

ENDOVASKULÁRNA LIEČBA KOMPLEXNÝCH LÉZIÍ AORTY

Jozef Sivák

Oddelenie rádiológie

SÚSCCH a.s., Banská Bystrica

2023

ANEURYZMA ABDOMINÁLNEJ AORTY

- 13. najčastejšia príčina úmrtí v EÚ
- 10. najčastejšia u mužov ≥ 55 rokov
- 5-ročné riziko ruptúry u aneuryziem AA ≥ 5 cm je až 40%
- Ruptúra AAA má 90% mortalitu



AAA- Terapia

Radikálna liečba sa indikuje u pacientov v prípade:

- pričný diameter aneuryzmy $\geq 5,5\text{cm}$
- pričný diameter $\geq 5,0\text{ cm}$ u pacientov s vysokým rizikom ruptúry
- symptomatická AAA
- rýchla expanzia vaku definovaná ako nárast pričného diametra o viac ako 5mm za 6 mesiacov
- aneuryzma s diametrom $\geq 9\text{ cm}$ je považovaná za emergentný stav s veľmi vysokým rizikom ruptúry a nutnosťou včasného radikálneho riešenia

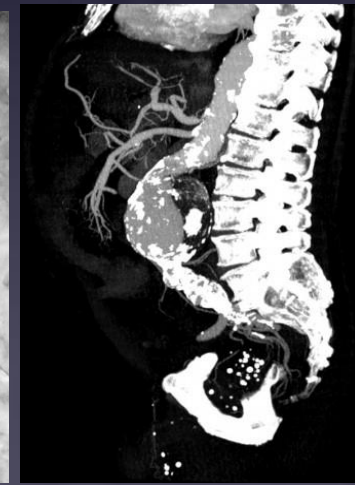
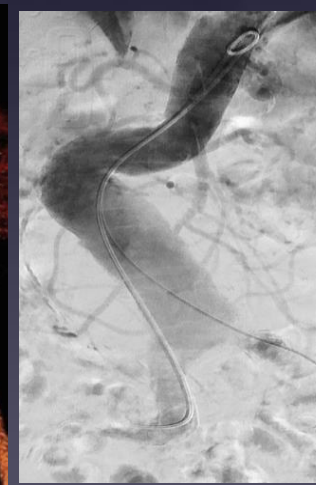
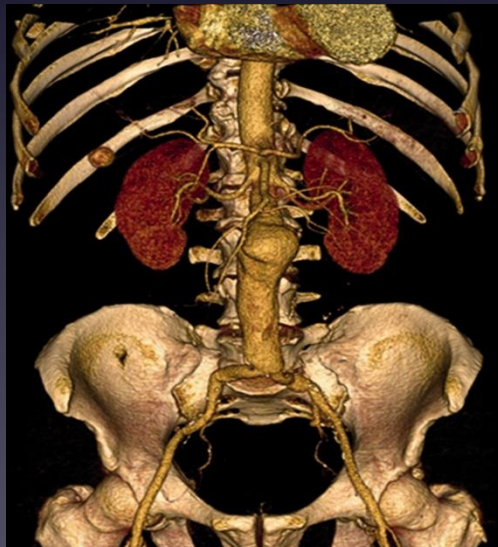
ANEURYZMA ABDOMINÁLNEJ AORTY

Štandardný EVAR:

- Dĺžka $\geq 10\text{mm}$ (15mm)
- Angulácia $\leq 60^\circ$
- Diameter krčka $\leq 30\text{mm}$
- Trombus/kalcifikát $\leq 50\%$ obvodu
- Normálny tvar

Komplexný EVAR (20-25%):

- Nesplnený ≥ 1 parameter
- juxta/pararenálna aneuryzma
- Torakoabdominálna aneuryzma
- Konkomitantné postihnutie iliackého riečiska

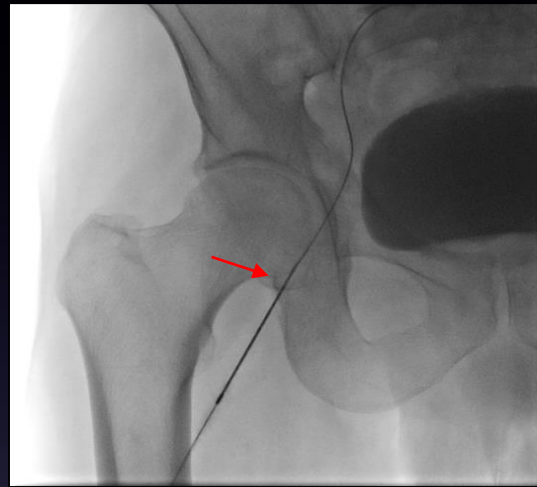
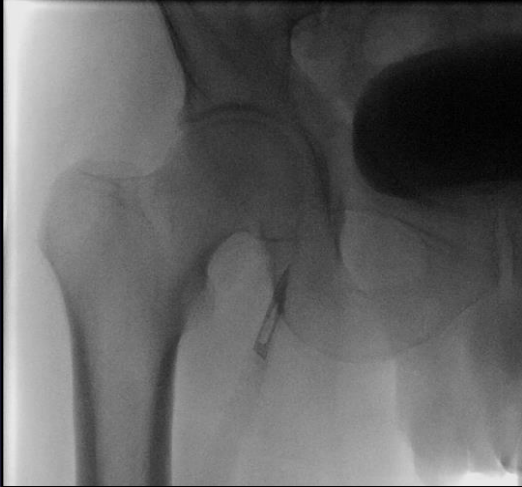


Typy zákrokov:

- ESAR (Heli-FX) - EndoSuture Aneurysm Repair
- IBD-PEVAR
- FEVAR
- BEVAR (T-Branch)
- Polymere plugs
- In-situ laser fenestration

MINIINVAZÍVNE RIEŠENIE

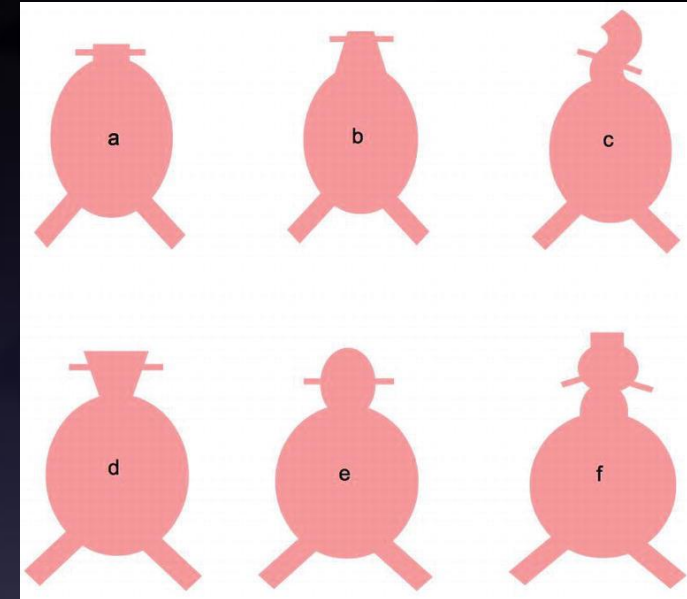
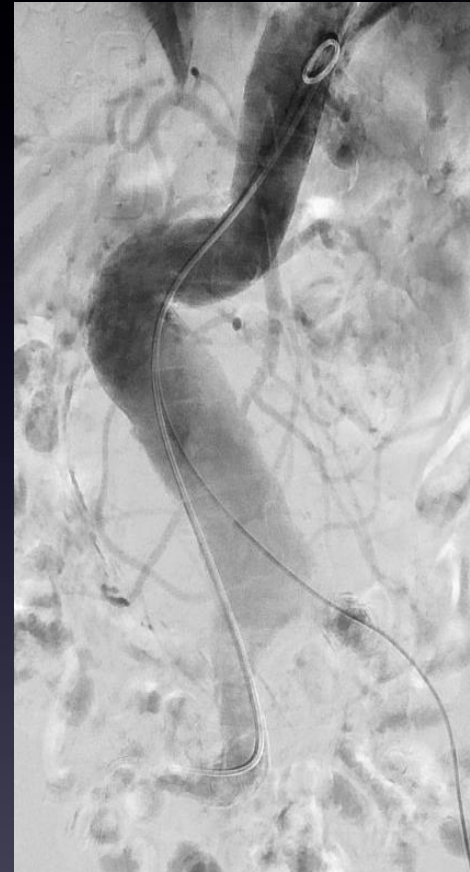
- Perkutánný prístup



ESAR - EndoSuture Aneurysm Repair

Infrarenálna aneuryzma s anatomicky nevhodným krčkom

- Dĺžka $\leq 10\text{mm}$ (15mm)
- Angulácia $\geq 60^\circ$
- Diameter krčka $\geq 30\text{mm}$
- Trombus/kalcifikát $\geq 50\%$ obvodu
- Konický tvar



ESAR - EndoSuture Aneurysm Repair

- Starší pacienti s vysokým rizikom/nevhodný na FEVAR (Fenestrováný EVAR)
- Akútne stavy
- Mladší pacienti s normálnou anatómiou ako prevencia neskorých komplikácií (?)
- Periprocedurálny endoleak typ Ia

HELI-Fx systém



Fig 2.



Fig 3.



Fig 4.



Fig 5.

- Rotate deflector knob on Guide to visualize "C" marker as a solid line

C - Shape



Anterior

| - Straight Line



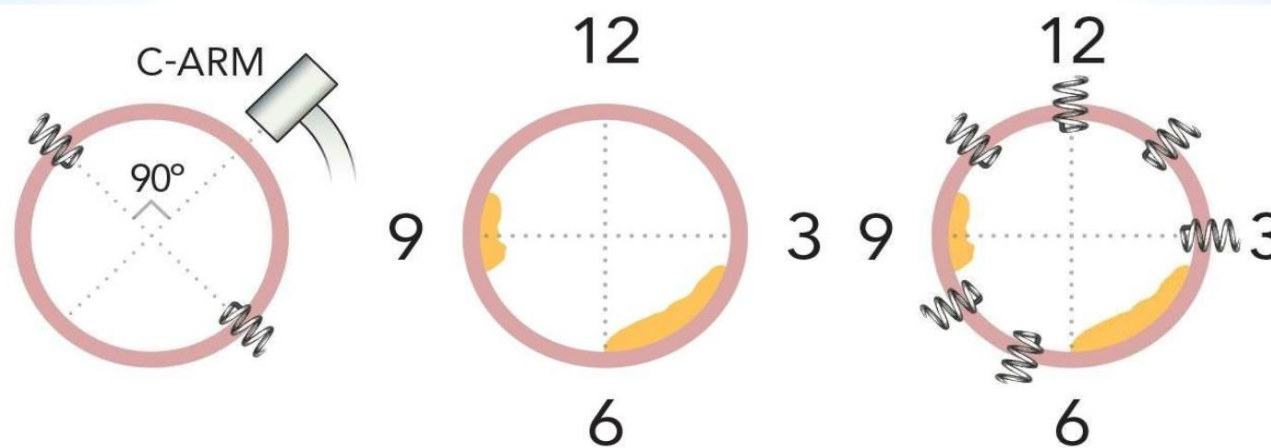
Lateral

C - Shape



Posterior

- Position Guide and Applier 90° relative to endograft

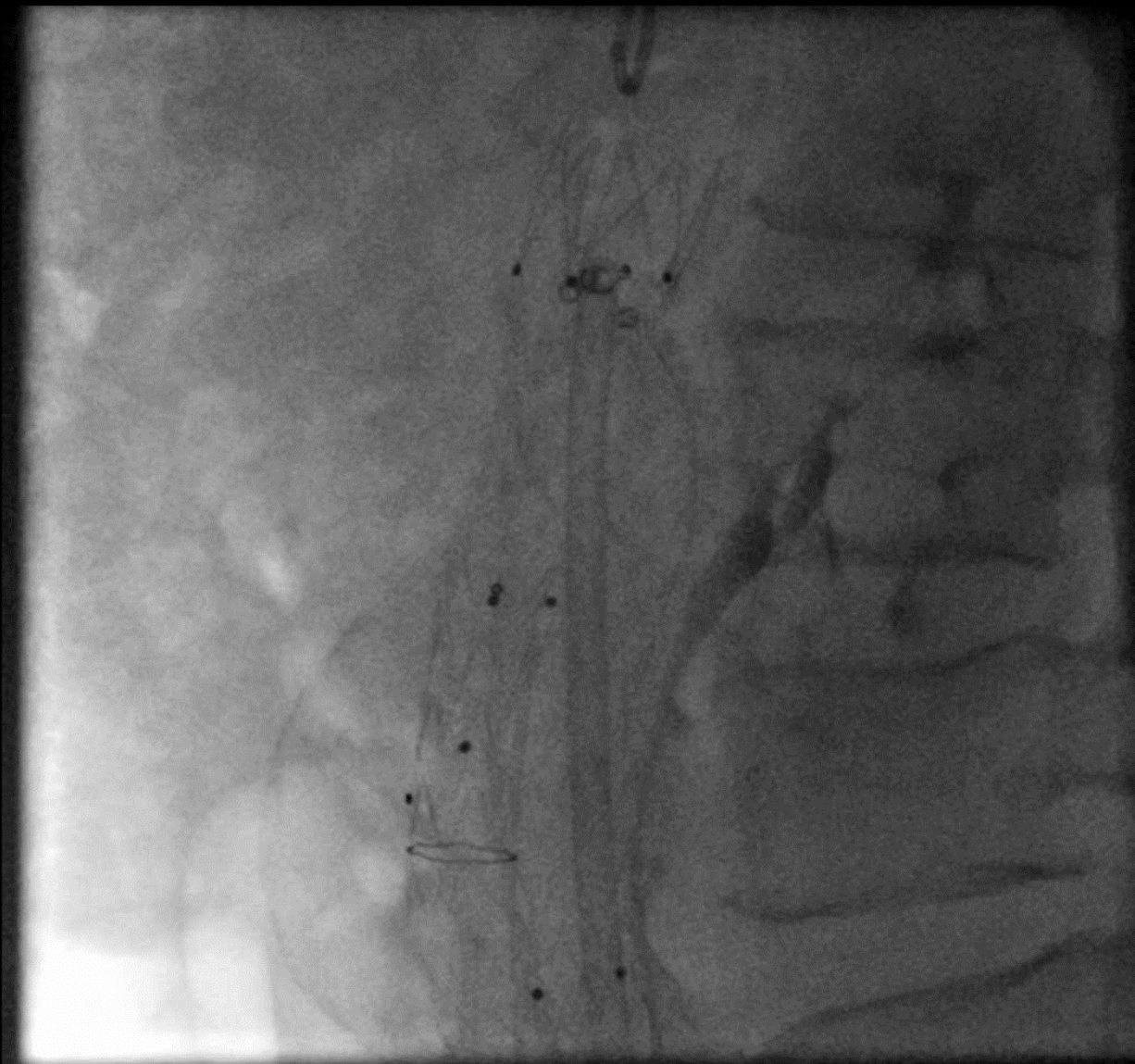


ESAR - EndoSuture Aneurysm Repair

- zabezpečuje aktívnu fixáciu a tesnenie medzi stentgraftom a stenou aorty (“endovaskulárne cievne sutúry”)
- jediná schválená (FDA/CE), “off the shelf” technika, indikovaná k liečbe aneuryziem abdominálnej aorty s nepriaznivou proximálnou kotviacou zónou, ktorá nie je závislá na nutnosti stentingu/graftingu renálnych artérií
- Nepredstavuje prekážku pre eventuálne budúce intervencie



ESAR - EndoSuture Aneurysm Repair

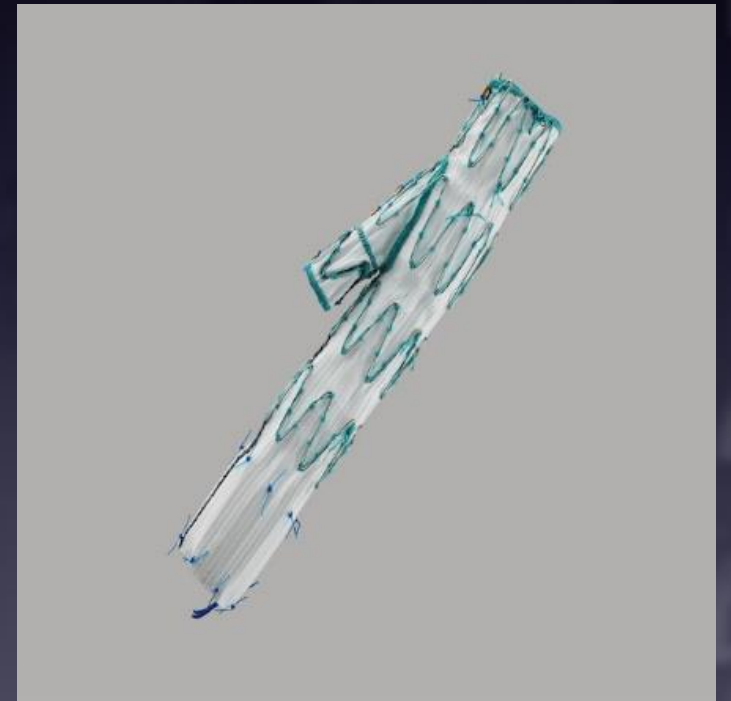




- 1. v SR a ČR
- ≥ 50 pacientov (najväčší súbor pacientov)
- Úspešné využitie aj v prípade rupturovaných aneuryziem bez možnosti chirurgického ošetrovania
- Bez komplikácií v zmysle migrácie graftu, deformácie kotiev a perforácie aorty

PEVAR + Iliac branch device (IBD)

- > 20-40% AAA má konkomitantné uni/ bilaterálne aneuryzmatické postihnutie iliackého riečiska
- $\geq 3,5\text{cm}$ \rightarrow EVL / Open surgery



- **gluteálne klaudikácie a erektilná dysfunkcia u 16-50% v prípade unilaterálnej a 16-80% v prípade bilaterálnej oklúzie AI**
- **bilaterálne oklúzia vedie spravidla k závažnejším a trvalejším komplikáciám**
- **Ischémia čreva, nekróza orgánov malej panvy**
- **v prípade extenzívneho postihnutia aorty je zachovanie toku do AI dôležitá z hľadiska rozvoja kolaterálneho obehu a prevencie spinálnej ischémie**

COR	LOE	Recommendations
1	C-LD	1. For patients with asymptomatic small AAA and concomitant common iliac artery aneurysm(s) ≥ 3.5 cm, elective repair of both abdominal and iliac aneurysms is recommended. ¹⁻⁴
1	B-NR	2. When treating common iliac artery aneurysms or ectasia as part of AAA repair, preservation of at least 1 hypogastric artery is recommended, if anatomically feasible, to decrease the risk of pelvic ischemia. ^{5,6}

Recommendation 104	Class	Level
Preserving blood flow to at least one internal iliac artery during open surgical and endovascular repair of iliac artery aneurysms is recommended.	I	B
Recommendation 105	Class	Level
In patients where internal iliac artery embolisation or ligation is necessary, occlusion of the proximal main stem of the vessel is recommended if technically feasible, to preserve distal collateral circulation to the pelvis.	I	C



ACC/AHA CLINICAL PRACTICE GUIDELINE

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines

Eric M. Isselbacher, MD, MSc, FACC, Ourania Preventza, MD, MBA, James Hamilton Black III, MD, DFSVS, John G. Augoustides, MD, FAHA, Adam W. Beck, MD, DFSVS, Michael A. Bolen, MD, Alan C. Braverman, MD, FACC, Bruce E. Bray, MD, FACC,

May Eur J Vasc Endovasc Surg (2018) ■, 1–97

MSC

Leo

Willi

MD,

MSM

Sch

MD,

—

European Society for Vascular Surgery (ESVS) 2019 Clinical Practice Guidelines on the Management of Abdominal Aorto-iliac Artery Aneurysms

Anders Wanhainen^{1,2}, Fabio Verzini^{3,4}, Isabelle Van Herzele⁵, Eric Allaire⁶, Matthew Bown⁷, Tina Cohnert⁸, Florian Dick⁹, Joost van Herwaarden¹⁰, Christos Karkos¹¹, Mark Koelemay¹², Tilo Kölbel¹³, Ian Loftus¹⁴, Kevin Mani¹⁵, Germano Melissano¹⁶, Janet Powell¹⁷, Zoltán Szeberin¹⁸

ESVS Guidelines Committee¹⁹, Gert J. de Borst, Nabil Chakfe, Sebastian Debus, Rob Hinchliffe, Stavros Kakkos, Igor Koncar, Philippe Kolh, Jes Lindholdt, Melina de Vega, Frank Vermassen

Aim: Document reviewers²⁰, Martin Björck, Stephen Cheng, Ronald Dalman, Lazar Davidovic, Konstantinos Donas, Jonathan Earnshaw, Hans-Henning Eckstein, Jonathan Golledge, Stephan Haulon, Tara Mastracci, Ross Naylor, Jean-Baptiste Ricco, Henc Verhagen

prov

score

surv

(ie, e

Met

202

that

Com

stud

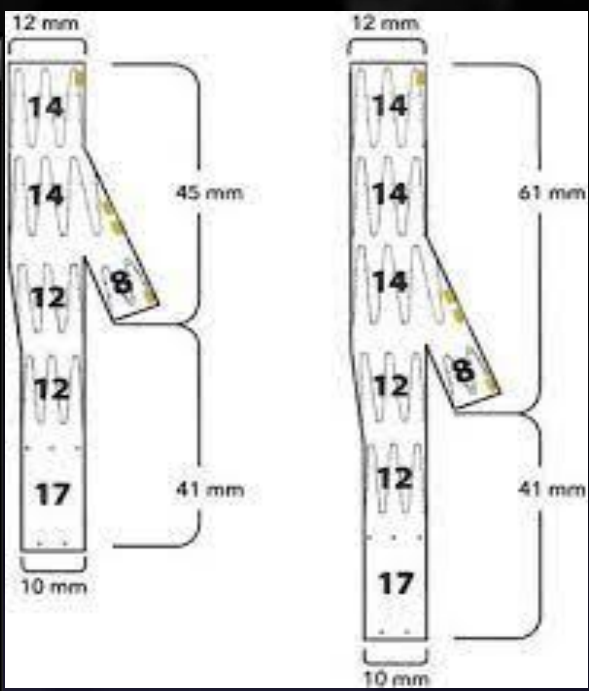
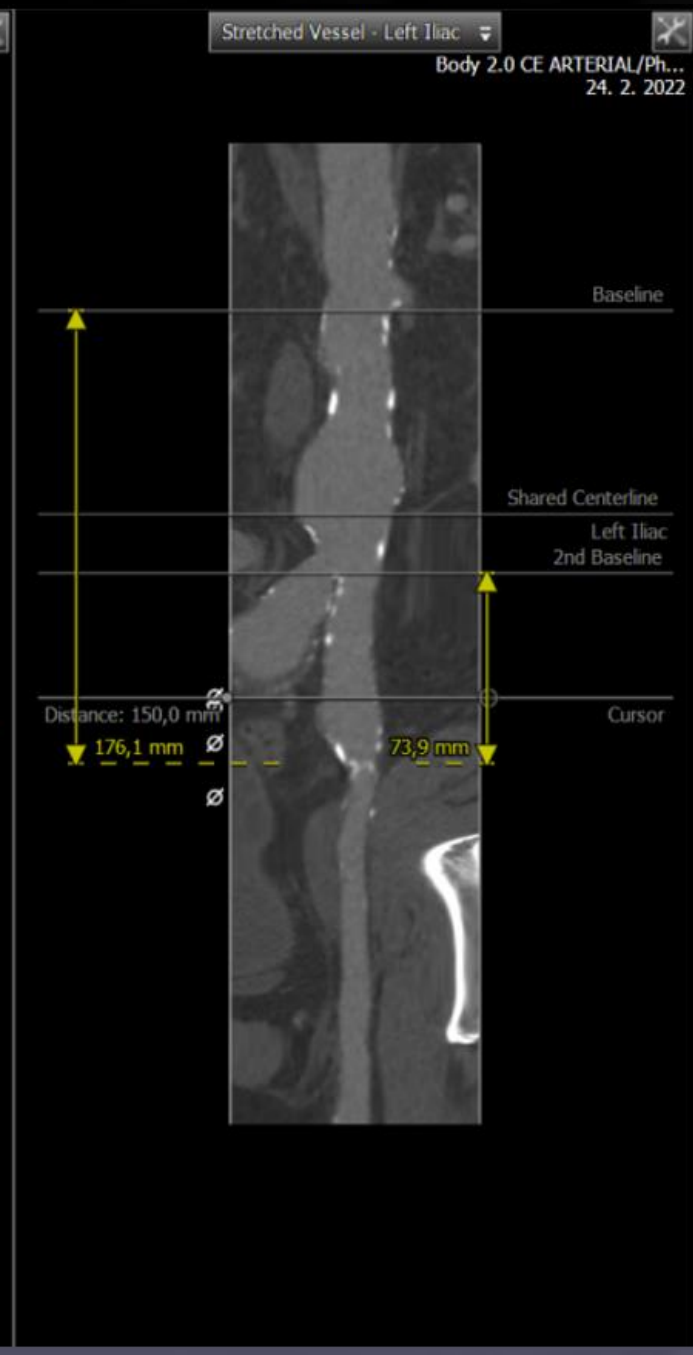
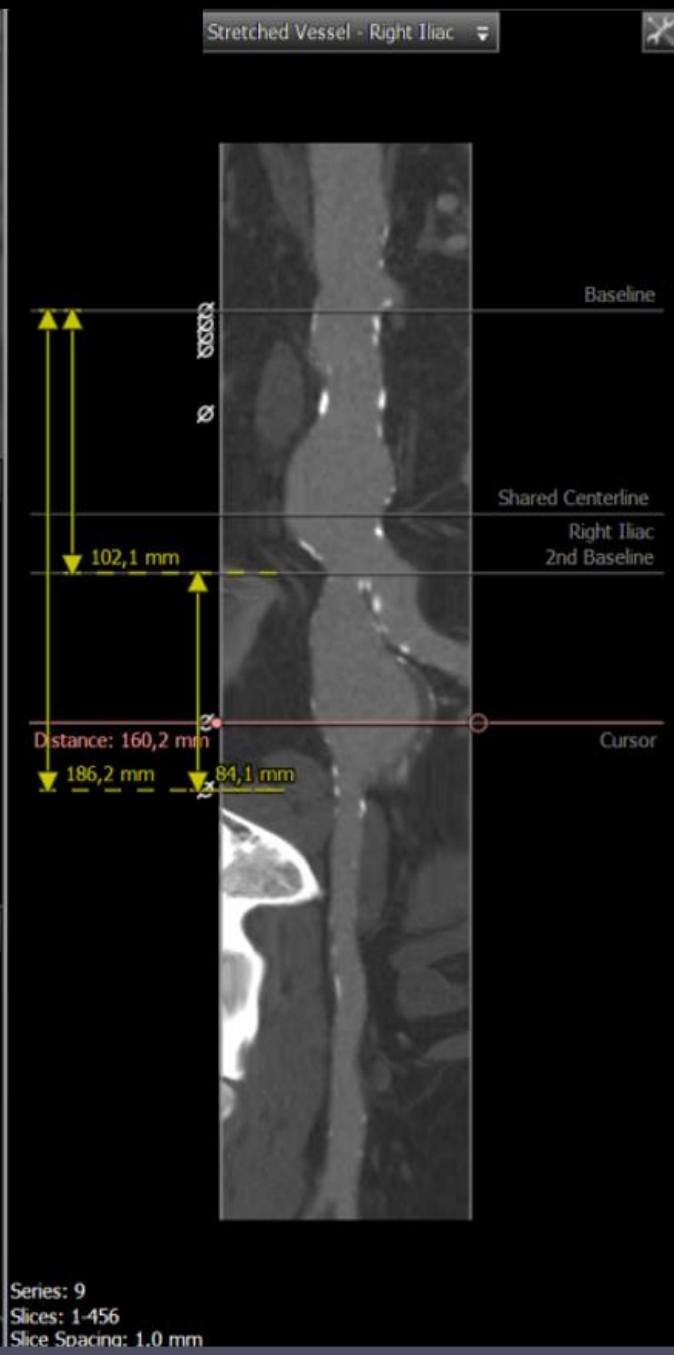
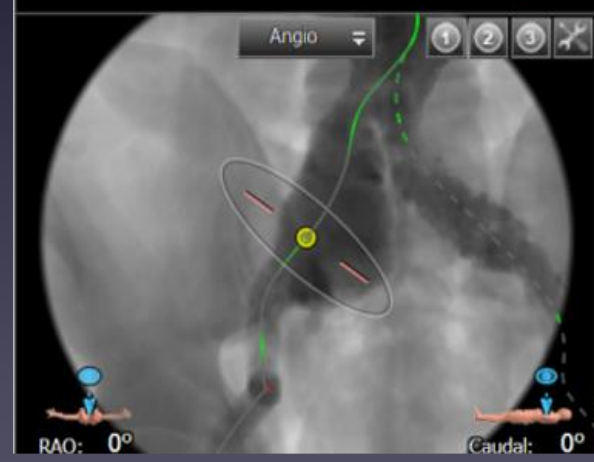
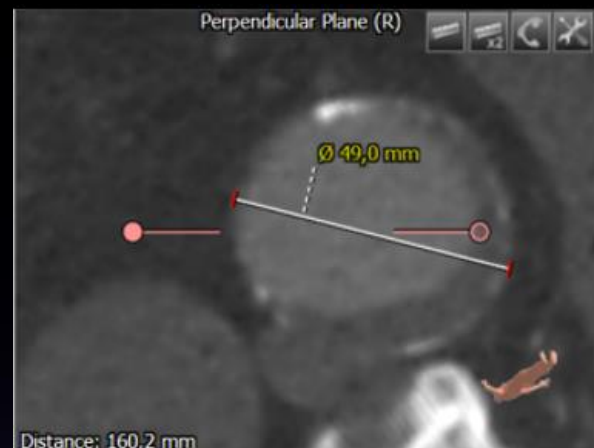
cons

TABLE OF CONTENTS

List of abbreviations	4
1. Introduction and General Aspects	5
1.1. Introduction and methods	5
1.1.1. The purpose of these guidelines	5
1.1.2. Methodology	5
1.1.2.1. Strategy	5
1.1.2.2. Literature search and selection	5
1.1.2.3. Weighing the evidence	6
1.1.2.4. The patient's perspective	6
1.2. Service standards	6
1.2.1. Quality control	6
1.2.2. Resources and availability	7
1.2.3. Surgical volume	7
1.2.4. Pathway for treatment	8
2. Epidemiology, Diagnosis, and Screening	9
2.1. Epidemiology	9
2.1.1. Definition of abdominal aortic aneurysms	9
2.1.1.1. Suggested reporting standards for AAA	10
2.1.2. Prevalence of AAA	10
2.1.3. Natural history of small AAA	10
2.1.4. Risk factors for AAA	10
2.2. Diagnosis	10
2.2.1. Clinical signs	10
2.2.2. Imaging techniques	10
2.2.2.1. Ultrasonography	10
2.2.2.2. Computed tomography angiography	11

¹ **Writing Committee:** Anders Wanhainen¹ (chair) [Department of Surgical Sciences, Vascular Surgery, Uppsala University, Uppsala, Sweden], Fabio Verzini² (chair) [Department of Surgical Sciences, Turin University, Turin, Italy], Isabelle Van Herzele³ [Department of Thoracic and Vascular Surgery, University Hospital Ghent, Ghent, Belgium], Eric Allaire⁴ [Department of Vascular Surgery, Mondor University Hospital, Assistance Publique-Hôpitaux de Paris Université Paris Est-Créteil, Créteil, Cedex, France], Matt Bown⁵ [NIHR Leicester Biomedical Research Centre, University of Leicester, Leicester, UK], Tina Cohnert⁶ [Department of Vascular Surgery, Graz University Hospital, Medical University of Graz, Graz, Austria], Florian Dick⁷ [Department of Vascular Surgery, Kantonsspital St. Gallen and University of Bern, Switzerland], Joost van Herwaarden⁸ [Department of Vascular Surgery, University Medical Center Utrecht, Utrecht, The Netherlands], Christos Karkos⁹ [Vascular Surgery Unit, 5th Department of Surgery, Medical School, Aristotle University of Thessaloniki, Thessaloniki, Greece], Mark Koelemay¹⁰ [Department of Surgery, Academic Medical Center, Amsterdam, The Netherlands], Tilo Kölbel¹¹ [German Aortic Center Hamburg, Department of Vascular Medicine, University Heart Center, Hamburg, Germany], Ian Loftus¹² [St Georges Healthcare NHS Foundation Trust, London, UK], Kevin Mani¹³ [Department of Surgical Sciences, Vascular Surgery, Uppsala University, Uppsala, Sweden], Germano Melissano¹⁴ [Department of Vascular Surgery, Università Vita-Salute San Raffaele Milano, Milan, Italy], Janet Powell¹⁵ [Vascular Surgery Research Group, Imperial College, London, UK], Zoltán Szeberin¹⁶ [Department of Vascular Surgery, Semmelweis University, Budapest, Hungary].

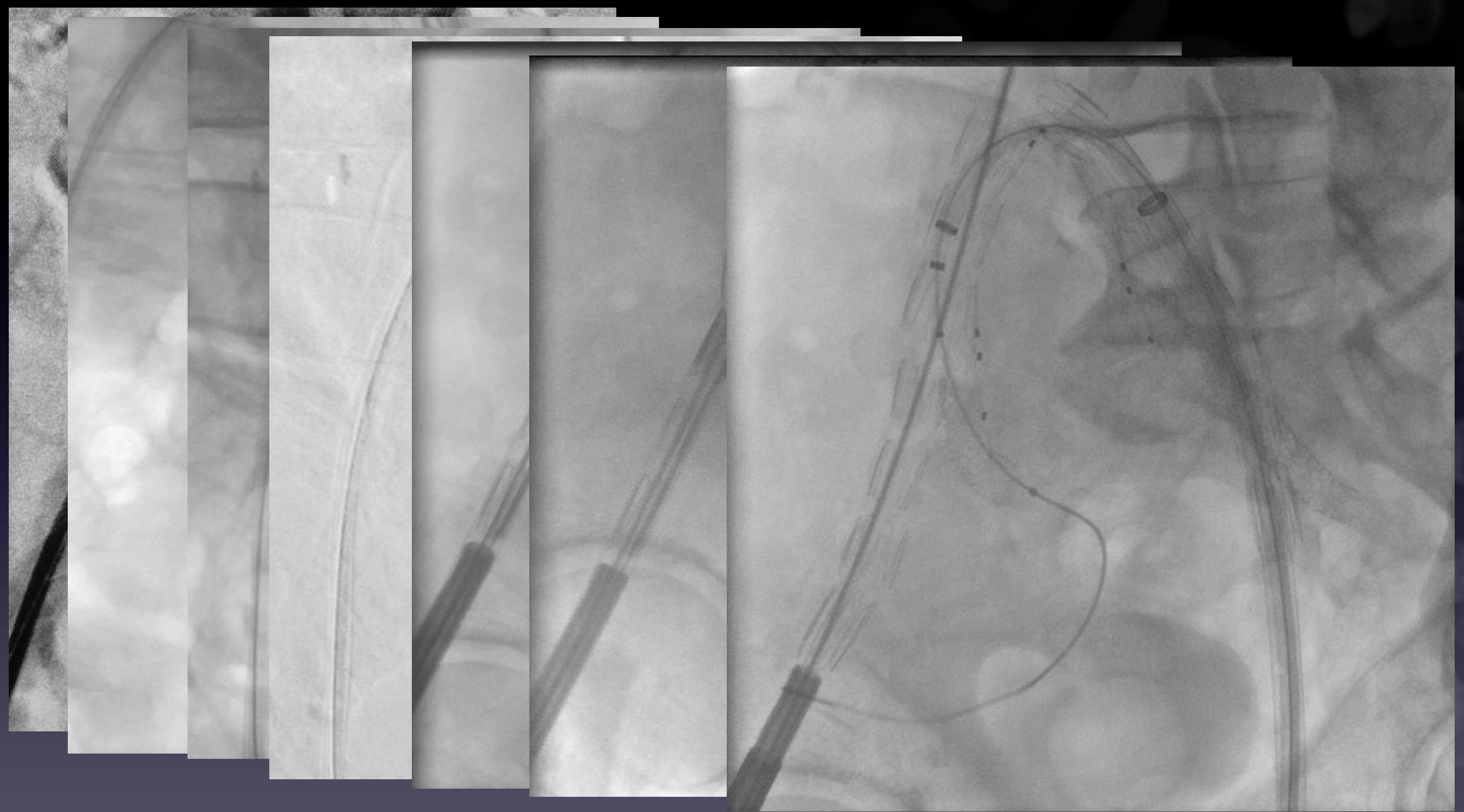
¹⁹ **ESVS Guidelines Committee:** Gert J. de Borst (chair) [Utrecht, Netherlands], Nabil Chakfe [Strasbourg, France], Sebastian Debus (Hamburg, Germany), Rob Hinchliffe [Bristol, United Kingdom], Stavros Kakkos (Patras, Greece), Igor Koncar (guideline coordinator) [Belgrade, Serbia], Philippe Kolh (Liege,





H

K



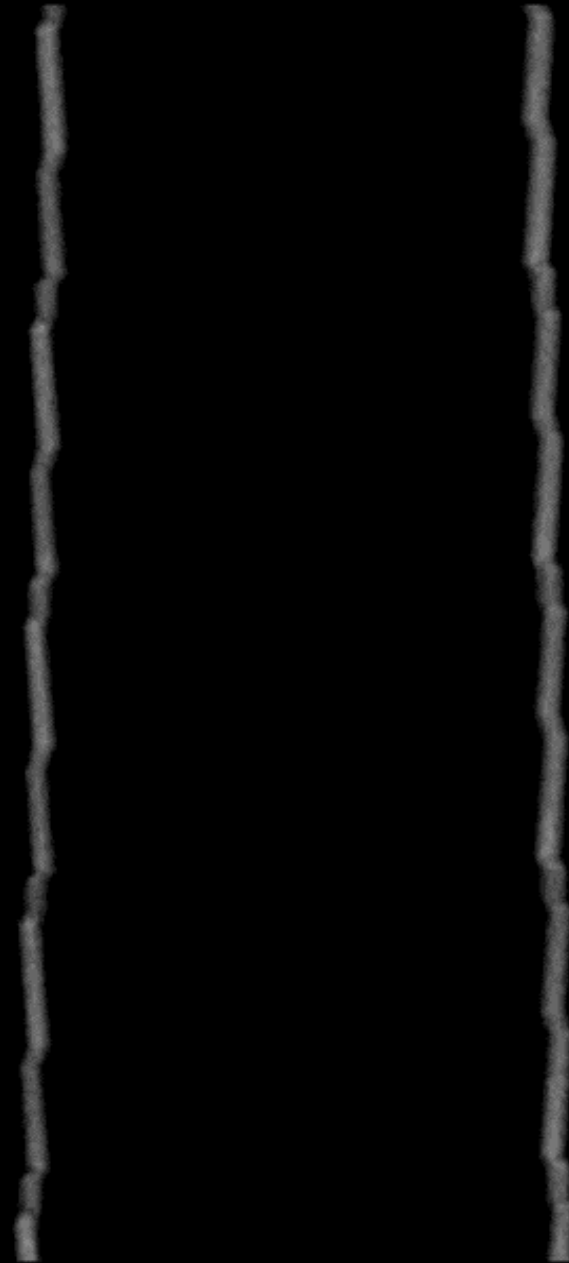


HPR

H

RAF

R



FENESTROVANÝ EVAR (FEVAR)

Juxtarenálna/Pararenálna aneuryzma alebo infrarenálna AAA s anatomicky nevhodným krčkom → v niektorých prípadoch sa preliňajú indikácie na ESAR a FEVAR

Recommendation 95	Class	Level	References
In patients with juxtarenal abdominal aortic aneurysm, open repair or complex endovascular repair should be considered based on patient status, anatomy, local routines, team experience, and patient preference.	Ila	C	[524,570]

Recommendation 96	Class	Level	References
In complex endovascular repair of juxtarenal abdominal aortic aneurysm, endovascular repair with fenestrated stent grafts should be considered the preferred treatment option when feasible.	Ila	C	[568]

Recommendation 94	Class	Level	References
Centralisation to specialised high volume centres that can offer both complex open and complex endovascular repair for treatment of juxtarenal abdominal aortic aneurysm is recommended.	I	C	[162,278]

Zenith Fe

AAA ENDOVASCULAR

DEVICE ORDER FORM

Send the completed form to:
Czech Republic: ARID
Slovak Republic: ARID
Europe: Cook Aortic

Date: 07/20/22
Hospital:
Physician signature:
Physician e-mail:

One

PBD mm	
24	<input type="checkbox"/>
26	<input type="checkbox"/>
28	<input type="checkbox"/>
30	<input type="checkbox"/>
32	<input type="checkbox"/>

PBL mm	
76	<input type="checkbox"/>
91	<input type="checkbox"/>
106	<input type="checkbox"/>
121	<input type="checkbox"/>

Note: Where PBD = 24-32, A = 16
Where PBD = 34/36, A = 21

CLOCK POSITION

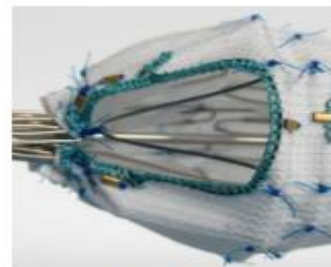
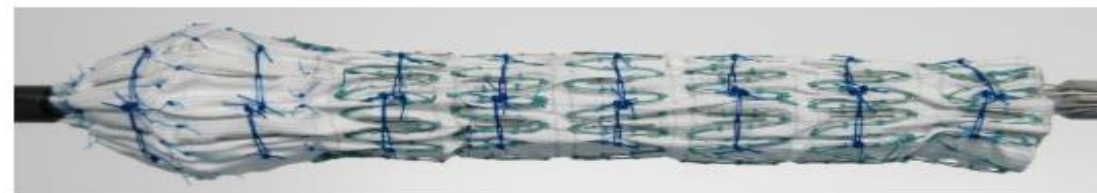
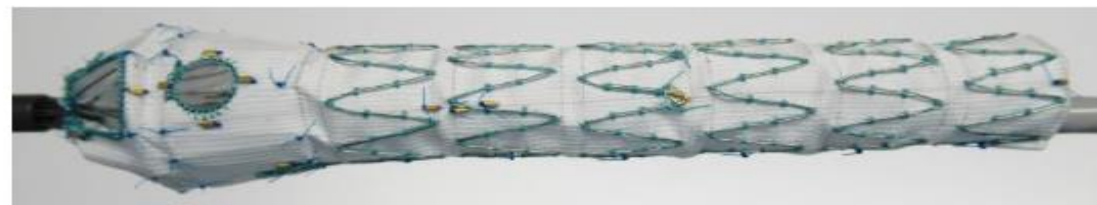
GENERAL NOTES



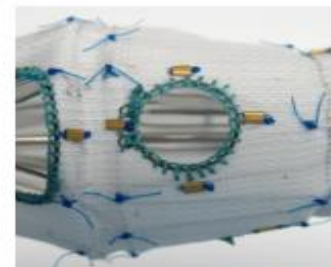
AAA-REINFORCED-FENESTRATED-PROXIMAL

E93078

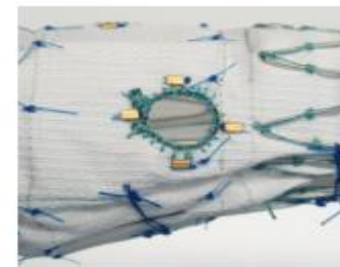
AC1131022



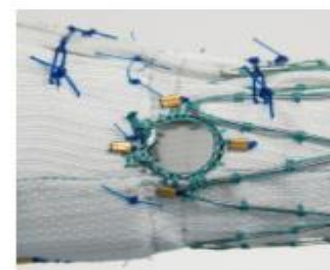
Scallop #1: 12:45



Large Fenestration #1: 12:45



Small Fenestration #1: 9:45

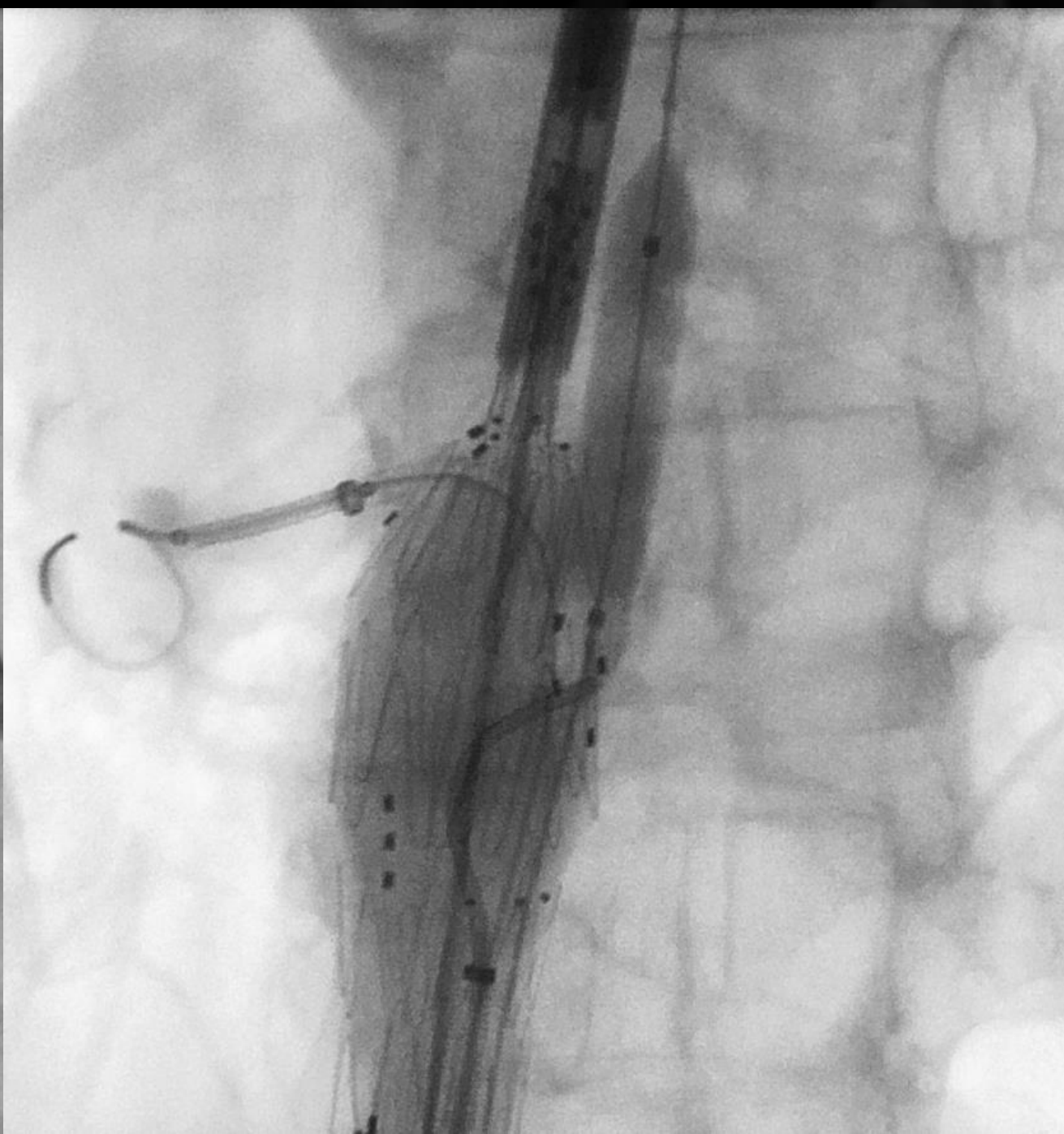
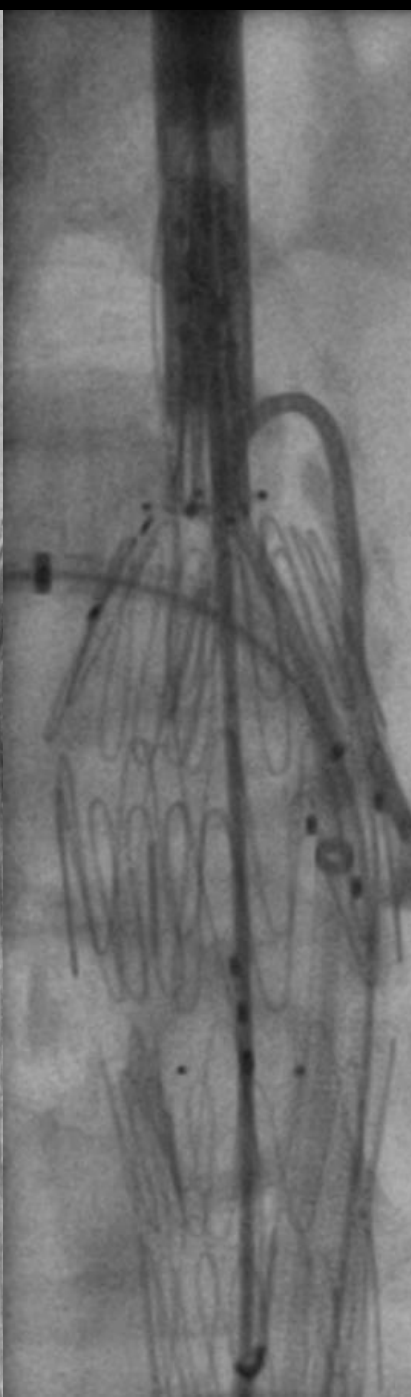


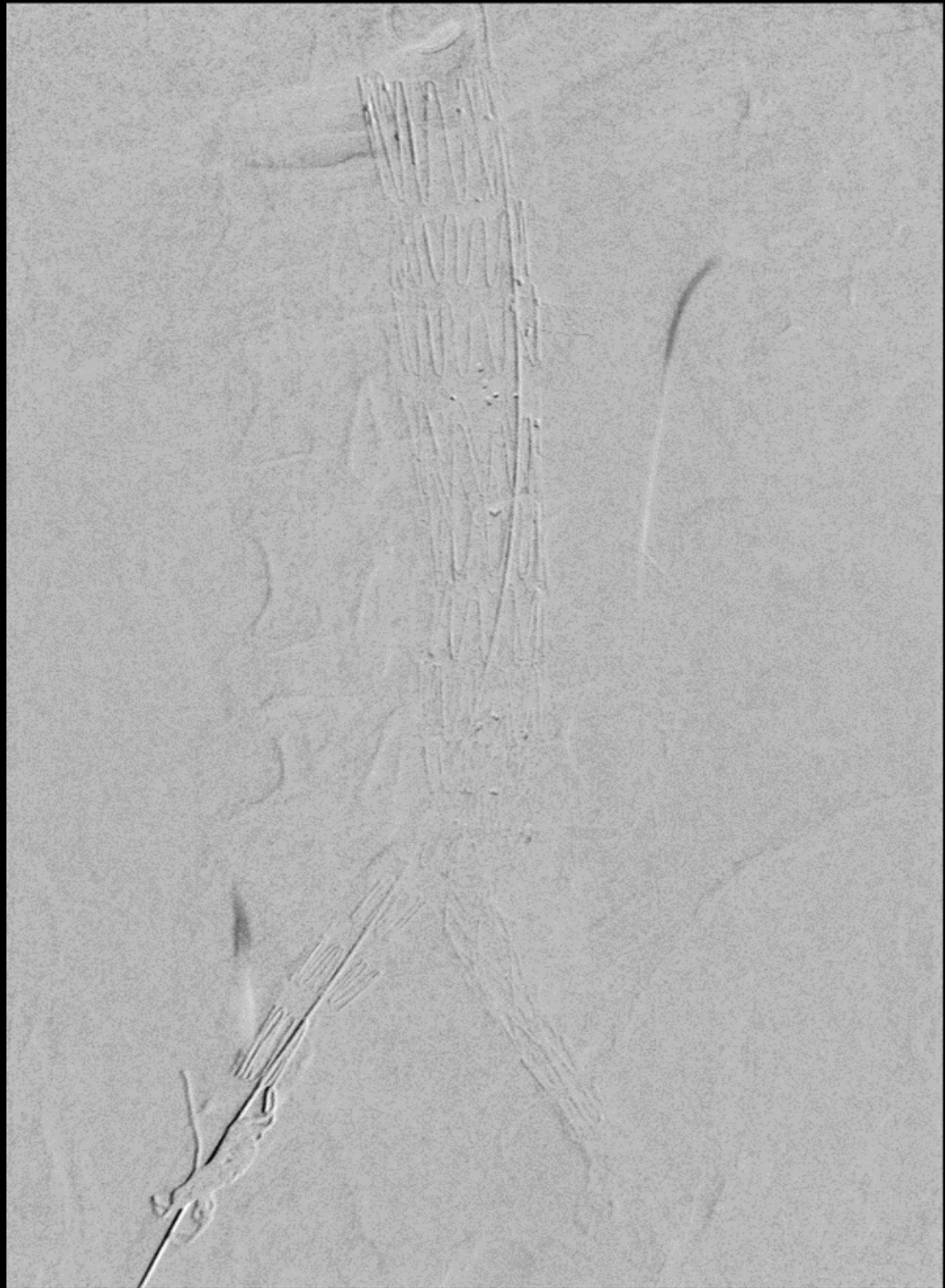
Small Fenestration #2: 4:00



ZI

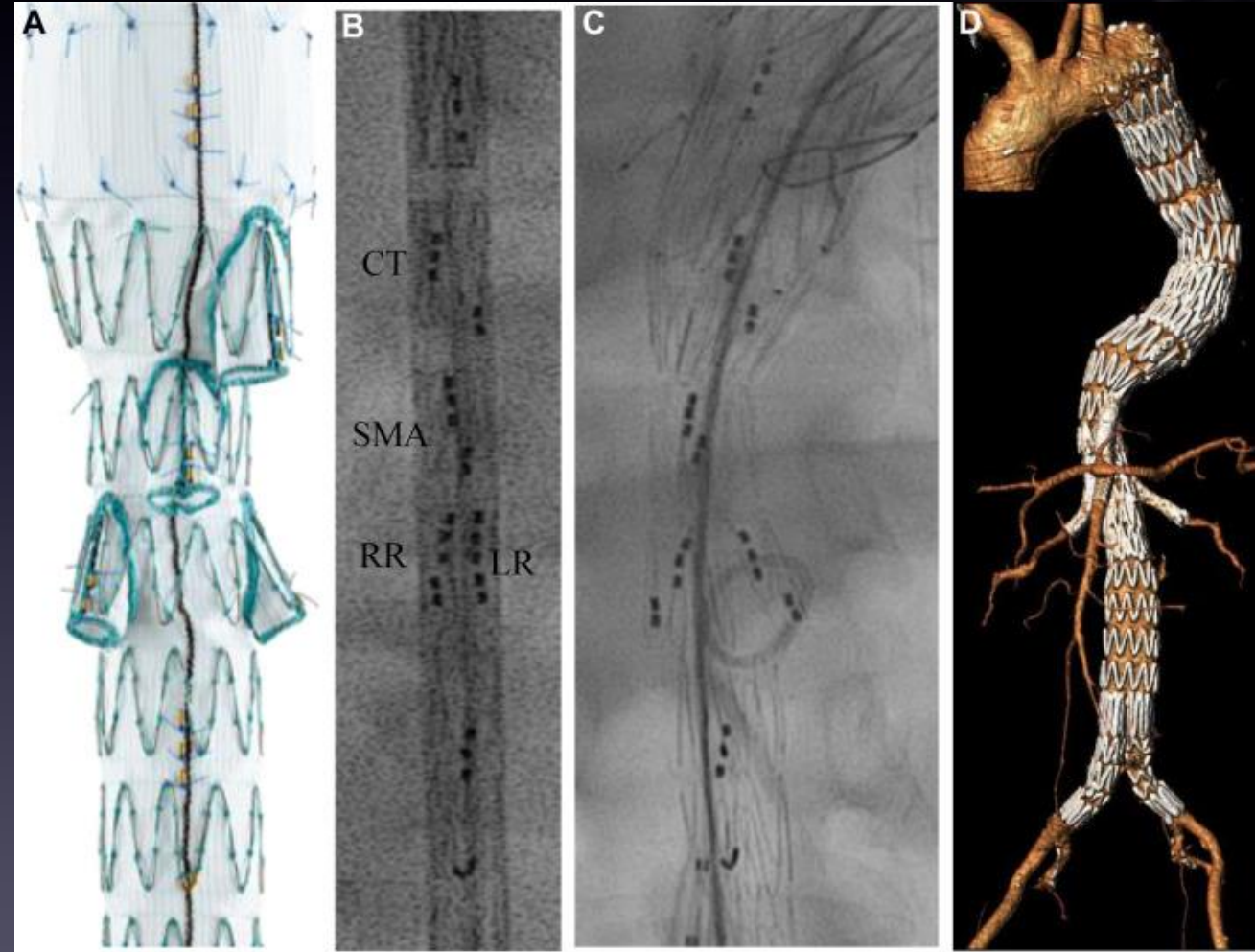
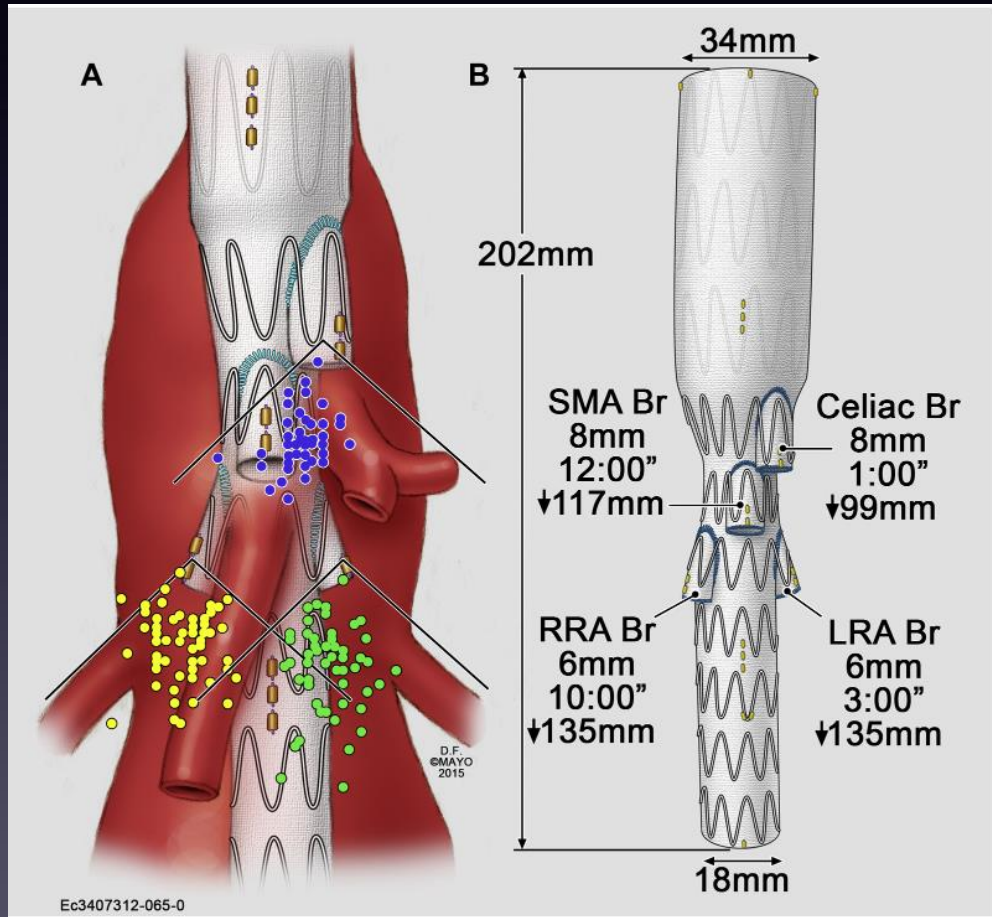






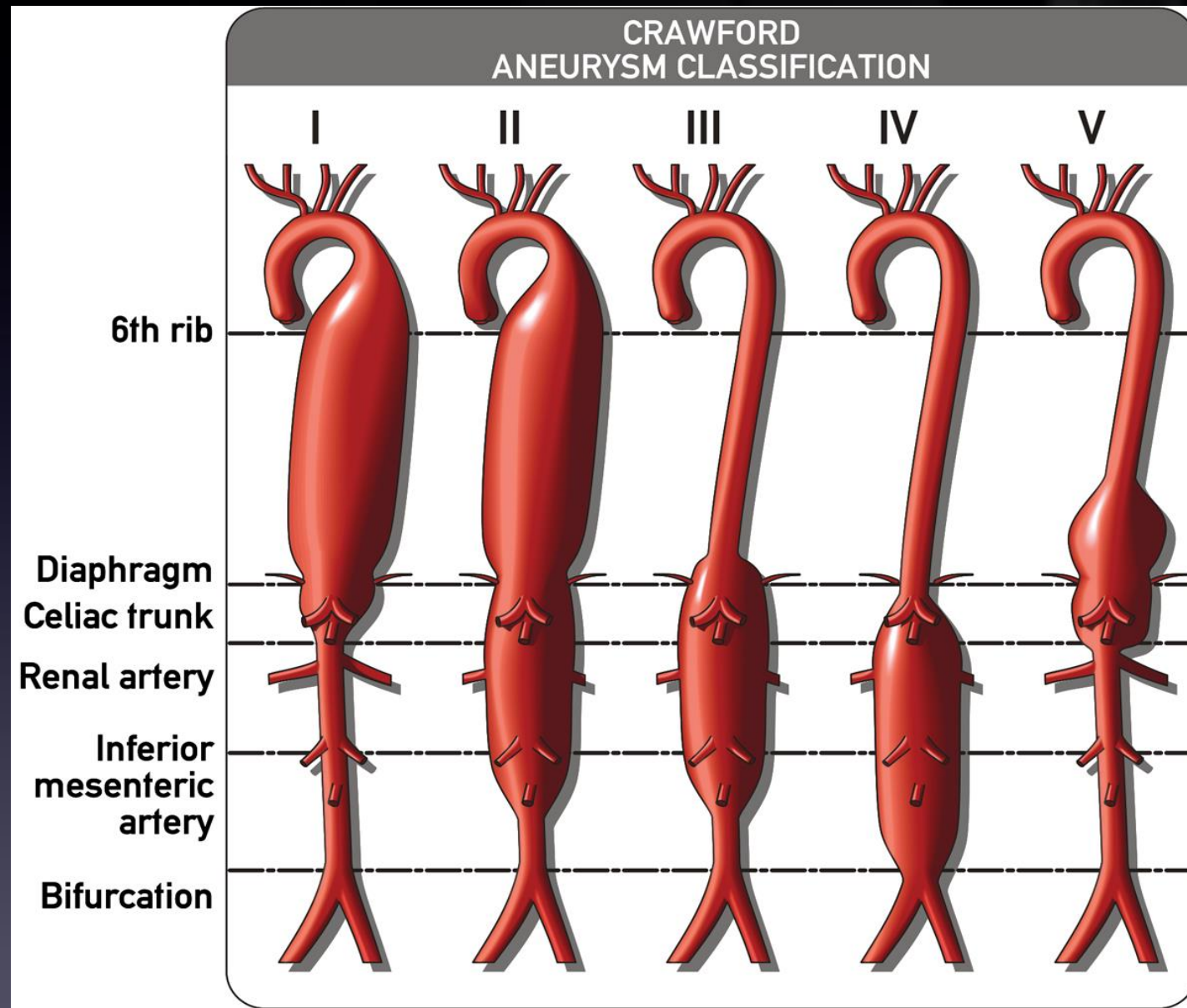
B(branch)EVAR - T-Branch

- Aneuryzma torakoabdominálnej aorty
- Suprarenálna aneuryzma AAA
- Disekcie hrudnej aorty

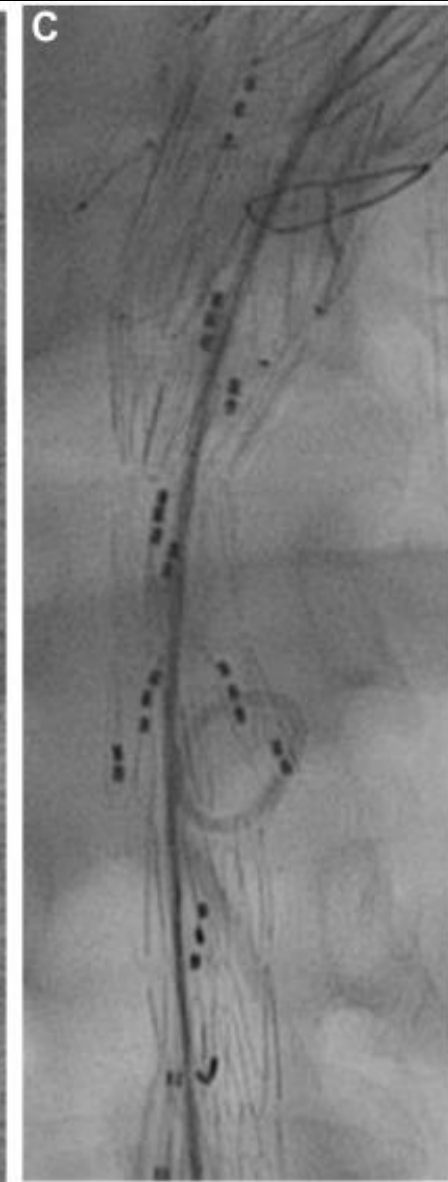
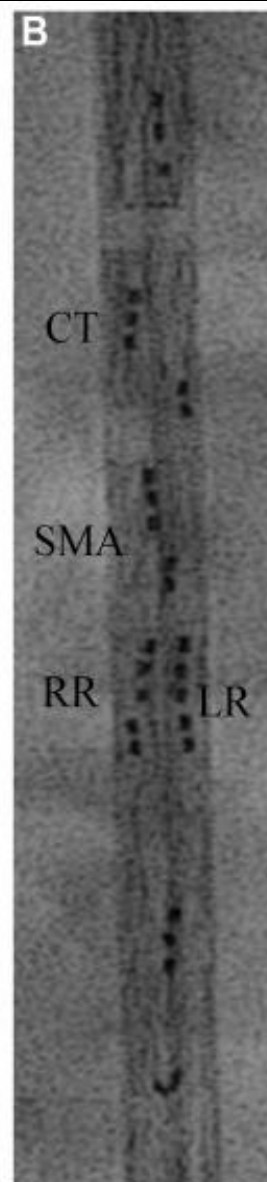
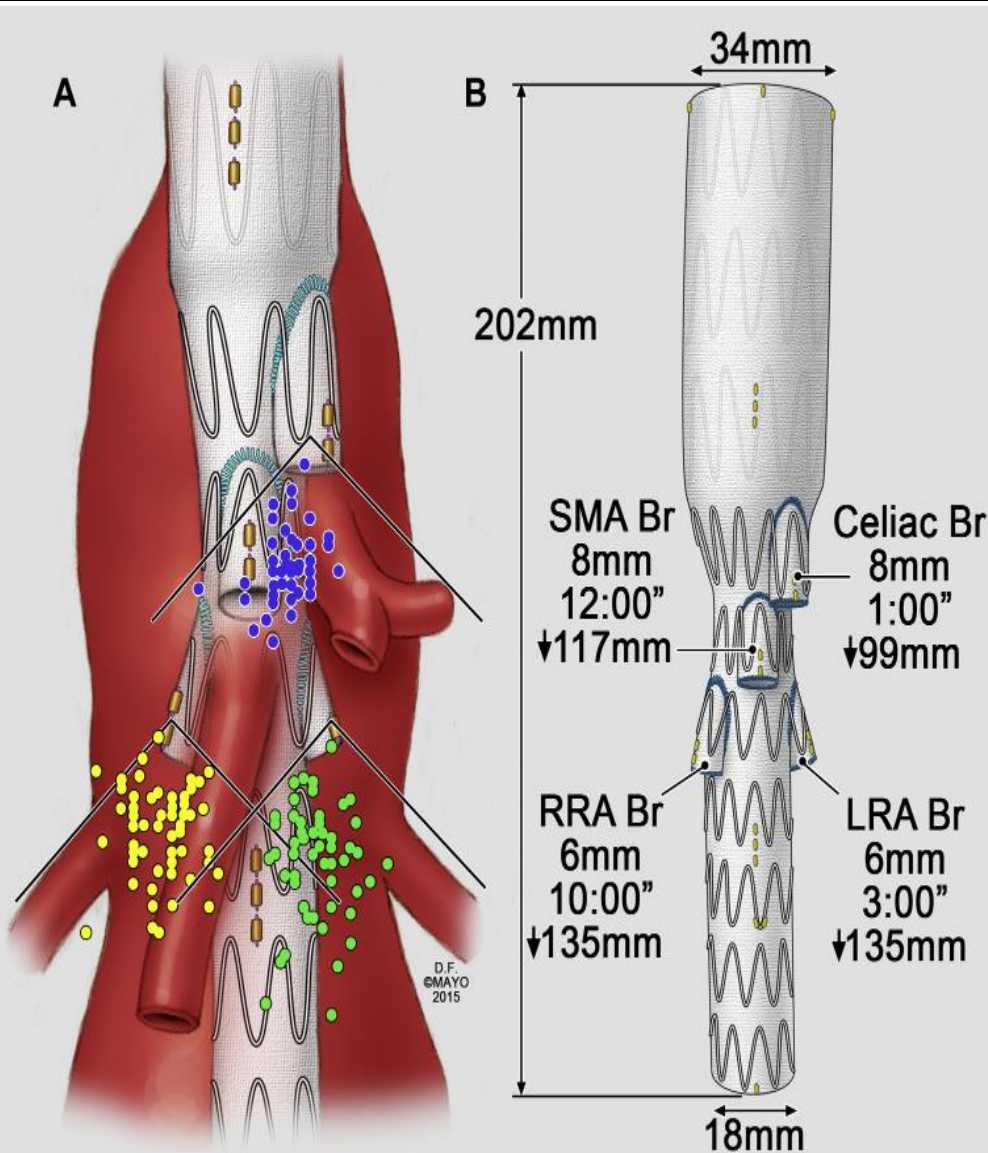


B(branch)EVAR - T-Branch

- Aneuryzma torakoabdominálnej aorty
- 1-5% všetkých aneuryziem aorty
- ↑ Riziko peri/postprocedurálnych komplikácií (iNCPM, spinálna ischemia – 4 vs 20% - EVL vs OSR)



B(branch)EVAR - T-Branch



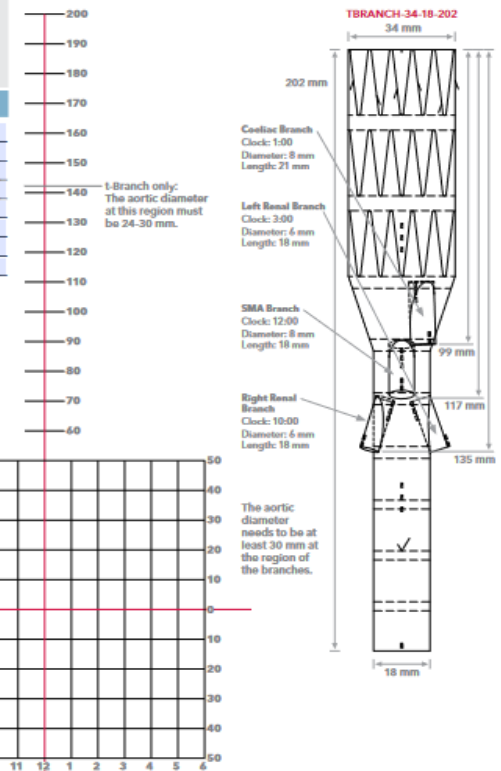
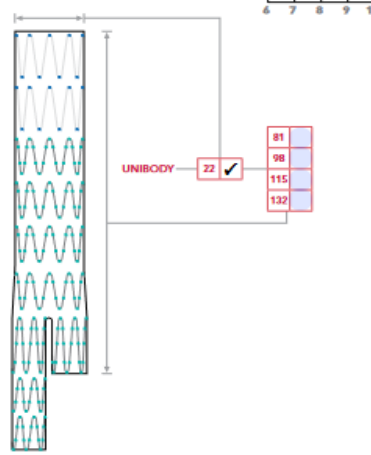
B(branch)EVAR - T-Branch

Zenith® t-Branch® THORACOABDOMINAL ENDOVASCULAR GRAFT

DEVICE SELECTION FORM

Date: _____
 Hospital: _____
 Patient ID: _____
 Physician name: _____
 Physician phone: _____
 Physician e-mail: _____
 Date of procedure: _____
 PO number: _____

- Step 1**
Mark the position of the SMA in the centre of the grid.
- Step 2**
Mark the position of the coeliac and renal arteries on the grid.
- Step 3**
Mark the proximal extent of the aneurysm on the y-axis.
- Step 4**
Use the clear plastic t-Branch sizing sheet to determine the optimal position for the t-Branch graft. Give preference to the position of the lowest renal artery when you place the sizing sheet.
- Step 5**
Mark the level of the aortic bifurcation on the y-axis.
- Step 6**
Select the size of the universal distal body. The contralateral limb should be no more than 15 mm above the aortic bifurcation.
- Step 7**
Select the Spiral-2® Iliac Leg and any additional components required.



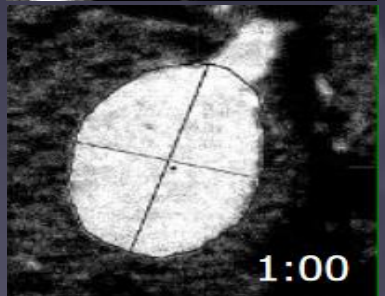
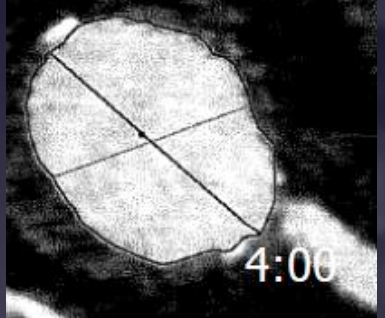
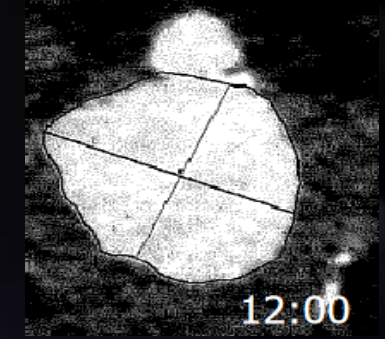
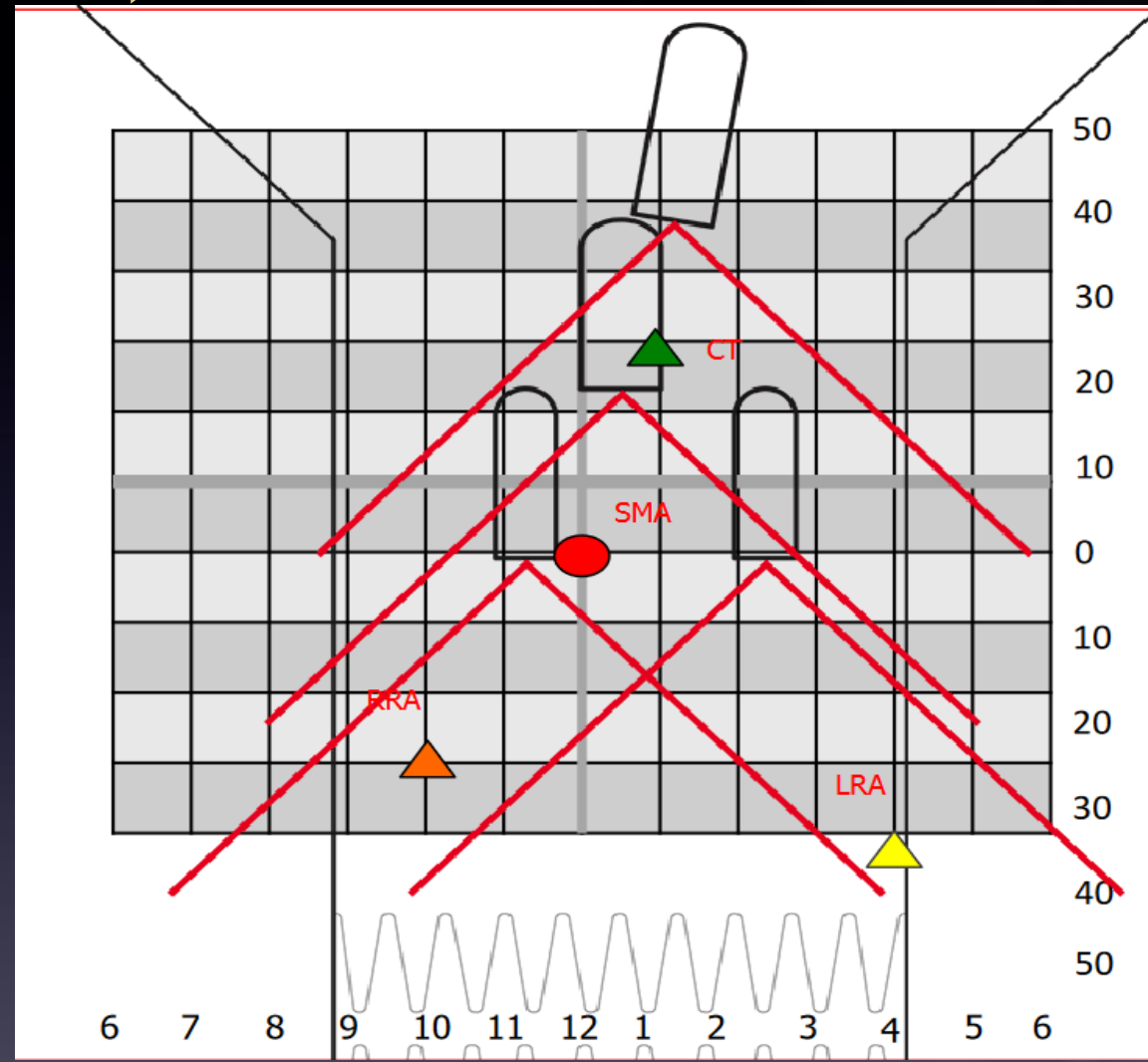
Please contact Cook Medical customer service to place an order.

Pieces required
TBRANCH - 34 - 18 - 202
UNIBODY - 22 -

Contralateral Iliac leg: **ZSLE -** - - ZT

Ipsilateral Iliac leg: **ZSLE -** - - ZT

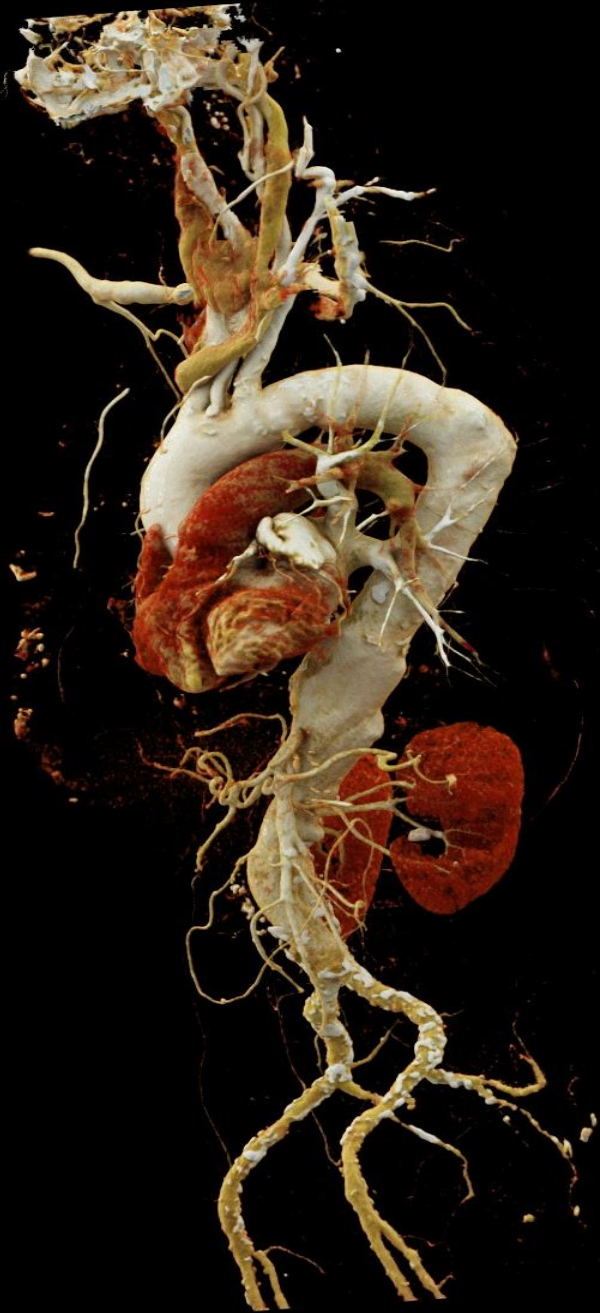
Additional components required:



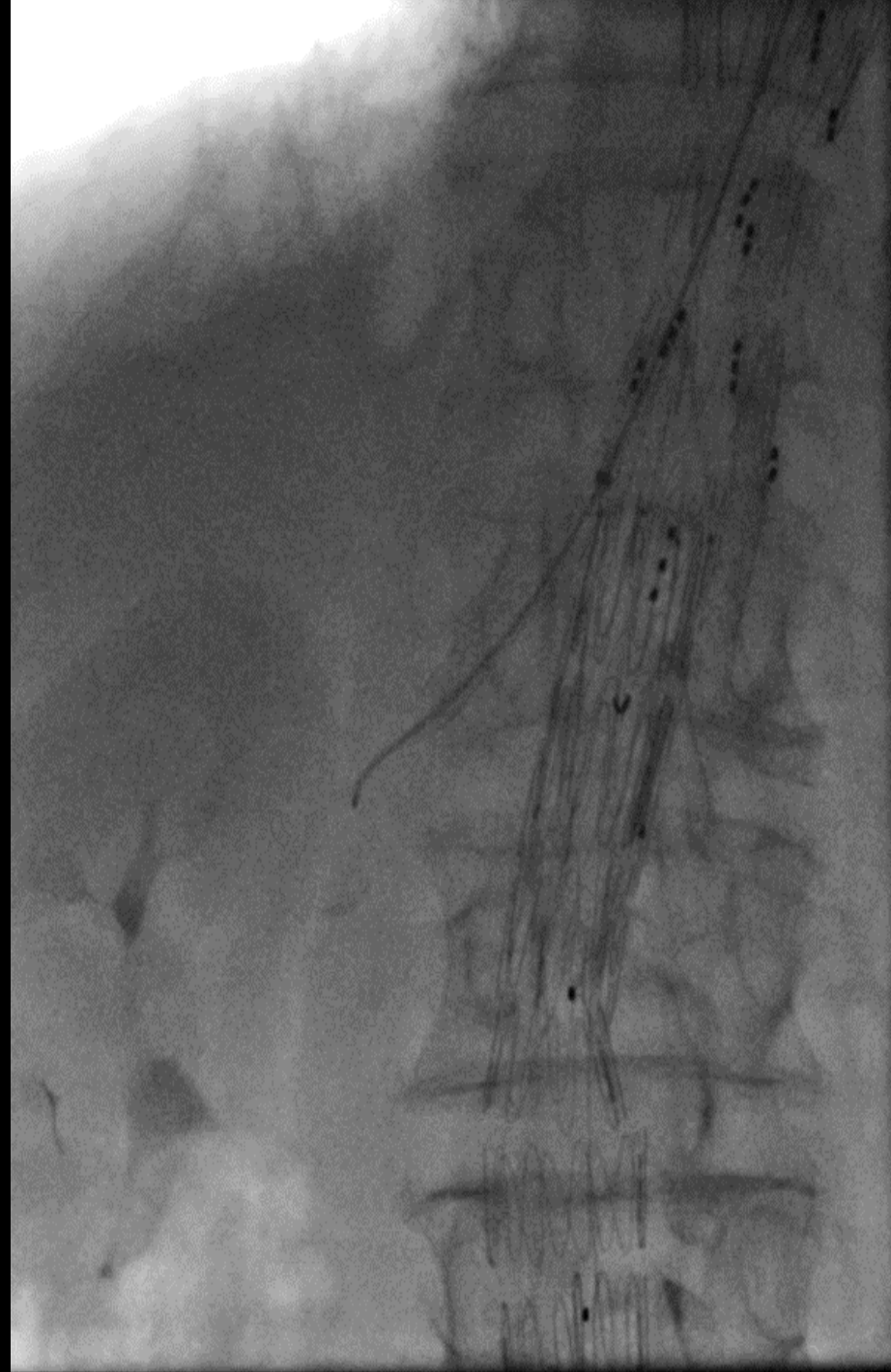
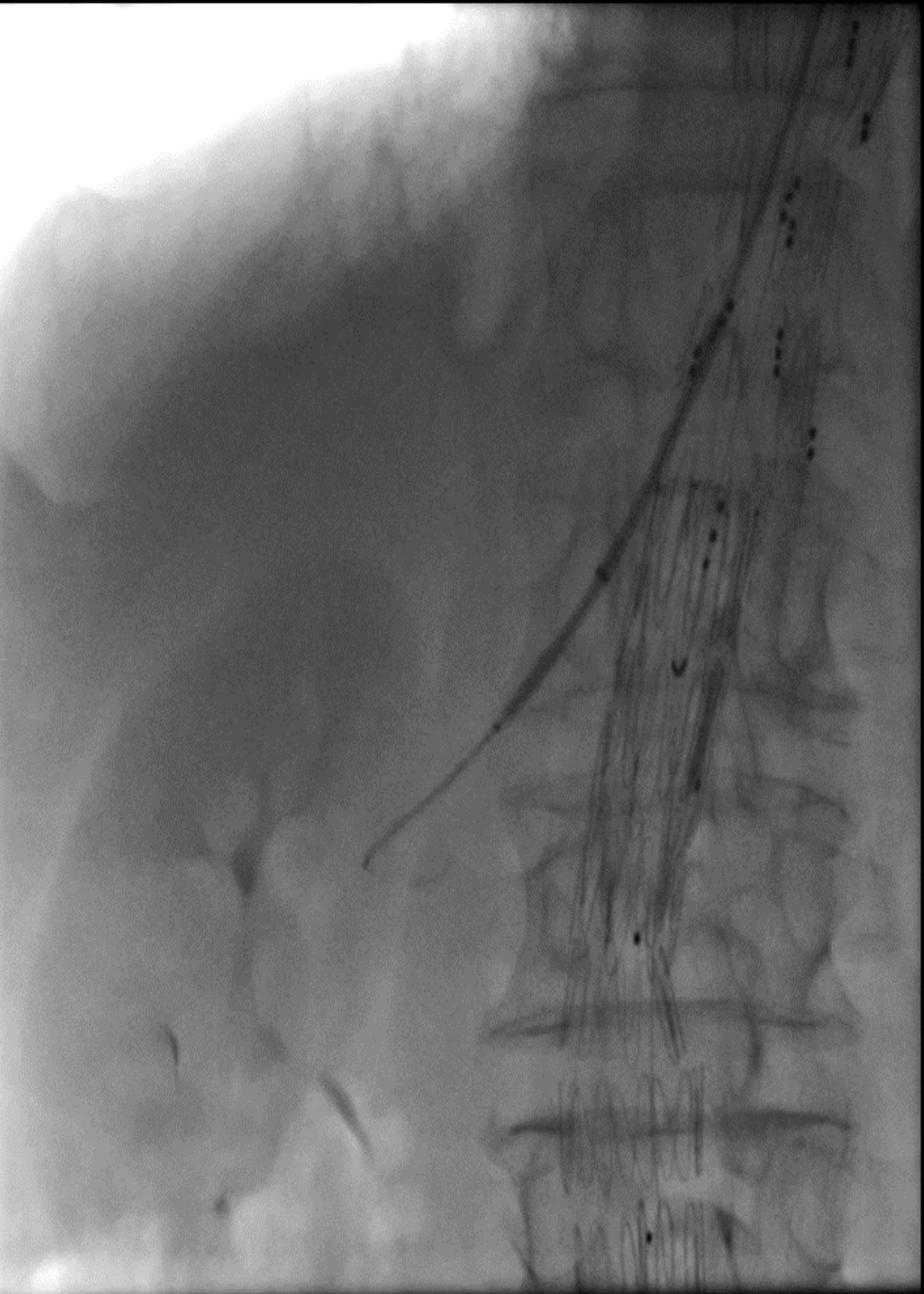
BEVAR (T-Branch)

- 2-stupňová procedúra – minimalizuje sa riziko ischémie miechy
- V prvom stupni obyčajne prekrytie descendentnej aorty
- V druhom stupni implantácia T-branch a kotvenie systému v iliakálnych artériách
- Doba medzi zákrokmi 4-8 týždňov
- Snažíme sa vždy zachovať čo najviac artérií zásobujúcich miechu – All obojstranne aj AS l.sin.
- Kedysi dominantne transaxilárny (perkutánný/chirurgický prístup), teraz čoraz viac transfemorálny prístup s použitím steerable sheathov

HRA



AKI



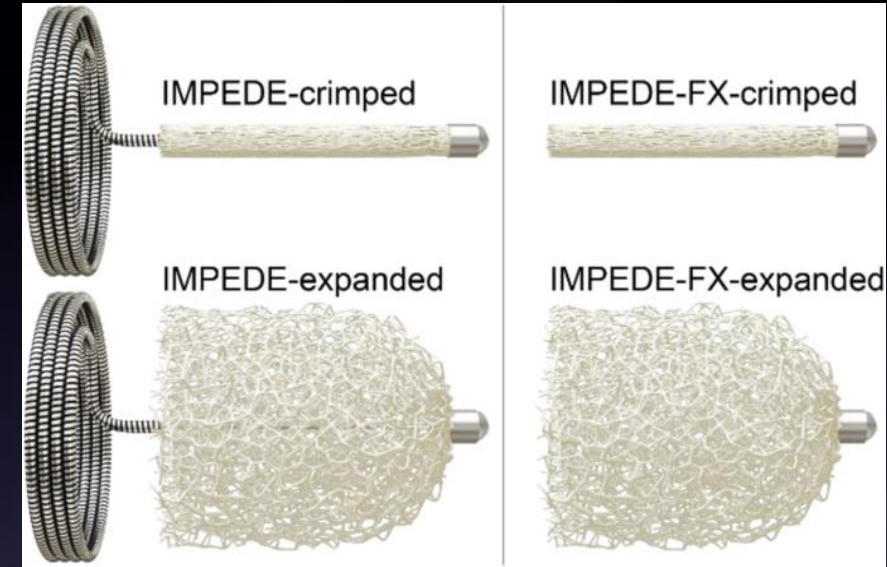


Polymérové embolizačné plugy

- Porózny, radiolucenčný embolizačný materiál
- Atraumatický (veľmi malá radiálna sila)

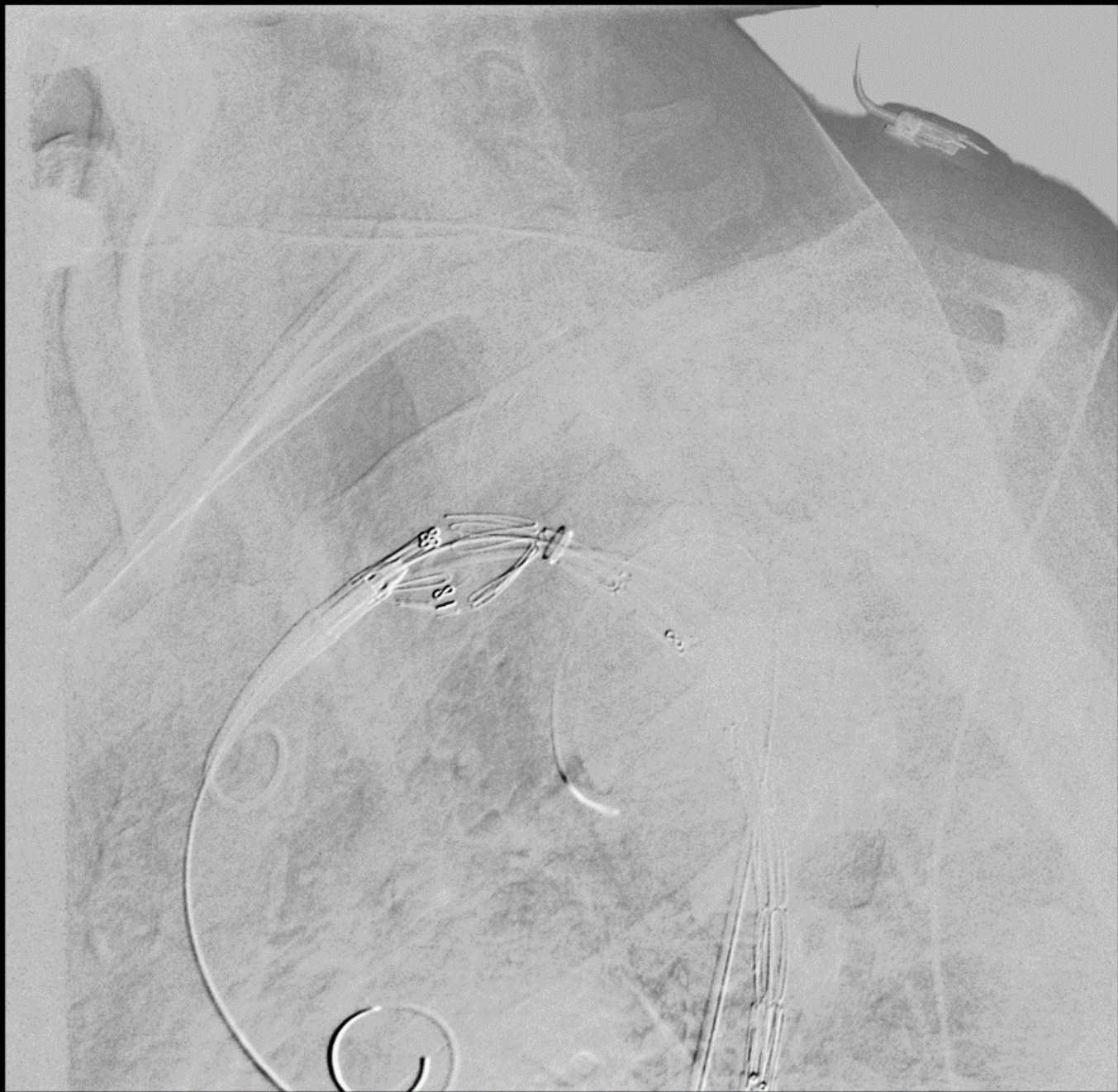
CIEĽ:

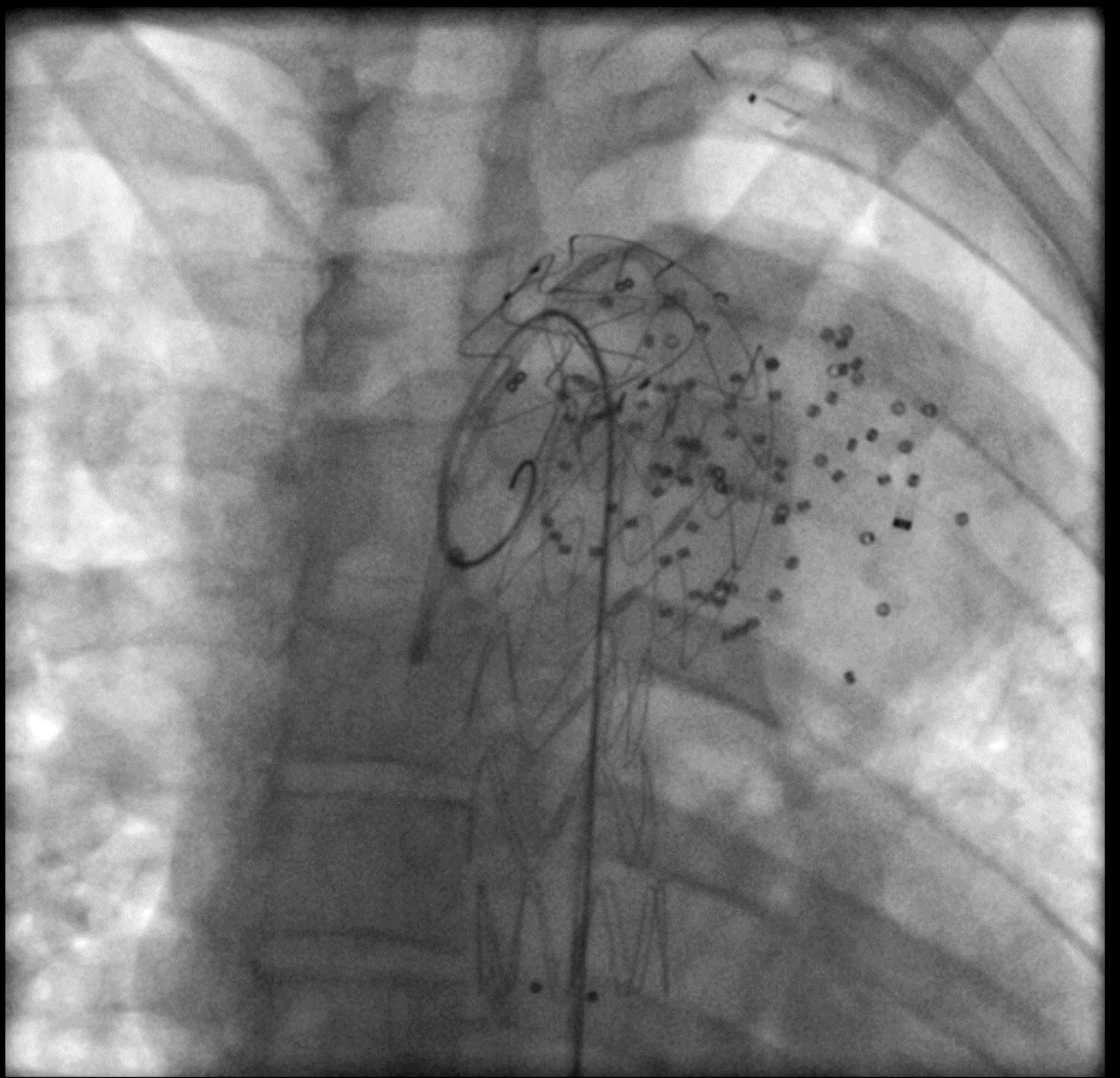
- Vyplniť vak aneuryzmy
- Minimalizovať riziko endoleaku
- Navodiť riadenú regresiu vaku aneuryzmy



		IMP-05	IMP-07	IMP-10	
Vessel diameter	mm	2 - 5	4 - 7	6 - 10	
Proximal marker diameter	inch	.032	.046	.065	
	mm	0.81	1.17	1.65	
Expanded SMP plug diameter	mm	6	8	12	
SMP plug length	mm	10	10	15	
Anchor coil diameter	mm	7	9	13	
Catheter ID*	min	inch	.038	.055	.070
			.057	.071	.090
	min	mm	0.97	1.40	1.78
			1.45	1.80	2.29





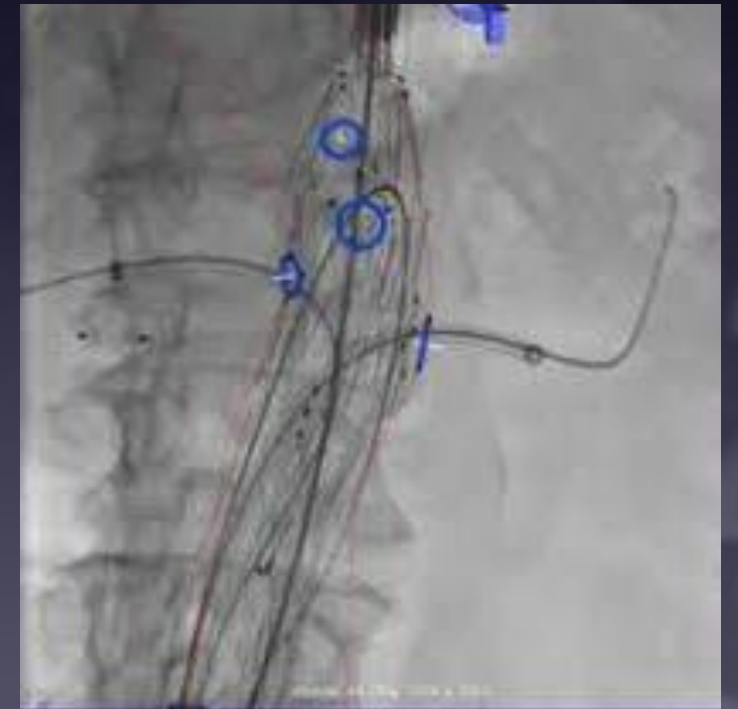
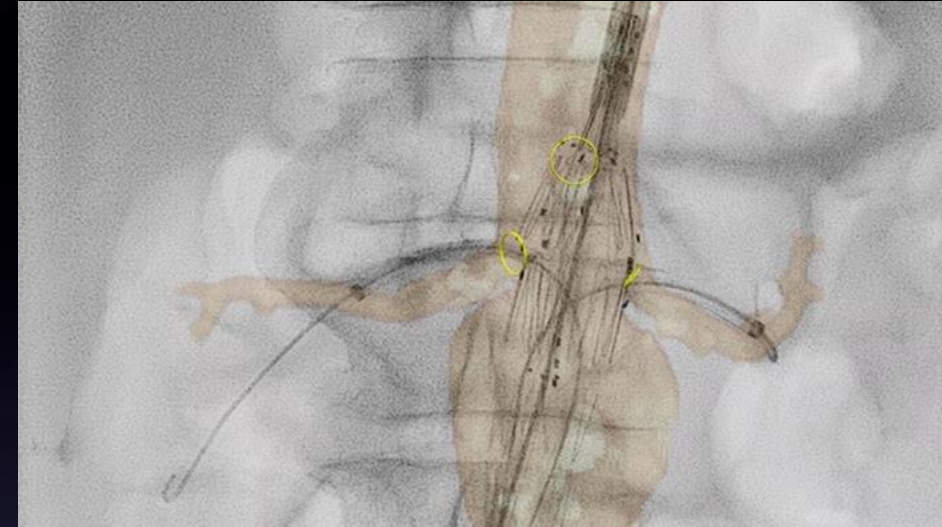


ZÁVER

- Komplexné AAA/TAA predstavujú výzvu pre EVL aj OSR
- Vyššia periprocedurálna morbidita a mortalita
- Nutnosť centralizácie týchto zákrokov
- Aplikácia ďalších nových techník do klinickej praxe (in situ laser fenestration)

ZÁVER

.....nová sála



ĎAKUJEM ZA POZORNOST

