XIV. STREDOSLOVENSKÝ KARDIOLOGICKÝ DEŇ

TAKÍ SME BOLI V ROKU 2023

# INTERVENČNÁ RÁDIOLÓGIA V LIEČBE VASKULÁRNYCH OCHORENÍ

**Jozef Sivák**

**SÚSCCH a.s., Banská Bystrica**

**24.10.2024**


diagnostická rádiológia
angiologické oddelenie
Intervenčná rádiológia
OAIM / Kardiochirurgia
JIS/Kardiológia/arytmológia

- Periférne artériové ochorenie - kritická končatinová ischémia
  - limitujúce klaudikácie
- EVL aneuryzmiem hrudnej a brušnej aorty
- EVL akútnych aortálnych syndrómov
- Stenookluzívne postihnutie supraaortálnych vetiev (karotické a vertebrálne riečisko, HKK)
- *Postihnutie viscerálnych tepien, NCMP*

# Rok 2023 vs Rok 2022

- 658 pacientov – nárast o 15%

- TEVAR, EVAR – 63 pacientov – nárast o 50%

- Komplexný EVAR (T-branch, FEVAR, IBD, ISF) – 12 pts – nárast o 33%

- CAS – 32 pacientov - nárast o 68%

- PVI PAO DK – 430 pacientov – nárast o 8%

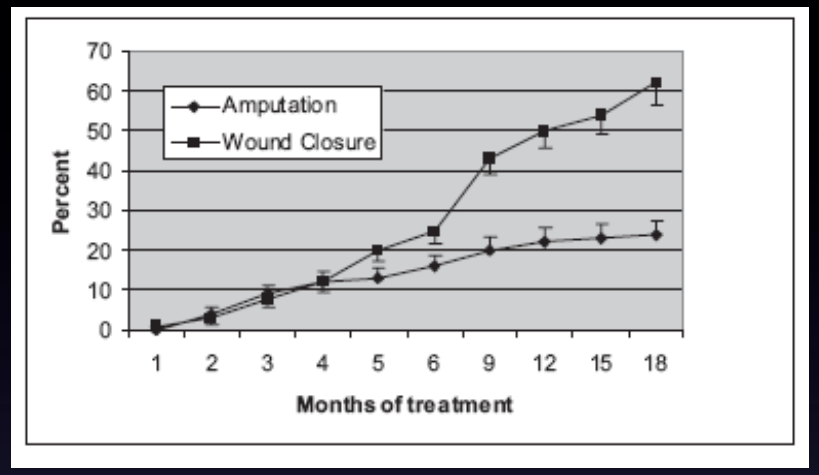
# Rok 2023 a periférne artériové ochorenie

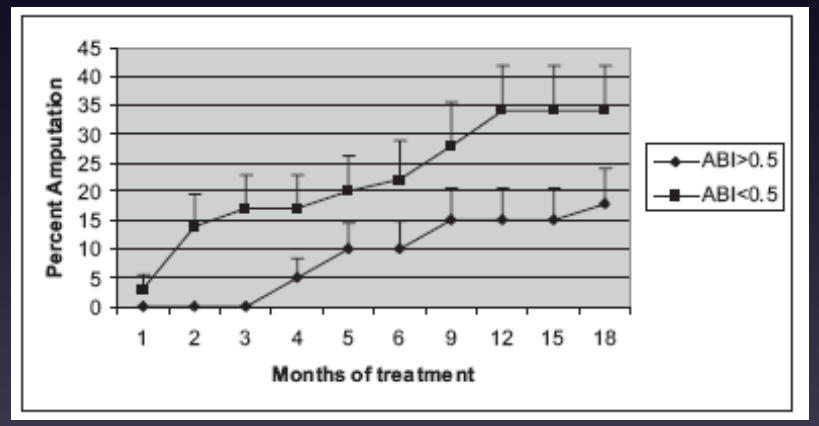
- **CLTI bez revaskularizácie:**

  **19% amputovaných do 6 mesiacov**

  **23% amputovaných do 12 mesiacov**

  **25% mortalita do 1 roka od amputácie**



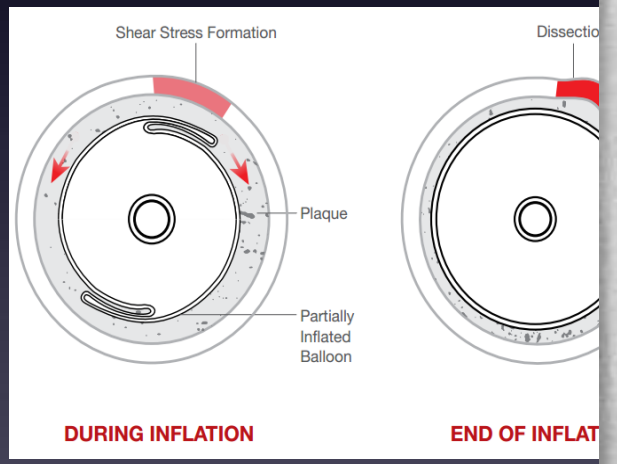



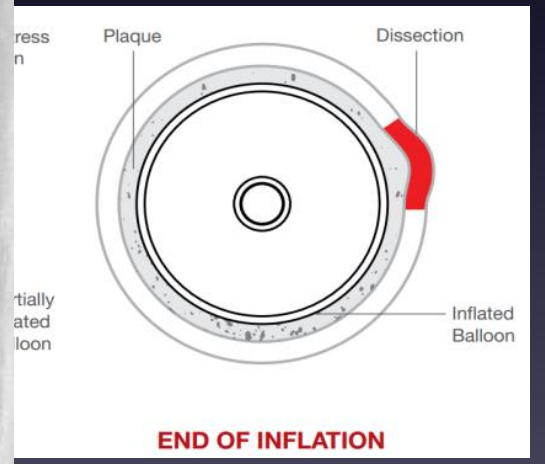

EVL liečba:

- POBA
- Implantácia stentu
- Drug-coated technológie (DCB, DES) - paclitaxel, sirolimus
- Aterektómia/trombektómia - laserová, direkcionálna, rotačná
- intravaskulárna litotripsia

nepr zie

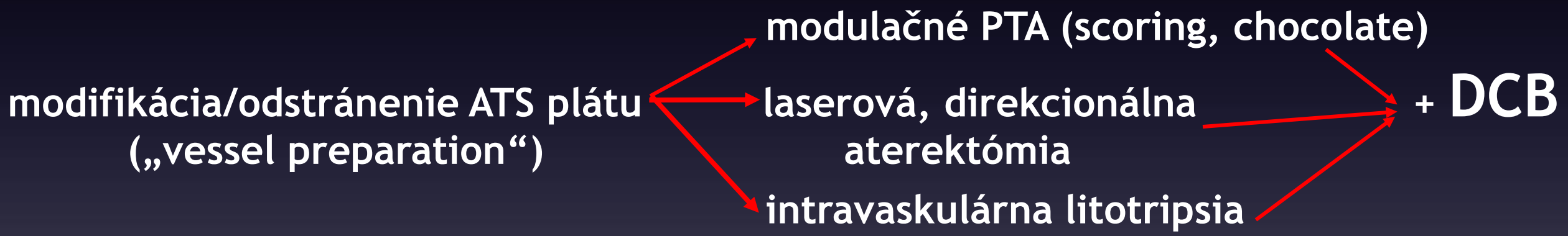
↑ bail- rePVI



## Koncept „leave nothing behind“ – moderné riešenie komplexných arteriálnych lézií

žiadny stent → nižšie riziko restenózy → nižšie riziko morbidity

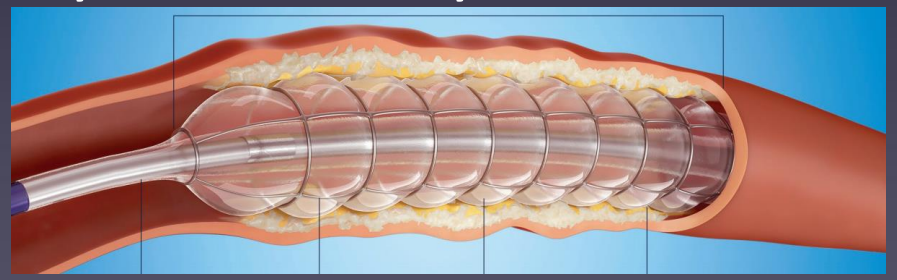


# Scoring PTA/Chocolate

- PTA katétre s rôznymi typmi nitinolového “skeletu“ na povrchu
- Minimálna/kontrolovaná disekcia limitovaná na malé segmenty cievnej steny

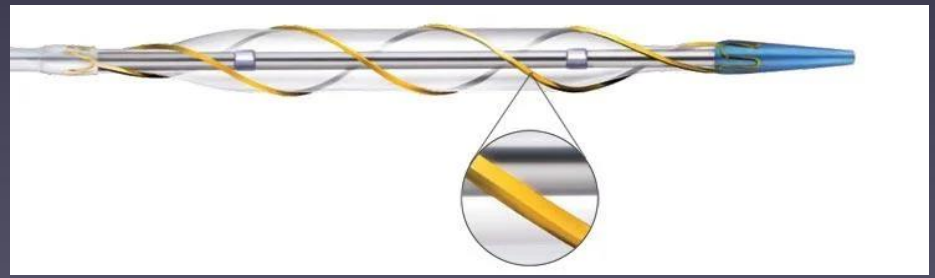
## Chocolate

- Uniformné rozloženie síl pôsobiacich na cievnu stenu počas inflácie
- chráni cievnu stenu pred pôsobením torzných a radiálnych síl

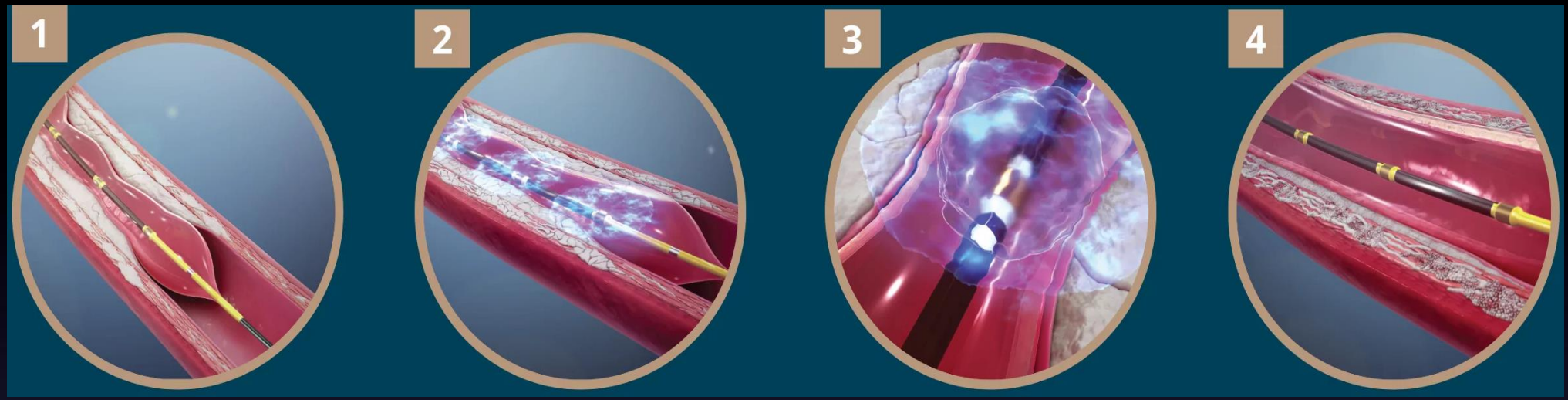


## Scoring PTA

- Narušenie kalcifikovaného plátu a kontrolovanejšia disekcia intimy
- Zjednodušené prenikanie liečiva k intime



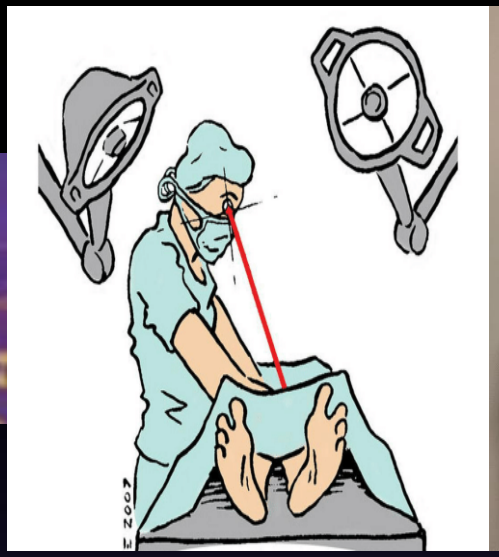
# Intravaskulárna litotripsia (Shockwave)

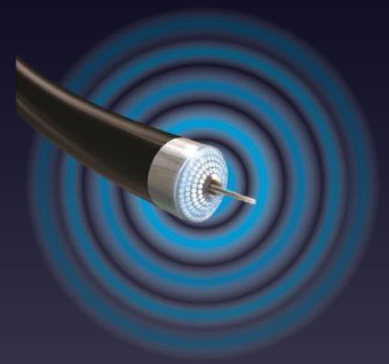




- kombinuje litotripsiu s bal. angioplastikou
- elektrický výboj z emiterov vo funkčnej časti katétra generuje akusticko-tlakové vlny
- uvoľnená energia má lokalizovaný účinok, prechádza cez okolité mäkké tkanivá a selektívne modifikuje/narúša Ca v intime a medii cievnej steny
- Integrovaný PTA bal. katéter je následne použitý na dilatáciu lézie
- Zvyšuje prediktibilitu dilatácie a znižuje riziko disekcie, zlepšuje prestup liečiva

# LASER

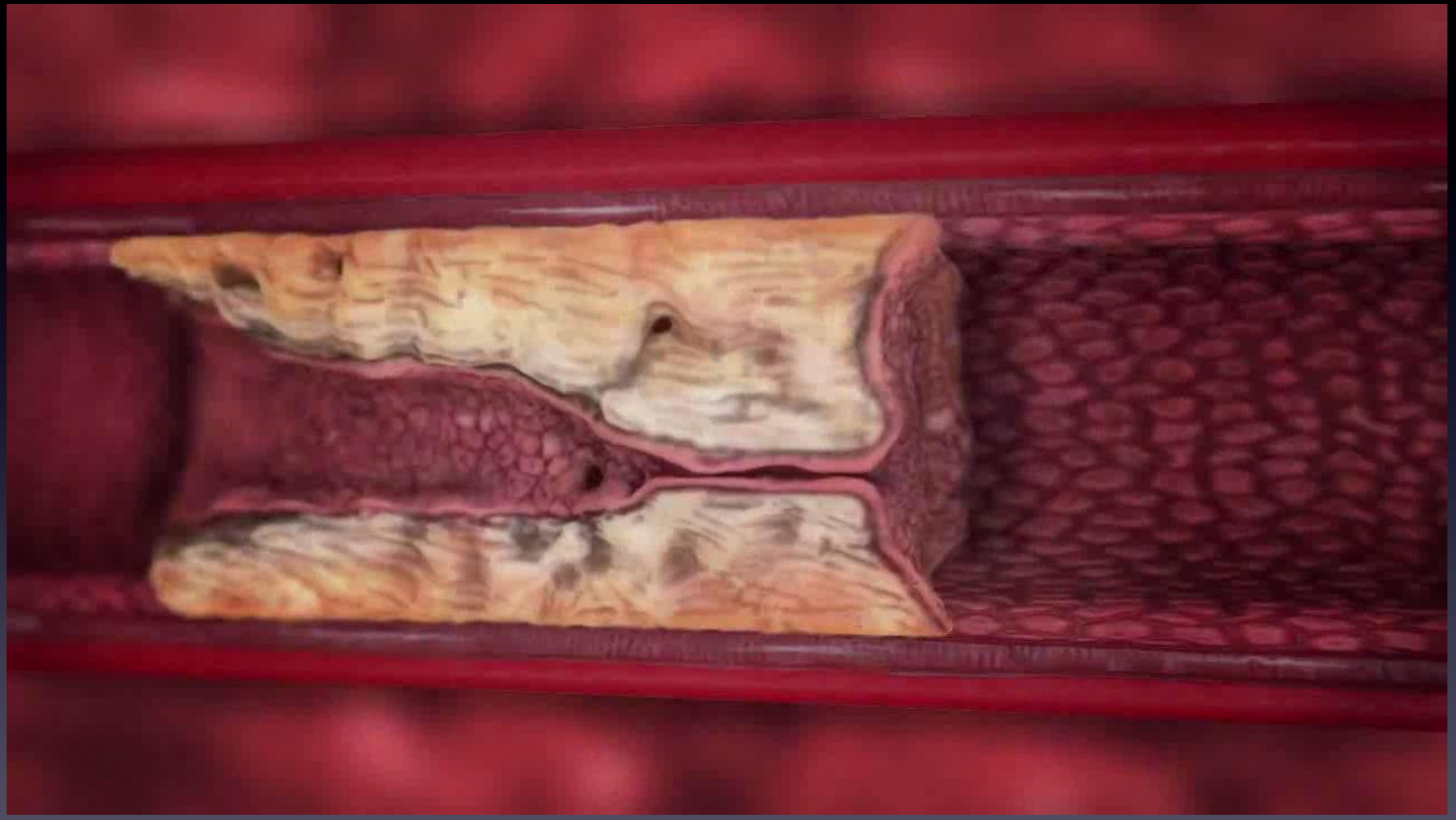
- Miniinvazívny prístup + EA
- Využitie  UV žiarenia 308nm
- Rozrušenie chemických väzieb, evaporizácia trombu, inhibícia agregácie trombocytov
- „ cool laser“ – bez zvýšenia teploty okolia



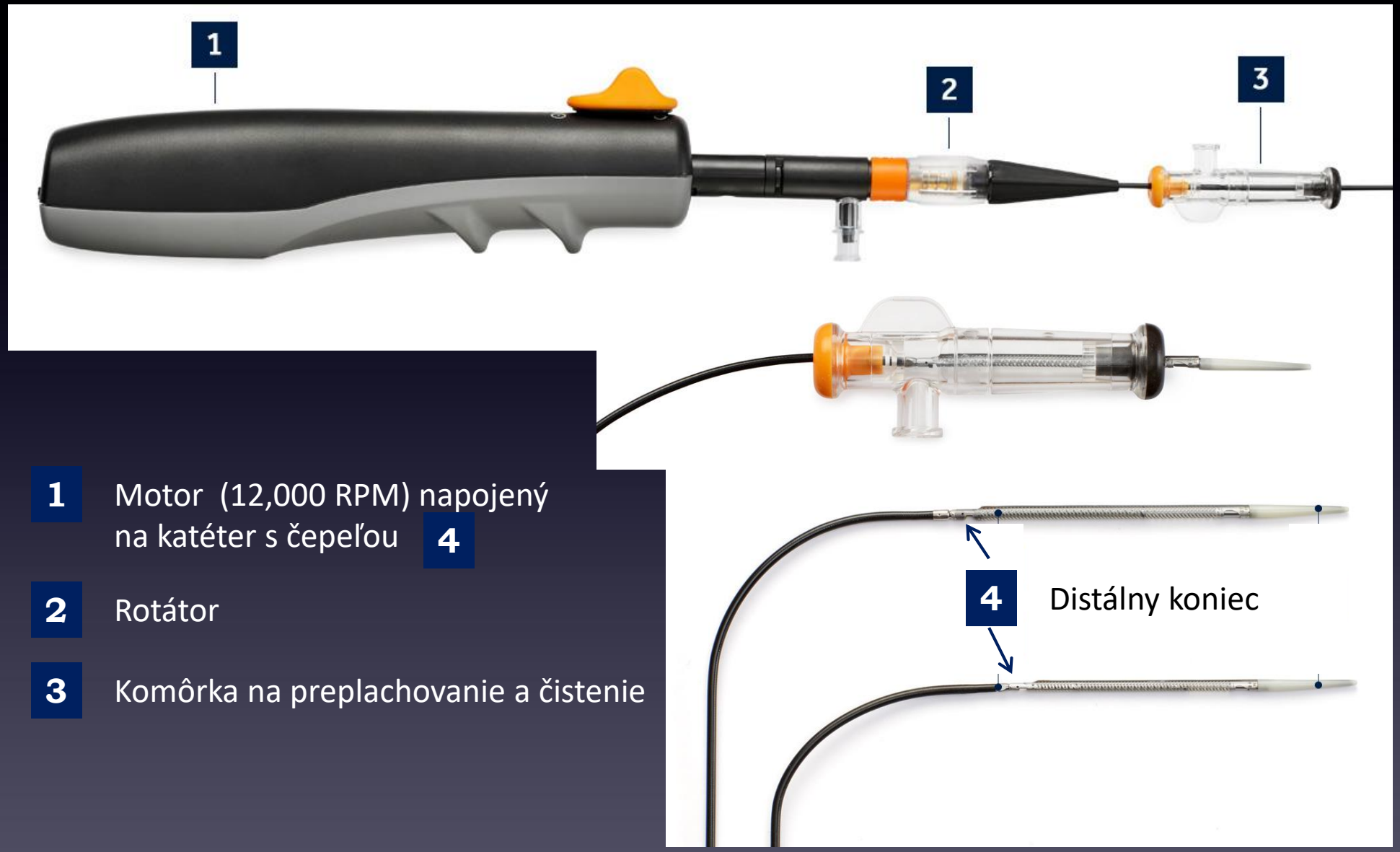



CVX-300 Excimer Laser

# LASER



# Direkcionálna aterektómia -Hawk-one

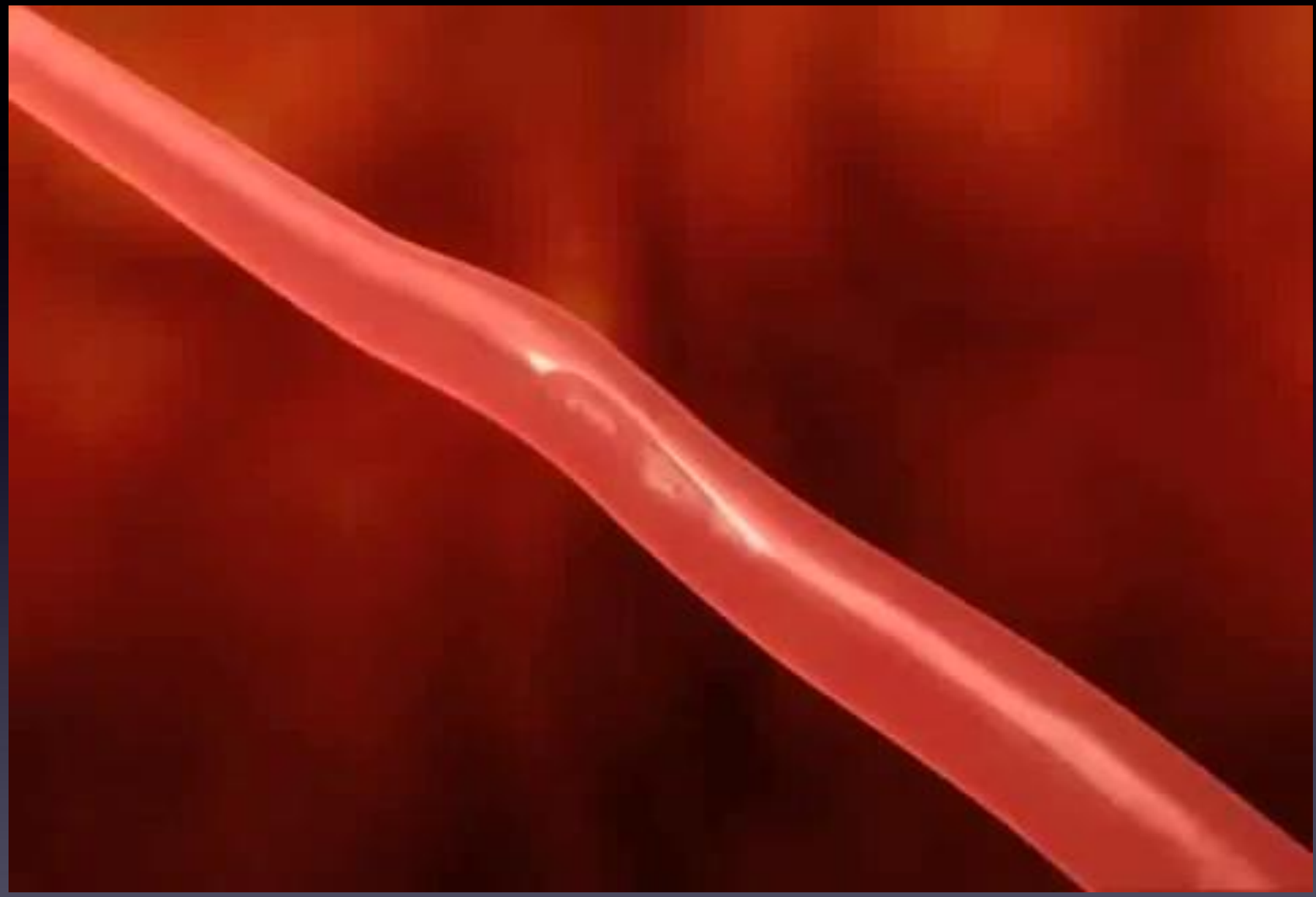



**1** Motor (12,000 RPM) napojený na katéter s čepeľou **4**

**2** Rotátor

**3** Komôrka na preplachovanie a čistenie

# Direkcionálna aterektómia



- **CAVE! – riziko periférnej embolizácie**
- **Každý zákrok pod emboloprotekciou typu filtra**



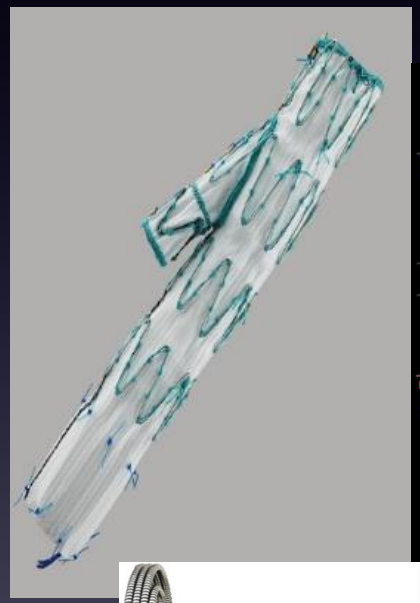


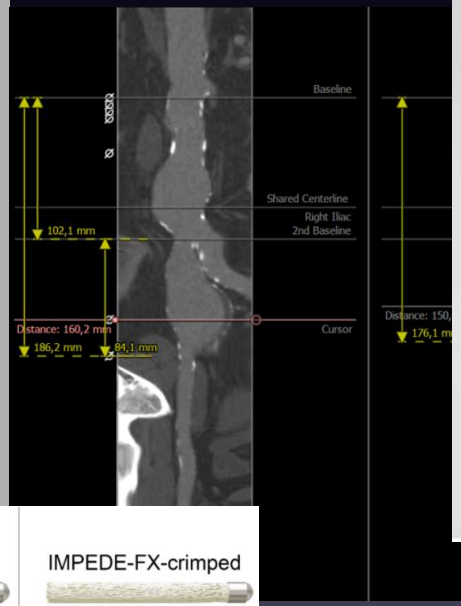
r.2016 vs r.2023

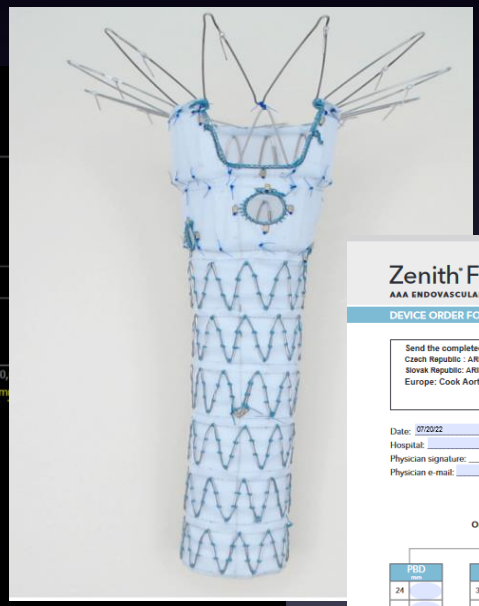
80% redukcia implantovaných stentov (primárne/bail-out)

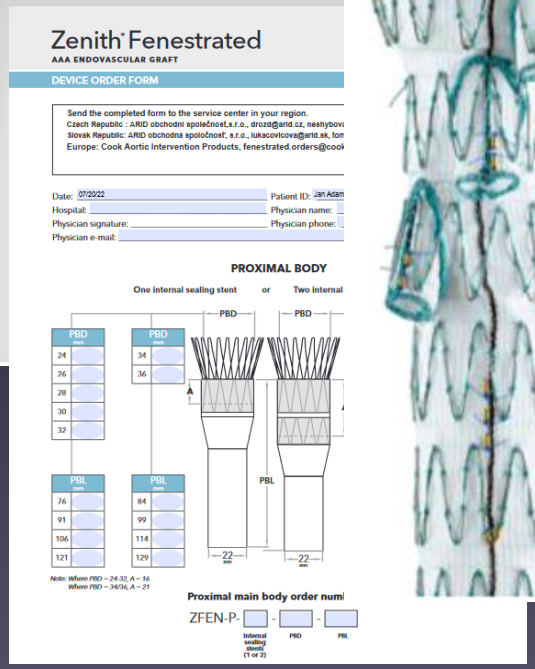
# Rok 2023 a EVAR/TEVAR

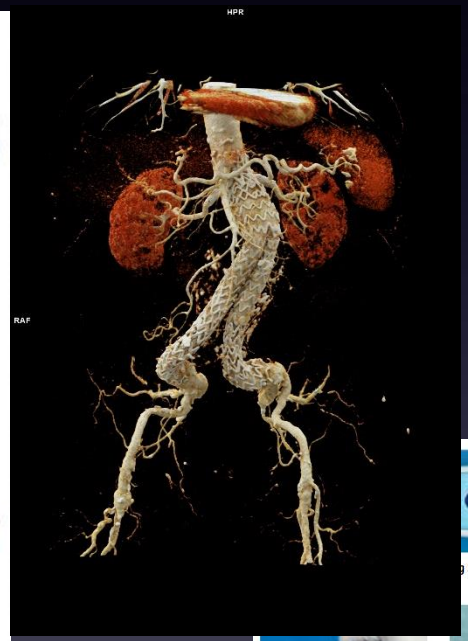
- Signifikantný nárast pacientov s patológiou aorty
- Signifikantné zvýšenie pacientov vyžadujúcich komplexné riešenie (ESAR, ISF EVAR, IBD, T-Branch, FEVAR, emboloprotekcia, polymérové plugy)

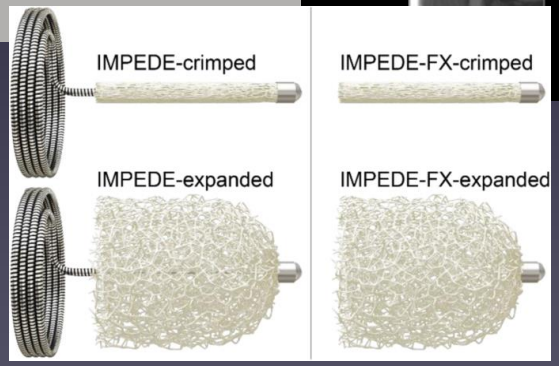


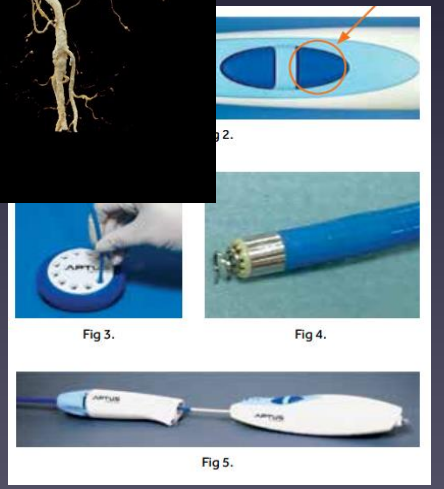




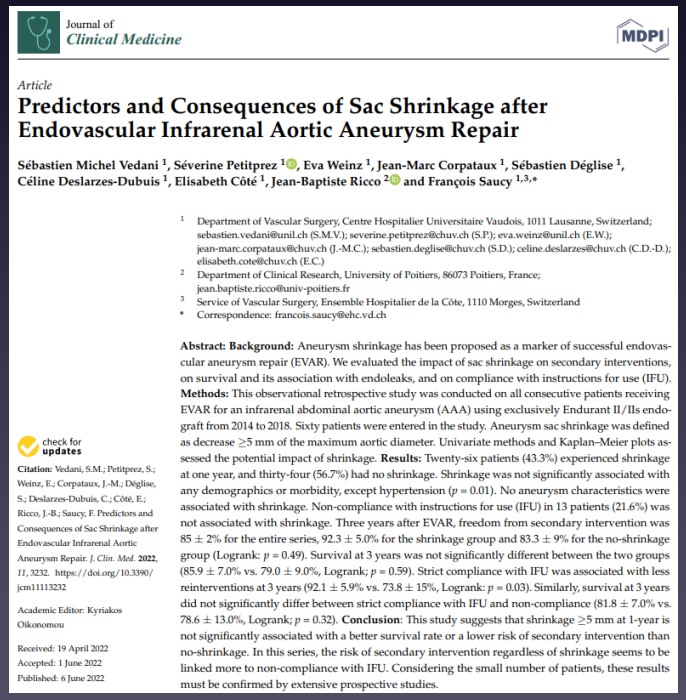


# Rok 2023 a EVAR/TEVAR

***Zmena paradigmy v liečbe AAA – zmenšenie vaku AAA je hlavným prediktorom úspešného a dlhodobo patentného EVAR***

- *Aktívnejšie pátranie po zdrojoch endoleaku vrátane nízkoprietokových*
- *Frekventovanejšie kontroly a EVL liečba*



Journal of *Clinical Medicine* MDPI

*Article*

**Predictors and Consequences of Sac Shrinkage after Endovascular Infrarenal Aortic Aneurysm Repair**

**Sébastien Michel Vedani [1], Séverine Petitprez [1], Eva Weinz [1], Jean-Marc Corpataux [1], Sébastien Déglise [1], Céline Deslarzes-Dubuis [1], Elisabeth Côté [1], Jean-Baptiste Ricco [2] and François Saucy [1,3,*]**

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**Abstract: Background:** Aneurysm shrinkage has been proposed as a marker of successful endovascular aneurysm repair (EVAR). We evaluated the impact of sac shrinkage on secondary interventions, on survival and its association with endoleaks, and on compliance with instructions for use (IFU). **Methods:** This observational retrospective study was conducted on all consecutive patients receiving EVAR for an infrarenal abdominal aortic aneurysm (AAA) using exclusively Endurant II/IIs endograft from 2014 to 2018. Sixty patients were entered in the study. Aneurysm sac shrinkage was defined as decrease ≥5 mm of the maximum aortic diameter. Univariate methods and Kaplan–Meier plots assessed the potential impact of shrinkage. **Results:** Twenty-six patients (43.3%) experienced shrinkage at one year, and thirty-four (56.7%) had no shrinkage. Shrinkage was not significantly associated with any demographics or morbidity, except hypertension ($p = 0.01$). No aneurysm characteristics were associated with shrinkage. Non-compliance with instructions for use (IFU) in 13 patients (21.6%) was not associated with shrinkage. Three years after EVAR, freedom from secondary intervention was 85 ± 2% for the entire series, 92.3 ± 5.0% for the shrinkage group and 83.3 ± 9% for the no-shrinkage group (Logrank: $p = 0.49$). Survival at 3 years was not significantly different between the two groups (85.9 ± 7.0% vs. 79.0 ± 9.0%, Logrank; $p = 0.59$). Strict compliance with IFU was associated with less reinterventions at 3 years (92.1 ± 5.9% vs. 73.8 ± 15%, Logrank: $p = 0.03$). Similarly, survival at 3 years did not significantly differ between strict compliance with IFU and non-compliance (81.8 ± 7.0% vs. 78.6 ± 13.0%, Logrank; $p = 0.32$). **Conclusion**: This study suggests that shrinkage ≥5 mm at 1-year is not significantly associated with a better survival rate or a lower risk of secondary intervention than no-shrinkage. In this series, the risk of secondary intervention regardless of shrinkage seems to be linked more to non-compliance with IFU. Considering the small number of patients, these results must be confirmed by extensive prospective studies.

check for updates

**Citation:** Vedani, S.M.; Petitprez, S.; Weinz, E.; Corpataux, J.-M.; Déglise, S.; Deslarzes-Dubuis, C.; Côté, E.; Ricco, J.-B.; Saucy, F. Predictors and Consequences of Sac Shrinkage after Endovascular Infrarenal Aortic Aneurysm Repair. *J. Clin. Med.* **2022**, *11*, 3232. https://doi.org/10.3390/jcm11113232

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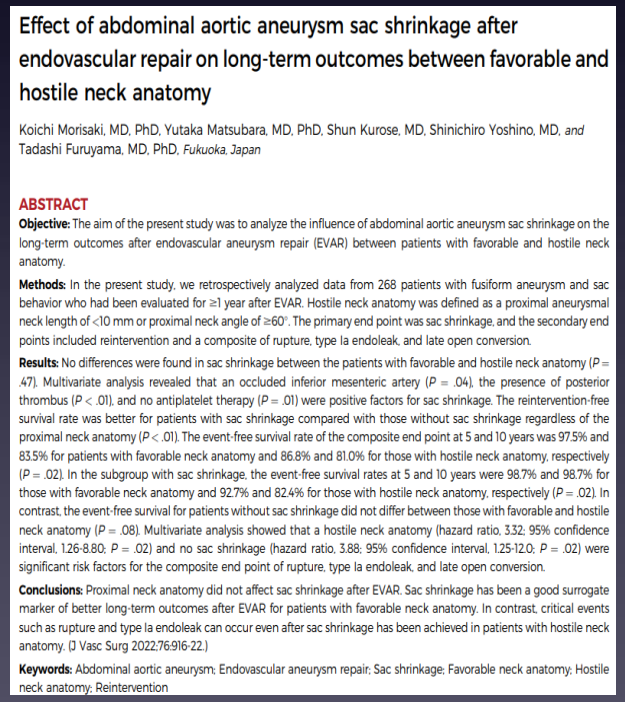


Effect of abdominal aortic aneurysm sac shrinkage after endovascular repair on long-term outcomes between favorable and hostile neck anatomy

Koichi Morisaki, MD, PhD, Yutaka Matsubara, MD, PhD, Shun Kurose, MD, Shinichiro Yoshino, MD, *and* Tadashi Furuyama, MD, PhD, *Fukuoka, Japan*

**ABSTRACT**

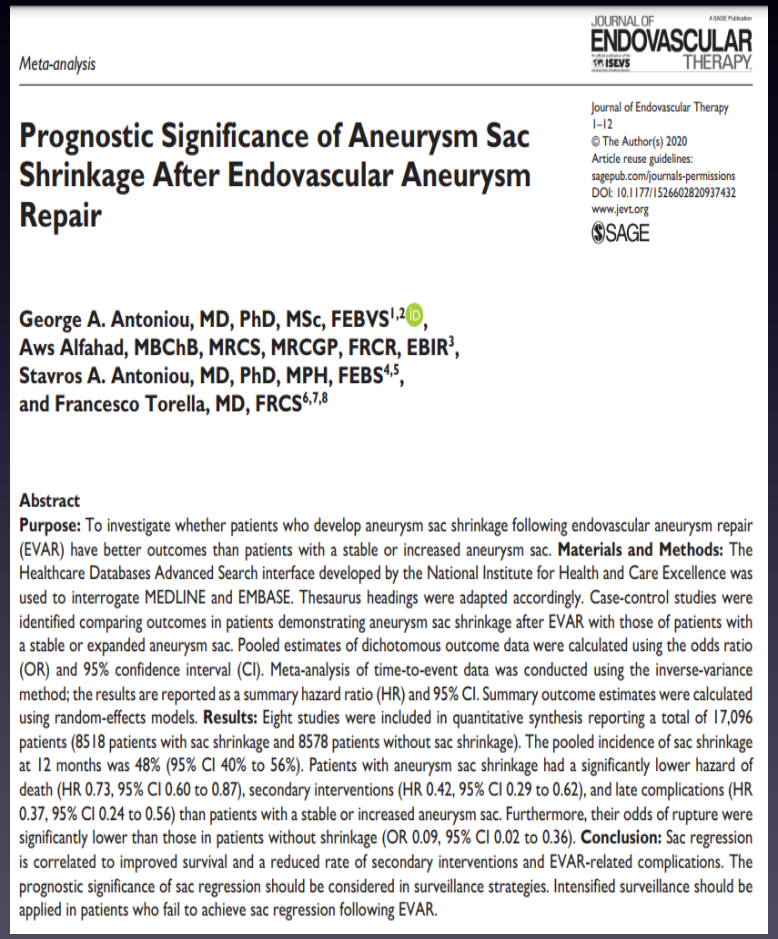
**Objective:** The aim of the present study was to analyze the influence of abdominal aortic aneurysm sac shrinkage on the long-term outcomes after endovascular aneurysm repair (EVAR) between patients with favorable and hostile neck anatomy.

**Methods:** In the present study, we retrospectively analyzed data from 268 patients with fusiform aneurysm and sac behavior who had been evaluated for ≥1 year after EVAR. Hostile neck anatomy was defined as a proximal aneurysmal neck length of <10 mm or proximal neck angle of ≥60°. The primary end point was sac shrinkage, and the secondary end points included reintervention and a composite of rupture, type Ia endoleak, and late open conversion.

**Results:** No differences were found in sac shrinkage between the patients with favorable and hostile neck anatomy ($P = .47$). Multivariate analysis revealed that an occluded inferior mesenteric artery ($P = .04$), the presence of posterior thrombus ($P < .01$), and no antiplatelet therapy ($P = .01$) were positive factors for sac shrinkage. The reintervention-free survival rate was better for patients with sac shrinkage compared with those without sac shrinkage regardless of the proximal neck anatomy ($P < .01$). The event-free survival rate of the composite end point at 5 and 10 years was 97.5% and 83.5% for patients with favorable neck anatomy and 86.8% and 81.0% for those with hostile neck anatomy, respectively ($P = .02$). In the subgroup with sac shrinkage, the event-free survival rates at 5 and 10 years were 98.7% and 98.7% for those with favorable neck anatomy and 92.7% and 82.4% for those with hostile neck anatomy, respectively ($P = .02$). In contrast, the event-free survival for patients without sac shrinkage did not differ between those with favorable and hostile neck anatomy ($P = .08$). Multivariate analysis showed that a hostile neck anatomy (hazard ratio, 3.32; 95% confidence interval, 1.26-8.80; $P = .02$) and no sac shrinkage (hazard ratio, 3.88; 95% confidence interval, 1.25-12.0; $P = .02$) were significant risk factors for the composite end point of rupture, type Ia endoleak, and late open conversion.

**Conclusions:** Proximal neck anatomy did not affect sac shrinkage after EVAR. Sac shrinkage has been a good surrogate marker of better long-term outcomes after EVAR for patients with favorable neck anatomy. In contrast, critical events such as rupture and type Ia endoleak can occur even after sac shrinkage has been achieved in patients with hostile neck anatomy. (J Vasc Surg 2022;76:916-22.)

**Keywords:** Abdominal aortic aneurysm; Endovascular aneurysm repair; Sac shrinkage; Favorable neck anatomy; Hostile neck anatomy; Reintervention



*Meta-analysis*

JOURNAL OF ENDOVASCULAR THERAPY

**Prognostic Significance of Aneurysm Sac Shrinkage After Endovascular Aneurysm Repair**

Journal of Endovascular Therapy
1–12

DOI: 10.1177/1526602820937432
www.jevt.org
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**Abstract**

**Purpose:** To investigate whether patients who develop aneurysm sac shrinkage following endovascular aneurysm repair (EVAR) have better outcomes than patients with a stable or increased aneurysm sac. **Materials and Methods:** The Healthcare Databases Advanced Search interface developed by the National Institute for Health and Care Excellence was used to interrogate MEDLINE and EMBASE. Thesaurus headings were adapted accordingly. Case-control studies were identified comparing outcomes in patients demonstrating aneurysm sac shrinkage after EVAR with those of patients with a stable or expanded aneurysm sac. Pooled estimates of dichotomous outcome data were calculated using the odds ratio (OR) and 95% confidence interval (CI). Meta-analysis of time-to-event data was conducted using the inverse-variance method; the results are reported as a summary hazard ratio (HR) and 95% CI. Summary outcome estimates were calculated using random-effects models. **Results:** Eight studies were included in quantitative synthesis reporting a total of 17,096 patients (8518 patients with sac shrinkage and 8578 patients without sac shrinkage). The pooled incidence of sac shrinkage at 12 months was 48% (95% CI 40% to 56%). Patients with aneurysm sac shrinkage had a significantly lower hazard of death (HR 0.73, 95% CI 0.60 to 0.87), secondary interventions (HR 0.42, 95% CI 0.29 to 0.62), and late complications (HR 0.37, 95% CI 0.24 to 0.56) than patients with a stable or increased aneurysm sac. Furthermore, their odds of rupture were significantly lower than those in patients without shrinkage (OR 0.09, 95% CI 0.02 to 0.36). **Conclusion:** Sac regression is correlated to improved survival and a reduced rate of secondary interventions and EVAR-related complications. The prognostic significance of sac regression should be considered in surveillance strategies. Intensified surveillance should be applied in patients who fail to achieve sac regression following EVAR.

# Systém H

- zabezpečuje aktívnu fixáciu a tesnenie medzi stentgraftom a stenou aorty (“endovaskulárne cievne sutúry”) – **ESAR - Endosuture aneurysm repair**
- Prevencia/terapia komplikácií spojených s EVAR – Endoleak Ia, migrácia
- Štandardizované použitie u pacientov s nepriaznovou anatómiou prox.krčka
- 50-ty pacient liečený technikou ESAR

DOI 10.4149/BLL_2024_52

Bratisl Med J 2024; 125 (6): 347–353

CLINICAL STUDY

Use of EndoAnchors during index endovascular aortic aneurysm repair in patients with hostile proximal aortic neck anatomy

**54% pacientov s regresiou vaku AAA**

of aneurysm.
MATERIALS AND METHODS: A single-centre, retrospective study evaluating 24 consecutive patients treated with EndoAnchors during the index EVAR procedure between November 2018 and August 2021. Endoanchor implantation was indicated for cases with hostile proximal aortic neck anatomy characterised by the presence of at least one of the following parameters: length of <15 mm, diameter of >28 mm, angle of >60°, circumferential thrombus/calcification involving ≥50%, and reverse taper.
RESULTS: Median follow-up period was 22.5 months (IQR 2–31.5 months) with no aneurysm-related death, rupture, or conversion to open surgical repair during the follow-up. The procedural success rate was 100%, with no type Ia endoleak at the completion angiography. A mean of 7 EndoAnchors was used

**33% pacientov vak stabilný**

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**Introduction**

Endovascular aneurysm repair is currently the preferred option for infrarenal aortic aneurysm treatment (1–3). However, despite the technological advance related to the endograft design, complications in terms of type Ia endoleak and graft migration are still fairly common in case of unfavorable proximal aortic neck anatomy. The majority of early type Ia endoleaks are caused by insufficient sealing and fixation between the endograft and the aortic wall. The cause of late type Ia endoleak and distal migration is considered to lie in the continuous progression of aneurysmal degeneration to the previously unaffected segment of the aorta. This results in the loss of adequate apposition of the endograft to

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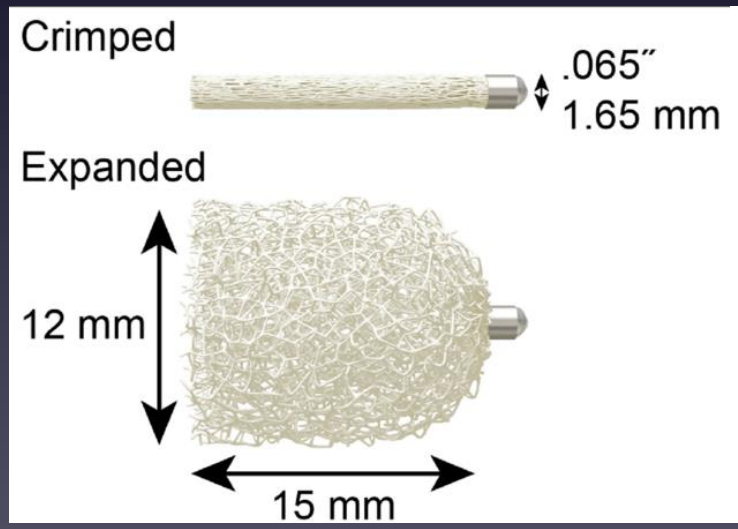
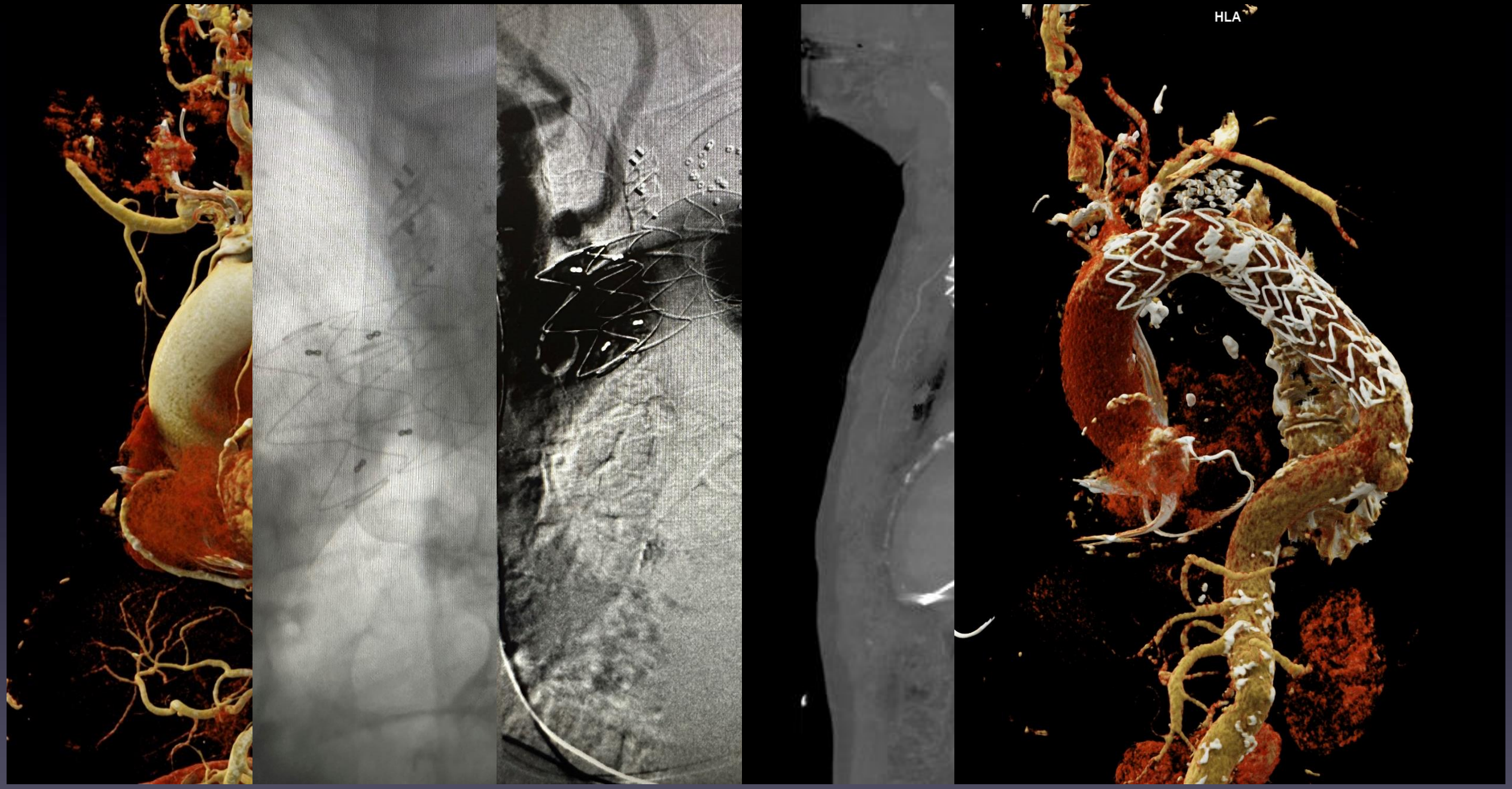
# Polymérové plugy – Shape memory

- Porózny, radiolucentný embolizačný materiál
- Atraumatický (veľmi malá radiálna sila)
- Aktívna výplň vaku aneuryzmy, embolizácia veľkých prívodných a odvodných tepien (rýchla formácia zrazenín)
- Navodiť riadenú regresiu vaku aneuryzmy (pomalá bioabsorbcia materiálu bez chronickej inflamácie)





HLA

- Imple
  DK – i
  základ
- CO2 a
- Nové
- EVL m
  *(mech*
- Nová i

ngiodroid

e $CO_2$ Injector

# Budúcnosť ?

*<u>Cievna chirurgia/hybridná sála</u> -možnosť rozšíriť spektrum komplexných EVL aj chirurgických zákrokov*

# ĎAKUJEM ZA POZORNOSŤ