FAKULTNÍ NEMOCNICE® OLOMOUC

Lékařská fakulta
Univerzita Palackého v Olomouci

KOMPLEXNÍ KARDIOVASKULÁRNÍ CENTRUM
FAKULTNÍ NEMOCNICE OLOMOUC

Nekoronární intervence

Miloslav Špaček

Transkutánní léčba získaných chlopenních vad

Historický kontext

1982: pulmonální valvuloplastika (VSV)

1984: mitrální valvuloplastika

(Rh-MS: Inoue)

1986: aortální valvuloplastika (Cribier)

Historický kontext

pulmonální valvuloplastika (VSV) 👍

mitrální valvuloplastika (RhMS: Inoue) 👍

aortální valvuloplastika (Cribier) 👎

-1990 odstartován vývoj TAVI

-2002 první klinická implantace (Cribier)

-2007 CE značka

Historický kontext

pulmonální valvuloplastika (VSV) 👍

mitrální valvuloplastika (RhMS: Inoue) 👍

aortální valvuloplastika (Cribier) 👎

TAVI 👍

MitraClip (2008 CE značka)

Mitrální stenóza

Mitrální stenóza

Inoue balón

Procedurální riziko:

Mortalita	0.4%
Tamponáda	0.2%
Systémová embolizace	0.6%
Těžká MR	**4.1%**

(Wilkins – Boston skore)

Mitrální stenóza

Inoue balón

Kontraindikace:

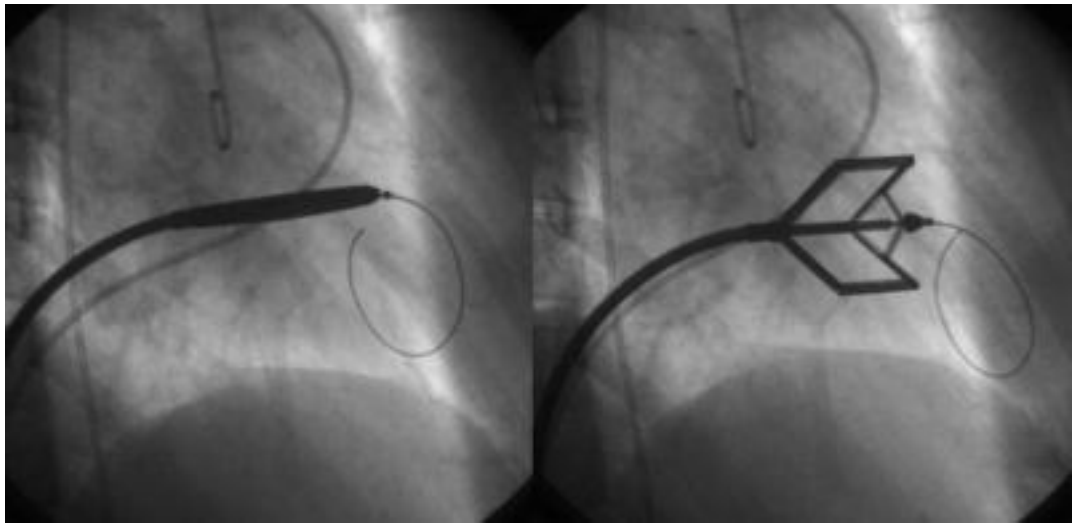
LA / LAA trombus

Významná MR

Masivní kalcifikace

Potřeba jiného KCH zákroku

Mitrální stenóza



Perkutánní mitrální komisurotomie

Mitrální regurgitace

D-MR

F-MR

Mitrální regurgitace

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 14, 2011 VOL. 364 NO. 15

Percutaneous Repair or Surgery for Mitral Regurgitation

Ted Feldman, M.D., Elyse Foster, M.D., Donald D. Glower, M.D., Saibal Kar, M.D., Michael J. Rinaldi, M.D., Peter S. Fail, M.D., Richard W. Smalling, M.D., Ph.D., Robert Siegel, M.D., Geoffrey A. Rose, M.D., Eric Engeron, M.D., Catalin Loghin, M.D., Alfredo Trento, M.D., Eric R. Skipper, M.D., Tommy Fudge, M.D., George V. Letsou, M.D., Joseph M. Massaro, Ph.D., and Laura Mauri, M.D., for the EVEREST II Investigators*

CONCLUSIONS

Although percutaneous repair was less effective at reducing mitral regurgitation than conventional surgery, the procedure was associated with superior safety and similar improvements in clinical outcomes. (Funded by Abbott Vascular; EVEREST II ClinicalTrials.gov number, NCT00209274.)

Primární (degenerativní) 👍

Mitrální regurgitace - funkční

Neexistují randomizované studie porovnávající chirurgické řešení vůči samotné OMT

Observační studie neprokázaly mortalitní benefit proti samotné OMT, avšak došlo k zlepšení symptomů SS

-> doporučení IIB, LOE C

-> symptomatická th.

Mitrální regurgitace - funkční

"The lower thresholds defining severe MR compared to primary MR are based on their association with prognosis. However, it is unclear if prognosis is independently affected by MR compared to LV dysfunction. For isolated mitral valve treatment in secondary MR, thresholds of severity of MR for intervention still need to be validated in clinical trials. So far, no survival benefit has been confirmed for reduction of secondary MR"

-> COAPT / RESHAPE HF / Mitra-FR

Primary	Secondary[h]
≥40	≥20 mm2 EROA
≥60	≥30 ml RV

Mitrální regurgitace - funkční

Nishimura, et al.
2017 AHA/ACC Focused Update on VHD

2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

Developed in Collaboration With the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

Nishimura, et al.
2017 AHA/ACC Focused Update on VHD

"severe" MR in RCTs of surgical intervention for secondary MR (69-72), the recommended definition of severe secondary MR is now the same as for primary MR (effective regurgitant orifice ≥0.4 cm^2 and regurgitant volume ≥60 mL), with the understanding that effective regurgitant orifice cutoff of >0.2 cm^2 is more sensitive and >0.4 cm^2 is more specific for severe MR. However, it is important to integrate the clinical and echocardiographic findings together to prevent unnecessary operation when the MR may not be as severe as documented on noninvasive studies.

Mitrální regurgitace - funkční

Changes in recommendations	
2012	**2017**
Indications for mitral valve intervention in secondary mitral regurgitation	
IIa C Surgery should be considered in patients with moderate secondary mitral regurgitation undergoing CABG	Taken out
IIb C When revascularization is not indicated, surgery may be considered in patients with severe secondary mitral regurgitation and LVEF >30%,who remain symptomatic despite optimal medical management (including CRT if indicated).	**IIb C (modified)** When revascularization is not indicated, surgery may be considered in patients with severe secondary mitral regurgitation and LVEF >30%, who remain symptomatic despite optimal medical management (including CRT if indicated) and have a low surgical risk.

Mitrální regurgitace - funkční

Changes in recommendations	
2012	**2017**
Indications for mitral valve intervention in secondary mitral regurgitation *(continued)*	
	IIb C (modified) *(continued)* When revascularization is not indicated and surgical risk is not low, a percutaneous edge-to-edge procedure may be considered in patients with severe secondary mitral regurgitation and LVEF >30%, who remain symptomatic despite optimal medical management (including CRT if indicated) and who have a suitable valve morphology by echocardiography, avoiding futility.

MitraClip

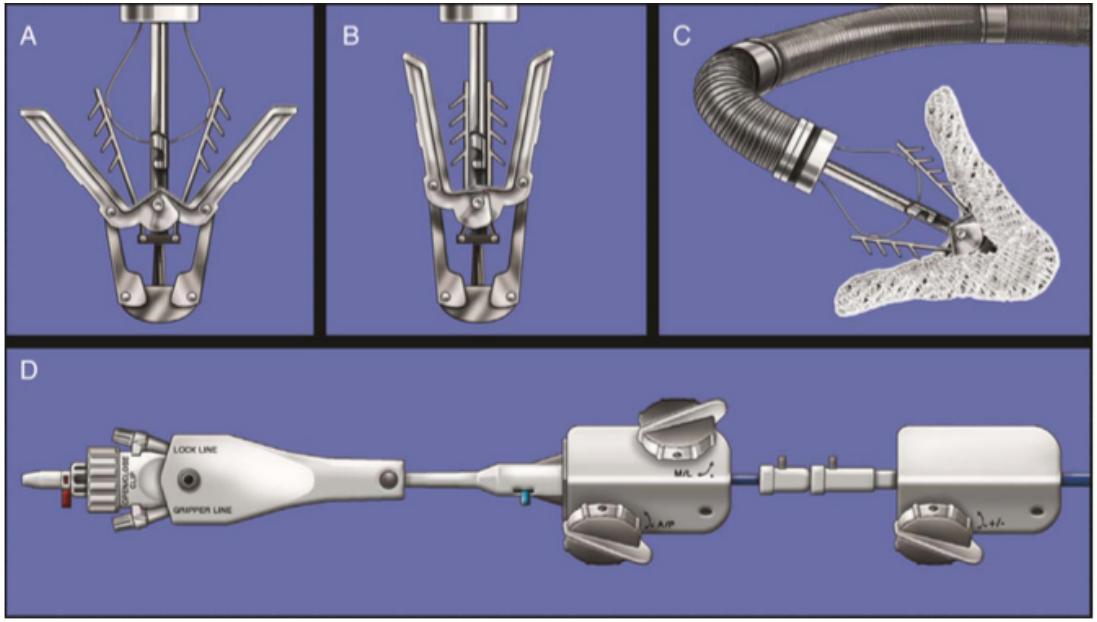
Jediné “leaflet repair device” v klinické praxi

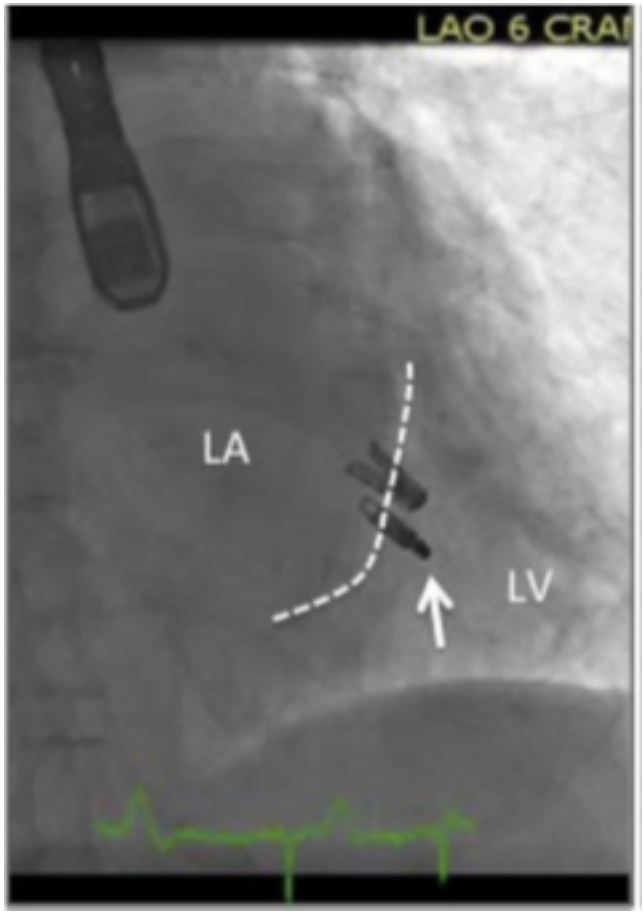
“Double orifice”

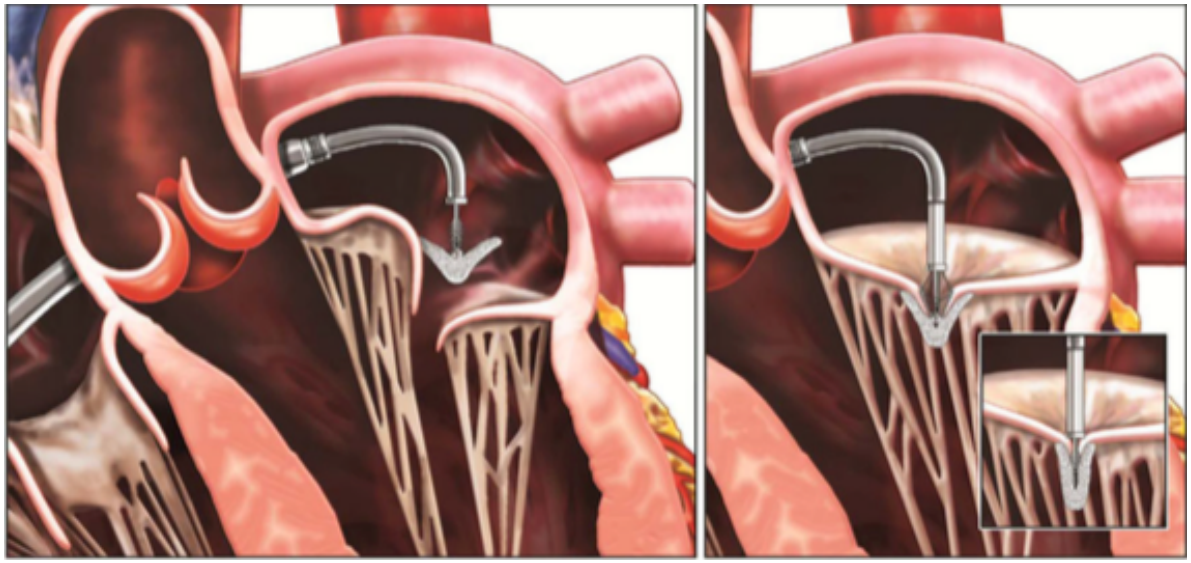
Trans-septální přístup

FDA schváleno pouze pro **D-MR** u chirurgicky vysoce rizikových pacientů.

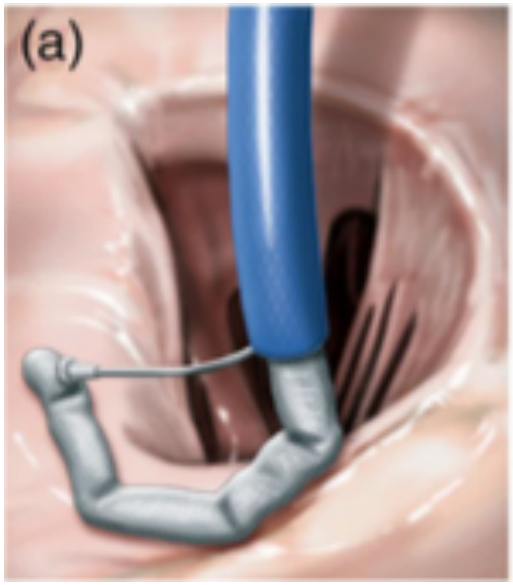
-> COAPT / RESHAPE HF / Mitra-FR

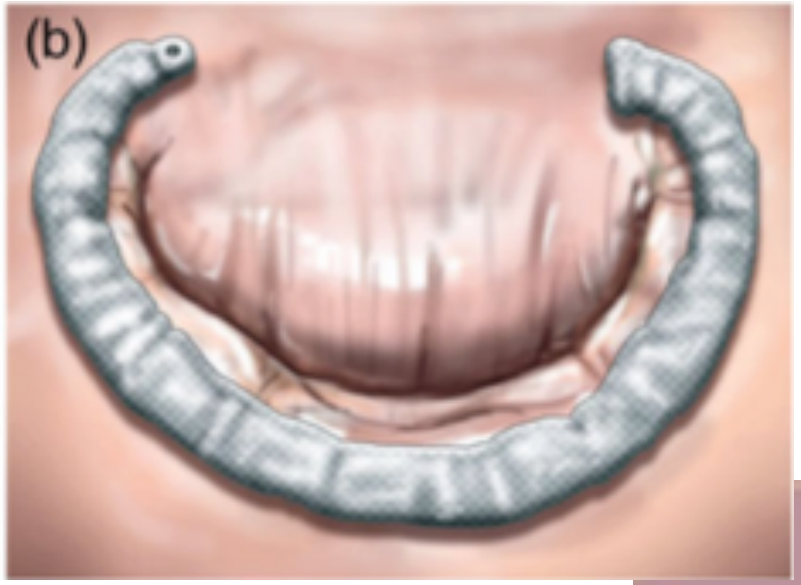

A
B
C
D
LOCK LINE
GRIPPER LINE

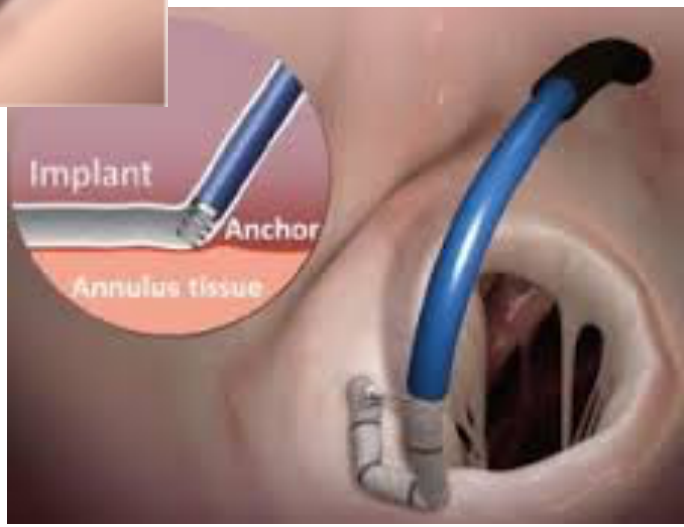

LAO 6 CRA
LA
LV



Cardioband

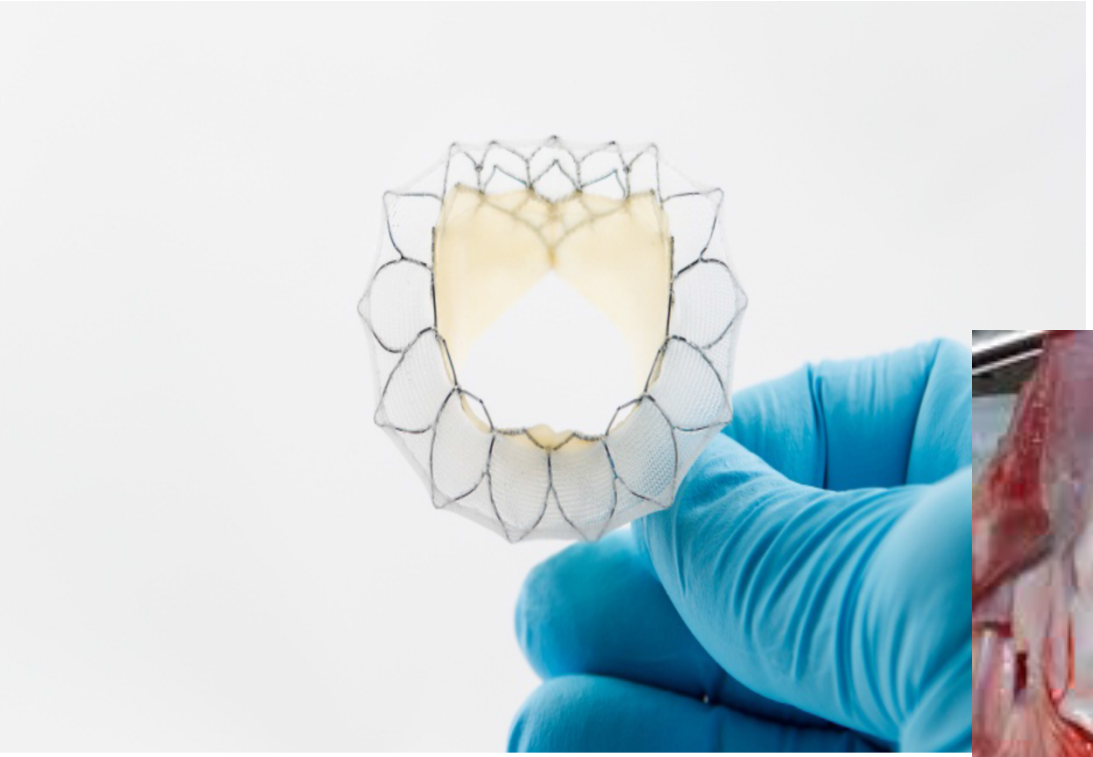


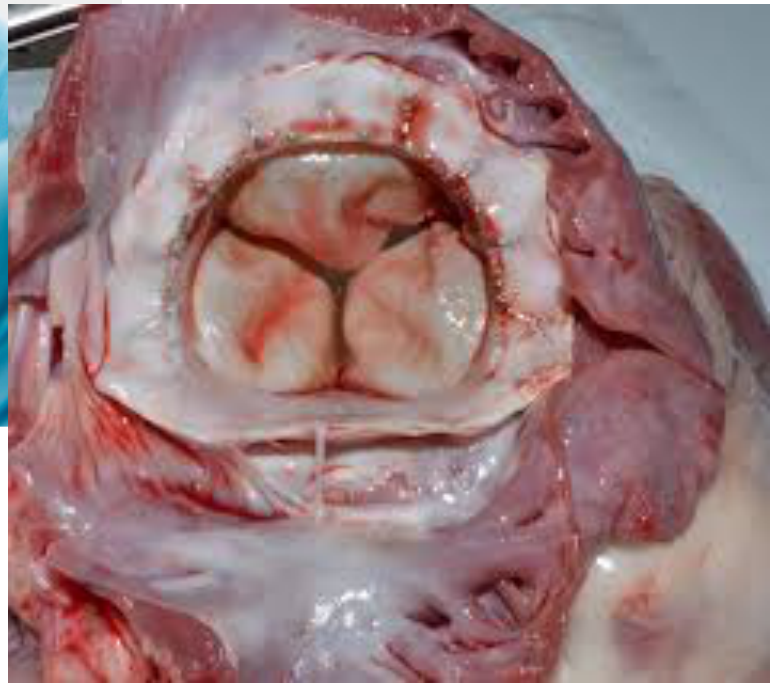




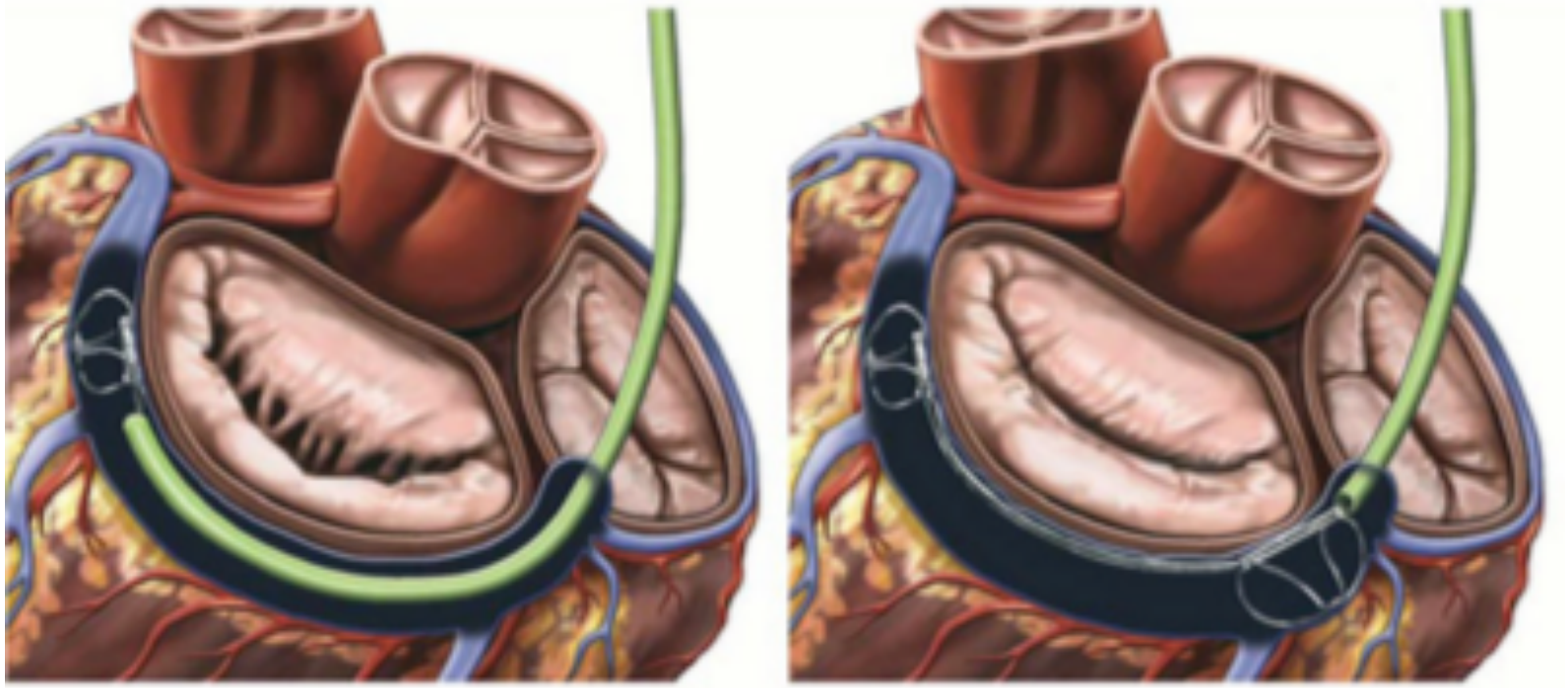
Přímá annuloplastika

Náhrada mitrální chlopně



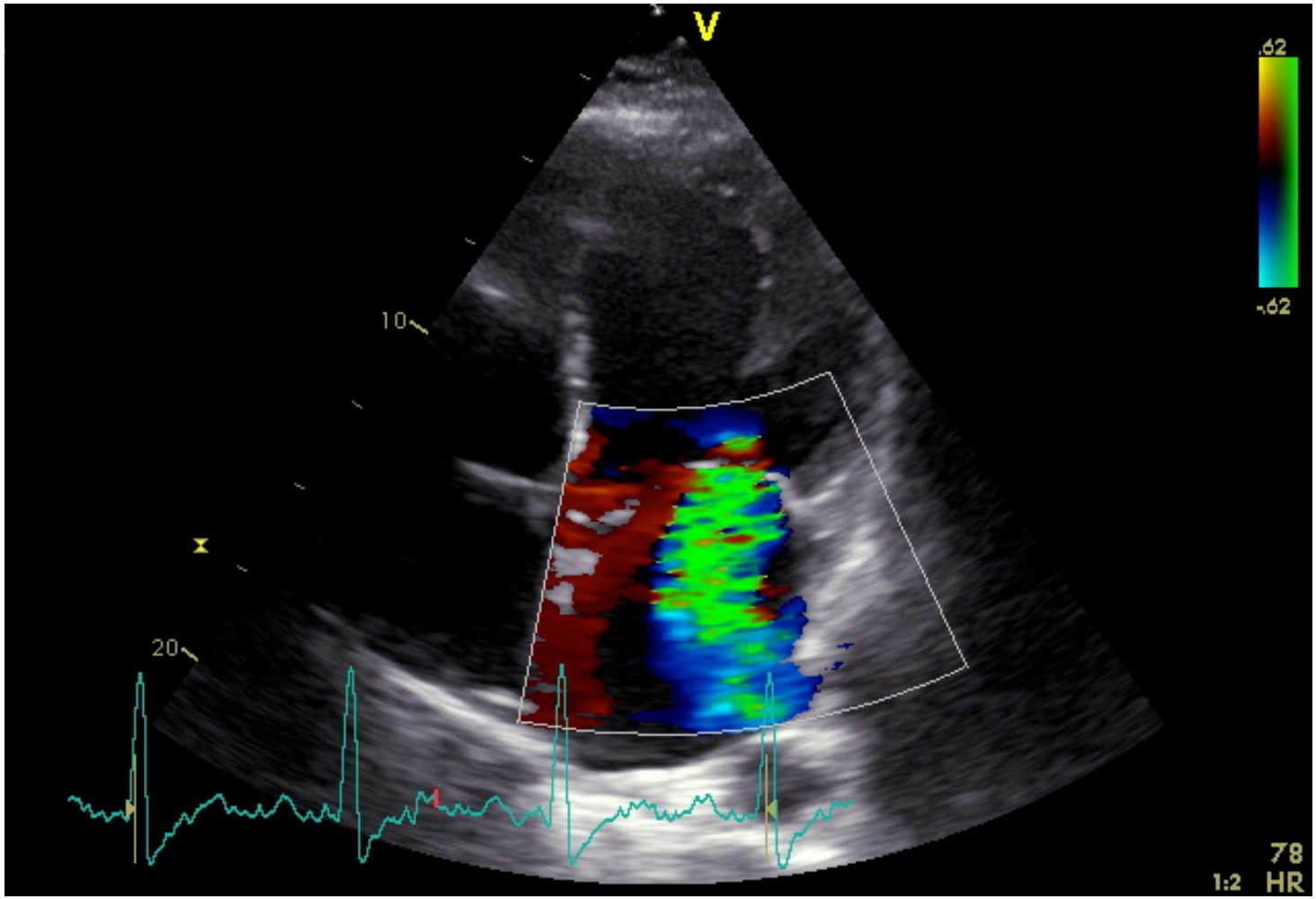


CARILLON

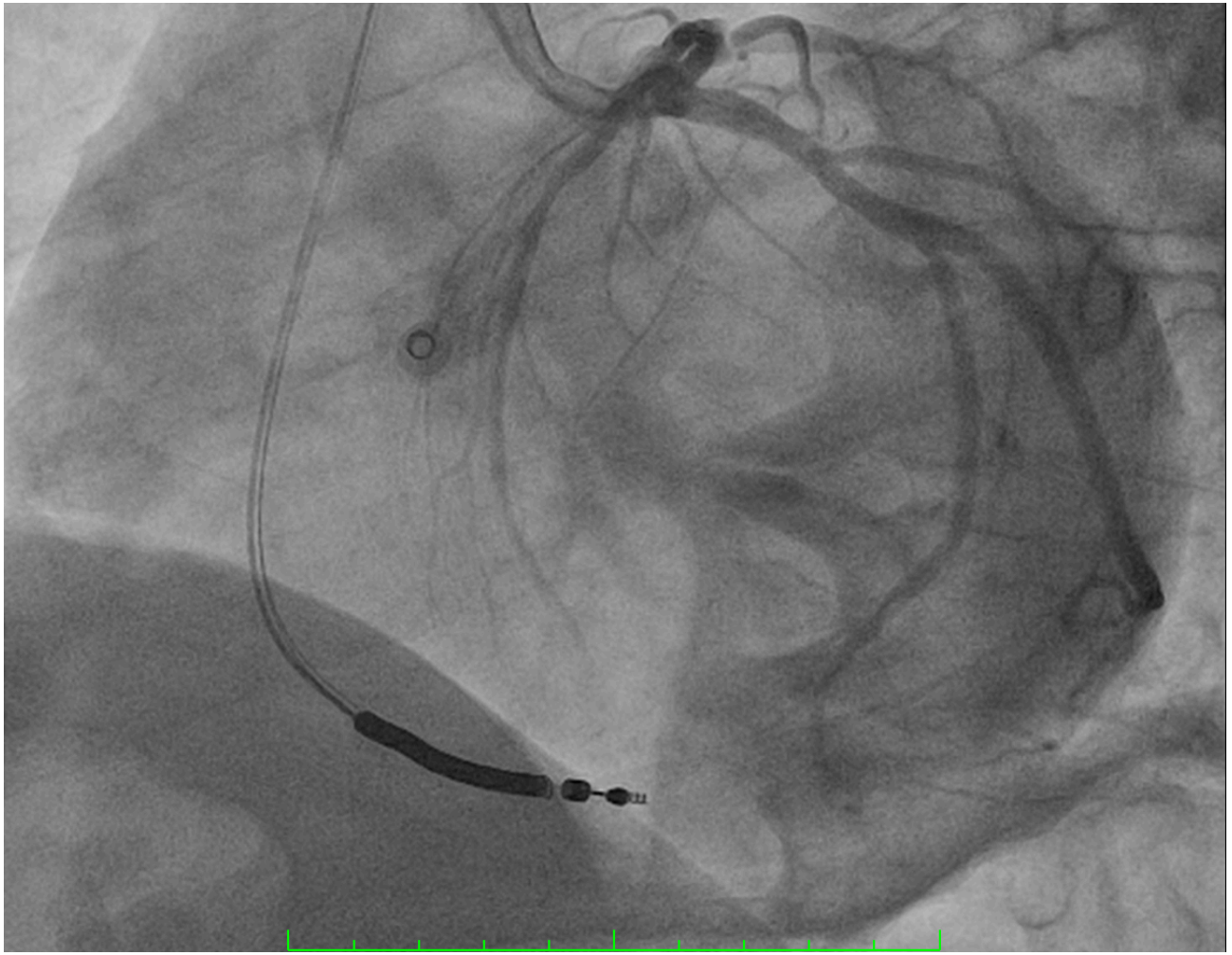


Nepřímá anuloplastika cestou koronárního sinu

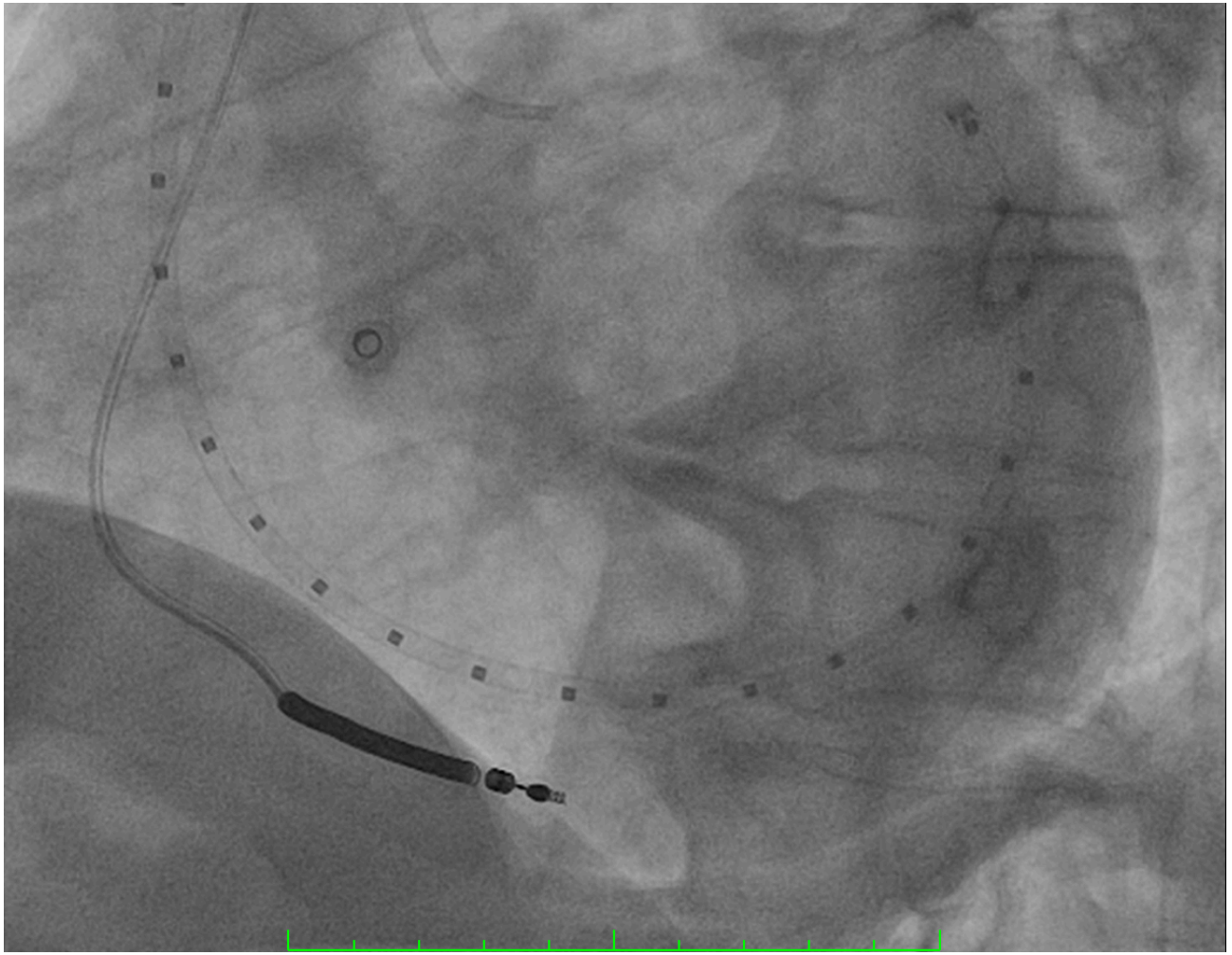
F-MR: CARILLON DEVICE



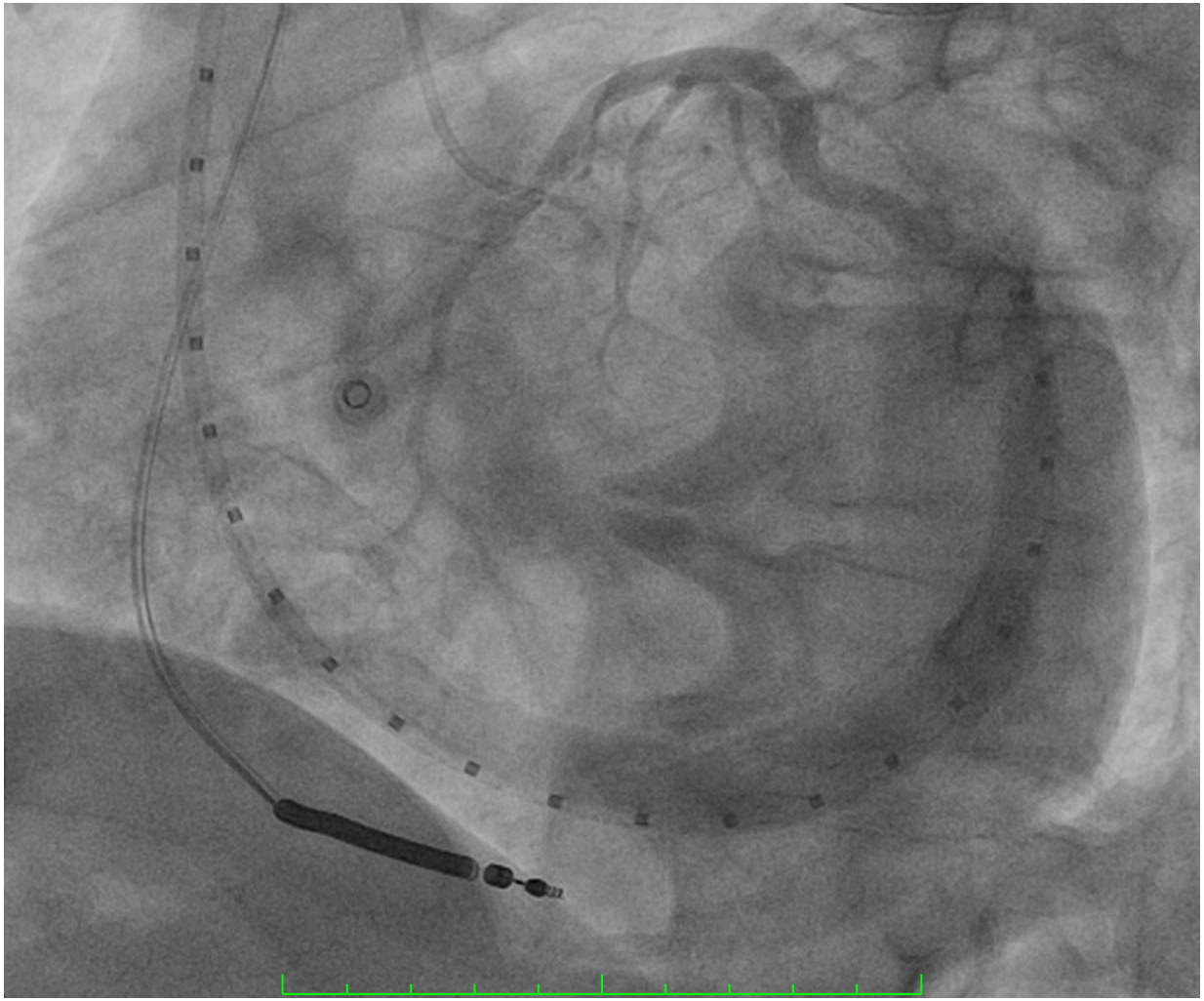
F-MR: CARILLON implantace



F-MR: CARILLON implantace

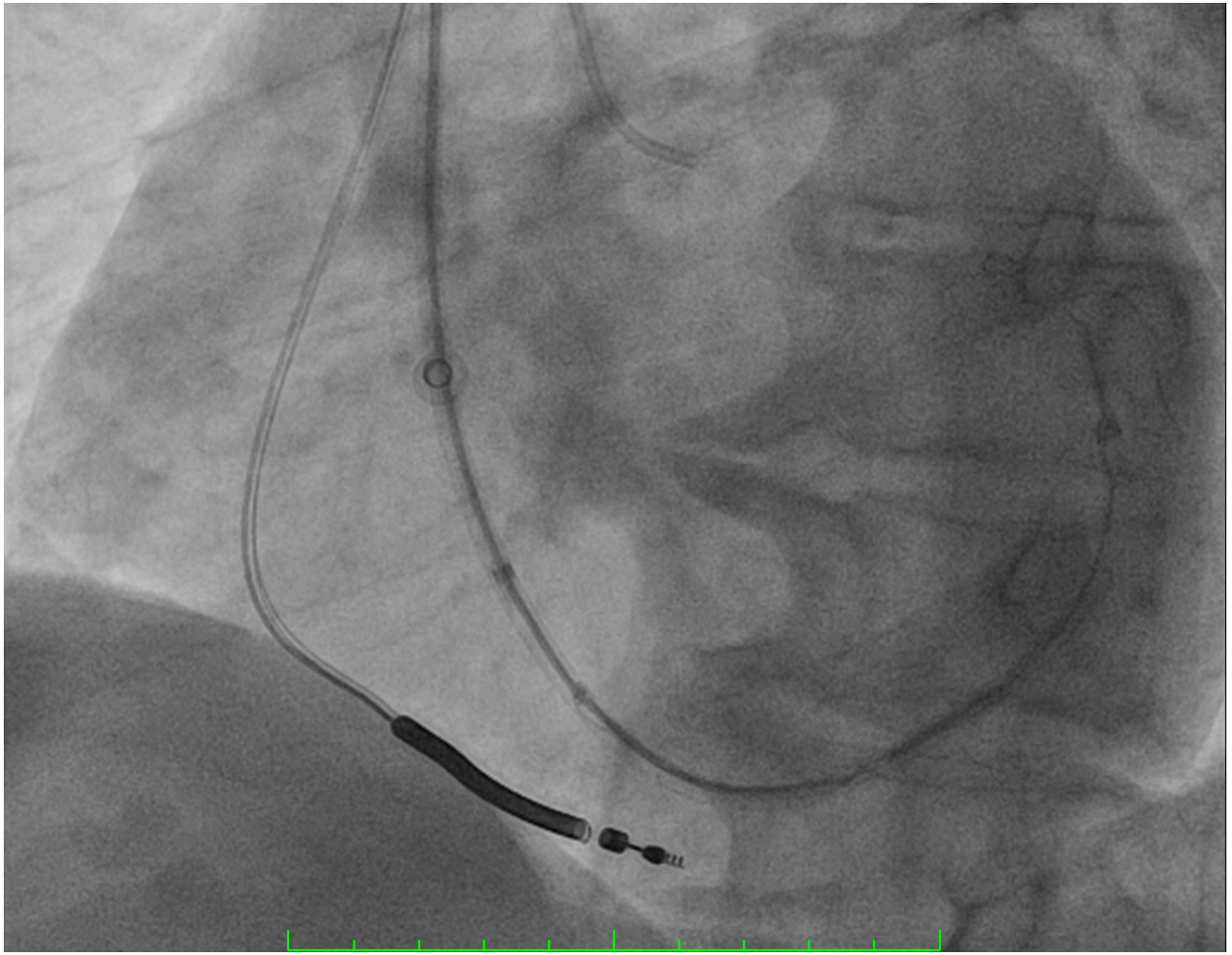


F-MR: CARILLON implantace

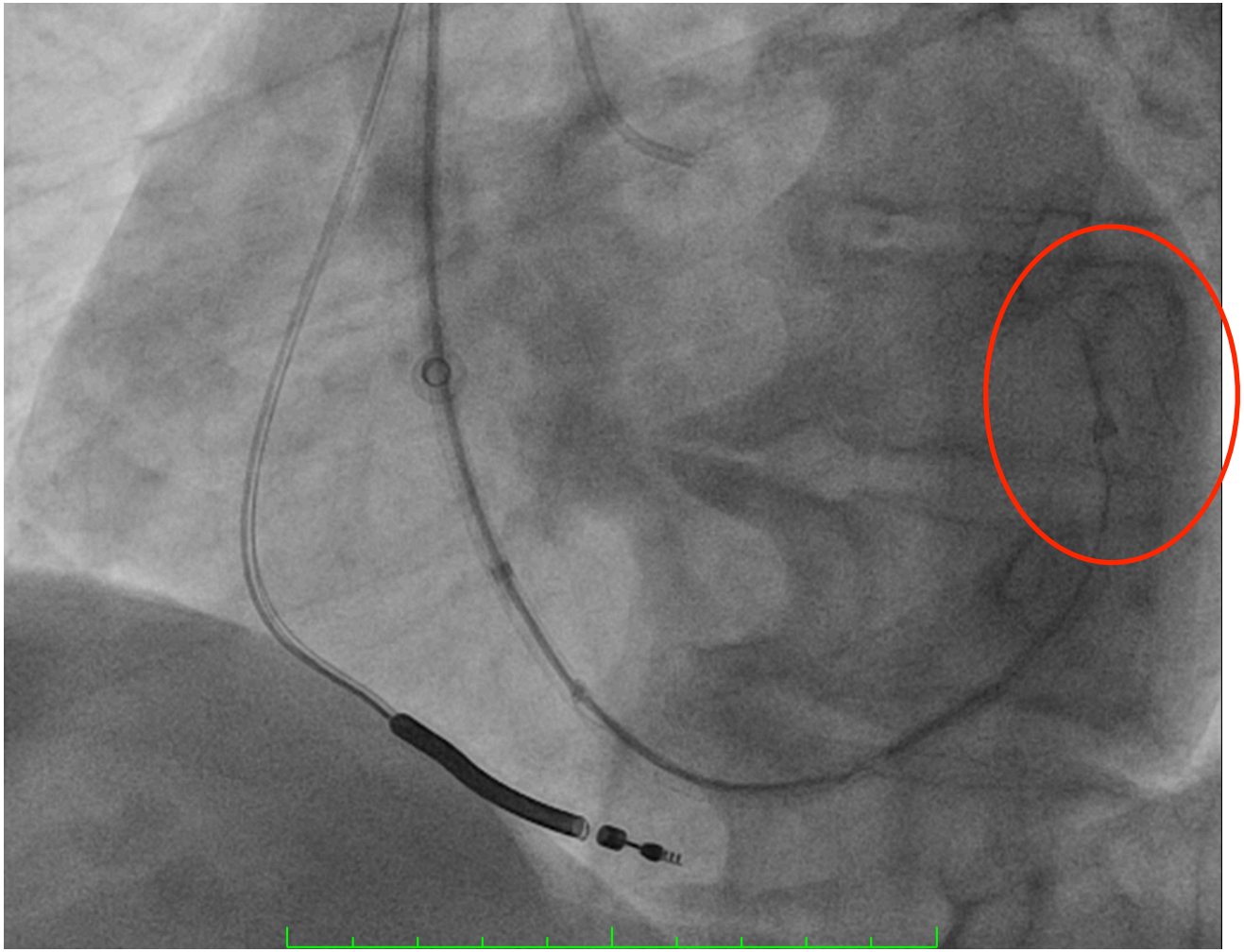



MERILOVA, Marie
Acquisition
Reference 1
76 kV
703 mA
6 ms
Rot +39°
Ang +2°
Height +5 cm
SID 108 cm
FD 27 cm
Exp 15 tps
Fluo Low
Time 44:48
0.44 mGy/s
17 min
AK 1669.89 mGy
10:46 AM

F-MR: CARILLON implantace



F-MR: CARILLON implantace



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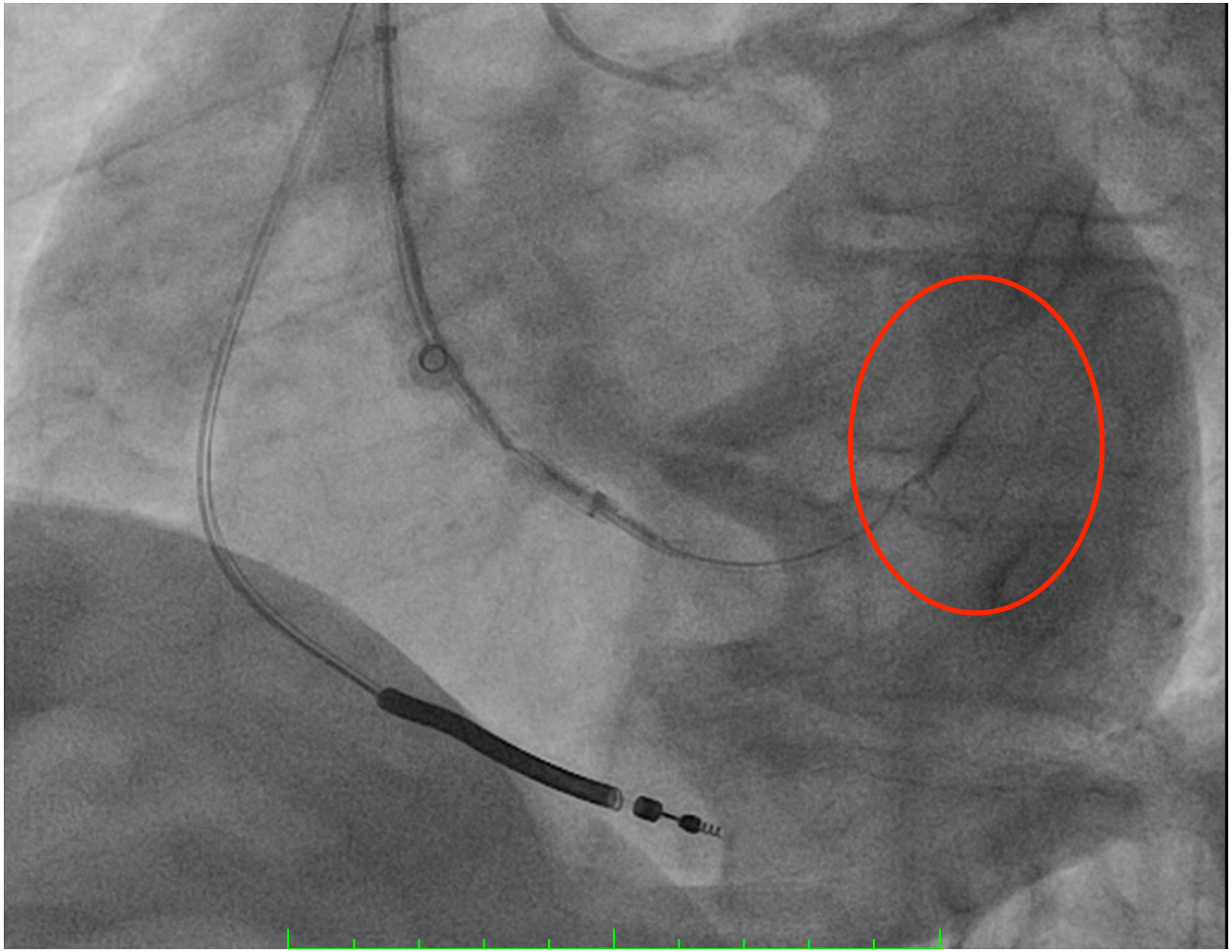

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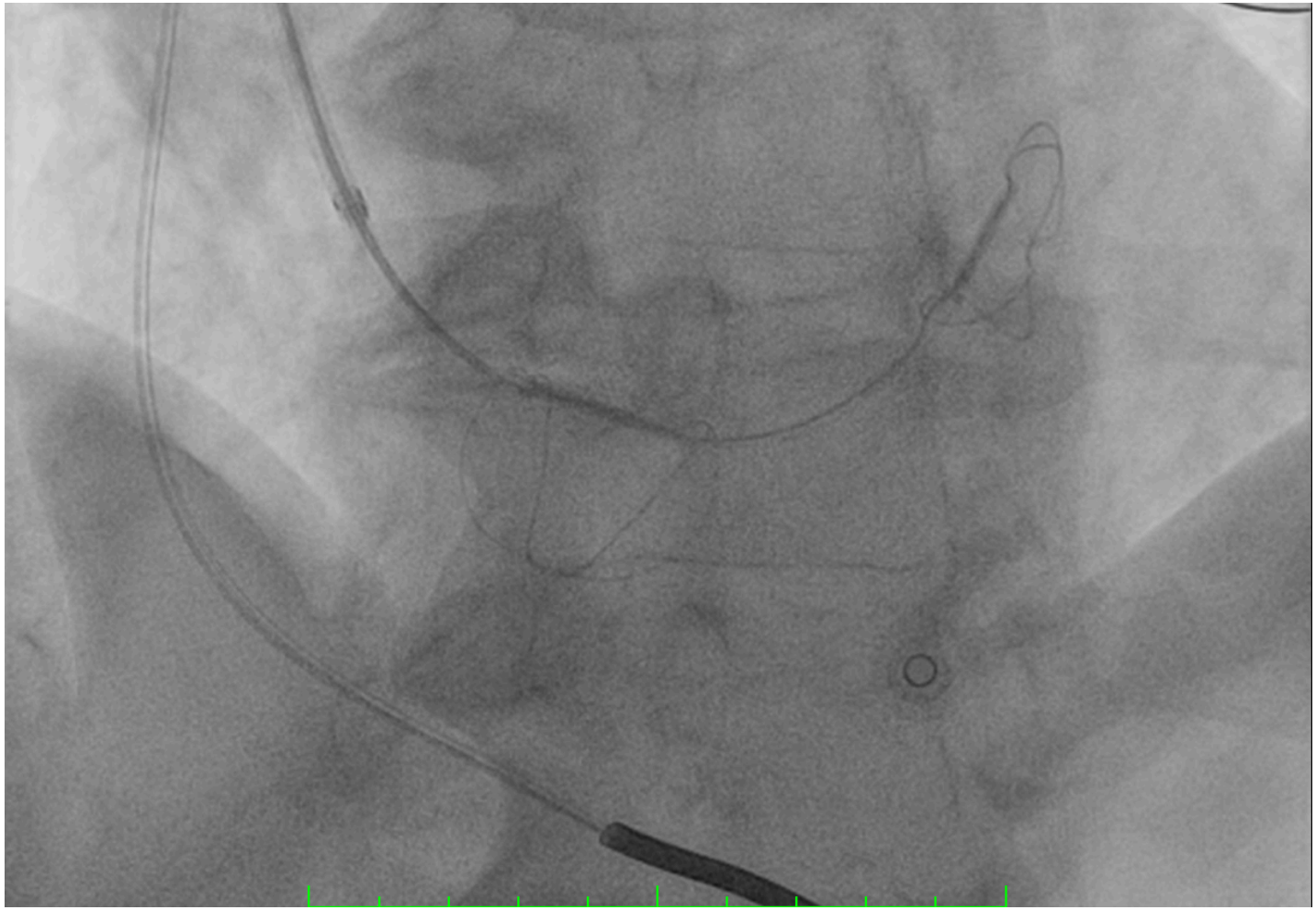

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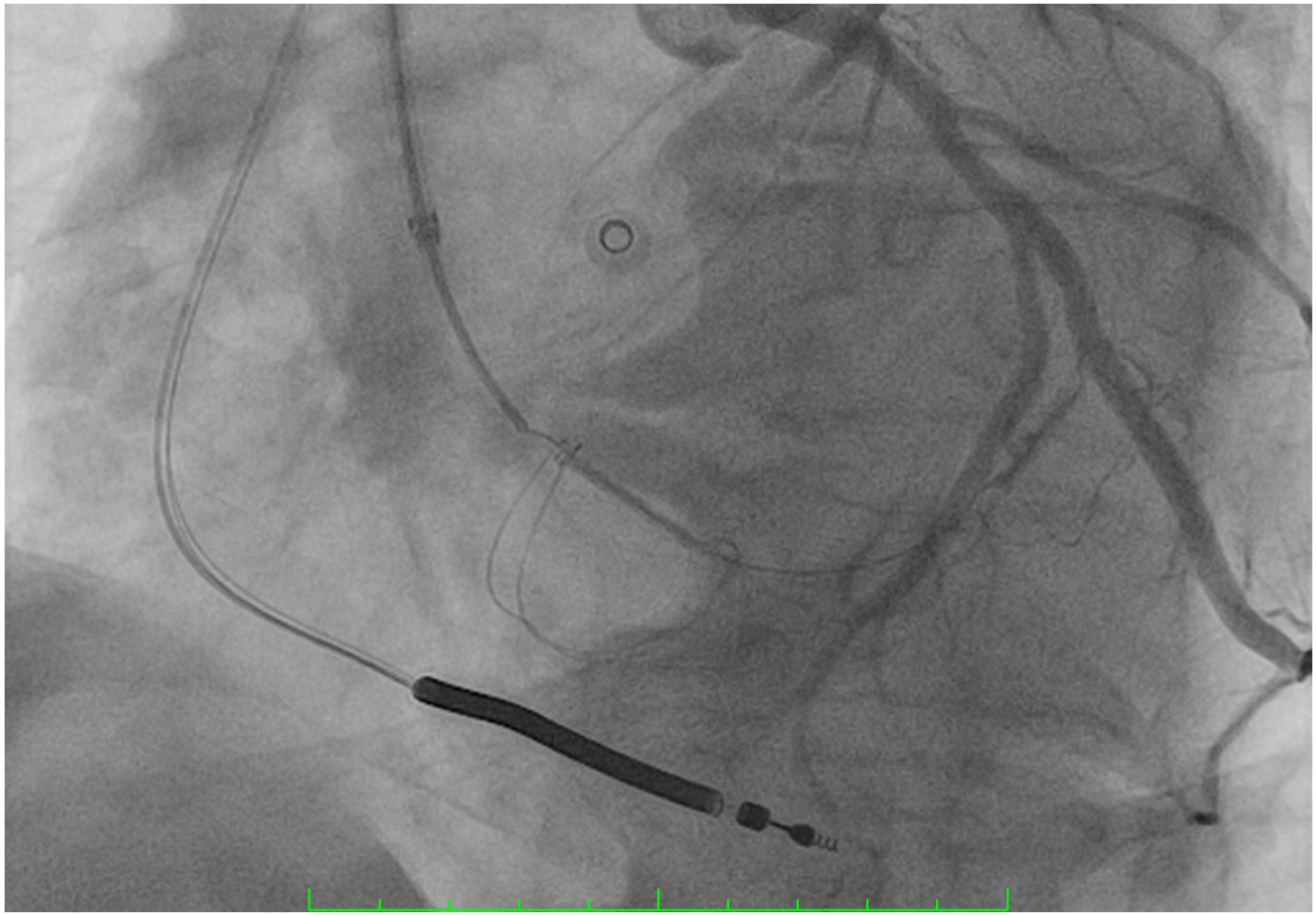


Mitrální valve-in-?

Degenerované bioprotézy

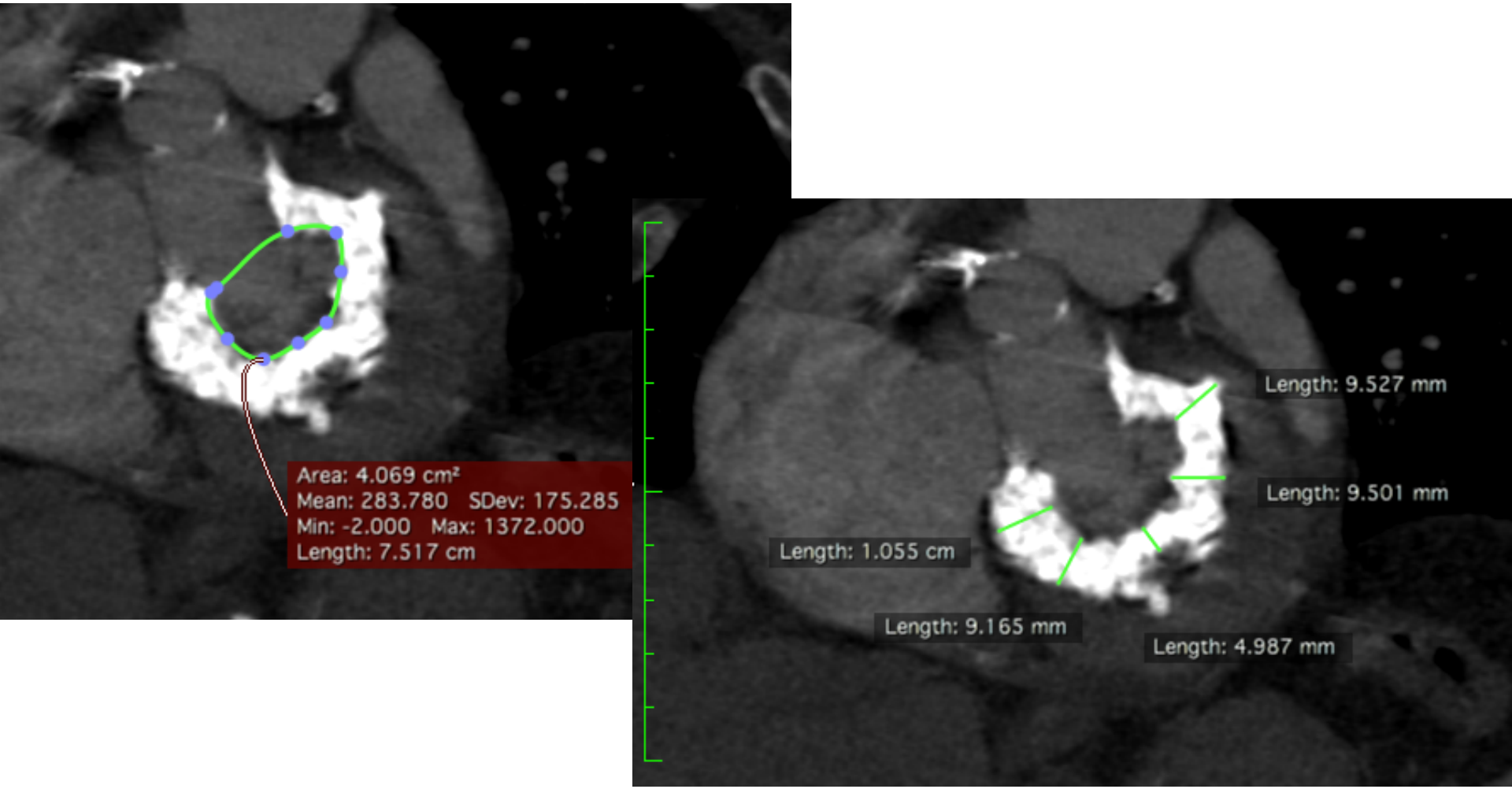
Annuloplastika ringem

? Kalcifikovaná MS (riziko obstrukce LVOT)

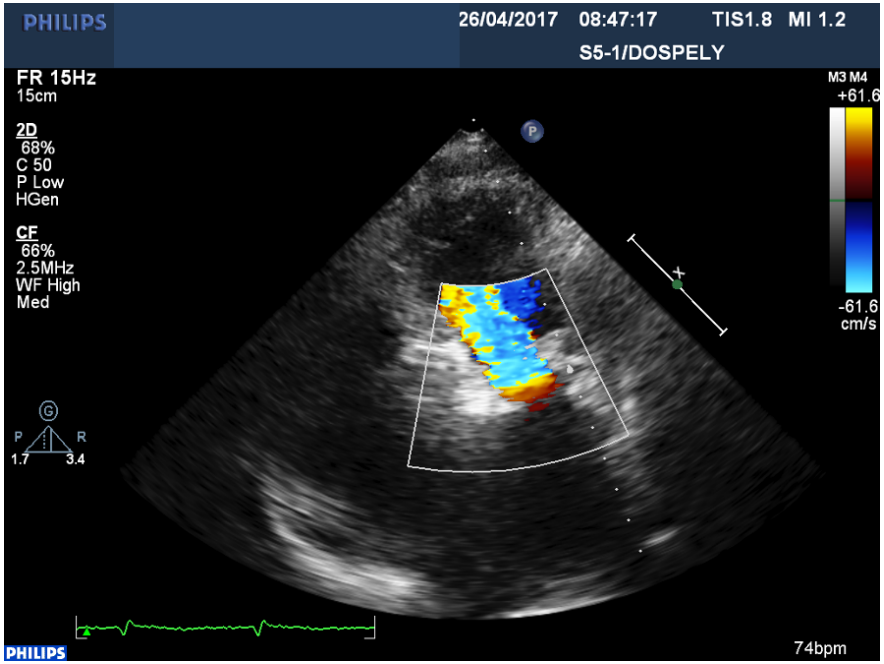
VIVID registr (17 pts.) naznačuje bezpečnost ViV a ViR procedur, chlopně < 25mm asociovány s vyšším reziduálním gradientem *

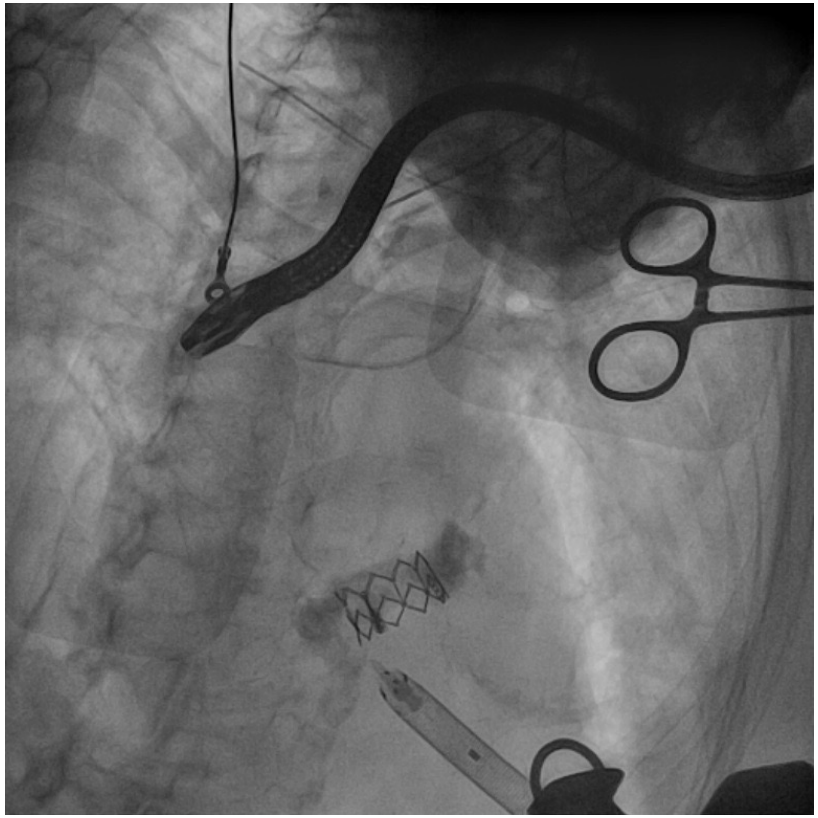
*Bouleti C, et al. JACC Cardiovasc Interv 2015

Mitrální valve-in-?



Mitrální valve-in-?





Aortální stenóza

BAV

Vysoká četnost časné restenózy prakticky odsunula BAV do pozice bridge-to-?

AS

Těžká AS + symptomy -> Heart Team

Těžká AS + dysfunkce LK -> Heart Team

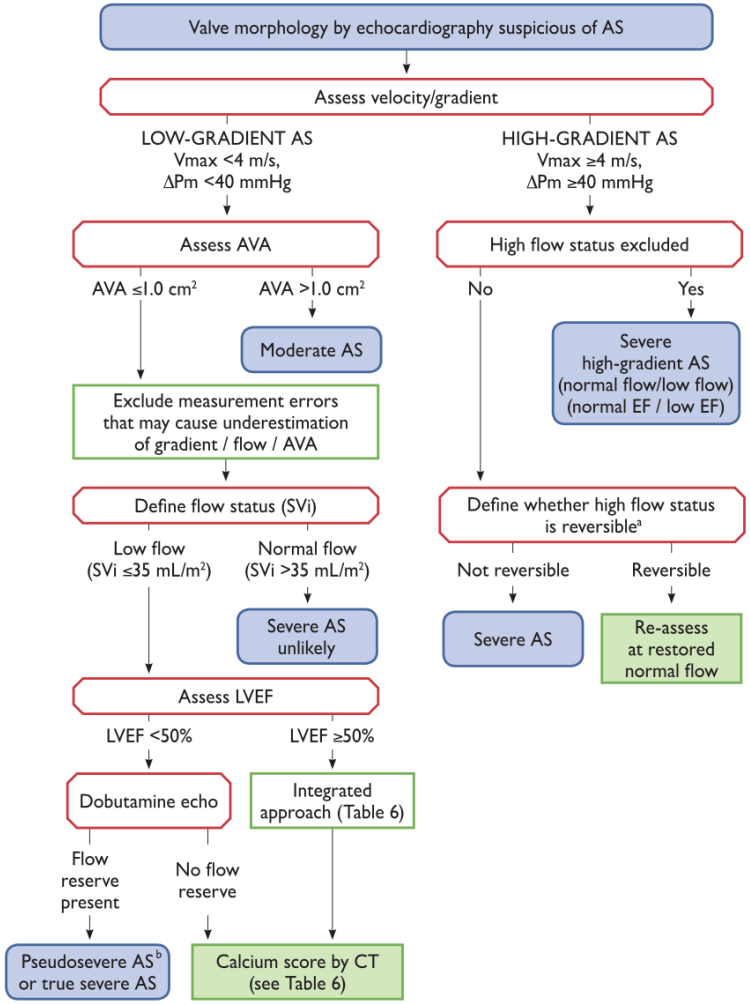
Těžká AS bez symptomů -> zátěž /(pomocná kritéria)

LF-LG AS -> expertní dovyšetření

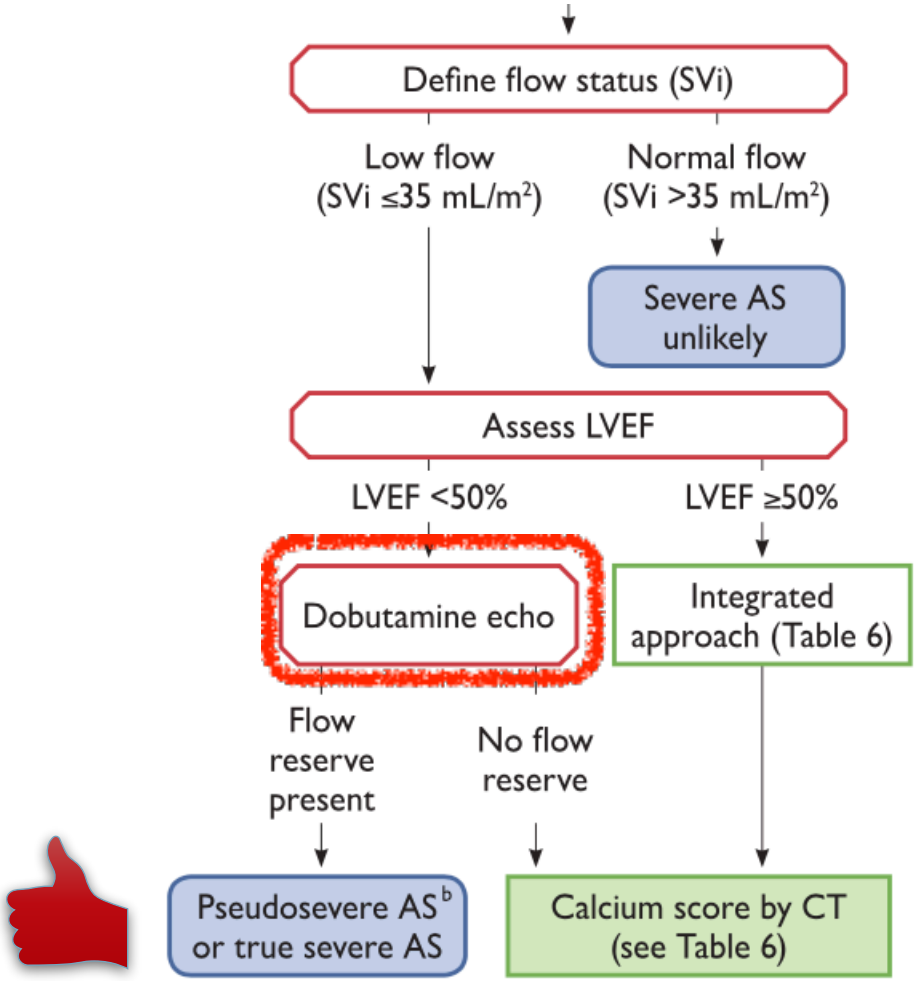
P-LF-LG AS -> expertní dovyšetření

Střední AS + symptomy -> dovyšetření (SKG ...) po vyloučení jiných příčin (anémie / spiro..)

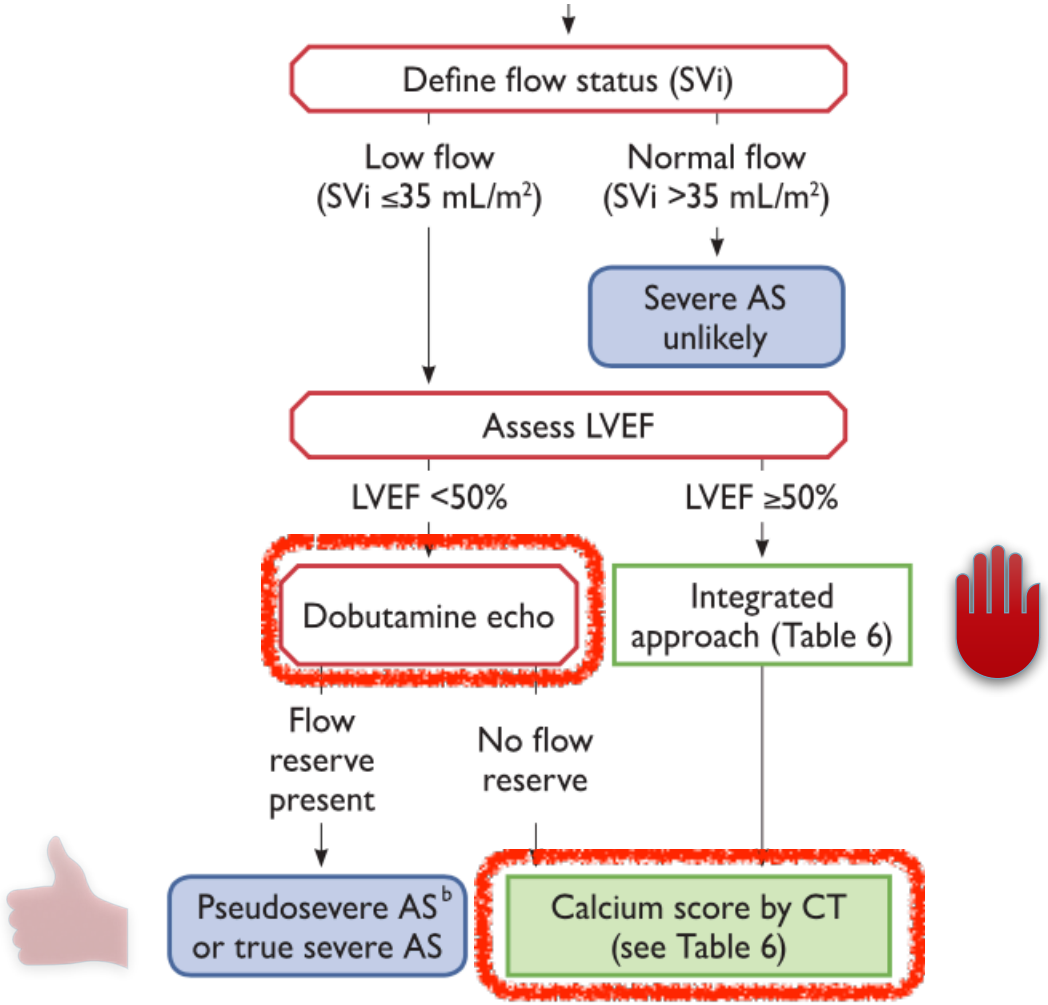
AS - novinky 2017



AS - novinky 2017

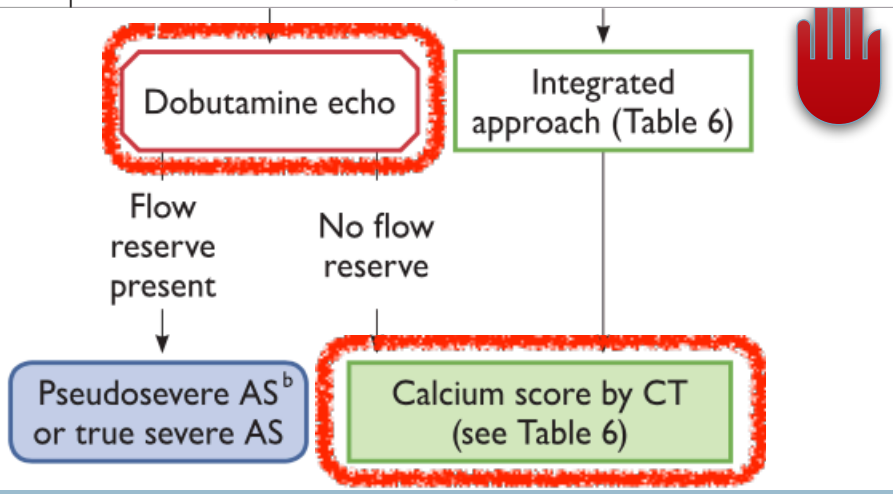


AS - novinky 2017



AS - novinky 2017

Criteria	
Clinical criteria	• Typical symptoms without other explanation • Elderly patient (>70 years)
Qualitative imaging data	• LV hypertrophy (additional history of hypertension to be considered) • Reduced LV longitudinal function without other explanation
Quantitative imaging data	• Mean gradient 30–40 mmHg[a]
	• AVA ≤0.8 cm^2
	• Low flow (SVi <35 mL/m^2) confirmed by techniques other than standard Doppler technique (LVOT measurement by 3D TOE or MSCT; CMR, invasive data)
	• Calcium score by MSCT[b] Severe aortic stenosis very likely: men ≥3000; women ≥1600 Severe aortic stenosis likely: men ≥2000; women ≥1200 Severe aortic stenosis unlikely: men <1600; women <800

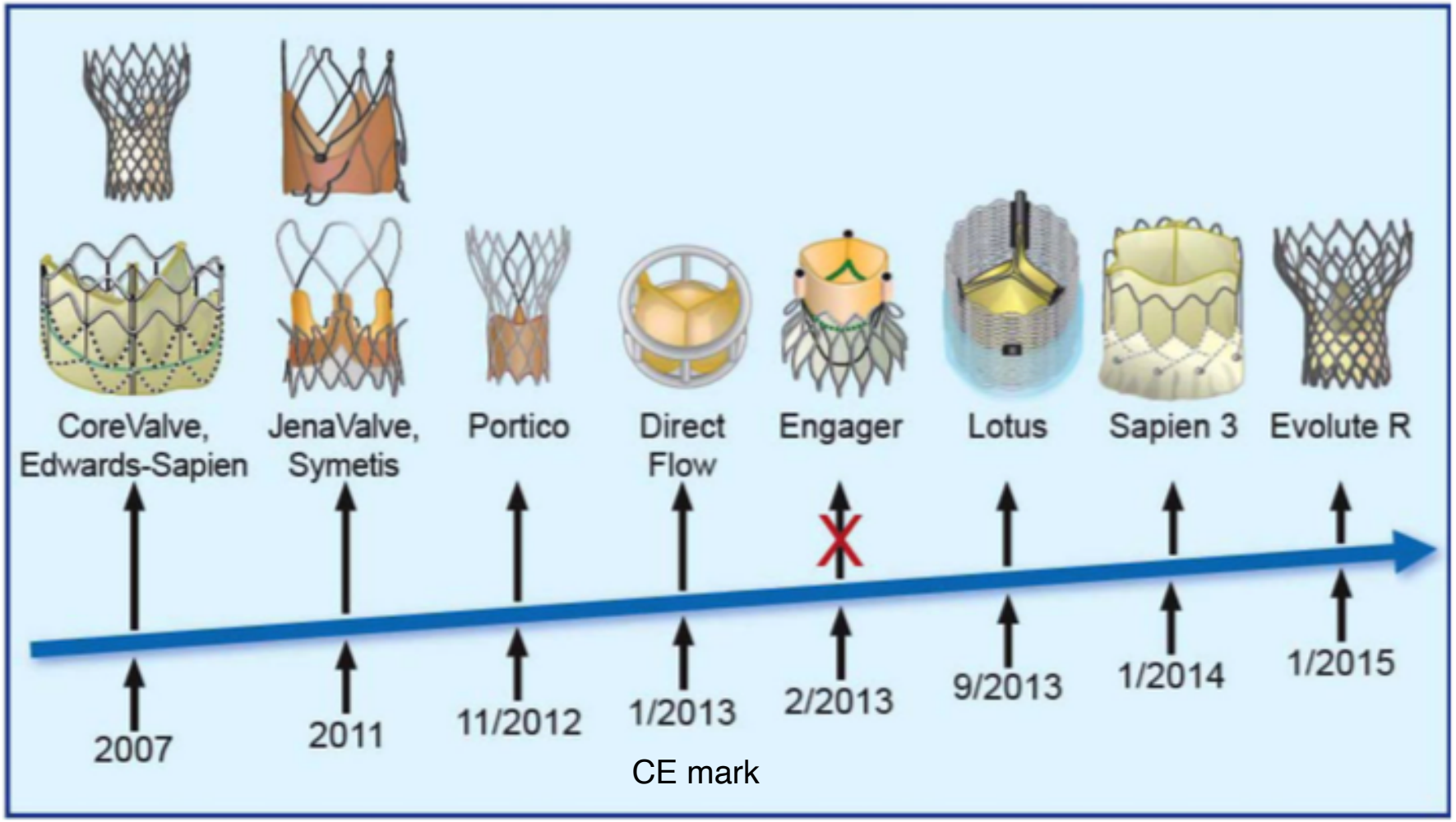


AS - novinky 2017

The choice for intervention must be based on careful individual evaluation of technical suitability and weighing of risks and benefits of each modality (aspects to be considered are listed in the according table). In addition, the local expertise and outcomes data for the given intervention must be taken into account.	I	C
SAVR is recommended in patients at low surgical risk (STS or EuroSCORE II <4% or logistic EuroSCORE I <10% and no other risk factors not included in these scores, such as frailty, porcelain aorta, sequelae of chest radiation).	I	B
TAVI is recommended in patients who are not suitable for SAVR as assessed by the Heart Team.	I	B

??? Nové paradigma - nehledáme pacienty pro TAVI, ale pro chirurgy …..

TAVI


CoreValve, Edwards-Sapien
JenaValve, Symetis
Portico
Direct Flow
Engager
Lotus
Sapien 3
Evolute R
2007
2011
11/2012
1/2013
2/2013
9/2013
1/2014
1/2015
CE mark

TAVI

Partner A : TAVI vs. SAVR – 5leté přežití podobně cca. 35% *

Partner B : TAVI vs. BMT – cca. 22% absolutní mortalitní benefit TAVR vs. BMT (kde přežilo 6/179 vs. 49/179 pts.) **

*Smith CR, et al. NEJM 2011
**Leon MB, et al. NEJM 2010

TAVI – 30-denní riziko

Mortalita ≤5%
CMP 2.5%
TKS 10-30%
Vaskulární komplikace 5%

Vylepšený sealing
Optimalizace instrumentaria
Možnost repozice, ~~BAV~~
Learning curve

TAVI – omezený benefit

- Pokročilá CHRI
- Pokročilá COPD (6MWT < 150m)

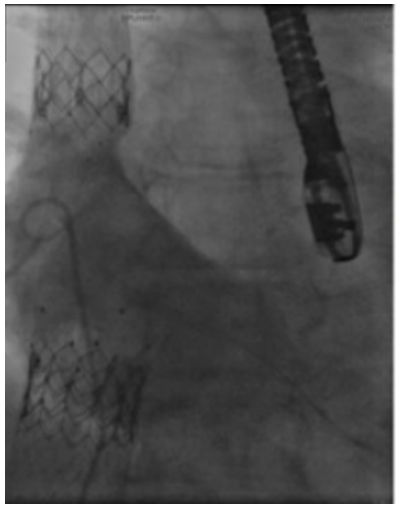
- „Frailty“

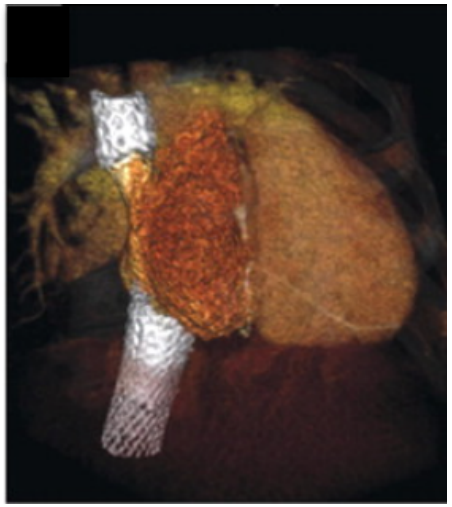
- LVEF < 30%
- Nízká kontraktilní rezerva
- PH (mimo izolovaně postkapilární)
- Nízký transaortální gradient
- Nízký SV (35ml/m2)

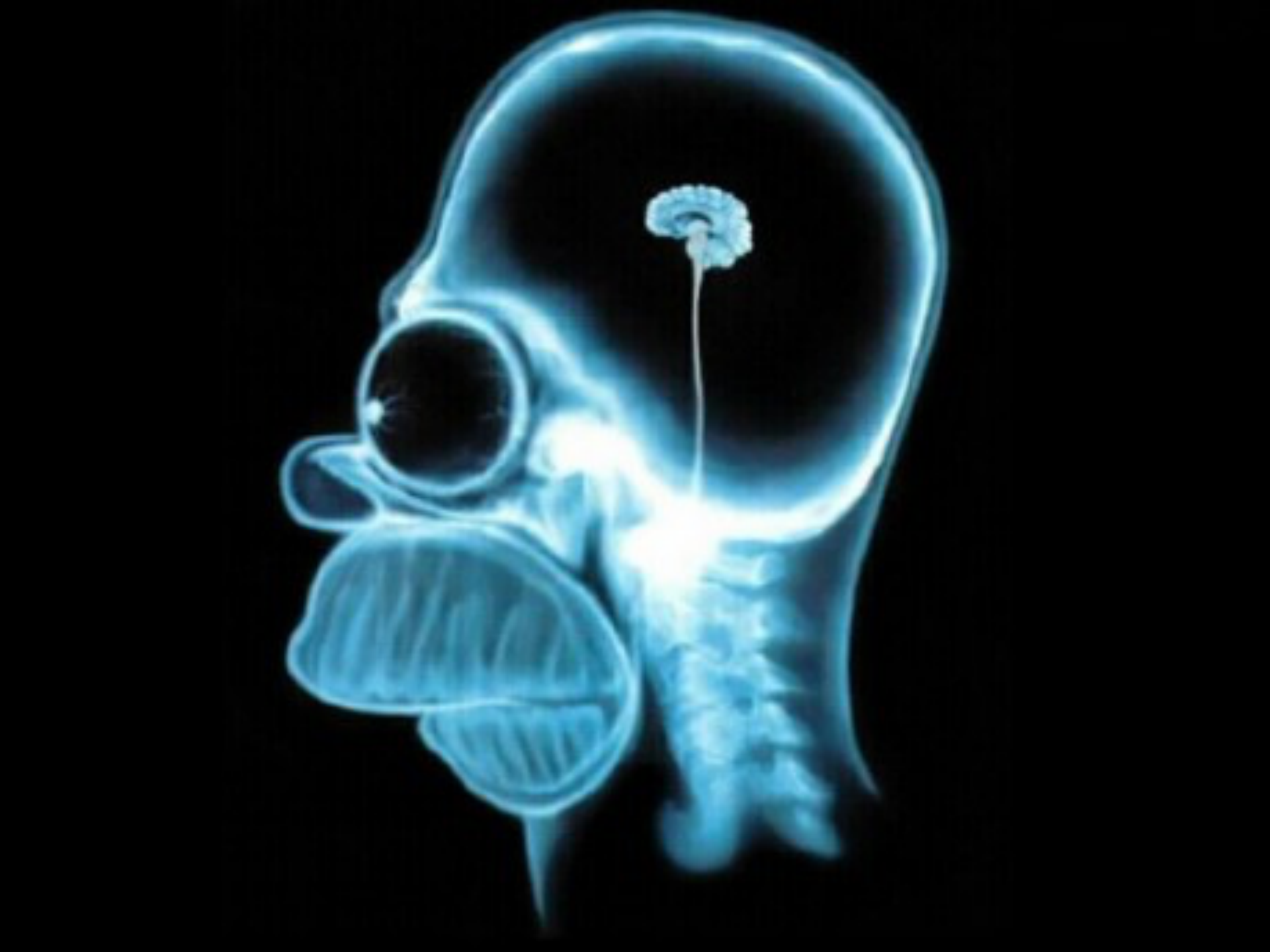
Trikuspidální regurgitace

Trikuspidální regurgitace

- Výkony na chlopni – koncepty kopírují mitrální procedury
- ~~Ortotopická náhrada~~ - komplikovaná anatomie a fixace (anulus až >70mm)
- Heterotopická implantace
- ViV procedury







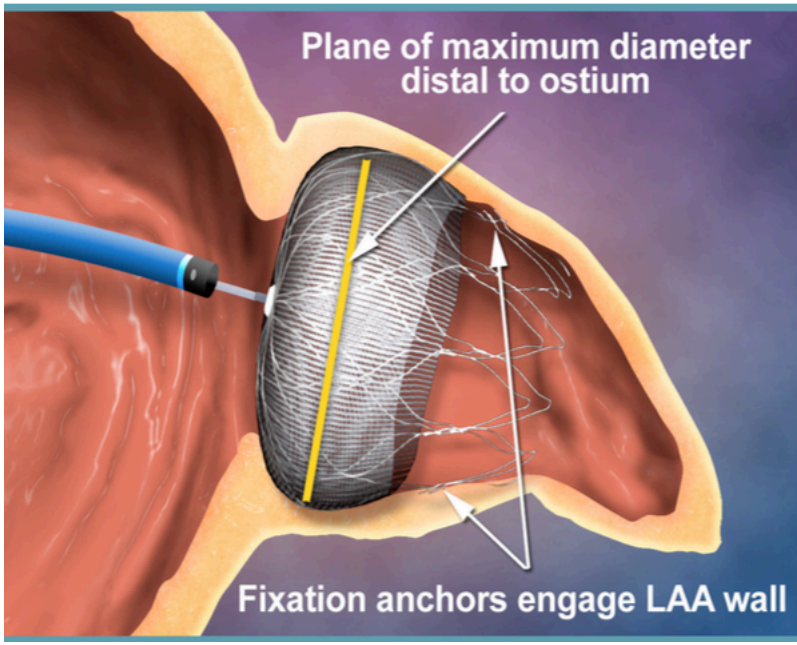
Uzávěr ouška levé síně

Indikace

Potential indications	Examples
A. Patient not eligible for long-term OAC therapy (absolute or relative contraindications to OAC)	
1. High risk for bleeding	
History of major or minor bleeding (with or without OAC therapy)	– Intracranial bleeding – GI bleeding – Symptomatic bleeding in critical organ (i.e., ocular, pericardial, spinal cord) – Recurrent epistaxis needing medical attention
Increased risk for bleeding due to physical condition and/or comorbidities	– Recurrent falls with head trauma and significant musculoskeletal injury – Need for additional dual antiplatelet therapy for CAD and stenting – Diffuse intracranial amyloid angiopathy – Bowel angiodysplasia – Severe renal insufficiency/haemodialysis – Blood cell dyscrasia
2. Inability to take OACs for reasons other than high risk for bleeding	– Intolerance – Documented poor adherence to medication – Documented variability in INR on warfarin – Higher risk occupation with increased injury potential – Patient's choice
B. Thromboembolic event or documented presence of thrombus in the LAA despite adequate OAC therapy	
	– Embolic stroke or other systemic thromboembolism on adequate OAC therapy with evidence for thrombus origin from the LAA ("malignant LAA") – Documented thrombus formation in the LAA on adequate OAC therapy

CAD: coronary artery disease; GI: gastrointestinal; OAC: oral anticoagulation

Watchman


Plane of maximum diameter
distal to ostium
Fixation anchors engage LAA wall

Watchman

Prevail

Protect AF

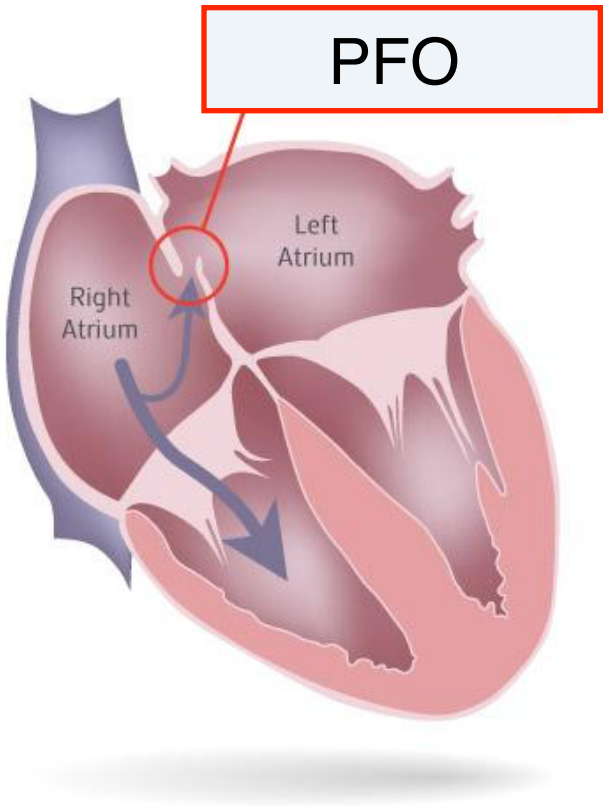
Ewolution registry

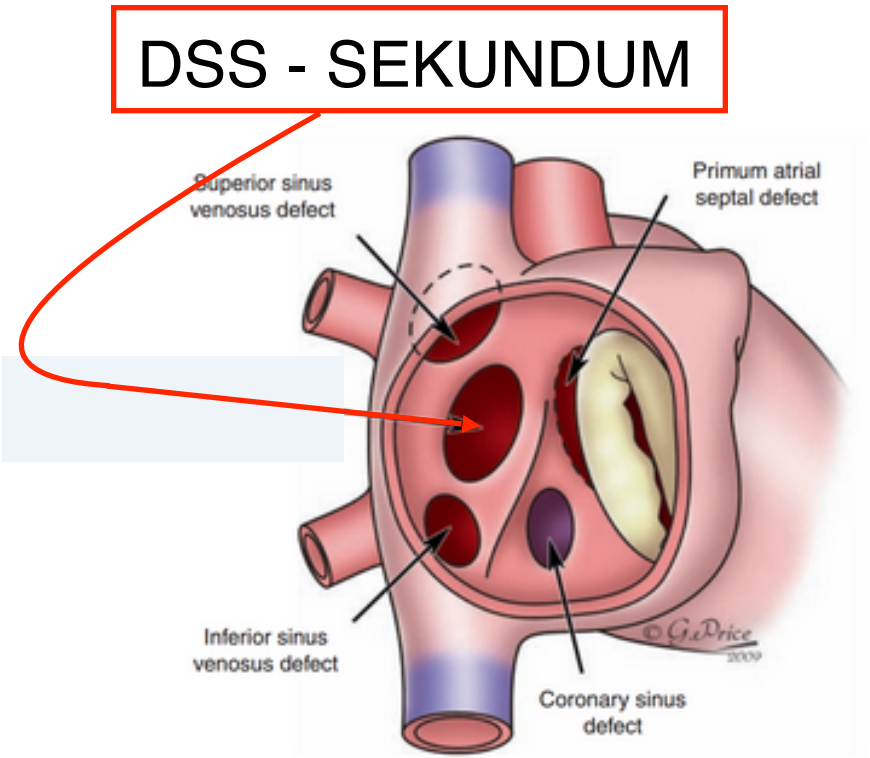
FDA approval

Septální okluze

SEPTÁLNÍ OKLUZE - SPEKTRUM

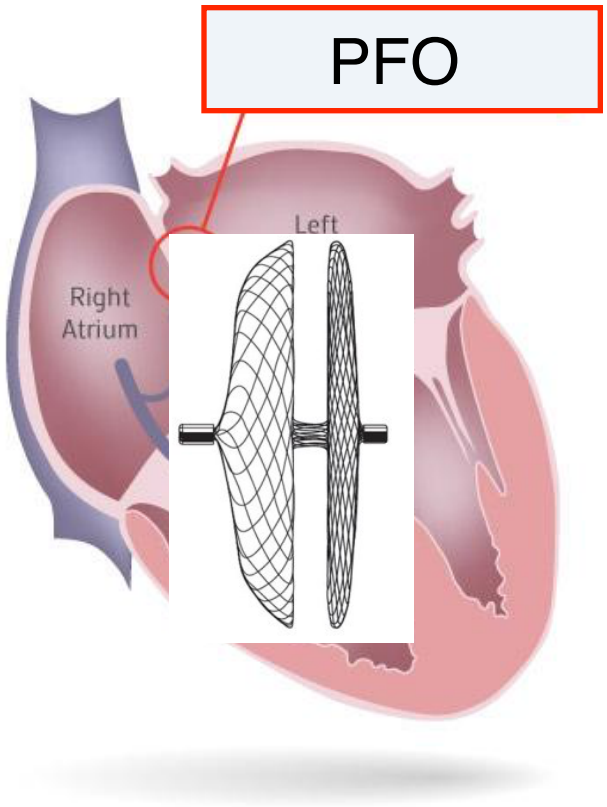
- PFO

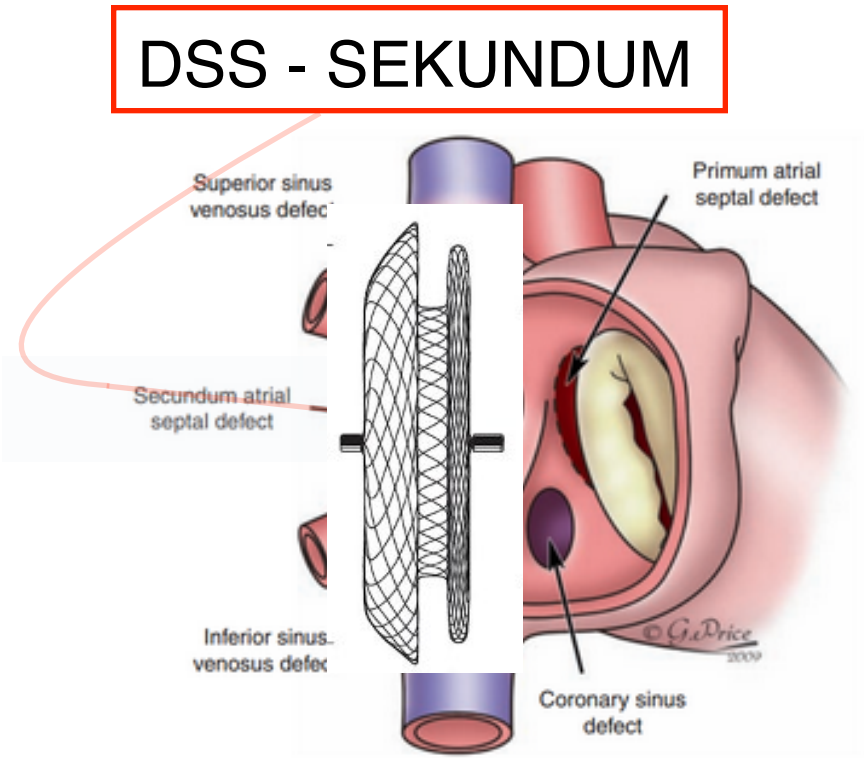




SEPTÁLNÍ OKLUZE - SPEKTRUM

- PFO



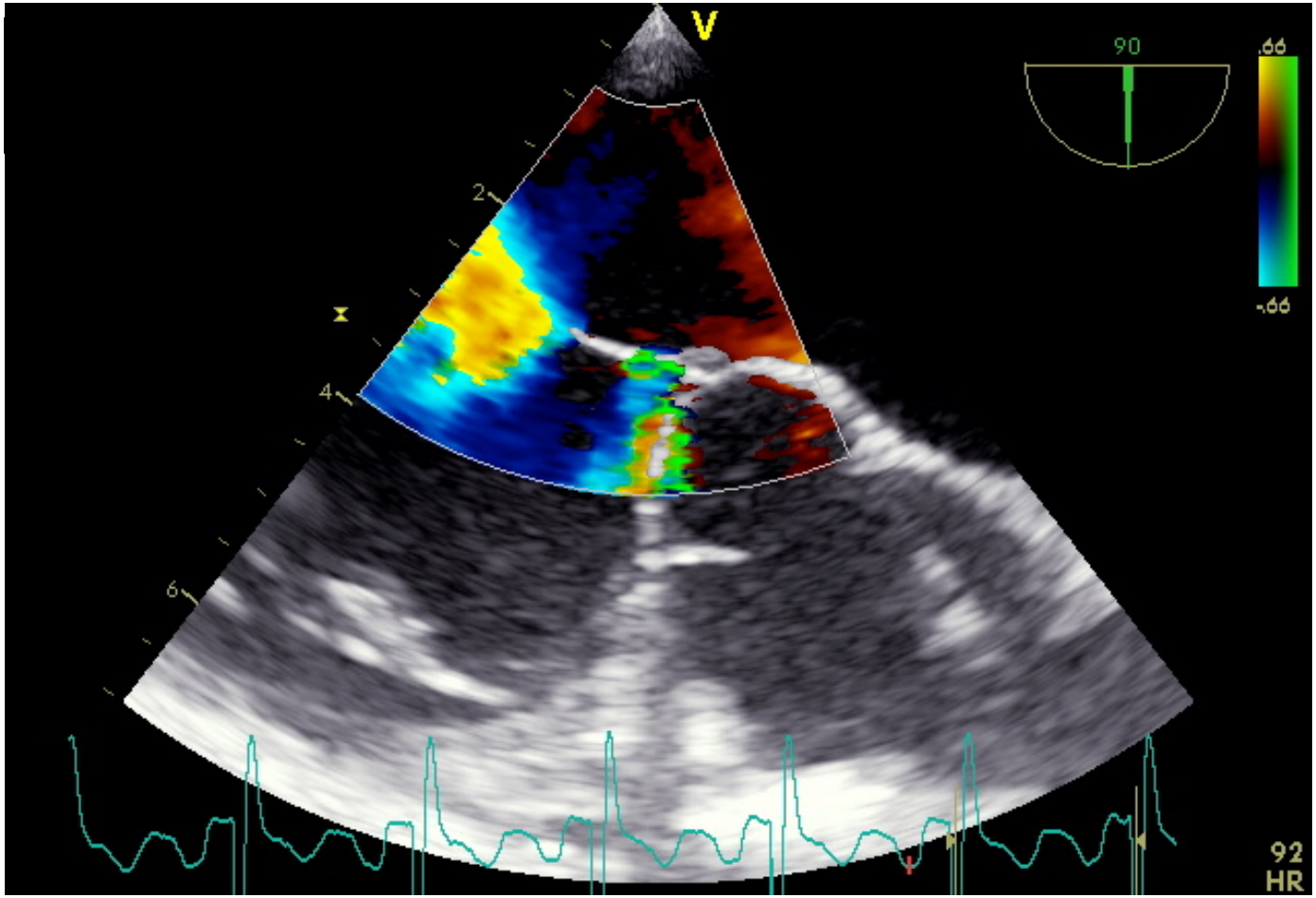


SEPTÁLNÍ OKLUZE - INDIKACE

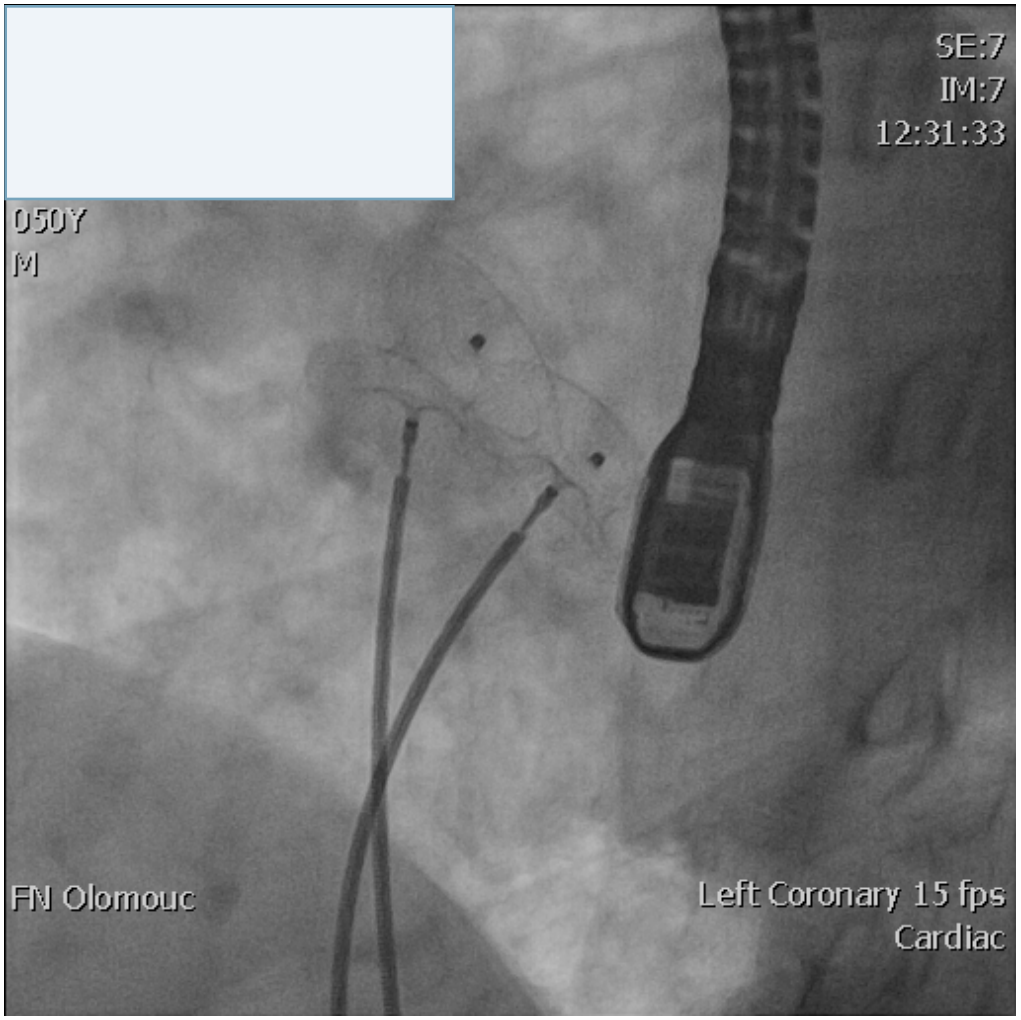
- DSS :
  - Suspekce na paradoxní embolizaci (kryptogenní CMP)
  - Významný L-P zkrat (CAVE! Eisenmenger)
- PFO :
  - Suspekce na paradoxní embolizaci (kryptogenní CMP)

    -> zejména pokud průkaz opakovaných embolizací do CNS alespoň pomocí MRI

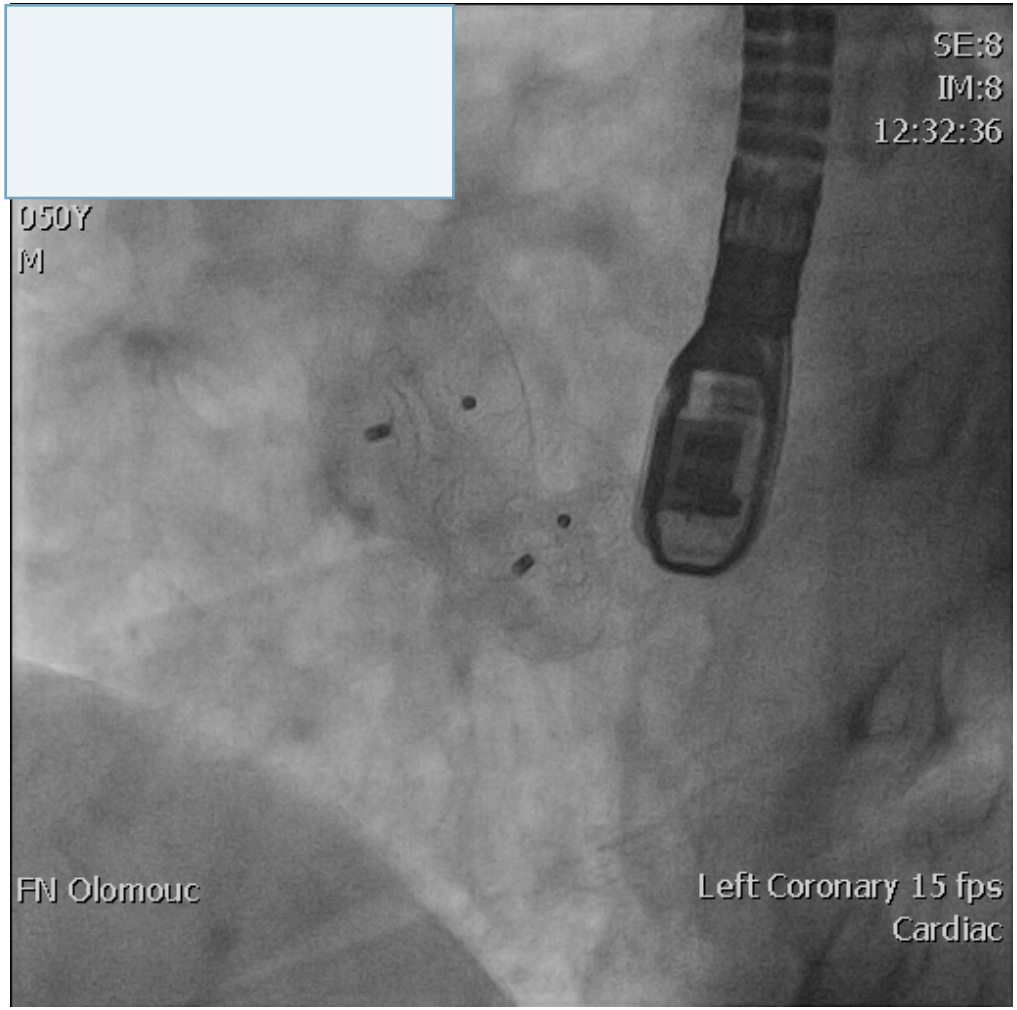
SEPTÁLNÍ OKLUZE - FNOL



SEPTÁLNÍ OKLUZE - FNOL



SEPTÁLNÍ OKLUZE - FNOL

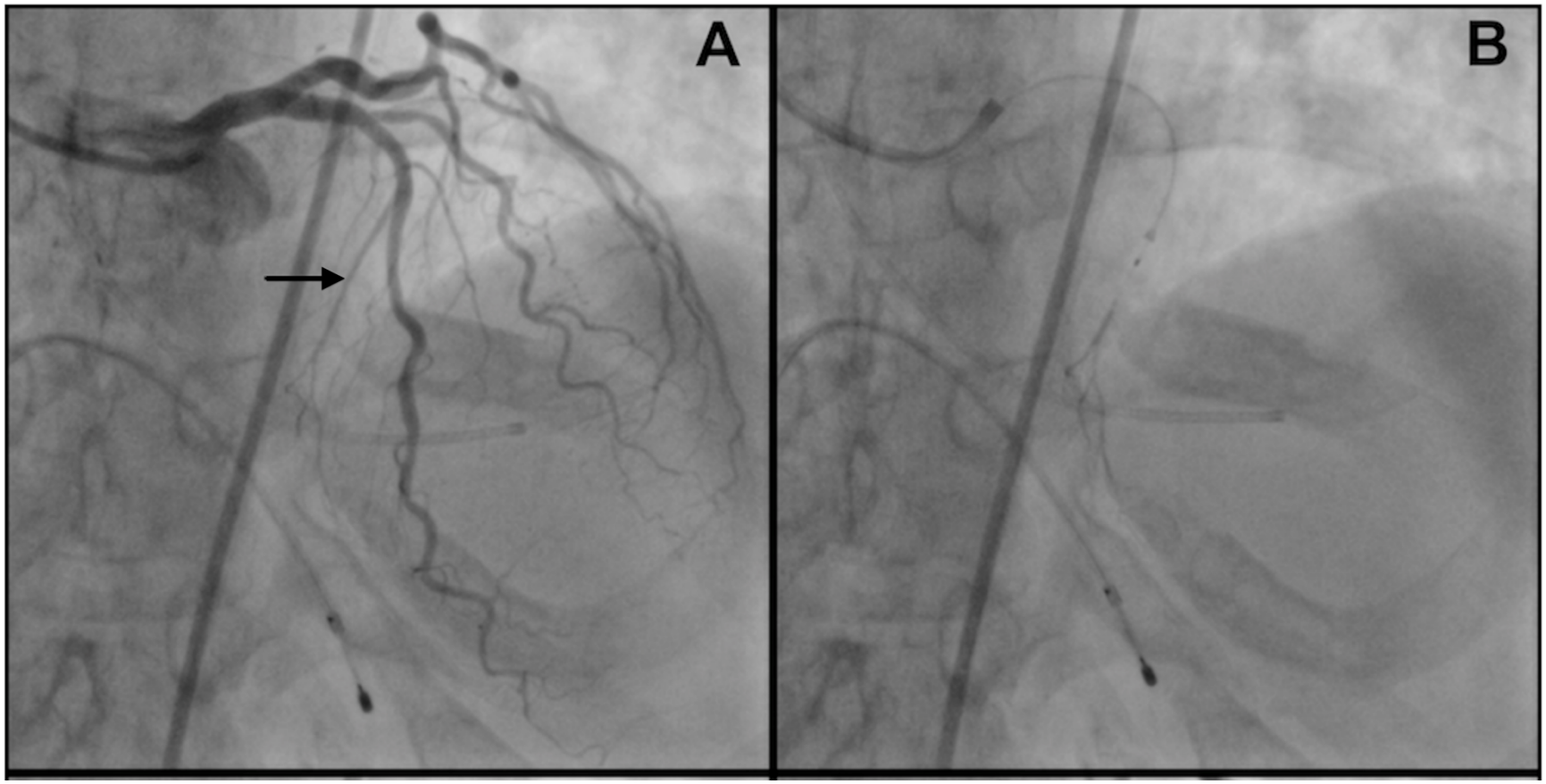


Alkoholová septální ablace

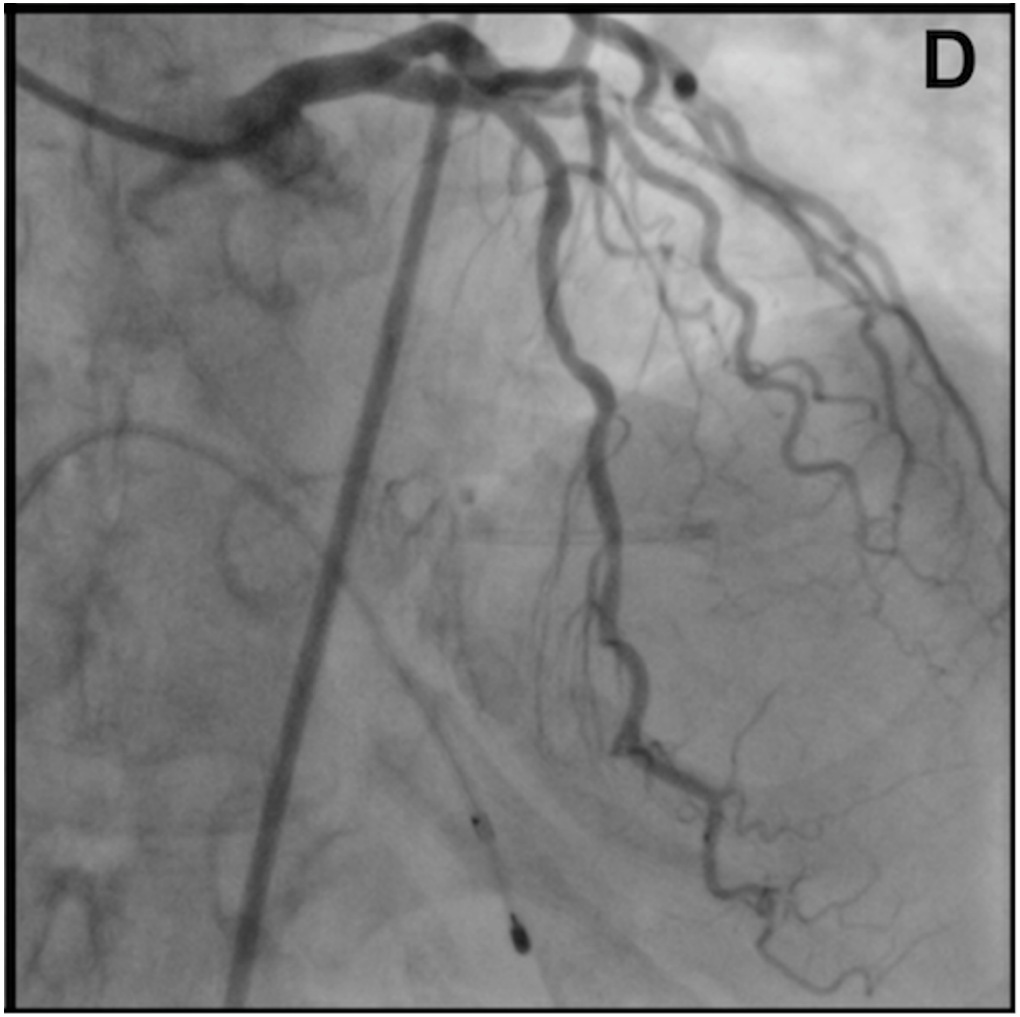
ASA

- Symptomatičtí pacienti s průkazem obstrukce LVOT

ASA



ASA



ASA