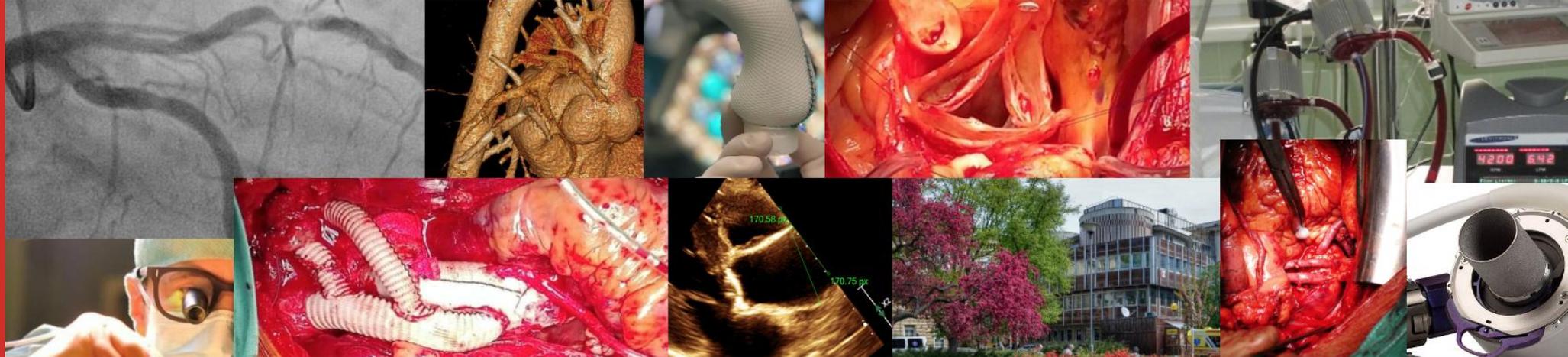




Centrum  
kardiovaskulární  
a transplantační  
chirurgie



# AORTÁLNÍ REGURGITACE A ONEMOCNĚNÍ AORTY A jak je můžeme léčit?

*Petr Fila*  
CKTCH Brno

Co s regurgitací?

Co s aneurysmatem?

Cíl? Nahradit vs. opravit

Cíl? Zabránit dilataci/disekci!

### Concomitant surgery of the ascending aorta

Valve-sparing aortic root replacement is recommended in young patients with aortic root dilatation at experienced centres, when durable results are expected.<sup>247,250–253,255</sup>

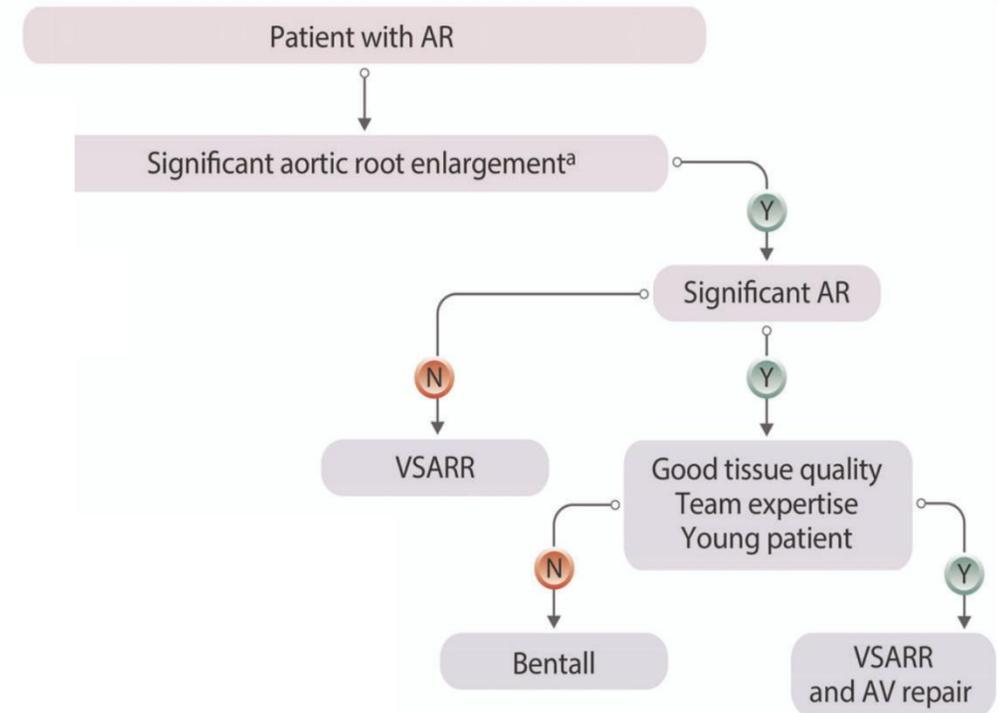
When AV surgery is indicated and the predicted surgical risk is low, replacement of the aortic root or ascending aorta should be considered if the maximal diameter is  $\geq 45$  mm.<sup>d</sup>

I

B

Ila

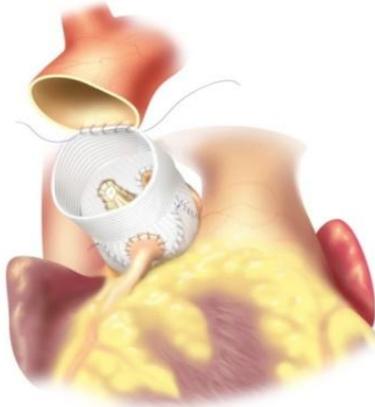
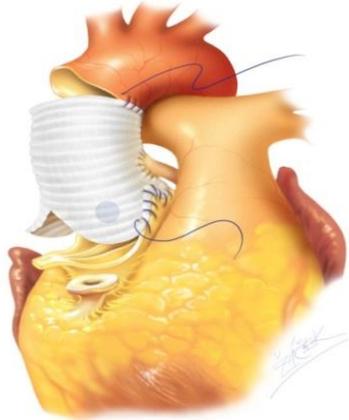
C



Co s regurgitací?

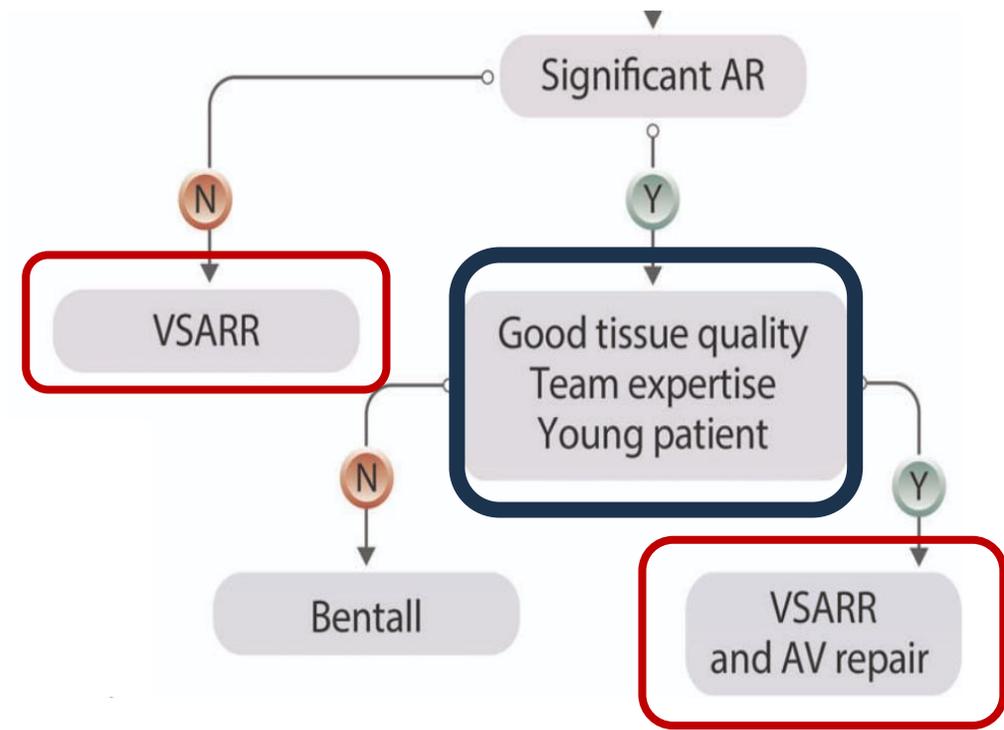
Co s aneurysmatem?

záchovné operace



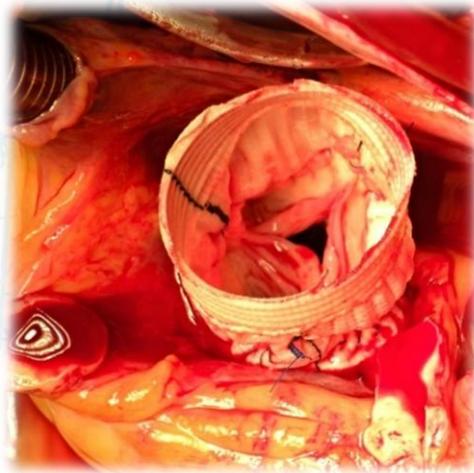
Cíl? Nahradit vs. opravit

Cíl? Zabránit dilataci/disekci!

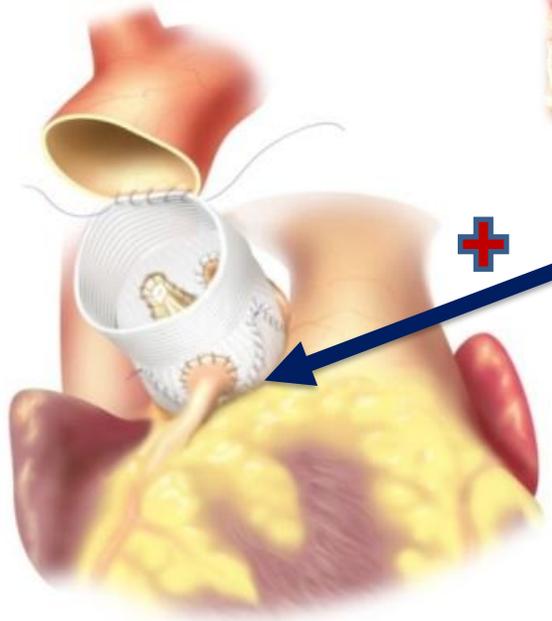
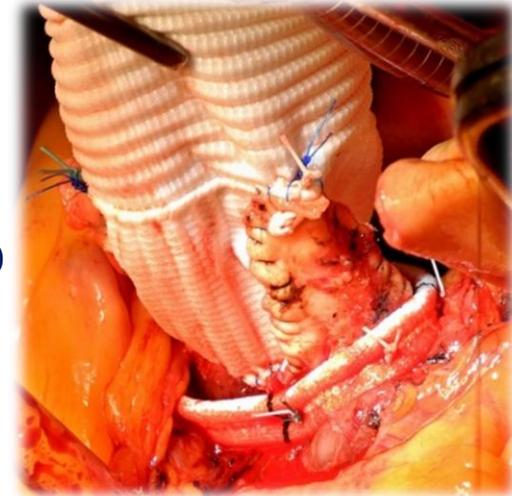


# Záchovné operace ao chlopně

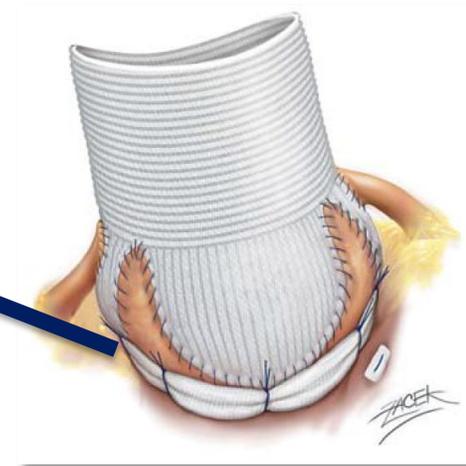
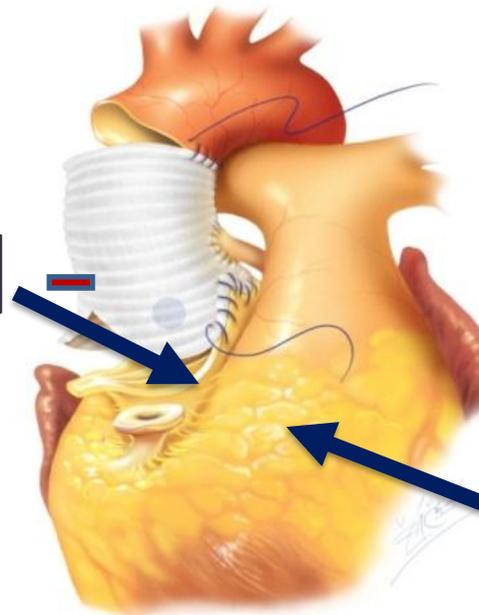
reimplantace - David



remodelace - Yacoub



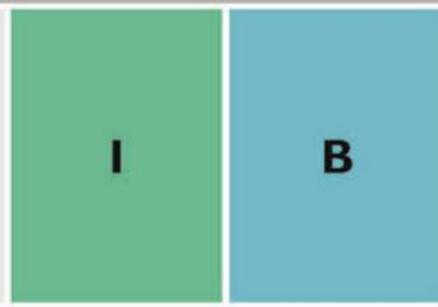
stabilizace aortálního anulu



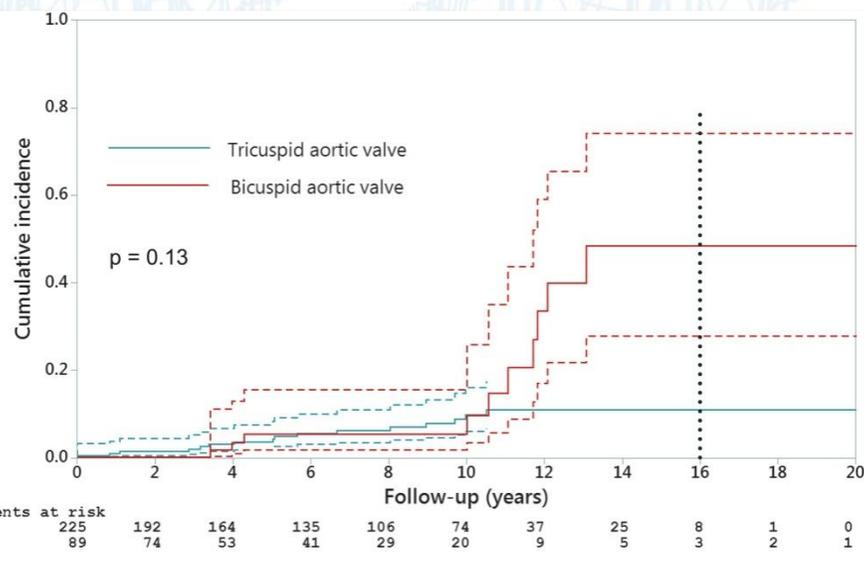
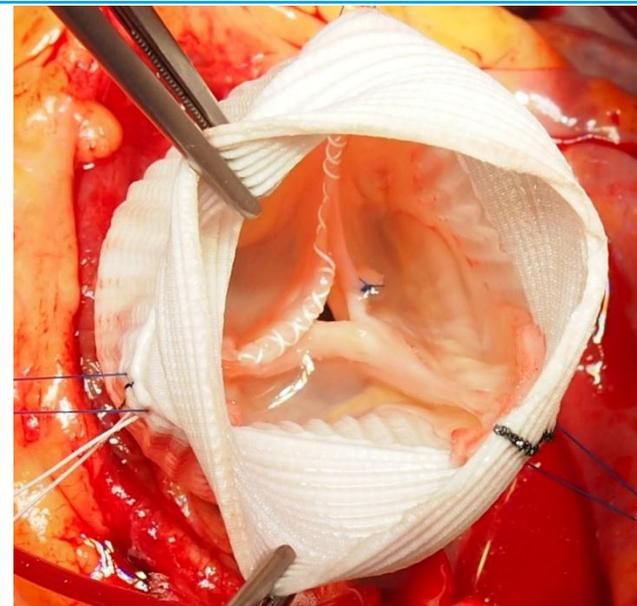
# Záchovné operace ao chlopně

Valve-sparing aortic root replacement is recommended in young patients with aortic root dilatation at experienced centres, when durable results are expected.

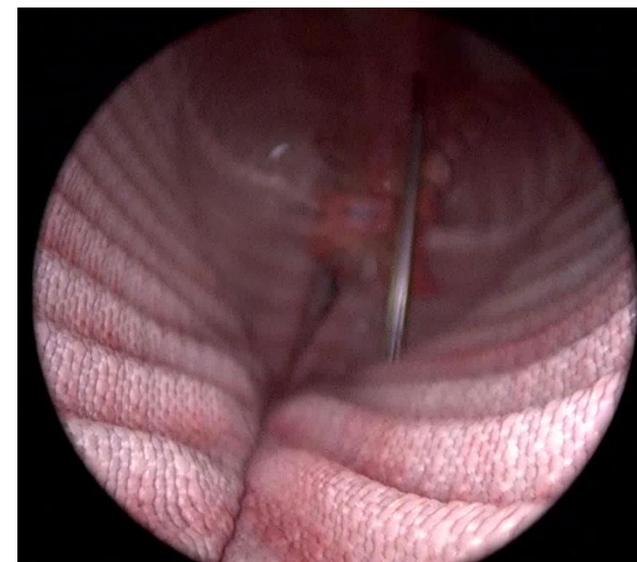
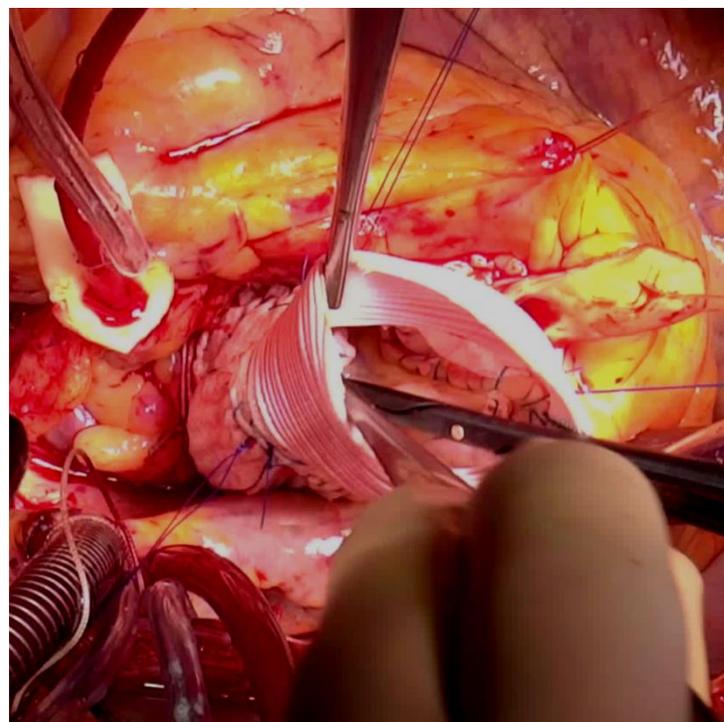
247,250–253,255



Praz F, 2025 ESC/EACTS Guidelines for the management of valvular heart disease. Eur J Cardiothorac Surg rger 2025, 67(8).



Klotz, Journal of thoracic cardiovascular surgery, 2018, 155. and4: 1403-1411. e1.



# David vs. Yacoub

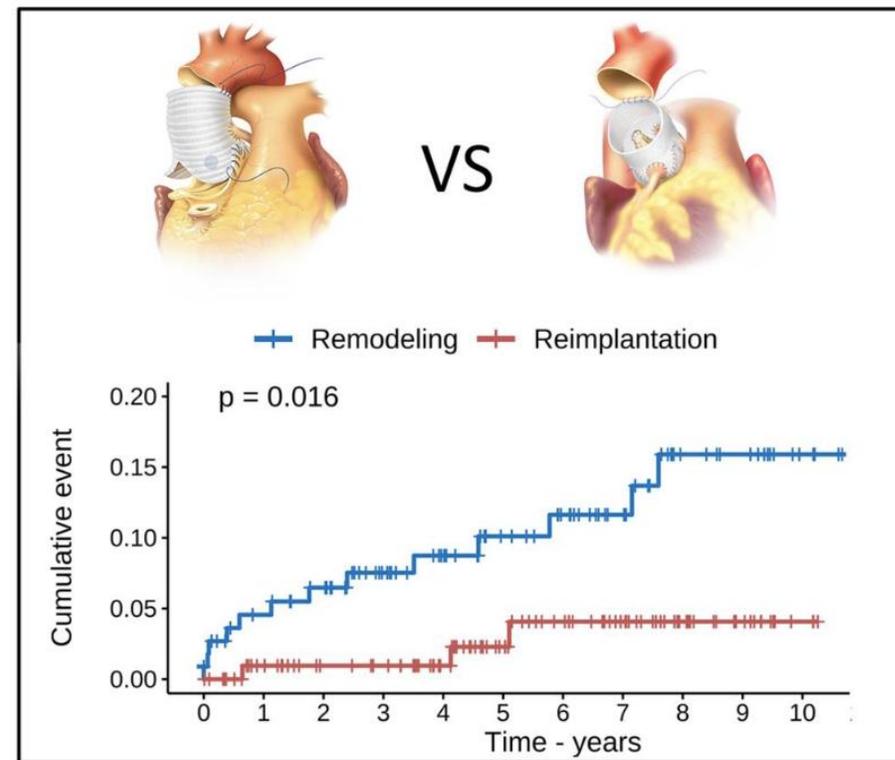
## Aortic valve performance after remodelling versus reimplantation in a propensity-matched comparison

Jan Gofus <sup>a,\*</sup>, Jan Vojacek <sup>a</sup>, Mikita Karalko <sup>a</sup>, Pavel Zacek <sup>a</sup>, Adrian Kolesar <sup>b</sup>, Tomas Toporcer <sup>b</sup>, Martin Urban <sup>c</sup>, Filip Glac <sup>c</sup>, Stepan Cerny <sup>d,e</sup>, Pavel Homola <sup>d</sup>, Jaroslav Hlubocky <sup>f</sup>, Andrey Slautin <sup>f</sup>, Petr Fila <sup>g</sup>, Daniela Zakova <sup>g</sup>, Jan Sterba <sup>g</sup>, Hiwad Rashid <sup>h</sup>, Arnaud Van Linden <sup>h</sup> and Tomas Holubec <sup>h</sup>

### Summary

Comparing groups of 112 matched pairs, remodeling was associated with higher reintervention risk than reimplantation over the median follow-up of 6 years ( $p = 0.016$ ).

Choice of surgical technique, need for decalcification and degree of immediate postoperative aortic regurgitation were the only independent risk factors for later reintervention detected by Cox proportional hazard regression model.



# Záchovné operace aortální chlopně vs. Bentall – Marfan

Systematic review and meta-analysis of surgical outcomes in Marfan patients undergoing aortic root surgery by composite-valve graft or valve sparing root replacement

Campbell D. Flynn<sup>1</sup>, David H. Tian<sup>2</sup>, Ashley Wilson-Smith<sup>2</sup>, Tirone David<sup>3</sup>, George Matalanis<sup>4</sup>, Martin Misfeld<sup>5</sup>, Stefano Mastrobuoni<sup>6</sup>, Gebrine El Khoury<sup>6</sup>, Tristan D. Yan<sup>2,7,8</sup>

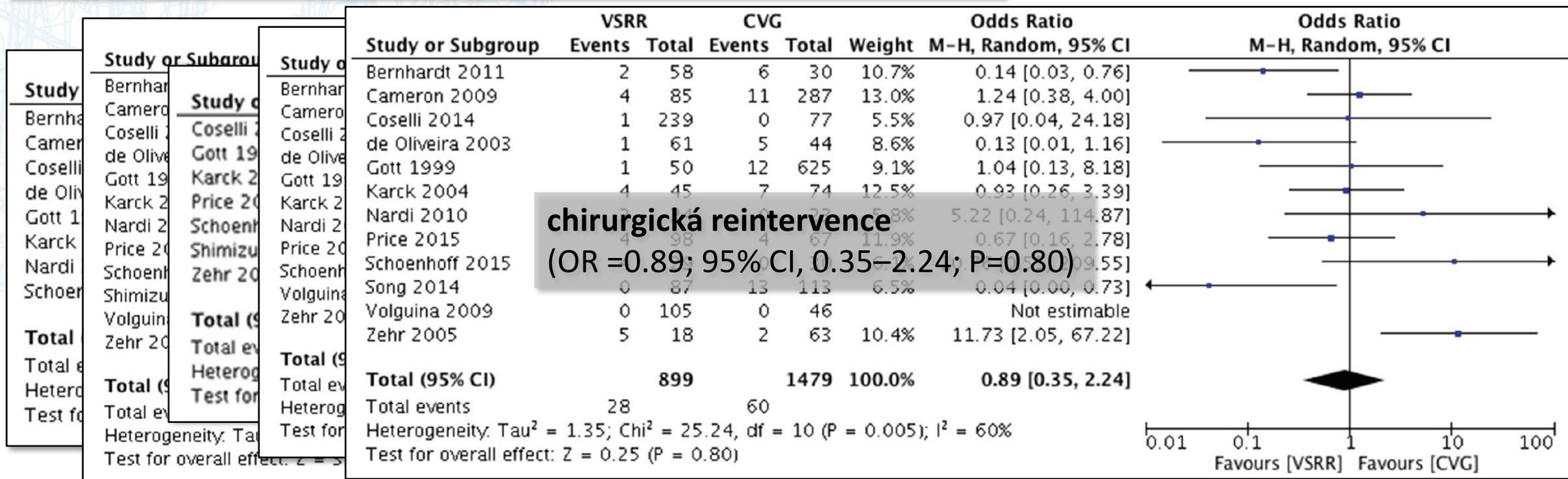
23 studií

2976 pts s Marfan syndromem

1352 VSRR vs. 1624 Bentall

Ø FU VSRR 4,5 roků vs. Bentall 7,14 roků

Flynn, *Annals of cardiothoracic surgery*, 2017, 6.6: 570

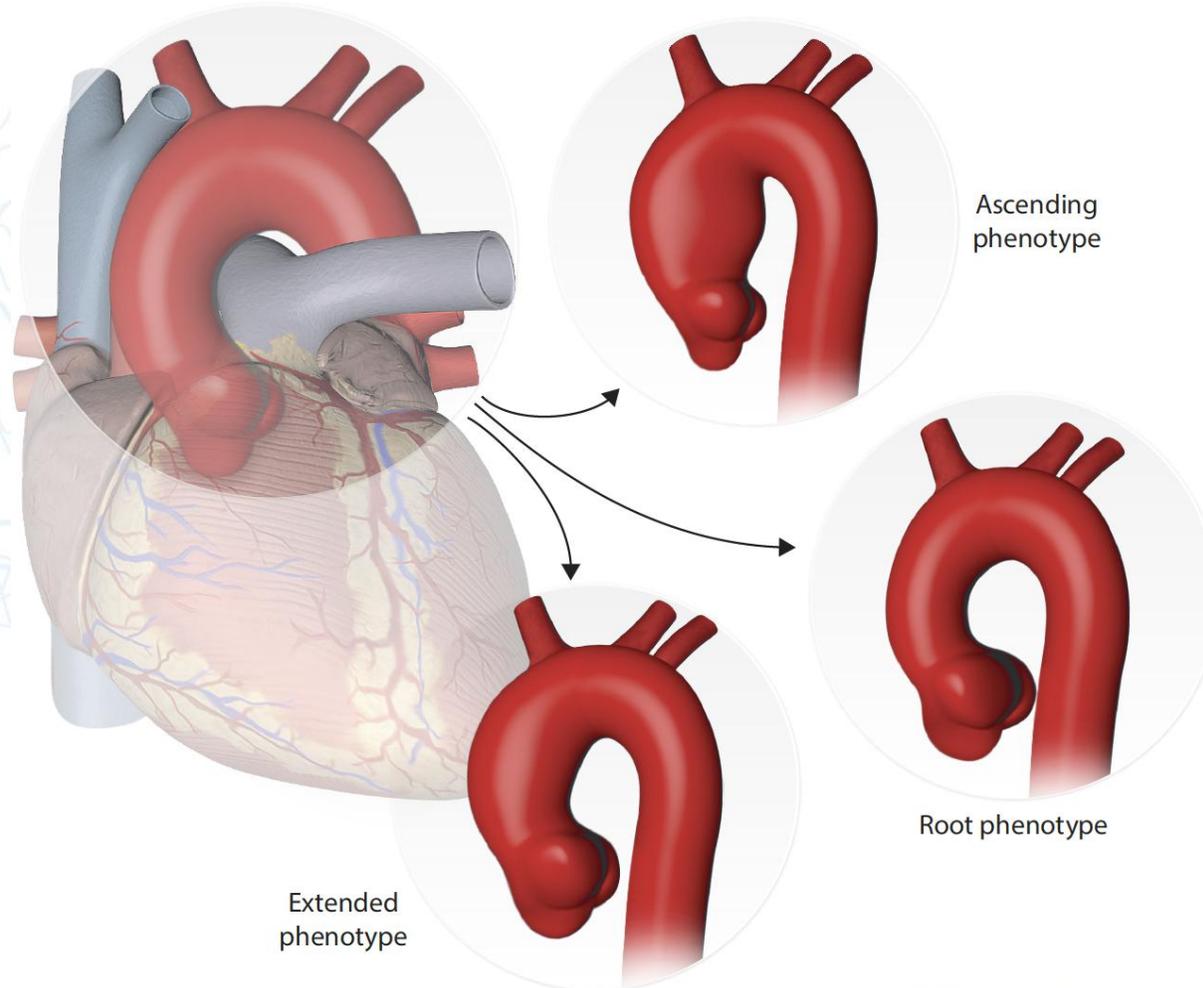


Co s regurgitací?

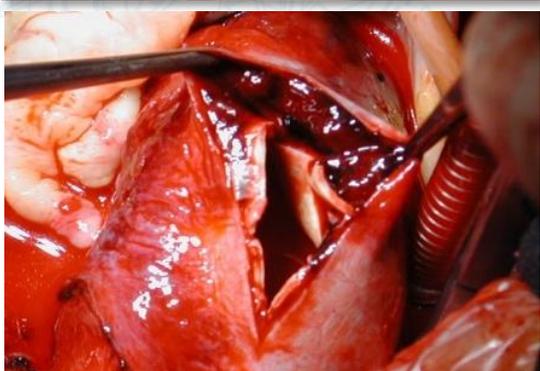
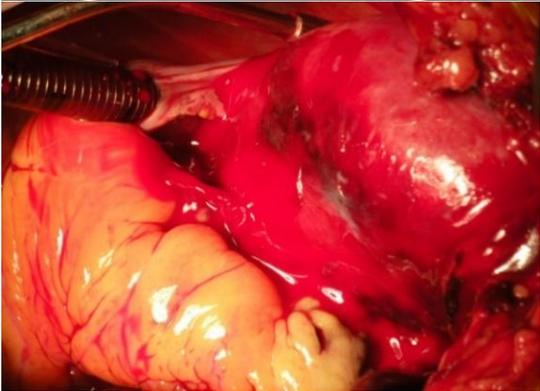
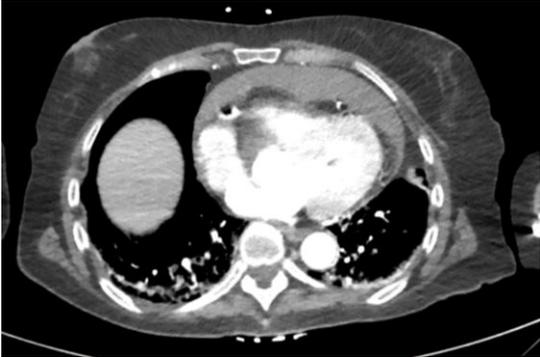
Co s aneurysmatem?

Cíl? Nahradit vs. opravit

Cíl? Zabránit dilataci/disekci!



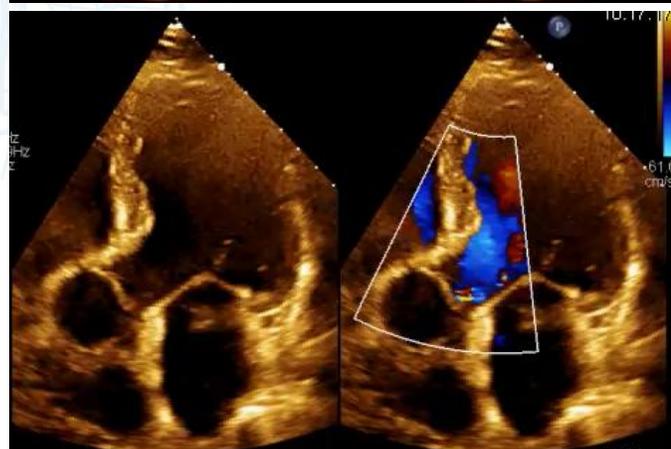
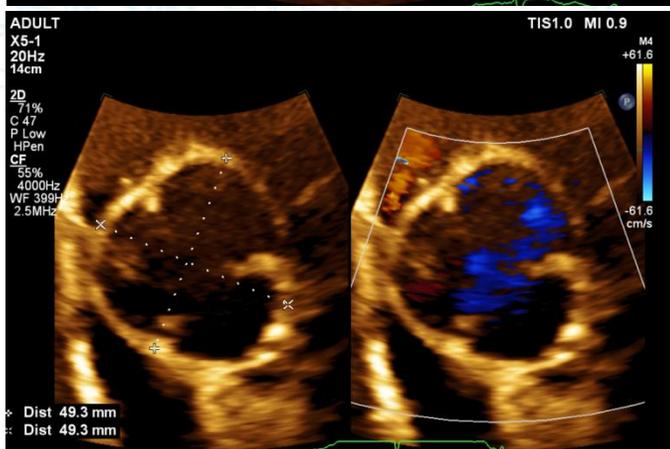
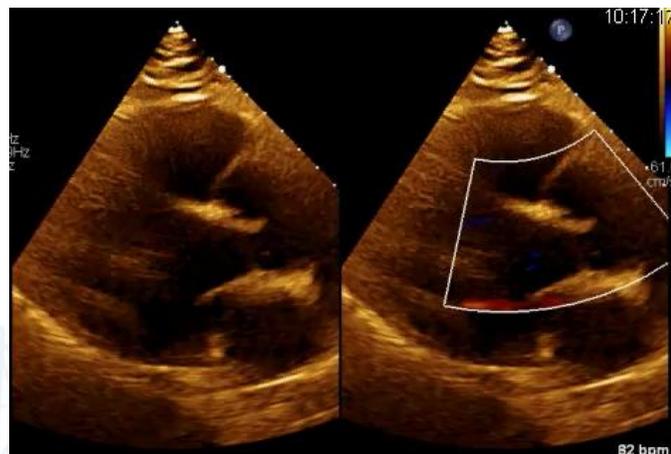
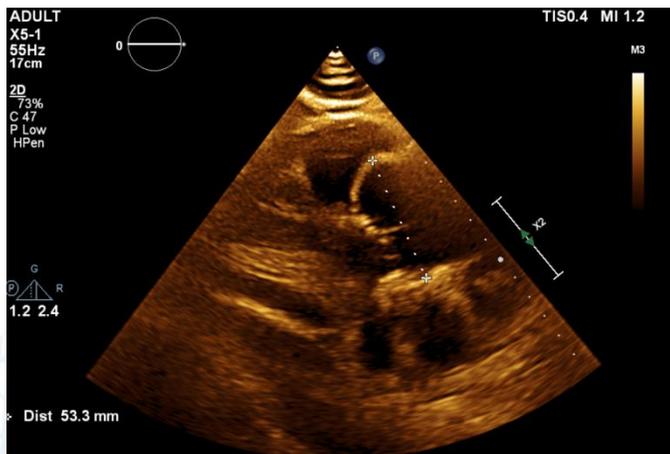
# Cíl? Zabránit dilataci/disekci!



- 20-50% zemře, než se dostane do nemocnice/kardiochirurgii
- 50 % neléčených typ A zemře do 48 hod - mortalita 1-2 % / hod
- 30 denní mortalita po operaci 5-24%

*Mahase, BMJ 2020; 368 :m304*

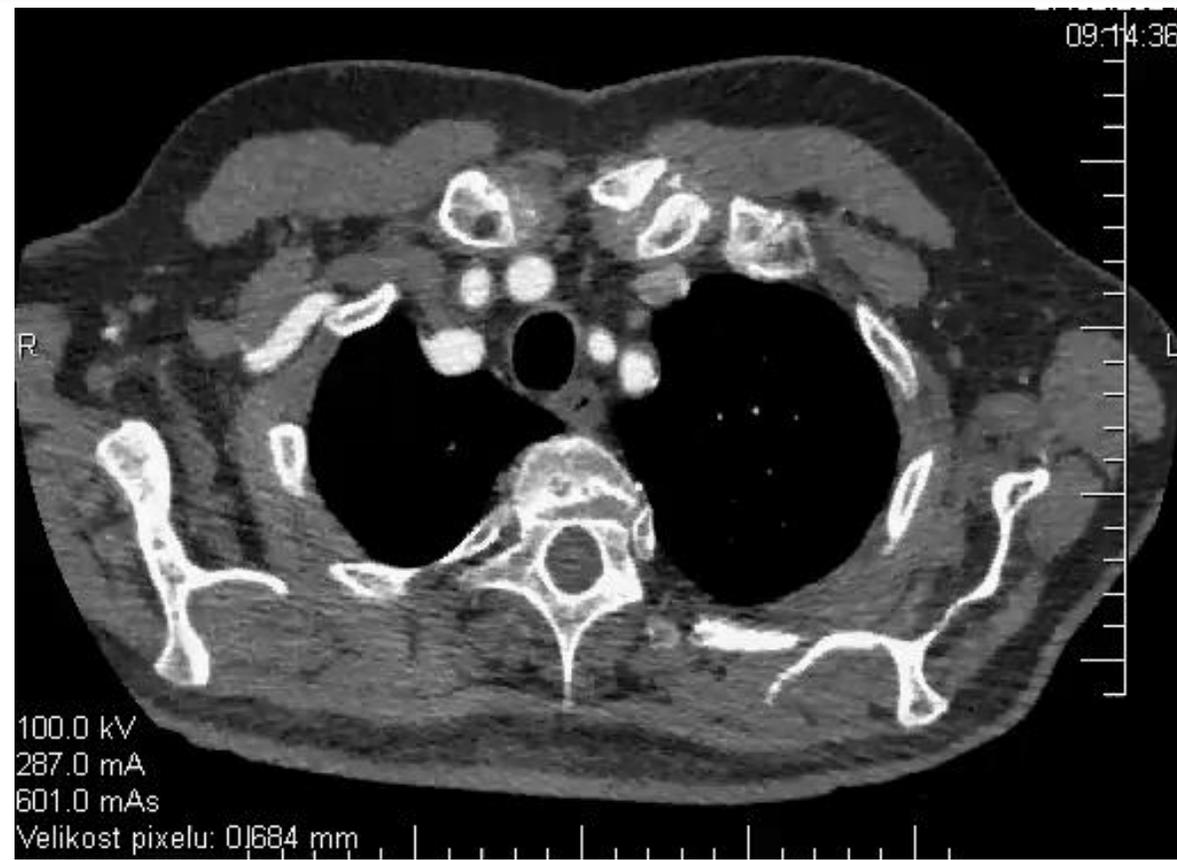
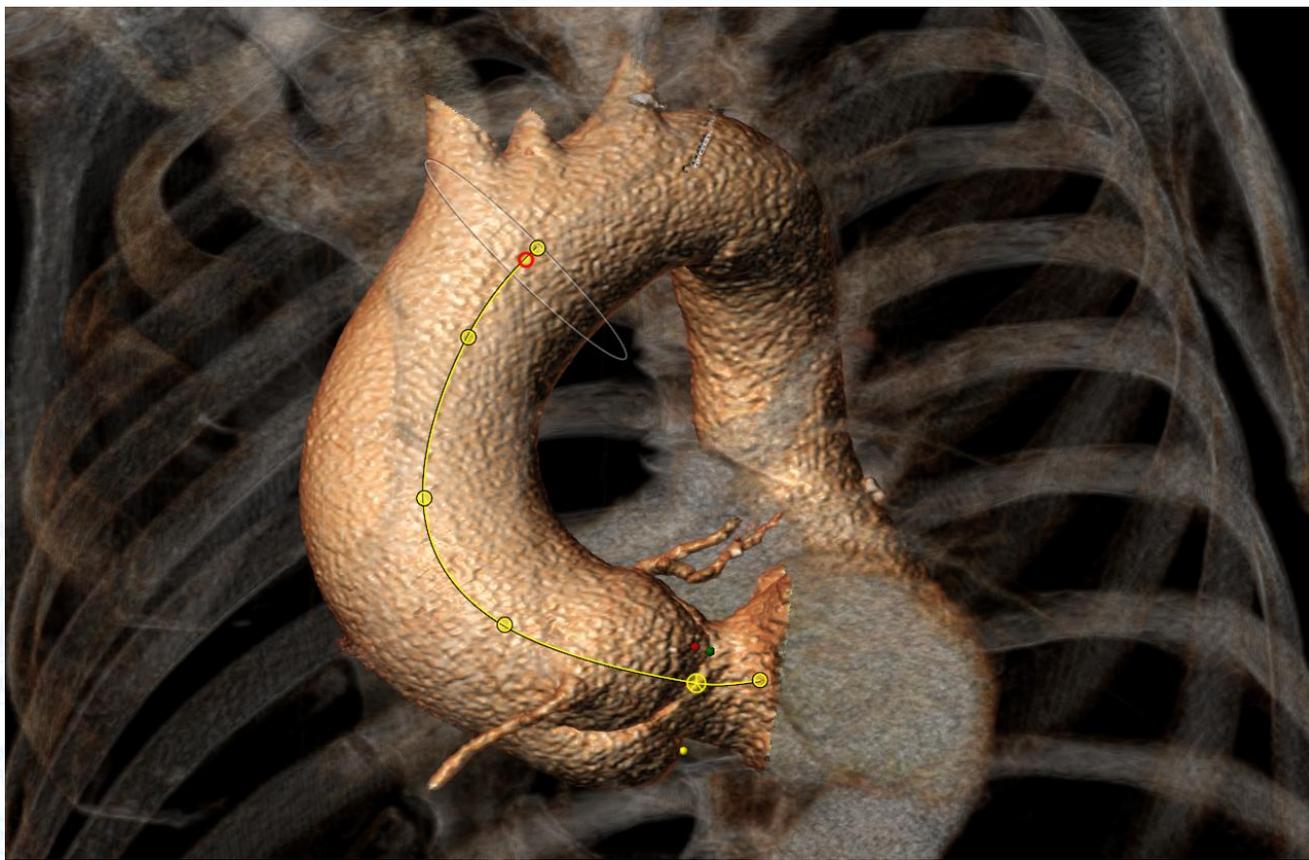
*Gudbjartsson,. Scandinavian Cardiovascular Journal, 2020, 54.1: 1-13.*



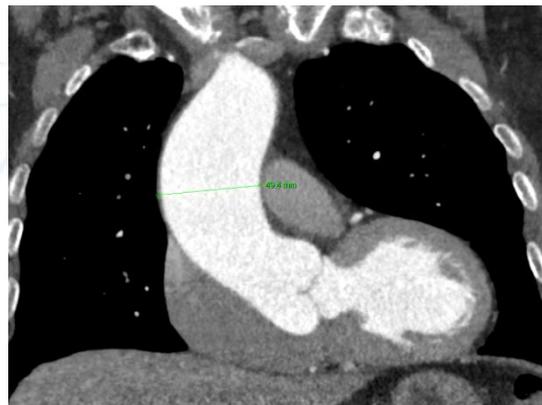
muž, 74 let  
hypertenze

trojcípá Ao chlopeň, AoR 1+  
od 2017 sledován pro dilataci  
kořene/asc. aorty

ECHO:  
47/52 mm  
50/52 mm  
50/51 mm

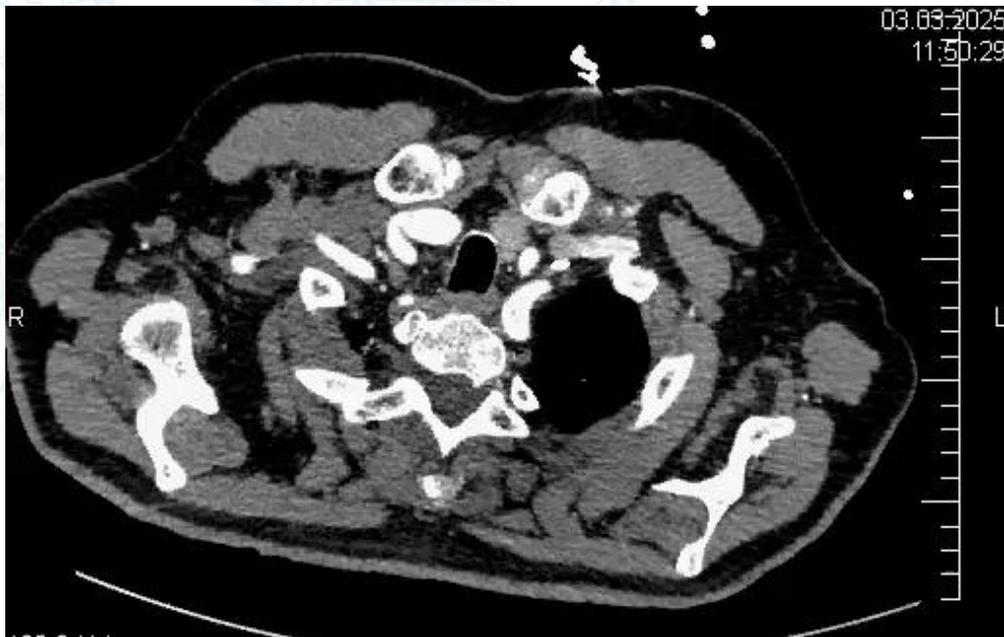
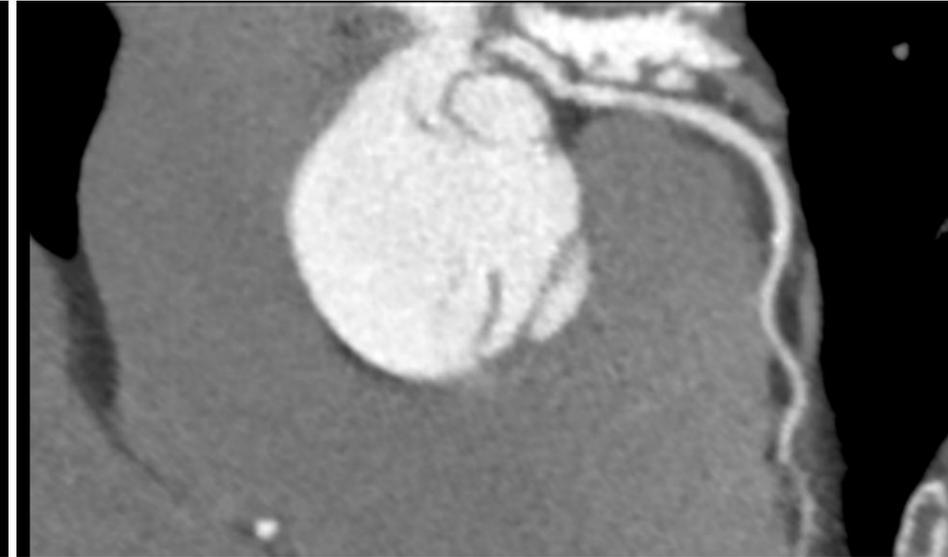
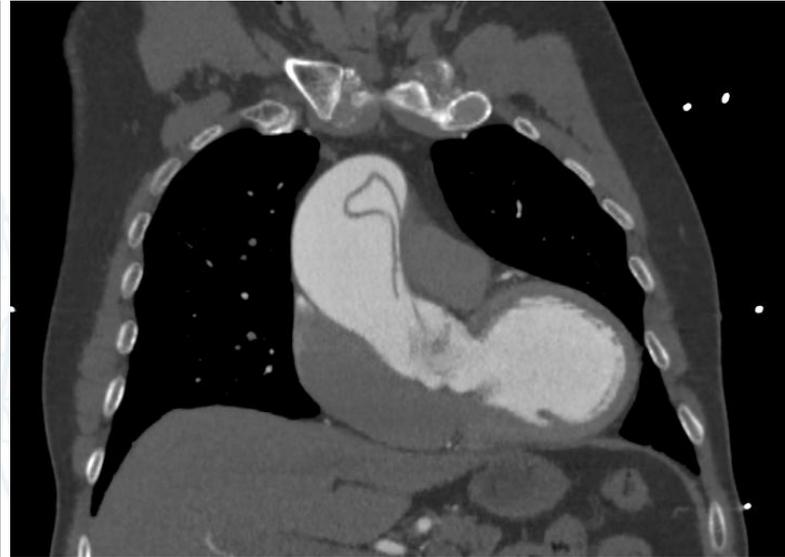
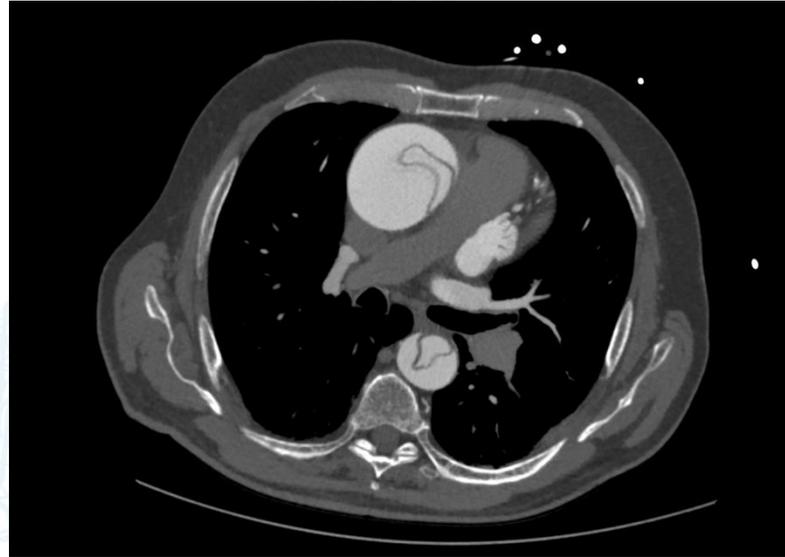


CT  
47/50 mm  
48/50 mm  
48/52 mm  
- stacionární náleží



**CO S PACIENTEM?**

...o rok později – akutní disekce, na operační sál hypotenzní, po úvodu do CA - KPR



- Bentallova operace, TVP
- anteroextenzivní IM při disekci ostia ACS
- PCI kmene ACS
- Impella 5.5
  
- pneumonie, sepse, MOF
- exitus 10. POD

# Predikce disekce aorty typu A

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY  
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AND THE AMERICAN HEART ASSOCIATION, INC.  
PUBLISHED BY ELSEVIER

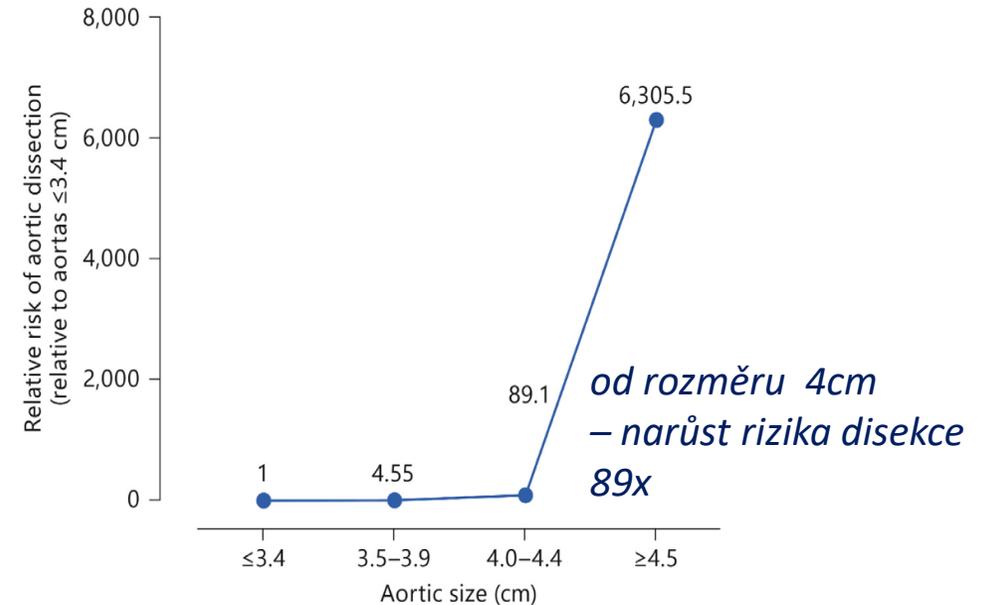
VOL. 80, NO. 24, 2022

## CLINICAL PRACTICE GUIDELINE

### 2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease



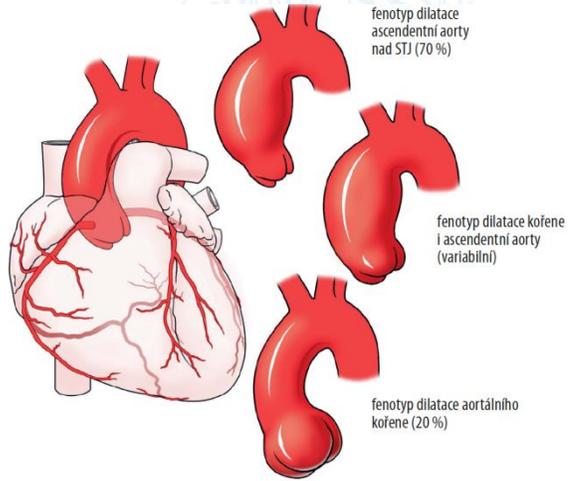
FIGURE 5 Relative Risk of Aortic Dissection by Size Range



The relative risk of aortic dissection begins to increase appreciably at a diameter of 4.0 cm to 4.4 cm and then increases dramatically at a diameter of ≥4.5 cm. Reprinted from Paruchuri et al.<sup>5</sup> Copyright 2005, with permission from Karger Publishers, Basel Switzerland.

- In asymptomatic patients with aneurysms of the aortic root or ascending aorta who have a maximum diameter of ≥5.0 cm, surgery is reasonable when performed by experienced surgeons in a Multidisciplinary Aortic Team.<sup>14-17</sup>

# Hranice pro výkon na aortě



- Marfan + RF (IIa)
- výkon na Ao chlopni

- Marfan (I)
- BAV root (I)
- BAV asc. + RF (IIa)
- TAV root low-risk (IIa)

- izolované aneurysma
- BAV asc. (I)
- TAV (I)



- PRKG1 + RF

- ACT2 + RF
- PRKG1

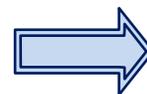
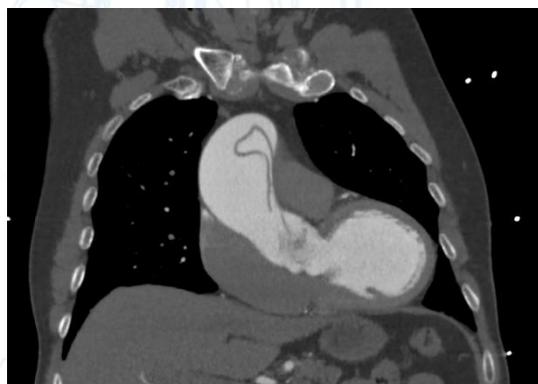
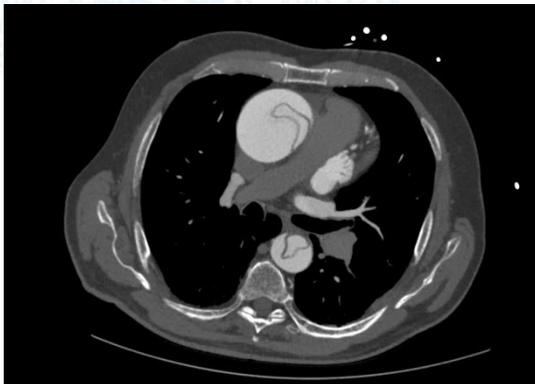
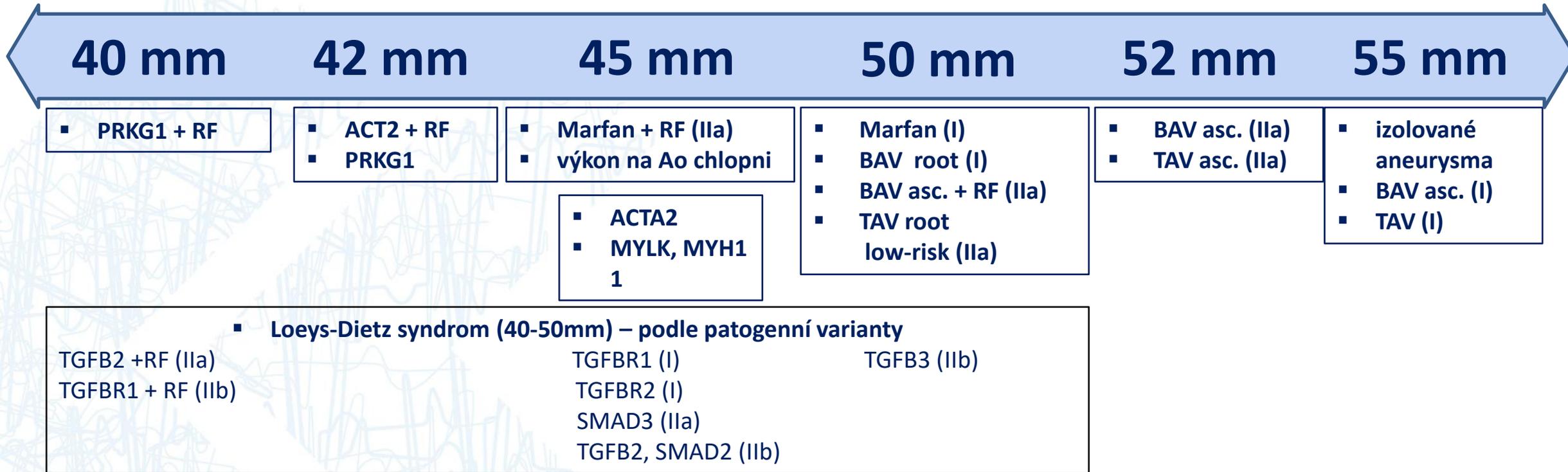
- ACTA2
- MYLK, MYH11

- BAV asc. (IIa)
- TAV asc. (IIa)

- Loeys-Dietz syndrom (40-50mm) – podle patogenní varianty
  - TGFB2 +RF (IIa)
  - TGFBR1 + RF (IIb)
  - TGFBR1 (I)
  - TGFBR2 (I)
  - SMAD3 (IIa)
  - TGFB2, SMAD2 (IIb)
  - TGFB3 (IIb)

Czerny, European Journal of Cardio-Thoracic Surgery, 2024, 65.2: ezad426.  
 Mazzolai, European heart journal, 2024, 45.36: 3538-3700.

# Hranice pro výkon na aortě



nejen dilatace  
(příčný rozměr) aorty!  
Co dalšího hraje roli?

# Riziko disekce dle geometrie aorty

European Journal of Cardio-Thoracic Surgery 2024, 65(1), ezae016  
https://doi.org/10.1093/ejcts/ezae016 Advance Access publication 13 January 2024

ORIGINAL ARTICLE

Cite this article as: Sun L, Li H, Feng X, Li X, Wang G, Sun J et al. Morphological risk of acute type A aortic dissection in the mildly to moderately dilated aorta. Eur J Cardiothorac Surg 2024; doi:10.1093/ejcts/ezae016.

## Morphological risk of acute type A aortic dissection in the mildly to moderately dilated aorta

Lianjie Sun <sup>a,1</sup>, Haoyou Li <sup>a,1</sup>, Xiangzhen Feng <sup>b,1</sup>, Xiao Li <sup>f</sup>, Guoqing Wang <sup>b</sup>, Jianchao Sun <sup>b</sup>, Xiaoming Zhang <sup>b</sup>, Wenfeng Zhang <sup>a</sup>, Jianxun Wang <sup>b</sup>, Zhaozhao Niu <sup>a</sup> and Gaoli Liu <sup>b,\*</sup>

Journal of the American Heart Association

## ORIGINAL RESEARCH

## Ascending Aortic Length and Its Association With Type A Aortic Dissection

Daniella Eliathamby, BASC; Mariana Gutierrez, BSc, MSc; Aileen Liu, BSc; Maral Ouzounian, MD, PhD; Thomas L. Forbes, MD; Kong Teng Tan, MD; Jennifer Chung <sup>g</sup>, MD, MSc

## Association of the ascending aortic length with acute type A aortic dissection: A retrospective cohort study

Tarmo Korpela <sup>g</sup>, Elina Salomaa, Petteri Kauhanen, Tuomas Selander, Marja Hedman and Annastiina Husso

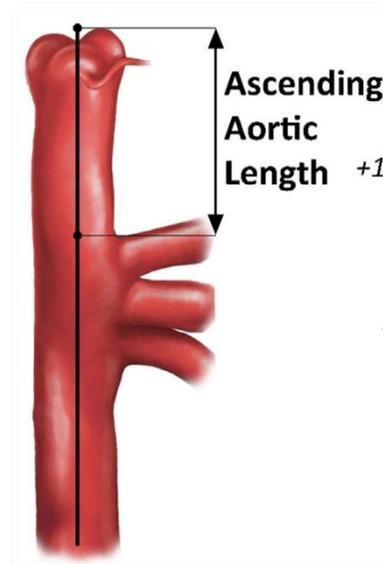
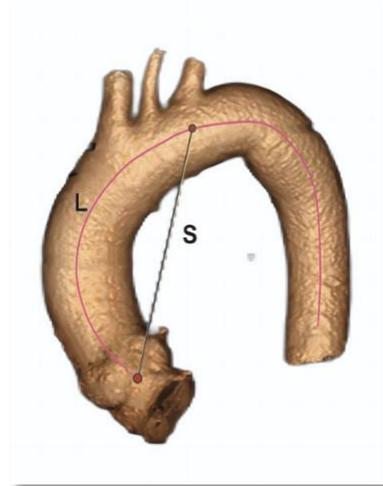
úhel asc/oblouk  $<130^\circ$   
délka acendentní aorty



srovnatelný / **větší** prediktor disekce  
než průměr aorty

průměr, délka, úhel,... genetika...

identifikovat pacienty, kteří budou  
profitovat z preventivního výkonu



Sun, EJCTS, 2024, 65.1: ezae016.

Eliathamby, Journal of the American Heart Association, 2021, 10.13: e020140.

Korpela, Scandinavian Journal of Surgery, 2025, 114.1: 56-64.

MUNI  
MED



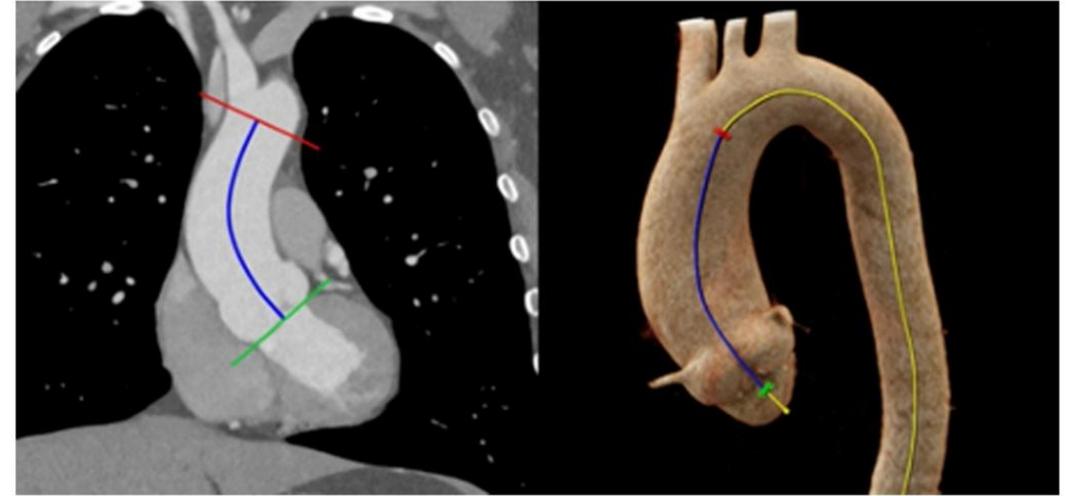
CKTCH

Centrum kardiologické  
a transplantáční chirurgie

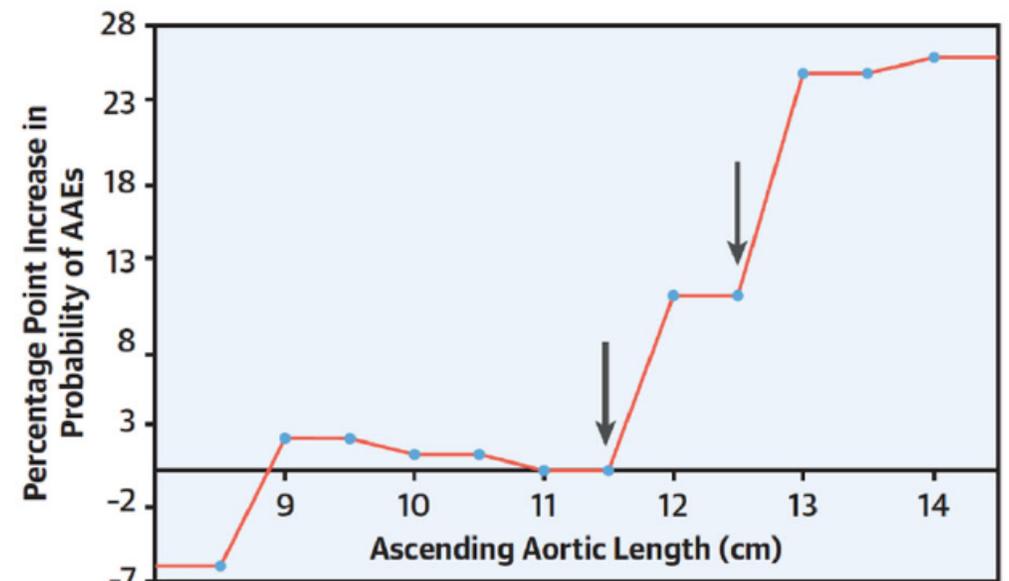
# Riziko elongace aorty

## EACTS/STS Guidelines for diagnosing and treating acute and chronic syndromes of the aortic organ

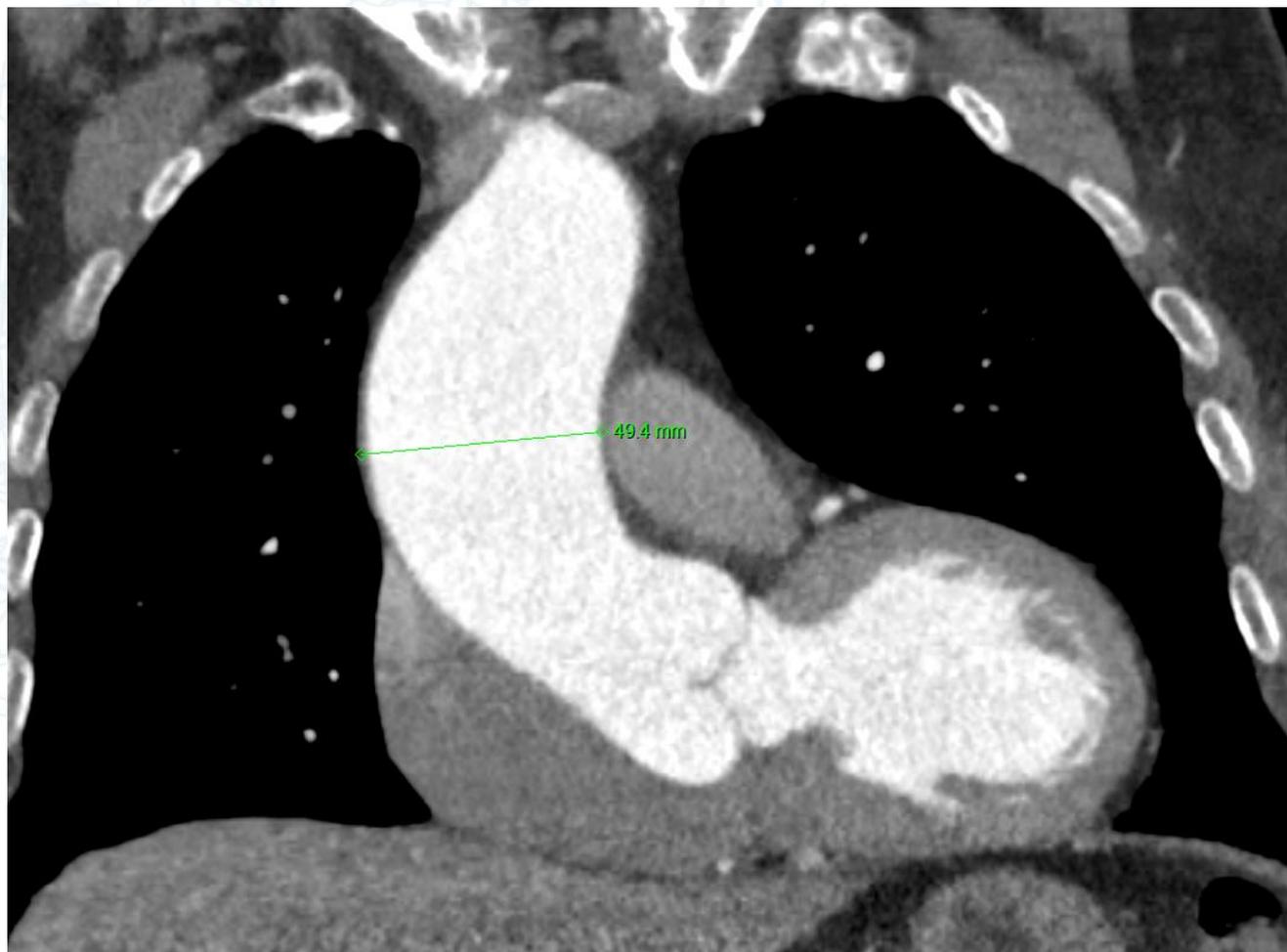
Authors/Task Force Members: Martin Czerny <sup>a,b,\*†</sup> (Co-Chairperson) (Germany), Martin Grabenwöger <sup>c,d,\*†</sup> (Co-Chairperson) (Austria), Tim Berger <sup>a,b</sup> (Task Force Coordinator), Victor Aboyans <sup>e,f</sup> (France), Alessandro Della Corte <sup>g,h</sup> (Italy), Edward P. Chen <sup>i</sup> (USA), Nimesh D. Desai <sup>j</sup> (USA), Julia Dumfarth <sup>k</sup> (Austria), John A. Elefteriades <sup>l</sup> (USA), Christian D. Etz <sup>m</sup> (Germany), Karen M. Kim <sup>n</sup> (USA), Maximilian Kreibich <sup>a,b</sup> (Germany), Mario Lescan <sup>o</sup> (Germany), Luca Di Marco <sup>p</sup> (Italy), Andreas Martens <sup>q,r</sup> (Germany), Carlos A. Mestres <sup>s</sup> (South Africa), Milan Milojevic <sup>t</sup> (Serbia), Christoph A. Nienaber <sup>u,v</sup> (UK), Gabriele Piffaretti <sup>w</sup> (Italy), Ourania Preventza <sup>x</sup> (USA), Eduard Quintana <sup>y</sup> (Spain), Bartosz Rylski <sup>a,b</sup> (Germany), Christopher L. Schlett <sup>b,z</sup> (Germany), Florian Schoenhoff <sup>aa</sup> (Switzerland), Santi Trimarchi <sup>ab</sup> (Italy) and Konstantinos Tsagakis <sup>ac</sup> (Germany), EACTS/STS Scientific Document Group



Recommendations	Class <sup>a</sup>	Level <sup>b</sup>	Ref <sup>c</sup>
Surgery should be considered for a symptomatic aneurysm of the ascending aorta, almost independently of size (once non-aortic causes have been eliminated).	IIa	C	-
For individuals of small body size, height nomograms should be considered in the decision about indications for surgery at various aortic dimensions.	IIa	B	[340]
An ascending aortic length exceeding 110 mm should be considered as a risk factor for aortic events when indicating elective surgery for aortic aneurysms.	IIa	B	[196]
Despite metrics and precision criteria, the benefits and risks of surgical intervention versus nonoperative management should be considered on a case-by-case basis.	IIa	C	-

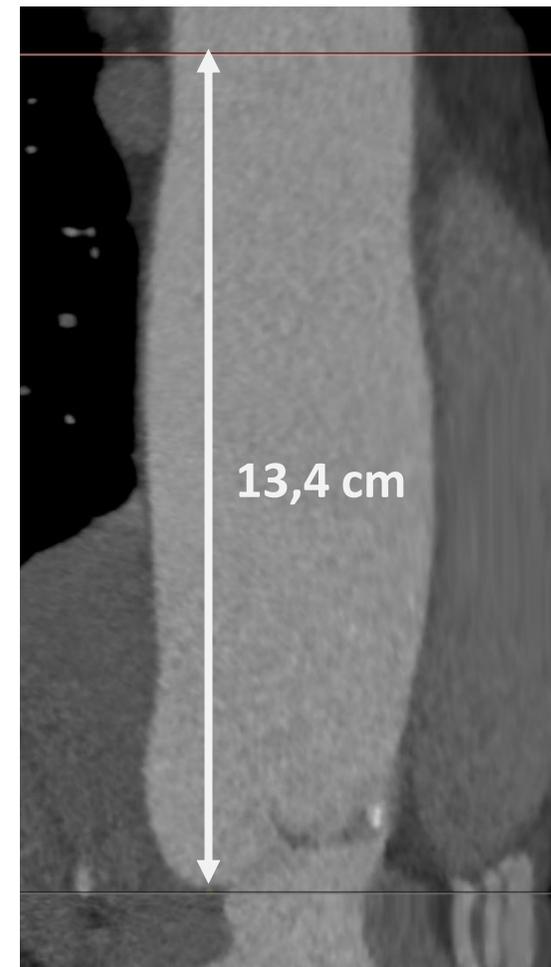
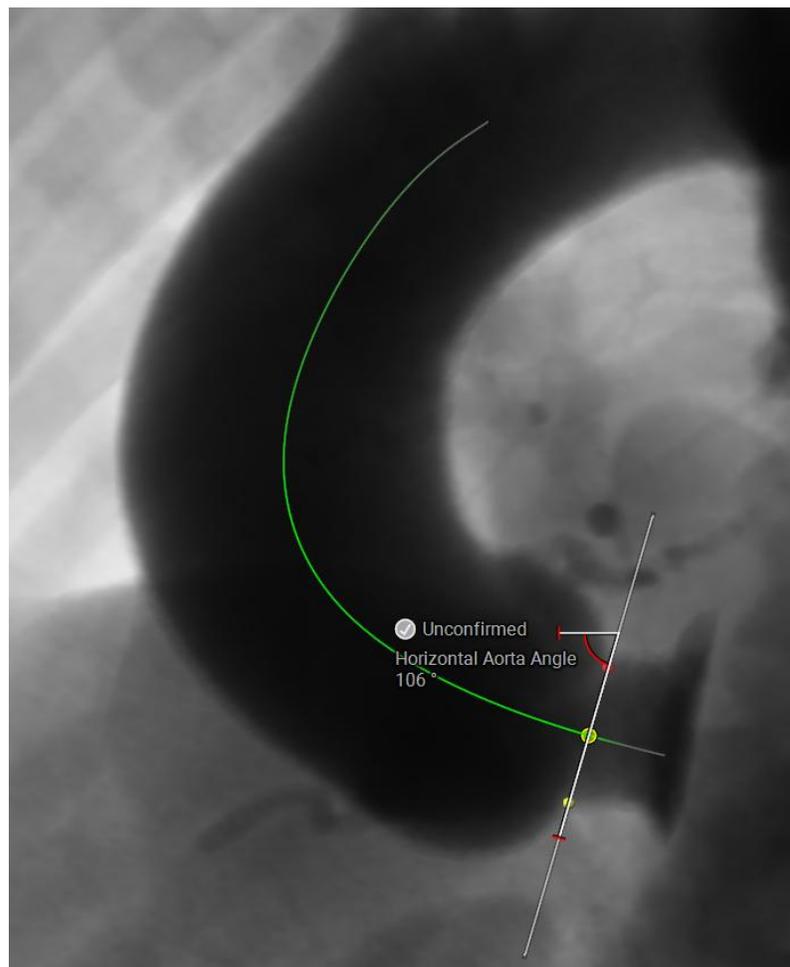


Muž, 74 let  
2024 ECHO 50/51, CT 48/52 – stacionární nález

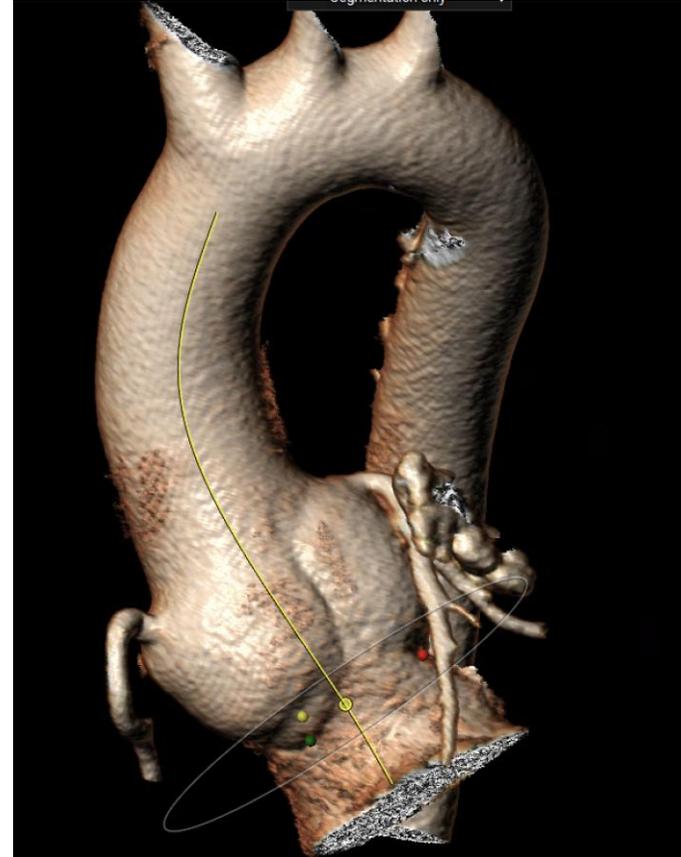
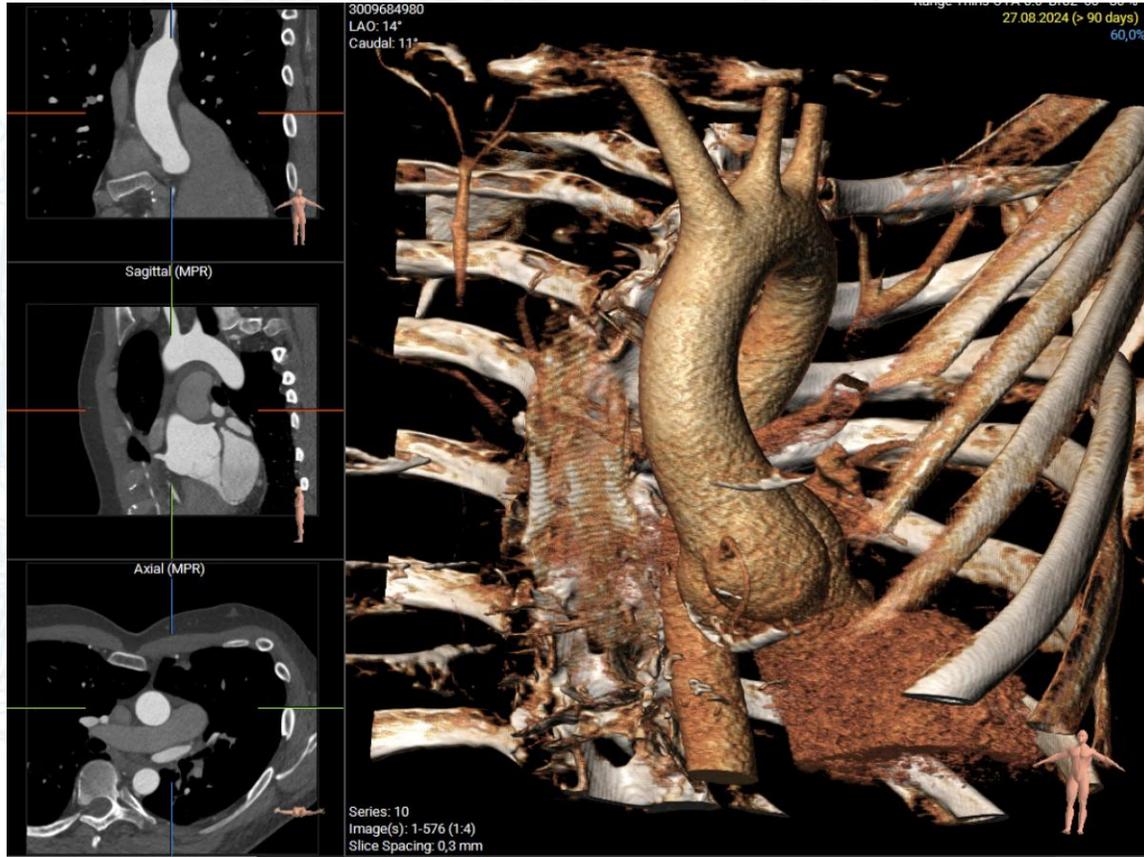


Muž, 74 let

2024 ECHO 50/52, CT 47/50 – stacionární nález



# Posun k preventivní chirurgické léčbě - individualizované řešení

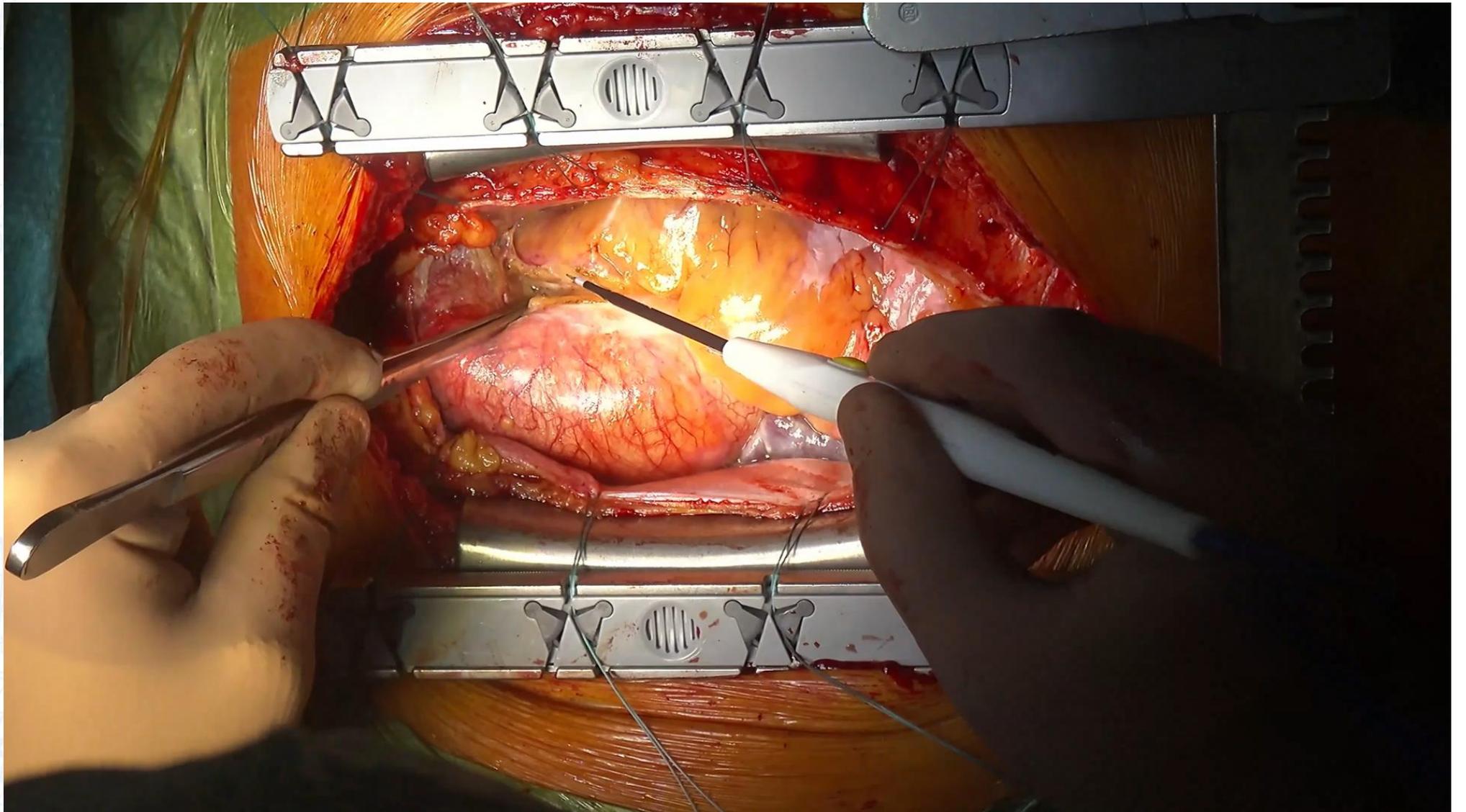


# PEARS - myšlenka na individualizované řešení

- PEARS - Personalised External Aortic Root Support
- polyesterová síťka kolem kořene a asc. aorty
- individualizace tvaru dle CT
- preventivní/kurativní výkon

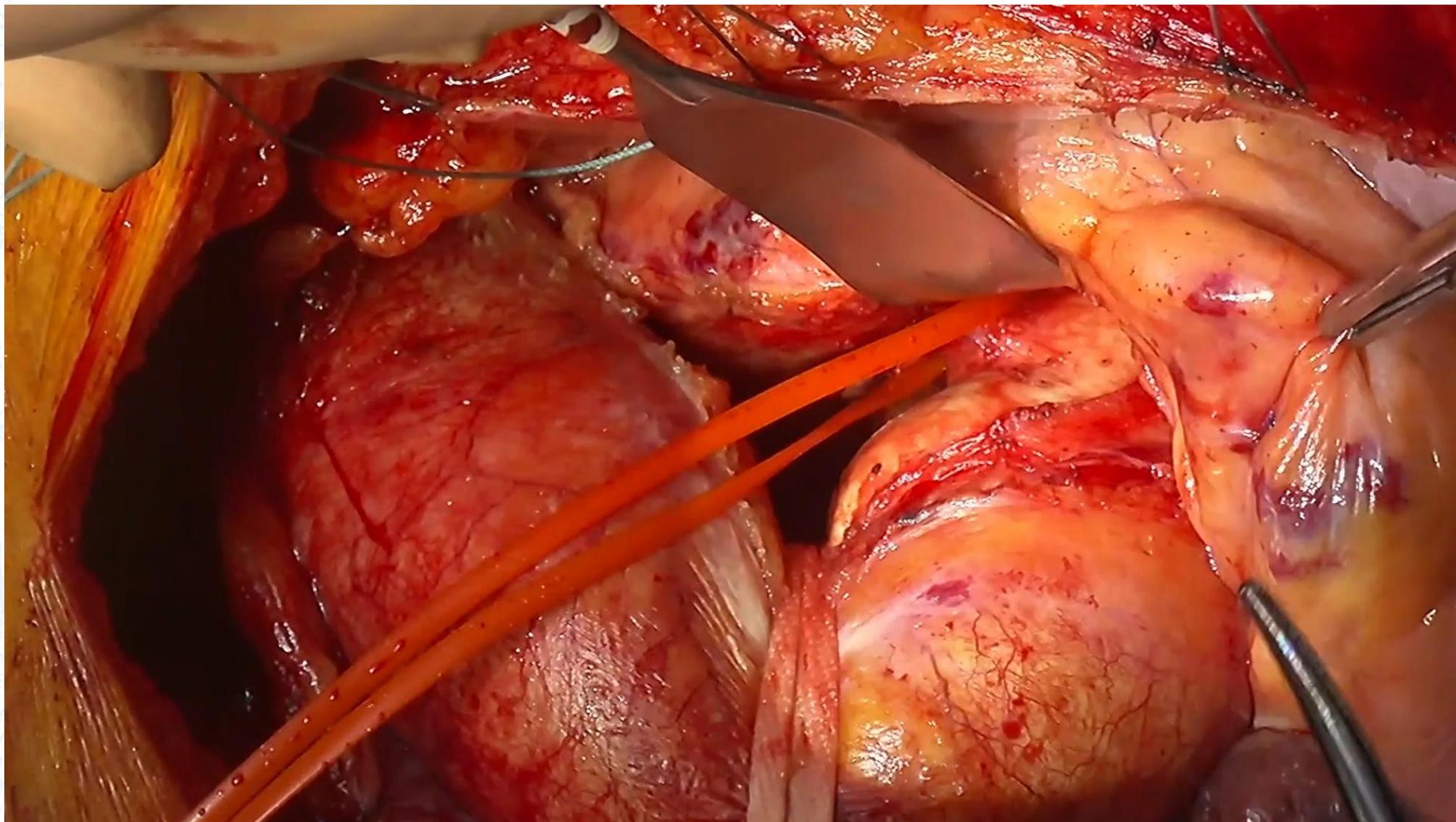


# Implantace PEARS



# Implantace PEARS

kmen ACS  
kmen ACD

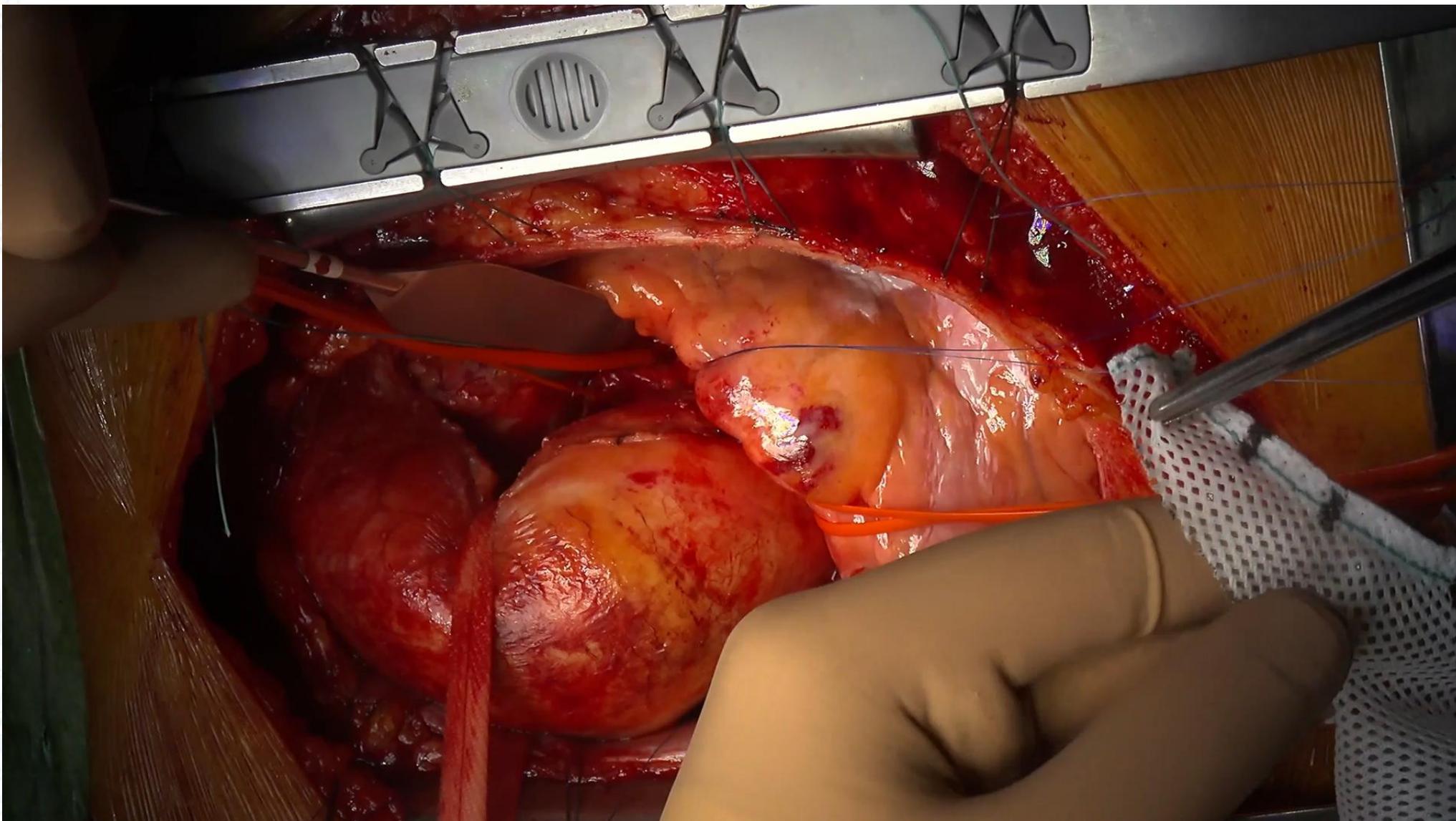


# Implantace PEARS



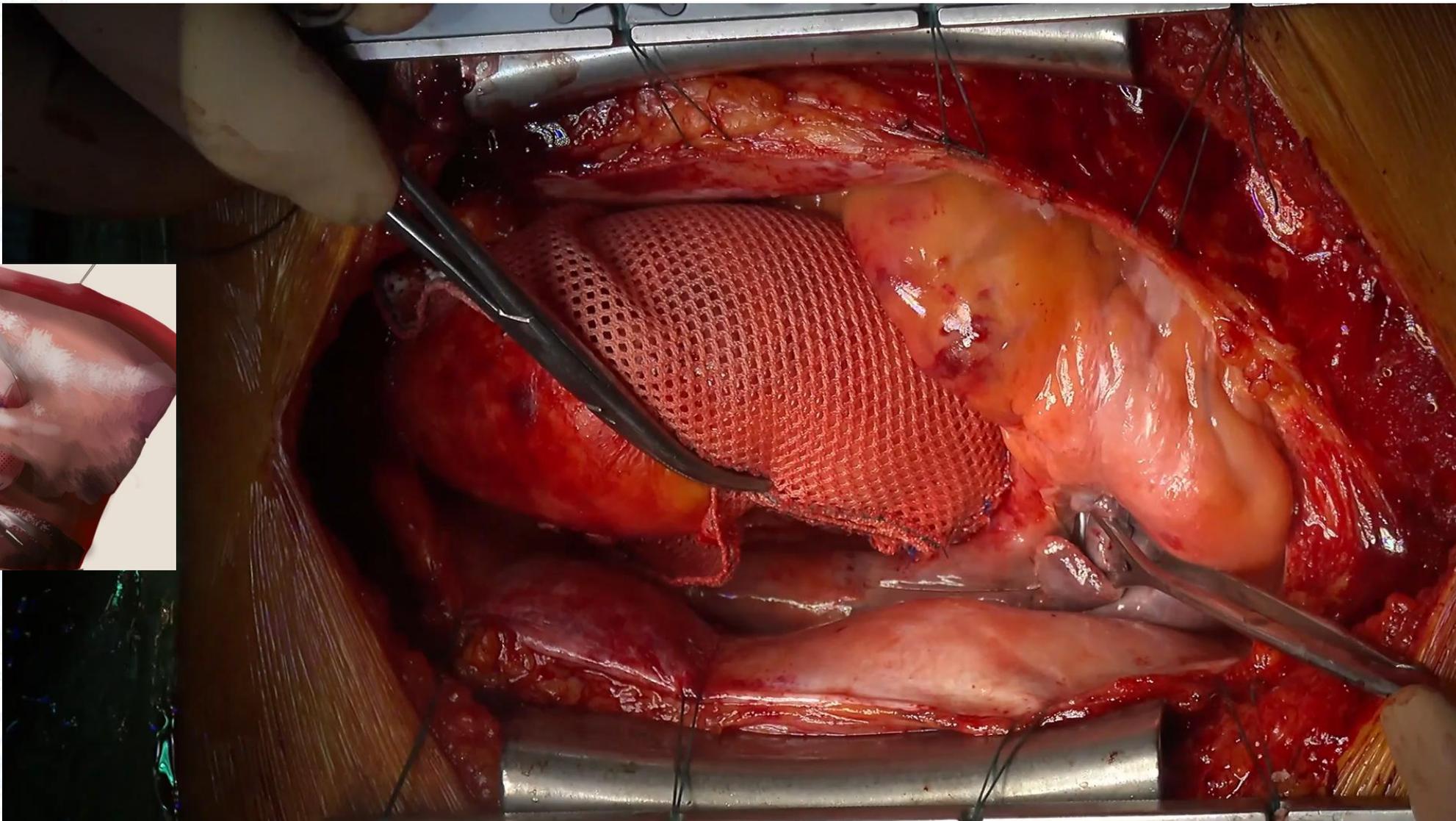
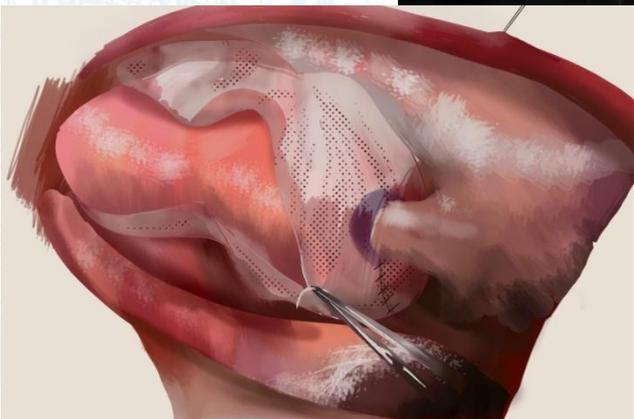
# Implantace PEARS

Exovasc  
umístění



# Implantace PEARS

sutura švu



# PEARS – celosvětový report

5. března 2026

**n = 1695 (458 žen, 1237 mužů), 3-84 let**

**MFS, bikuspidní aortopatie, L-D sy, Turner sy, E-D sy, MYBCP3, ACTA2**

**mutace, TGA, Ross/PEARS**

**79% bez mimotělního oběhu**

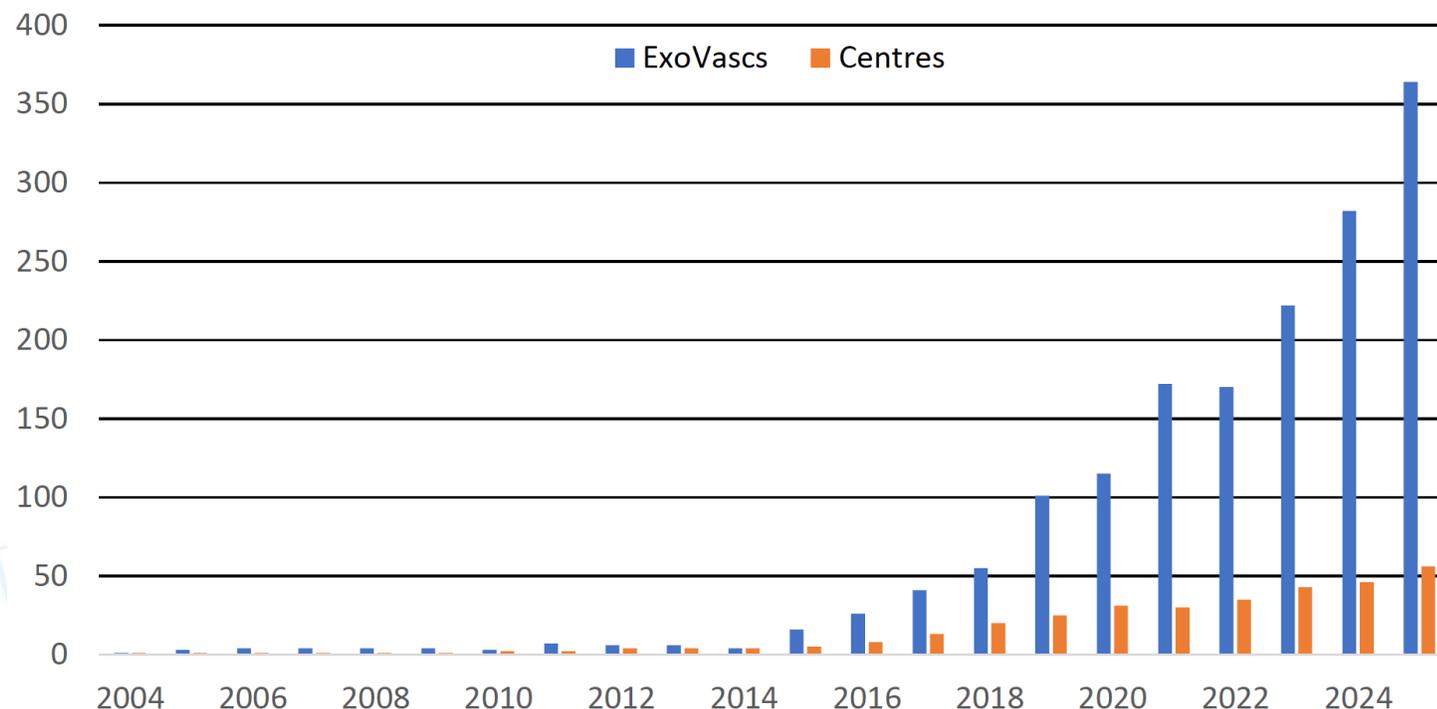
5 pacienti > 20 let

60 pacientů > 10 let

420 pacientů > 5 let

15 žen - 16 narozených dětí

**bez akutní disekce (pokryté části) u implantovaných pacientů**



# Pro které pacienty je Exovasc vhodný?

- bikuspidní i trojcípá
- AoR – centrální – trojcípá <2. st., bikuspidní – přísnější



**PEARS je preventivní výkon  
- nečekejme na parametry z guidelines**

- $\leq 55\text{mm}$
- v úvahu brát i délku ascendentní aorty  $> 11\text{cm}$
- přísnější při věku  $< 50$  let
- progresse dilatace
- genetické postižení – Marfan, Loeys-Dietz, Ehlers-Danlos...
- ženy ve fertilním věku
- **nechrání před disekcí nepokryté části – nonA-nonB disekce, B-disekce**

# Shrnutí

## Záchovné operace

- náhrada dilatované aorty + korekce chlopenní vady

## Rossova operace – ano, ALE....

## Aneurysma aorty

- němé/agresivní onemocnění
- příznaky = problém

## PEARS

- moderní, pacientovi na míru
- prevence fatální komplikace
- včasné řešení
- bez nutnosti ECC/bez zákroku na nativní chlopní
- bez antikoagulaci, zachovává endotel nativní aorty