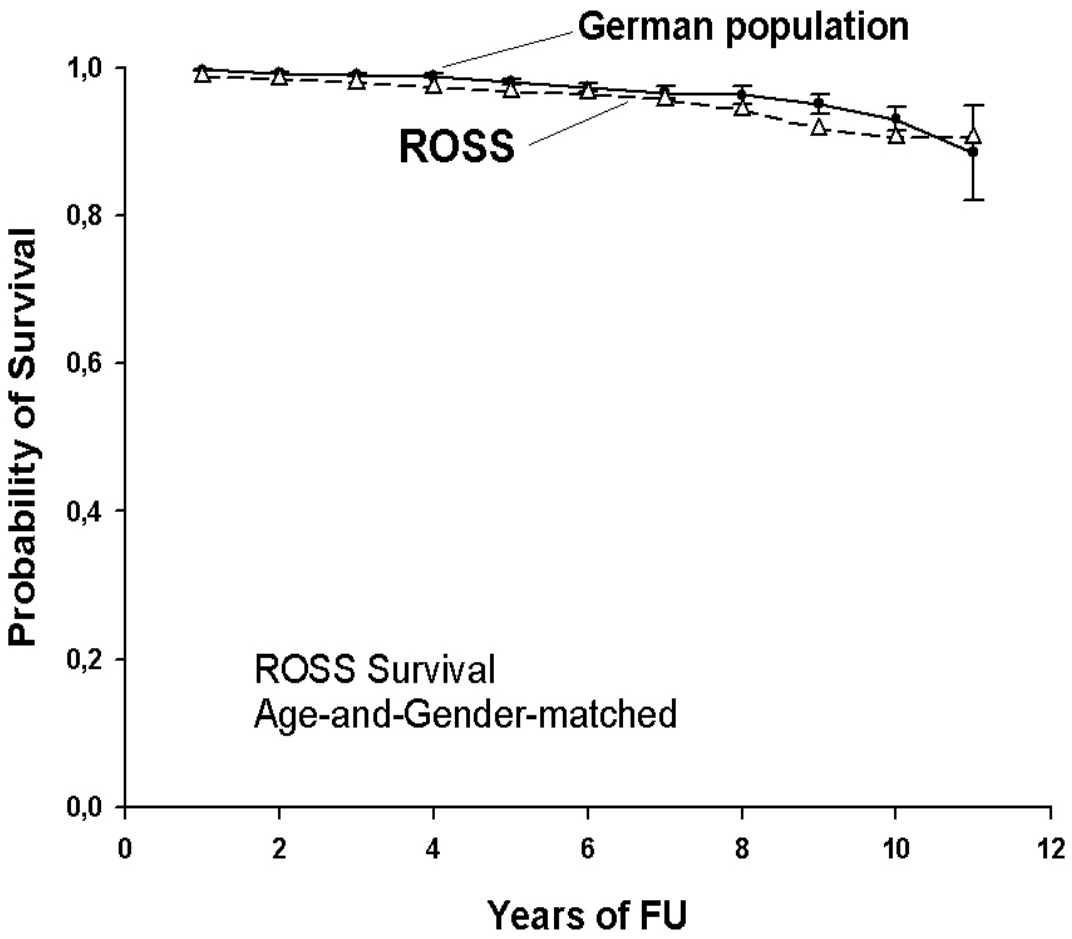
10% během 10 let



Pulmonální autograft v aortální pozici

Dlouhodobé přežívání po Rossově operaci

German-Dutch Ross Registry



QoL after the Ross procedure

Zacek *et al. BMC Cardiovascular Disorders* (2016) 16:63
DOI 10.1186/s12872-016-0236-0

BMC Cardiovascular Disorders

RESEARCH ARTICLE Open Access

Quality of life after aortic valve repair is similar to Ross patients and superior to mechanical valve replacement: a cross-sectional study

Pavel Zacek[1*†], T. Holubec[2†], M. Vobornik[1], J. Dominik[1], J. Takkenberg[3], J. Harrer[1] and J. Vojacek[1]

ORIGINAL RESEARCH ARTICLE

Long-Term Outcomes of the Ross Procedure Versus Mechanical Aortic Valve Replacement

Propensity-Matched Cohort Study

T. DAVID, Circulation, August 2016

258 Ross X 1444mech AVR; operated by TD; 208 pairs; Ø FU: 14±6 years

In the Ross group

BETTER SURVIVAL

LOWER INCIDENCE OF VALVE RELATED COMPLICATIONS

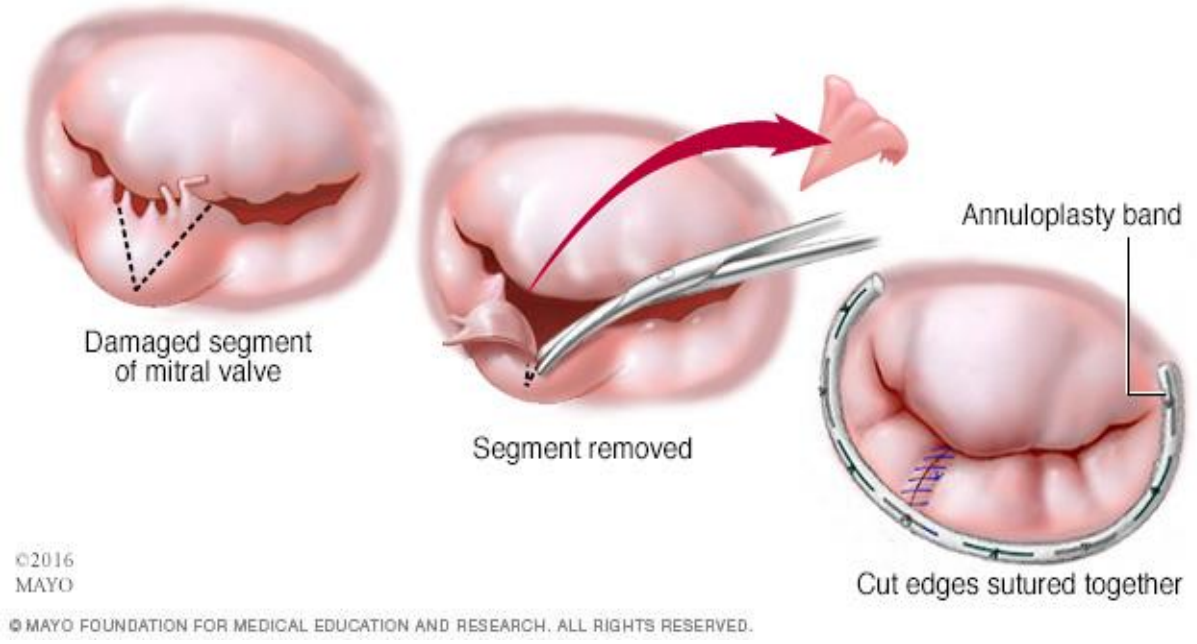
SAME RISK OF REOPERATION

Rosssova operace - indikace

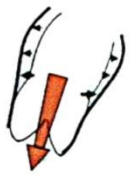
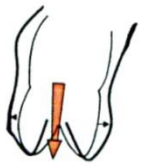
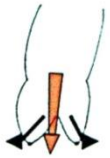
WARFARIN!

Chirurgická léčba aortální regurgitace

Plastiky aortální chlopně

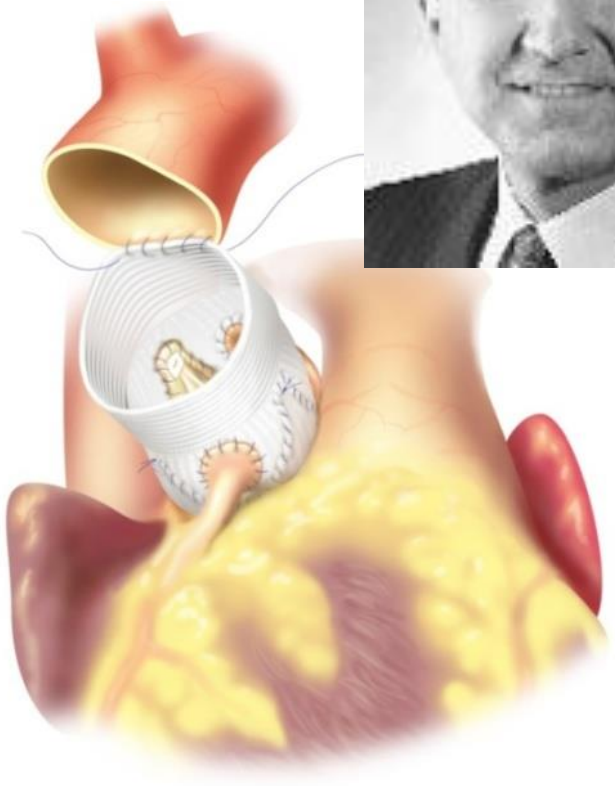


Plastiky aortální chlopně a etiologie AR

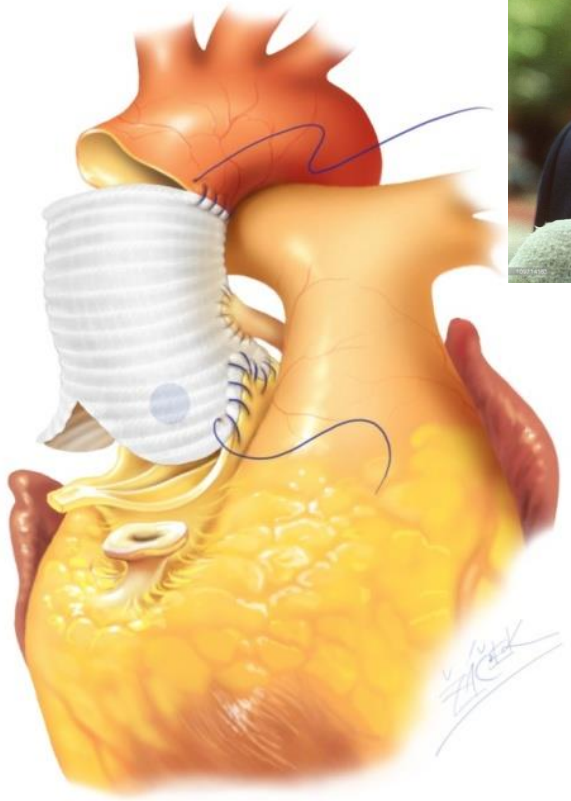
Typ aortální regurgitace z hlediska záchovných operací	Typ I				Typ II	Typ III
	Ia	Ib	Ic	Id	Prolaps cípu	Restrikce cípu
Mechanizmus						
Operační technika	**Zmenšení průměru STJ**	**Náhrada kořene aorty se zachováním chlopně**	**Zmenšení aortálního anulu**	**Uzávěr defektu**	**Plastika prolapsu**	**Plastika cípu**
	náhrada vzestupné aorty plikace STJ	reimplantace nebo remodelace	subkomisurální plikace aortálního anulu	perikardiální záplata cípu	plikace cípu vyztužení volného okraje goretexovým stehem triangulární resekce	dekalcifikace perikardiální záplata

ElKhoury et al

Plastiky a záchovné operace aortální chlopně

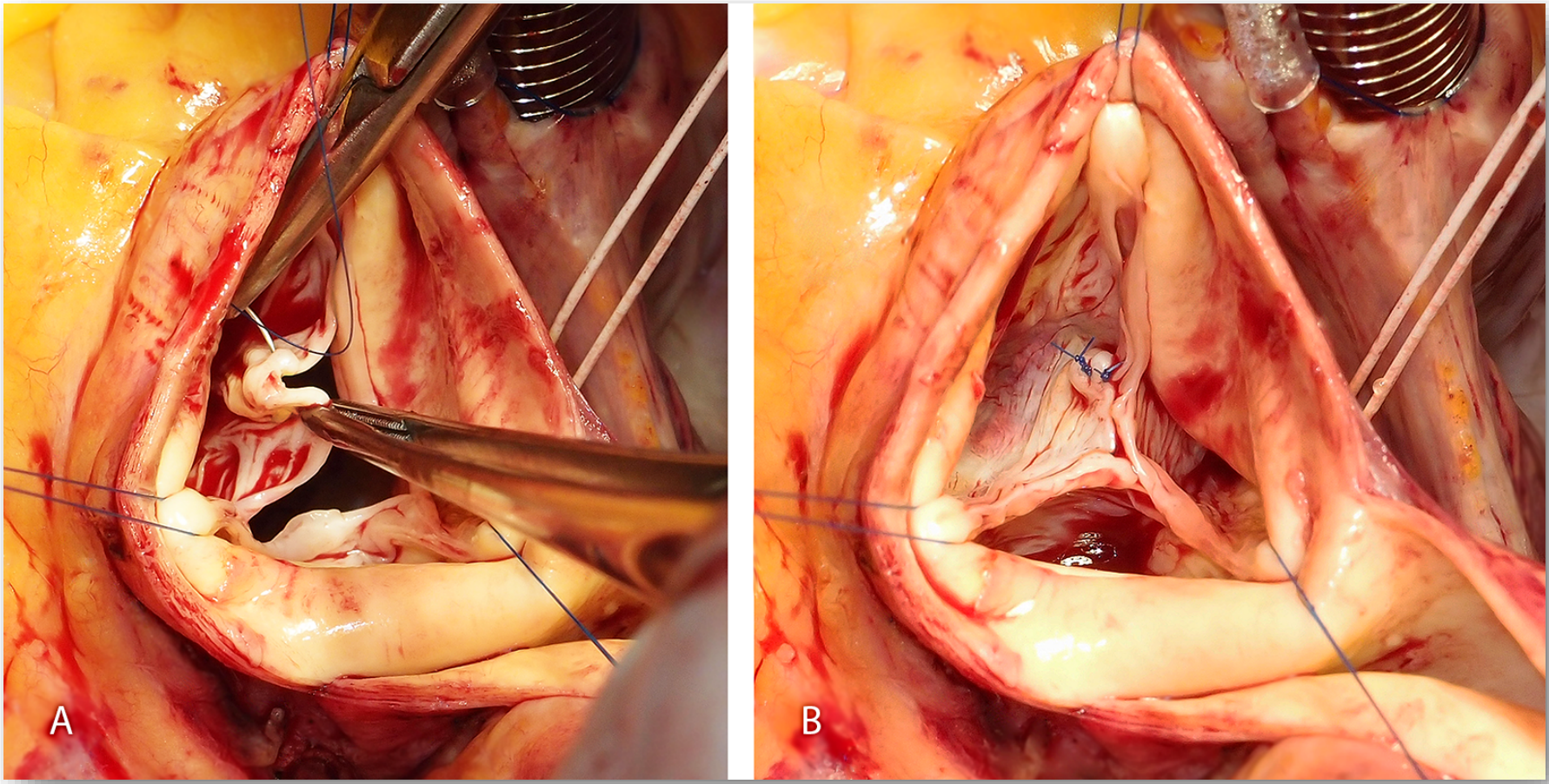


David procedure - 1994



Yacoub procedure - 1983

Plastiky a záchovné operace aortální chlopně



Dlouhodobé výsledky plastik aortální chlopně

Table 2. Linearized Occurrence Rates of Late Outcome Events

Pooled Late Outcome Events	LOR + 95% CI	Heterogeneity (I^2)	Included Studies (n)
Late mortality	1.53 (1.19–1.96)	82.6	31
Reoperation on aortic valve	1.32 (1.0–1.74)	72.3	31
Hemorrhage	0.23 (0.13–0.42)	78.7	26
Thromboembolism	0.41 (0.22–0.77)	27.6	26
Endocarditis	0.23 (0.11–0.51)	0.00	30
MAVRE	1.66 (1.24–2.23)	100	20

Kumulativní riziko krvácení a TE = 6% během 10 let

Arabkhani et al. Reported Outcome After Valve-Sparing Aortic Root Replacement for Aortic Root Aneurysm: A Systematic Review and Meta-Analysis. Ann Thorac Surg 2015 Sep;100(3):1126-31.

Dlouhodobé výsledky plastik aortální chlopně

Table 2. Linearized Occurrence Rates of Late Outcome Events

Pooled Late Outcome Events	LOR + 95% CI	Heterogeneity (I^2)	Included Studies (n)
Late mortality	1.53 (1.19–1.96)	82.6	31
Reoperation on aortic valve	1.32 (1.0–1.74)	72.3	31
Hemorrhage	0.23 (0.13–0.42)	78.7	26
Thromboembolism	0.41 (0.22–0.77)	27.6	26
Endocarditis	0.23 (0.11–0.51)	0.00	30
MAVRE	1.66 (1.24–2.23)	100	20

Riziko reoperace: 13% během 10 let

Arabkhani et al. Reported Outcome After Valve-Sparing Aortic Root Replacement for Aortic Root Aneurysm: A Systematic Review and Meta-Analysis. Ann Thorac Surg 2015 Sep;100(3):1126-31.

European Journal of Cardio-Thoracic Surgery 52 (2017) 616–664
doi:10.1093/ejcts/ezx324 Advance Access publication 26 August 2017

2017 ESC/EACTS Guidelines for the management of valvular heart disease

The Task Force for the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Recommendations for surgical techniques in aortic disease

Recommendations	Class[a]	Level[b]	Ref.[c]
Cerebrospinal fluid drainage is recommended in surgery of the thoraco-abdominal aorta, to reduce the risk of paraplegia.	I	B	126–127
Aortic valve repair, using the re-implantation technique or remodelling with aortic annuloplasty, is recommended in young patients with aortic root dilation and tricuspid aortic valves.	I	C	

EUROPEAN SOCIETY OF CARDIOLOGY®

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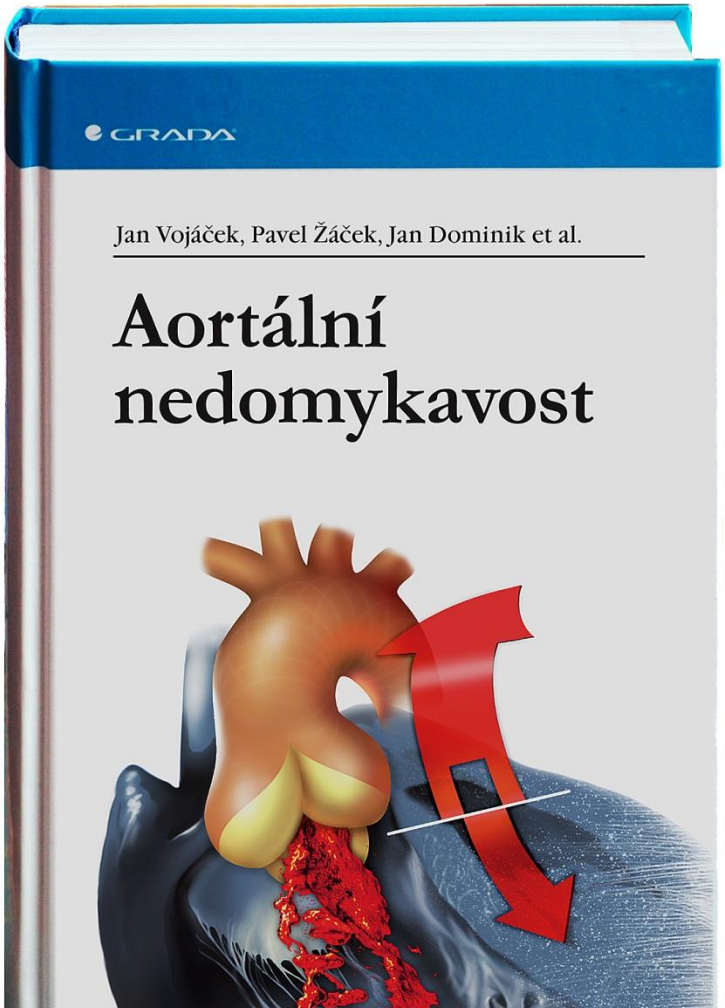
2017 ESC/EACTS Guidelines for the management of valvular heart disease

The Task Force for the M… European Society of Cardiology (ESC) and … ic Surgery (EACTS)



Heart Team discussion i… patients[C] in whom aortic … alternative to valve repla…

I	C

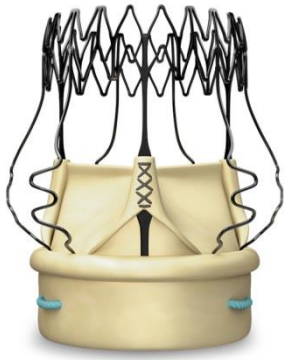
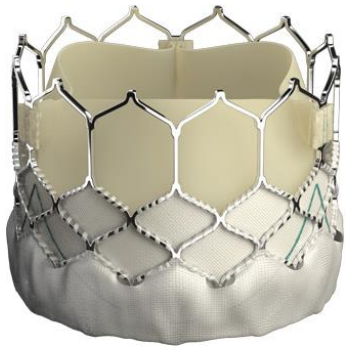
[C]Patients with plia… cuspid valves who have a type I (enlar… ormal cusp motion) or type II (cusp pro… gitation [6, 48, 49].

Závěry

58 let od první AVR

Standardizovaný výkon, vynikající výsledky



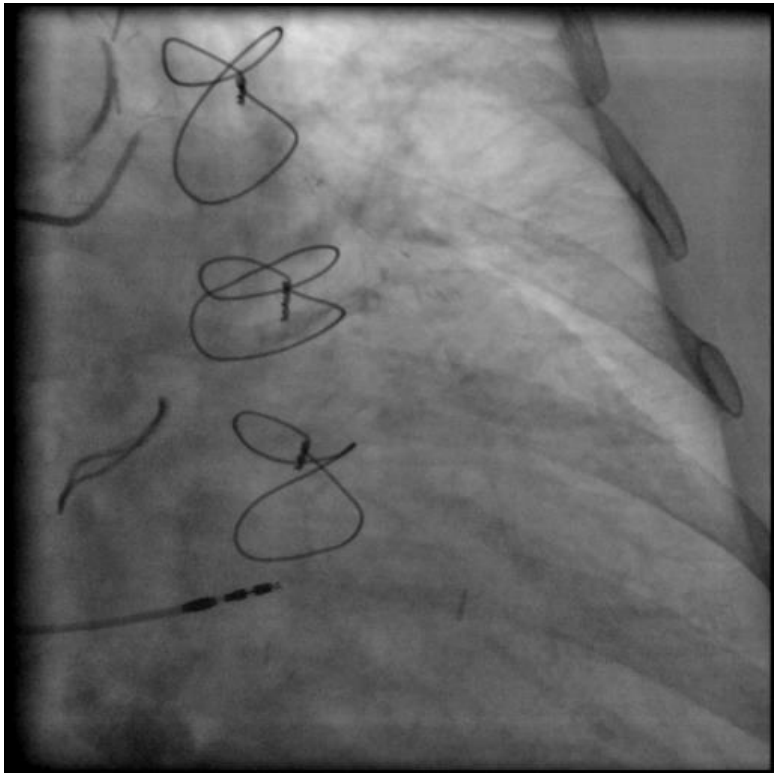
Harmonious
Evaluation of
Advanced
ca**R**diac
Therapeutics

Together
Everyone
Achieves
More

Pacientka 74 let, polymorbidní
2013: bioAVR (21mm), CABG 3x (LIMA-RIA, VSM-RMS1 + 2)

2018: plicní edém, NYHA IV, dysfunkce bioprotézy

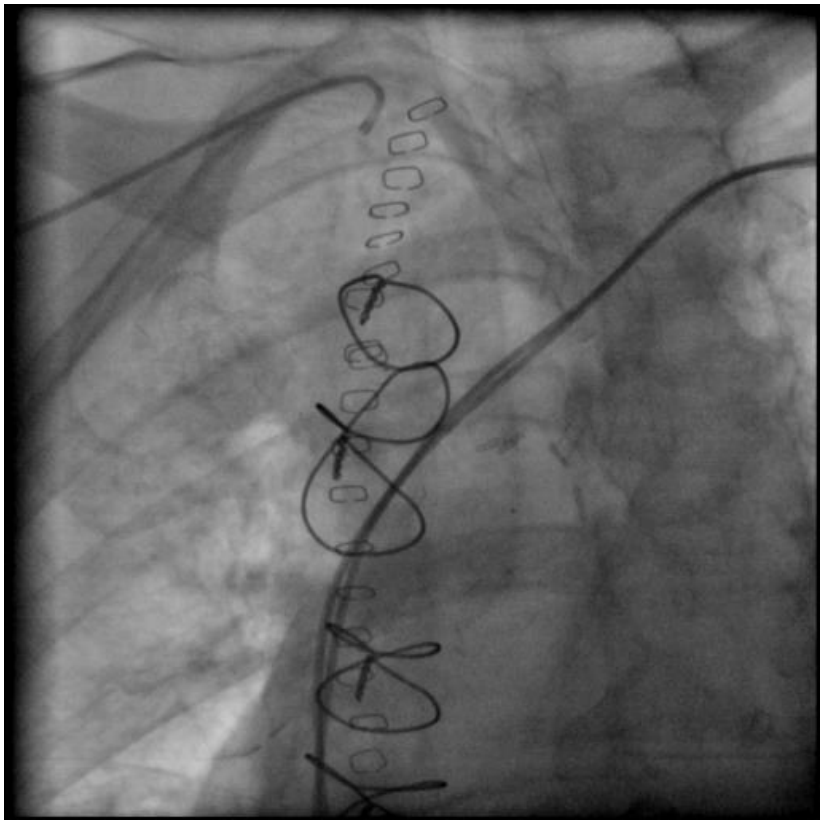
ES2=19%, frailty, kandidátka na **TAVI - ViV**



HEART TEAM: velmi nízké odstupy ACS a ACD
(ověřeno na CT)

HEART TEAM: „vysoké riziko uzávěru věnčitých tepen“

HEART TEAM:
1. OPCABG: RIMA-ACD
2. TAVI - ViV



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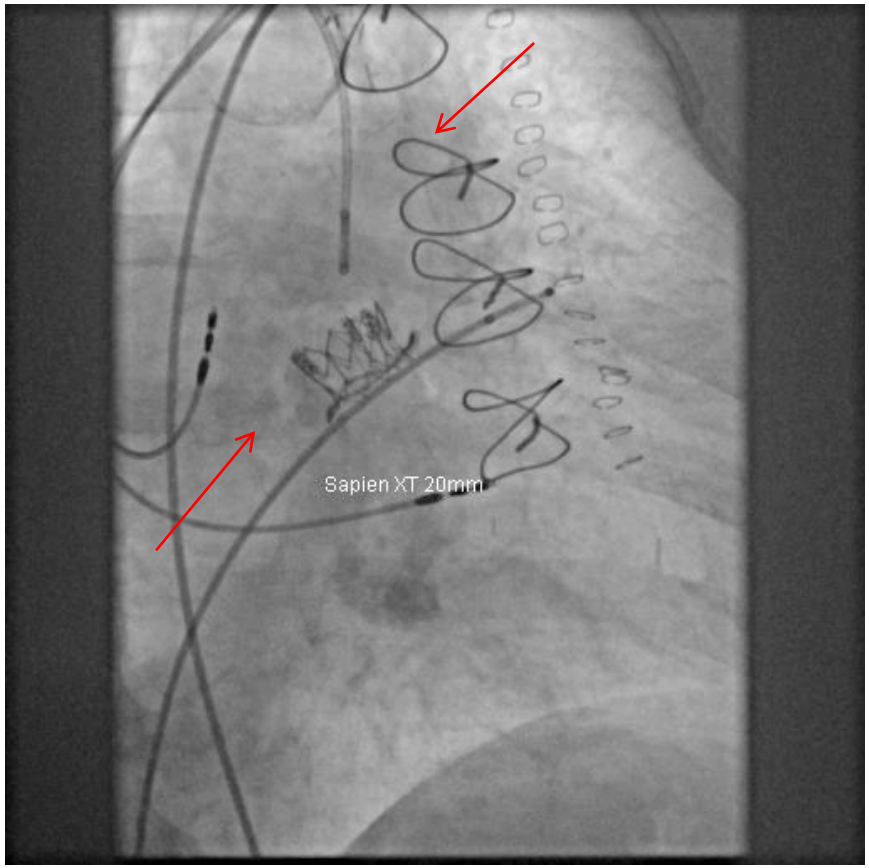

Are we dinosaurs?☺