ROZWARSTWIENIE AORTY

Arkadiusz Kazimierczak
Klinika Chirurgii Naczyniowej PUM w Szczecinie
Kierownik: Prof. hab. n. med. Piotr Gutowski

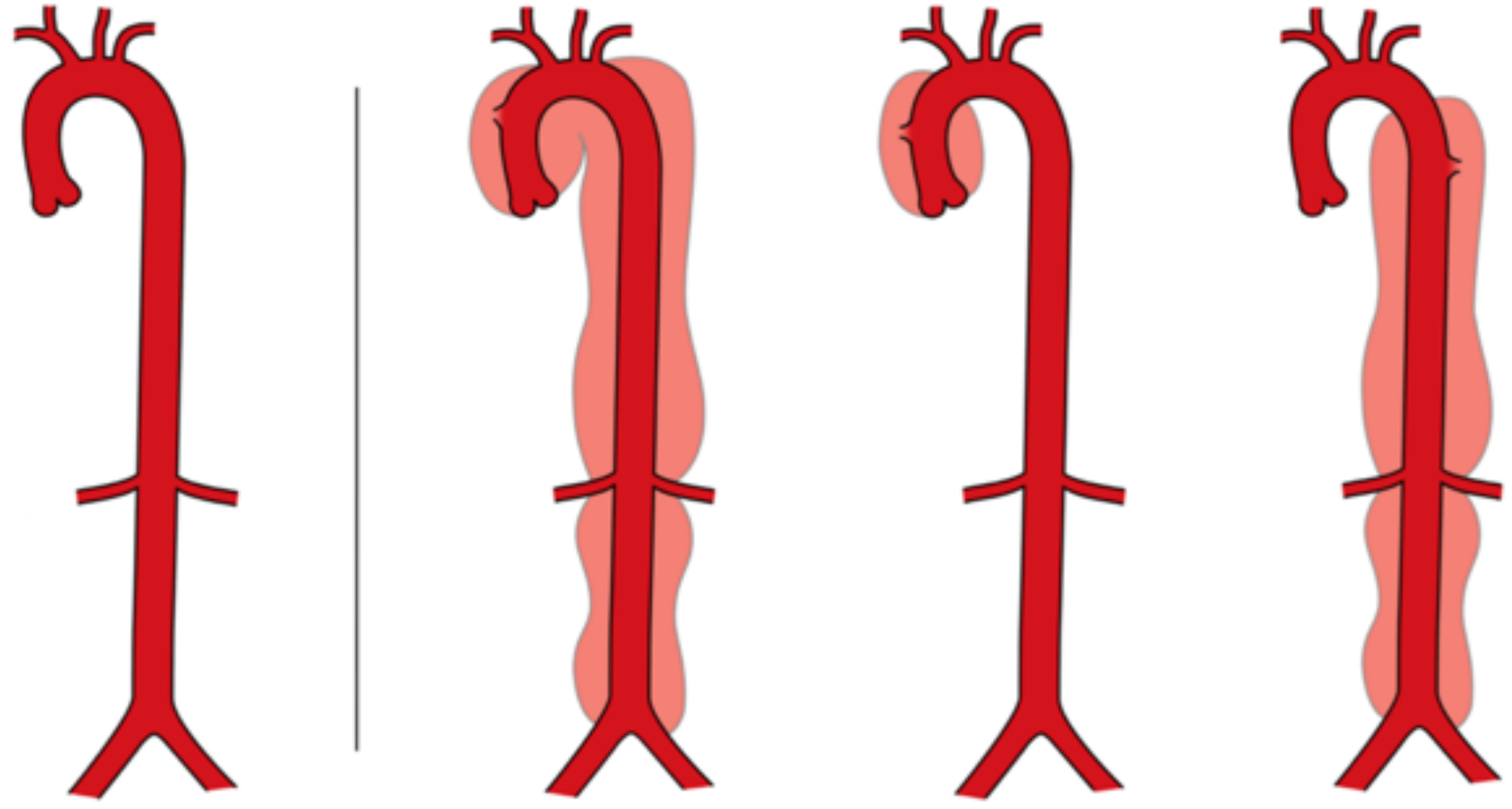
60%

Typ A

40%

Typ B

STANFORD	Type A		Type B
DEBAKEY	Type I	Type II	Type III

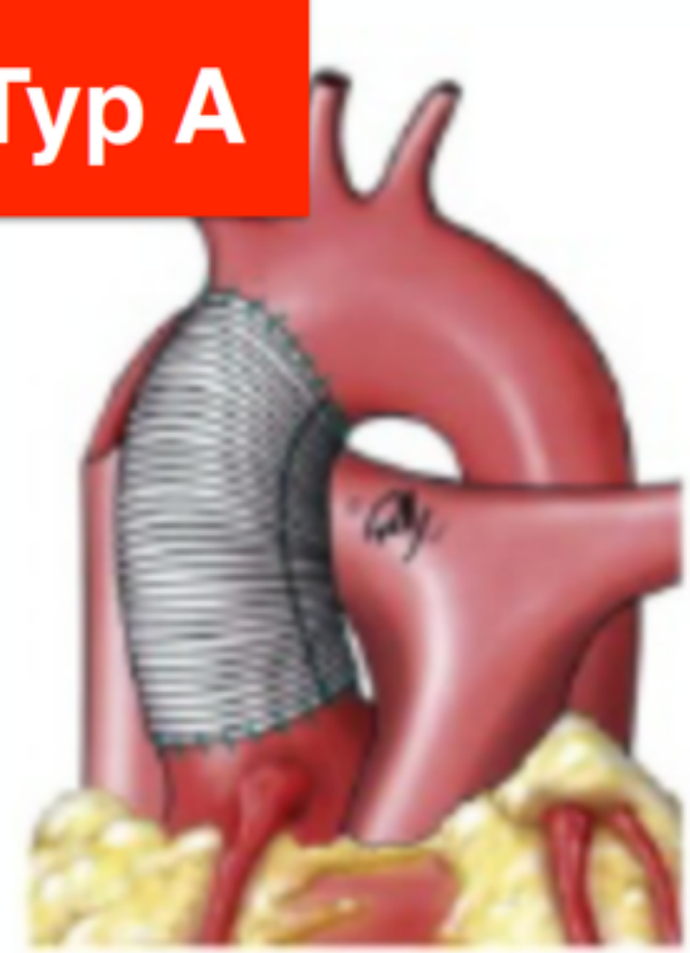


NORMAL

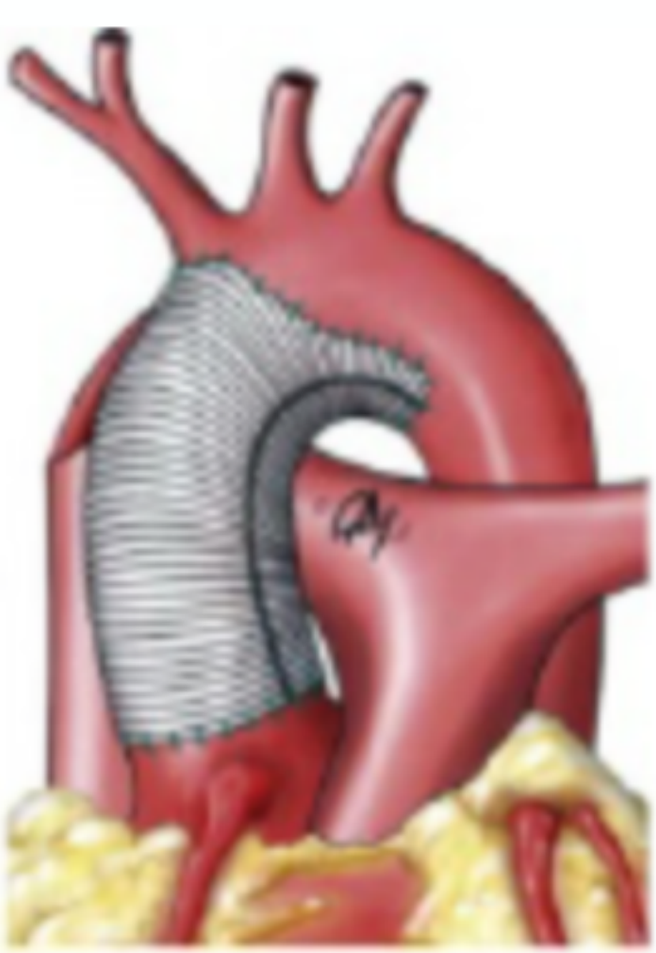
PODZIAŁ CZASOWY

- **Ostre <2 tyg**
- **Podostre 2-9 tyg**
- **Przewlekle >9 tyg**

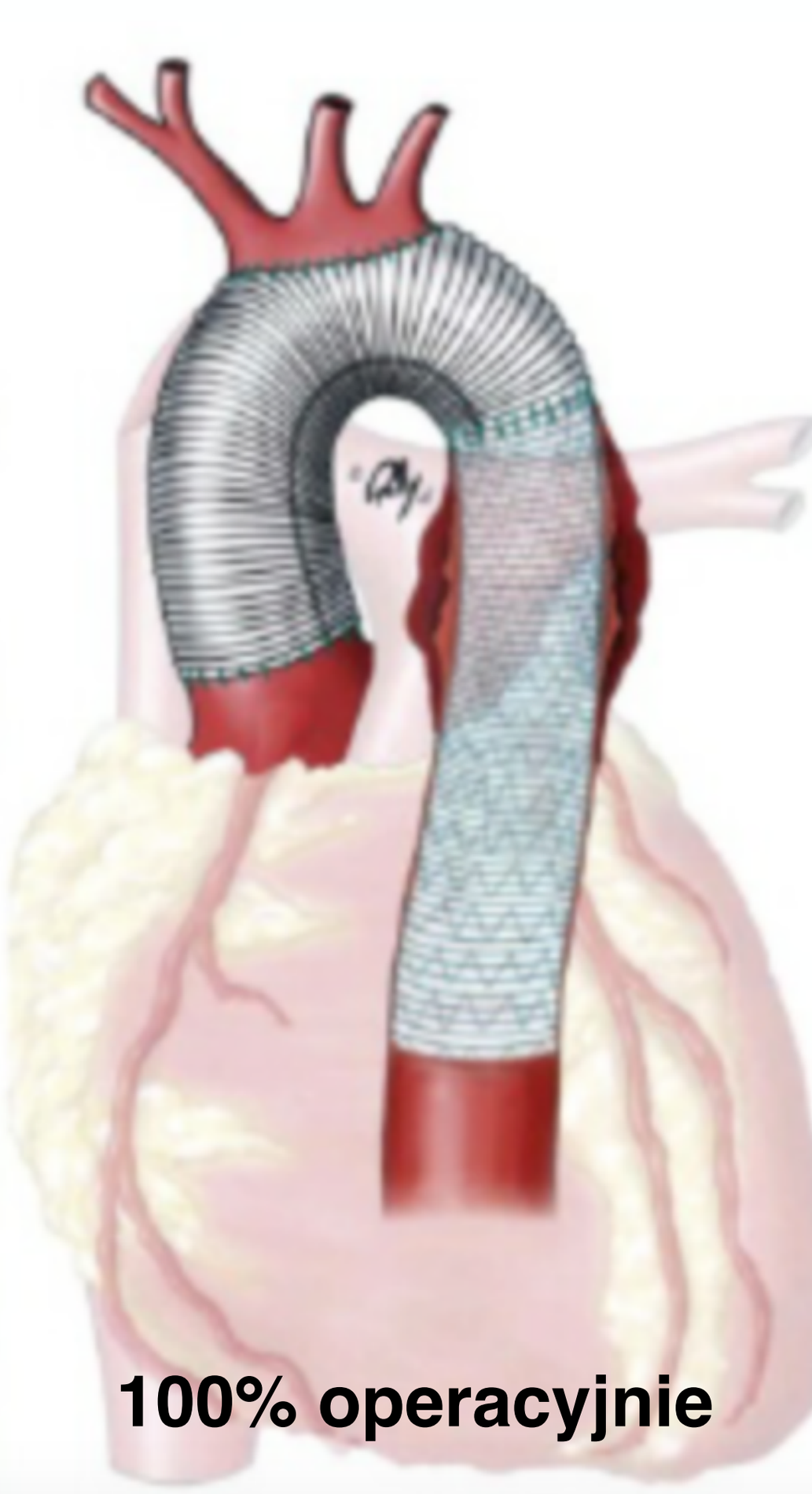
Typ A



A Supracommissural replacement



B Hemiarch replacement



100% operacyjnie

Typ B

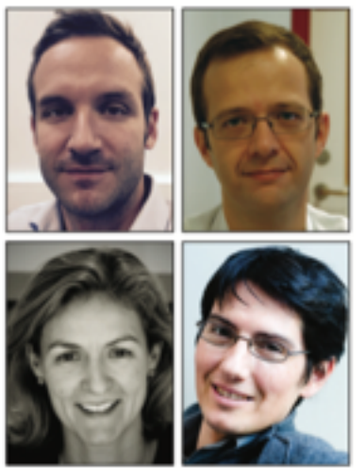
BMT TEVAR PETTICOAT

60-80% 20-40% operacyjnie

Exploring the Use of Bare Stents in the Treatment of Type B Dissection

Understanding the effects on aortic remodeling and malperfusion.

BY JONATHAN SOBOCINSKI, MD, PHD; NUNO V. DIAS, MD, PHD; RACHEL CLOUGH, MD, PHD; AND STÉPHAN HAULON, MD, PHD



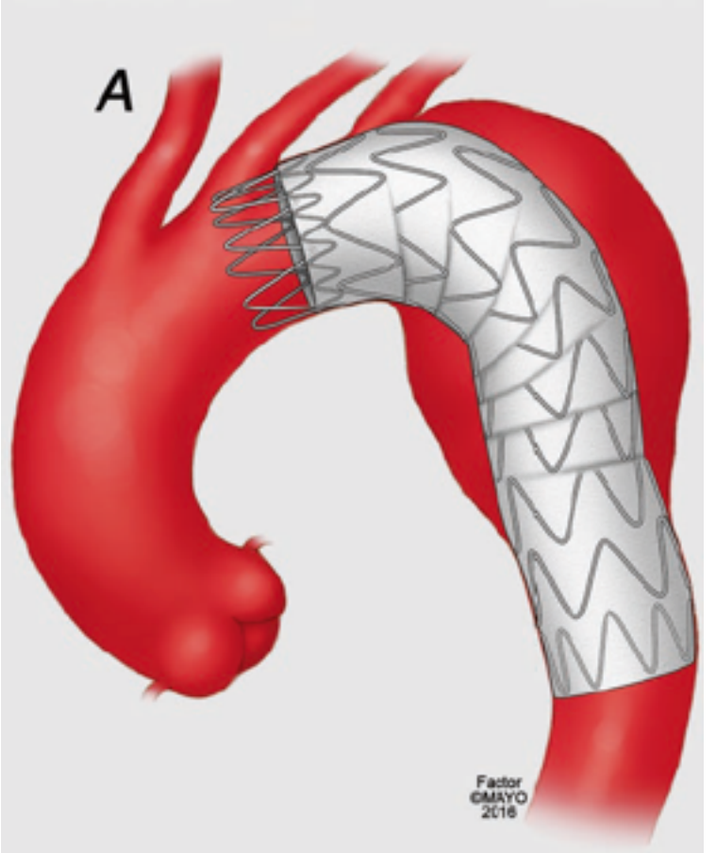
Malperfusion of aortic branches and aortic rupture are the two most feared complications in the acute phase of a type B aortic dissection. When such complications occur, stent graft deployment should be considered with the proximal landing zone in a healthy, nondissected aorta.[1-3] The coverage of the main proximal intimal tear redirects the aortic flow toward the true lumen and thus promotes a drop of pressure within the false lumen. Thoracic stent grafting (TEVAR) has been associated with encouraging early outcomes for the treatment of acute complicated type B aortic dissection,[4,5] but questions still remain regarding the mid- and long-term results.[6] Initial successful treatment with TEVAR is not necessarily associated with favorable remodeling of the dissected aorta during follow-up.[7] Only few exhaustive anatomical analyses of the aorta following TEVAR for acute type B aortic dissection have been performed so far.[7-11] TEVAR generally induces positive aortic remodeling, but this is usually limited to the aortic segment covered by the stent graft; frequently, the outcomes of the distal thoracic and abdominal aorta remain of concern.[12]

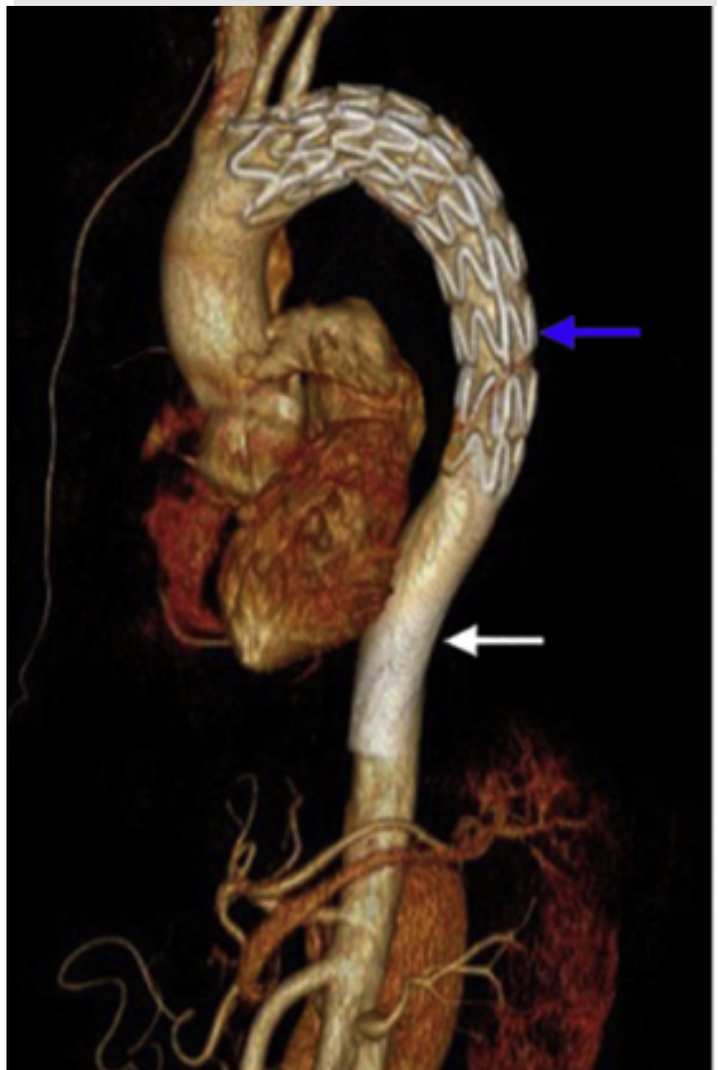
The additional implantation of a self-expanding bare stent in the aortic true lumen, distally to the proximal stent graft(s), was proposed in 2005. This composite device design approach, also known as STABLE (staged aortic and branch vessel endoluminal repair), aimed to enhance global aortic remodeling, especially in the area of the abdominal aorta, and to improve the management of visceral/renal/lower limb malperfusion in the acute phase.[13] First, the proximal stent graft is positioned, then intraprocedural angiography is performed to assess if there is insufficient expansion of the true lumen, continuous retrograde perfusion of the false lumen, or evidence of malperfusion of arterial branches originating from the true lumen. If any of these features is present, then a distal bare stent may be used (Figure 1).[14]

Variations of the endovascular techniques described in the STABLE trial have been reported. He et al have suggested that if the proximal stent graft is deployed first, then the distal end of the stent graft is landed in the diseased aorta, which has the risk of causing further aortic dissection or other structural damage. They therefore advocate that the distal bare stent is placed first, at the intended distal landing zone, followed by the proximal stent graft.[15] Hofferberth et al reported the use of balloon-driven expansion of the true lumen following placement of the bare-metal stent below the stent graft to remove any residual flow in the false lumen and achieve complete true lumen expansion. This technique is called the stent-assisted balloon-induced intimal disruption and relamination in aortic dissection repair (STABILISE).[16]

AORTIC REMODELING

Long-term results from the IRAD registry indicate that at 5 years, more than 60% of patients develop aortic growth or formation of a new aneurysm after endovascular repair of acute complicated type B aortic dissection.[17] The implantation of a bare stent distal to the stent graft, to support true lumen expansion within the thoracoabdominal aorta, can be performed to promote remodeling of the dissected aorta. Improved aortic remodeling has been associated with a reduced risk of late aortic complications during follow-up. In a prospective, nonrandomized, multicenter feasibility study (STABLE 1 study), 86 patients with acute and subacute type B aortic dissections (within 90 days of symptom onset) underwent endovascular repair with a composite device design (Zenith TX2 Endovascular Graft and Zenith Dissection Endovascular Stent, Cook Medical).





CME

Nature Clinical Practice Cardiovascular Medicine (2005) **2**, 316-321
doi:10.1038/ncpcardio0224
Received 17 February 2005 | Accepted 27 April 2005

Staged endovascular treatment for complicated B aortic dissection

Peter J Mossop*, Craig S McLachlan, Shalini A Amukotuwa and Ian K Nixon About the authors

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Email mossoppj@svhm.org.au

SUMMARY

Background A 40-year-old man presented with acute chest and back pain, hypertension and anuria. Two years previously he had been diagnosed with acute uncomplicated type B aortic dissection. Following conservative management, with aggressive antihypertensive therapy and analgesia, he was monitored with 6-monthly surveillance CT scans. These demonstrated a

J Endovasc Ther. 2006 Dec;13(6):738-46.

Provisional extension to induce complete attachment after stent-graft placement in type B aortic dissection: the PETTICOAT concept.

Nienaber CA[1], Kische S, Zeller T, Rehders TC, Schneider H, Lorenzen B, Bünger C, Ince H.

Author information

Abstract

PURPOSE: To report the use of a technique (PETTICOAT: provisional extension to induce complete attachment) to obliterate sustained abdominal false lumen flow and pressurization despite successful stent-graft sealing of the thoracic entry tear in patients with complicated type B aortic dissection.

METHODS: Of 100 initial patients subjected to stent-graft repair for complex type B aortic dissection with thoracoabdominal extension, 12 patients (10 men; mean age 58.7 years, range 44-76) demonstrated distal true lumen collapse and a perfused abdominal false lumen despite successful sealing of the proximal tears. As an adjunctive or staged procedure, a scaffolding stent was placed for distal extension of the previously implanted stent-graft. In each case, a Sinus aortic stent, Fortress stent, or a Z-stent system was customized with maximum 2-mm oversizing versus the original stent-graft diameter. Magnetic resonance or computed tomographic angiography was performed at discharge, at 3 months, and then annually to determine false channel thrombosis, true and false lumen dimensions, and re-entry flow.

RESULTS: Delivery was successful in all cases (100%). The compressed distal true lumen (mean 4+/-3 mm) was reconstructed to a mean width of 21+/-3 mm, and malperfusion was abolished without any obstruction of the abdominal side branches. At up to 1-year follow-up, there were no signs of expansion or distal progression of the scaffolded dissected aorta. All patients with complete thoracic thrombosis showed evidence of improved aortic remodeling; 1 patient with no false lumen thrombosis died at 11 months from thoracoabdominal aortic rupture.

CONCLUSION: The PETTICOAT technique may offer a safe and promising adjunctive endovascular maneuver for patients with distal malapposition of the dissecting membrane and false lumen flow. The technique can both abolish distal true lumen collapse and enhance the remodeling process of the entire dissected aorta.

Eur J Vasc Endovasc Surg (2015) 50, 450–459

Modified Petticoat Technique with Pre-placement of a Distal Bare Stent Improves Early Aortic Remodeling after Complicated Acute Stanford Type B Aortic Dissection

H. He [a,b,c,*,f], **K. Yao** [a], **W.P. Nie** [a], **Z. Wang** [a], **Q. Liang** [d], **C. Shu** [e], **A. Dardik** [b,c]

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[e] Department of Vascular Surgery, The Second Xiangya Hospital of Central South University, Changsha, China

WHAT THIS STUDY ADDS

The aim of this study was to evaluate the safety and effectiveness of combined proximal endografting with distal restrictive bare stents (RBSs) in the endovascular treatment of acute complicated Stanford type B aortic dissections. Studies focusing specifically on re-dissection at the distal edge of the stent graft and the subsequent aortic remodeling are lacking. Thus, this study was initiated to explore the feasibility of using RBS and their effectiveness in preventing stent induced distal re-dissection and enhancing aortic remodeling.

Objective: This study evaluates the safety and efficacy of pre-placement of a distal bare stent as an adjunct to thoracic endovascular aortic repair (TEVAR) in the setting of complicated acute Stanford type B aortic dissection (cTBAD).

Methods: The records of all patients diagnosed with cTBAD at the institution between 2010 and 2013 were reviewed. Indications for the pre-placement of a distal bare stent included symptomatic malperfusion and/or radiological evidence of true lumen collapse. Computed tomography angiography was performed post-operatively to assess aortic remodeling.

Results: 148 patients were treated for cTBAD: 113 patients (76.4%) were treated with standard TEVAR and 35 (23.6%) were treated by combined proximal TEVAR with pre-placement of an adjunctive distal bare stent. Primary technical success was 95.9%. The 30 day mortality rate was 4.1% and was not different between groups. The 30 day morbidity included transient renal failure (10.1%), endoleak (7.4%), and paraplegia (2.7%), and was not different between groups. The mean follow up was 10 months (range 2–12 months). No late stent complications were observed; patients with an adjunctive bare stent had less distal re-dissection (0% vs. 15%; $p = .01$) and fewer endovascular re-interventions (5.7% vs. 20.4%; $p = .04$). At 1 year, patients treated with TEVAR and an adjunctive distal bare stent had increased true lumen volume (166 vs. 110 mL; $p = .022$), decreased false lumen volume (60 vs. 90 mL; $p = .043$), and increased complete false lumen thrombosis in the thoracic (76.5% vs. 29.5%; $p < .001$) and abdominal (20.6% vs. 3.8%; $p = .002$) segments.

Conclusions: Combined pre-placement of a distal bare stent as an adjunct to proximal TEVAR to treat cTBAD restricts oversizing of the distal stent graft, reducing the potential for distal true lumen collapse and visceral malperfusion, and improving remodeling of the dissected thoracic aorta. Long-term follow up and prospective studies are needed to assess the overall effectiveness of this treatment strategy.

Article history: Received 26 December 2014, Accepted 21 April 2015, Available online 19 June 2015
Keywords: Type B aortic dissection, Stent graft, Bare stent, Aortic remodeling

Cardiovascular Surgery

Ostre AD powikłane

Randomized Comparison of Strategies for Type B Aortic Dissection

The INvestigation of STEnt Grafts in Aortic Dissection (INSTEAD) Trial

Christoph A. Nienaber, MD, PhD; Hervé Rousseau, MD, PhD; Holger Eggebrecht, MD; Stephan Kische, MD; Rossella Fattori, MD, PhD; Tim C. Rehders, MD; Günther Kundt, PhD; Dierk Scheinert, MD, PhD; Martin Czerny, MD, PhD; Tilo Kleinfeldt, MD; Burkhart Zipfel, MD; Louis Labrousse, MD, PhD; Hüseyin Ince, MD, PhD; for the INSTEAD Trial

Background—Thoracic endovascular aortic repair (TEVAR) represents a novel concept for type B aortic dissection. Although life-saving in acute emergencies, outcomes and survival of TEVAR in stable dissection are unknown.

Methods and Results—One hundred forty patients in stable clinical condition at least 2 weeks after index dissection were randomly subjected to elective stent-graft placement in addition to optimal medical therapy (n=72) or to optimal medical therapy alone (n=68) with surveillance (arterial pressure according to World Health Organization guidelines ≤120/80 mm Hg). The primary end point was all-cause death at 2 years, whereas aorta-related death, progression (with need for conversion or additional endovascular or open surgery), and aortic remodeling were secondary end points. There was no difference in all-cause deaths, with a 2-year cumulative survival rate of 95.6±2.5% with optimal medical therapy versus 88.9±3.7% with TEVAR (P=0.15); the trial, however, turned out to be underpowered. Moreover, the aorta-related death rate was not different (P=0.44), and the risk for the combined end point of aorta-related death (rupture) and progression (including conversion or additional endovascular or open surgery) was similar (P=0.65). Three neurological adverse events occurred in the TEVAR group (1 paraplegia, 1 stroke, and 1 transient paraparesis), versus 1 case of paraparesis with medical treatment. Finally, aortic remodeling (with true-lumen recovery and thoracic false-lumen thrombosis) occurred in 91.3% of patients with TEVAR versus 19.4% of those who received medical treatment (P<0.001), which suggests ongoing aortic remodeling.

Conclusions—In the first randomized study on elective stent-graft placement in survivors of uncomplicated type B aortic dissection, TEVAR failed to improve 2-year survival and adverse event rates despite favorable aortic remodeling.

Clinical Trial Registration—URL: http://www.clinicaltrials.gov. Unique identifier: NCT00525356.

(*Circulation*. 2009;120:2519-2528.)

Endovascular Repair of Acute Uncomplicated Aortic Type B Dissection Promotes Aortic Remodelling: 1 Year Results of the ADSORB Trial

J. Brunkwall [a,*], **P. Kasprzak** [b], **E. Verhoeven** [c], **R. Heijmen** [d], **P. Taylor** [d], **the ADSORB Trialists** [e]

[a] Department of Vascular and Endovascular Surgery, University Clinics, University of Cologne, Cologne, Germany
[b] Section of Vascular Surgery, Department of Surgery, University of Regensburg, Department of Vascular Surgery, Klinikum Nuernberg, Nuremberg, Germany
[c] Department of Cardiovasc Surgery Antonius Hospital, Nieuwegein, The Netherlands
[d] Department of Vascular Surgery, St Guys Hospital, London, UK

Ostre AD niepowikłane

WHAT THIS PAPER ADDS

This is the only prospective randomised trial on acute type B dissection. The definition of the acute dissection is clearly defined as is the outcome. In the highly specialised centres participating, the outcome was good and the rate of thrombosis of the false channel can be estimated and be used as reference. Stent grafts induced thrombosis of the false channel and were safe to implant.

Objectives: Uncomplicated acute type B aortic dissection (AD) treated conservatively has a 10% 30-day mortality and up to 25% need intervention within 4 years. In complicated AD, stent grafts have been encouraging. The aim of the present prospective randomised trial was to compare best medical treatment (BMT) with BMT and Gore TAG stent graft in patients with uncomplicated AD. The primary endpoint was a combination of incomplete/no false lumen thrombosis, aortic dilatation, or aortic rupture at 1 year.

Methods: The AD history had to be less than 14 days, and exclusion criteria were rupture, impending rupture, malperfusion. Of the 61 patients randomised, 80% were DeBakey type IIIB.

Results: Thirty-one patients were randomised to the BMT group and 30 to the BMT+TAG group. Mean age was 63 years for both groups. The left subclavian artery was completely covered in 47% and in part in 17% of the cases. During the first 30 days, no deaths occurred in either group, but there were three crossovers from the BMT to the BMT+TAG group, all due to progression of disease within 1 week. There were two withdrawals from the BMT+TAG group. At the 1-year follow up there had been another two failures in the BMT group: one malperfusion and one aneurysm formation ($p = .056$ for all). One death occurred in the BMT+TAG group. For the overall endpoint BMT+TAG was significantly different from BMT only ($p < .001$). Incomplete false lumen thrombosis, was found in 13 (43%) of the TAG+BMT group and 30 (97%) of the BMT group ($p < .001$). The false lumen reduced in size in the BMT+TAG group ($p < .001$) whereas in the BMT group it increased. The true lumen increased in the BMT+TAG ($p < .001$) whereas in the BMT group it remained unchanged. The overall transverse diameter was the same at the beginning and after 1 year in the BMT group (42.1 mm), but in the BMT+TAG it decreased (38.8 mm; $p = .062$).

Conclusions: Uncomplicated AD can be safely treated with the Gore TAG device. Remodelling with thrombosis of the false lumen and reduction of its diameter is induced by the stent graft, but long term results are needed.

Article history: Received 13 August 2013, Accepted 12 May 2014, Available online 22 June 2014
Keywords: Acute type B dissection, Uncomplicated, Stent graft, Thrombosis, Remodelling

Mid-term Outcomes and Aortic Remodelling After Thoracic Endovascular Repair for Acute, Subacute, and Chronic Aortic Dissection: The VIRTUE Registry

Podostre AD niepowikłane

The VIRTUE Registry Investigators *

WHAT THIS PAPER ADDS

The VIRTUE Registry, describes the mid-term clinical and morphological results of thoracic endovascular repair in patients with type B aortic dissection. Analysis of aortic morphology showed that patients with subacute dissection demonstrated a similar degree of aortic remodelling to patients with acute dissection. Retention of aortic plasticity in the subacute group lengthens the therapeutic window for the treatment of uncomplicated type B dissection.

Objective: The VIRTUE Registry describes the mid-term clinical and morphological results of thoracic endovascular repair (TEVR) in patients with type B aortic dissection.

Methods: This was a prospective cohort study. The VIRTUE Registry is a prospective, multicentre clinical trial that enrolled patients with complicated acute (<15 days), subacute (15—92 days), and chronic (>92 days) type B aortic dissections treated with the Valiant endograft. One hundred patients were enrolled and the clinical outcomes described at the 3-year follow-up. Analysis of the aortic area and false lumen thrombosis rates defined the morphological response to TEVR in the three clinical groups.

Results: Three-year all-cause mortality (18%, 4%, and 24%), dissection related mortality (12%, 4%, and 9%), aortic rupture (2%, 0%, and 4%), retrograde type A dissection (5%, 0%, and 0%), and aortic reintervention rates (20%, 22%, and 39%) were, respectively, defined for patients with acute ($n = 50$), subacute ($n = 24$), and chronic ($n = 26$) dissections. Analysis of aortic morphology observed that patients with subacute dissection demonstrated a similar degree of aortic remodelling to patients with acute dissection. Patients with acute and subacute dissection exhibited greater aortic plasticity than patients with chronic dissection.

Conclusions: The principle clinical findings suggest that TEVR is able to provide good protection from aortic-related death in the mid-term, but with a high rate of aortic reintervention. Analysis of aortic morphology suggested that aortic remodelling in subacute patients is similar to the acute group. Retention of aortic plasticity in the subacute group lengthens the therapeutic window for the treatment of uncomplicated type B dissection.

Article history: Received 31 December 2013, Accepted 6 May 2014, Available online 18 June 2014

Keywords: Aortic dissection, Endovascular, Type B

WSZYSCY SKUPILI SIĘ NA ZAMKNIĘCIU ENTRY

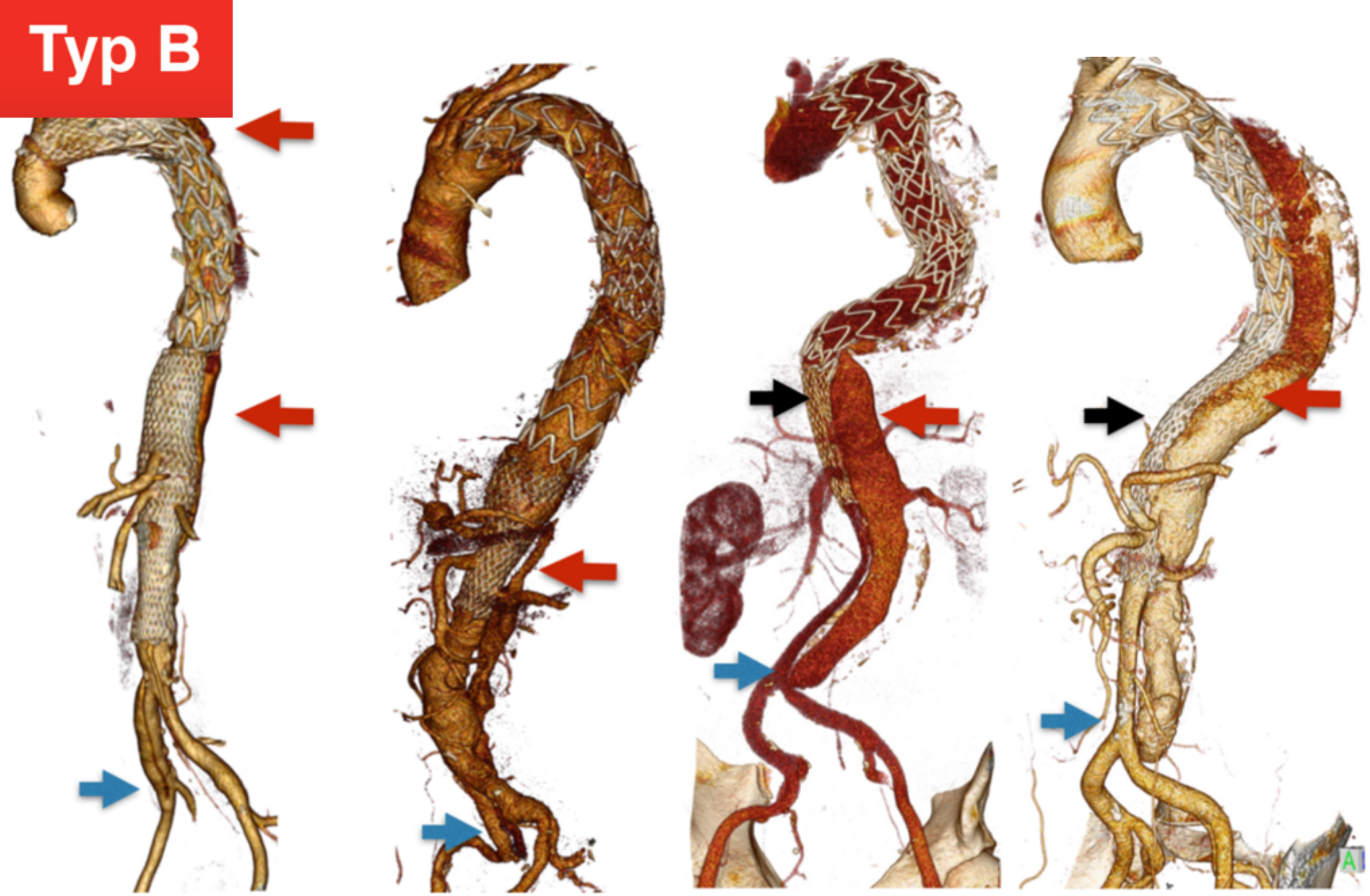
(WAŻNE DLA USUNIĘCIA OBJAWÓW I KOMPLIKACJI)

A CO Z DEGENERACJĄ ODLEGŁĄ?

CZY LECZENIE ZACHOWAWCZE WYSTARCZA?

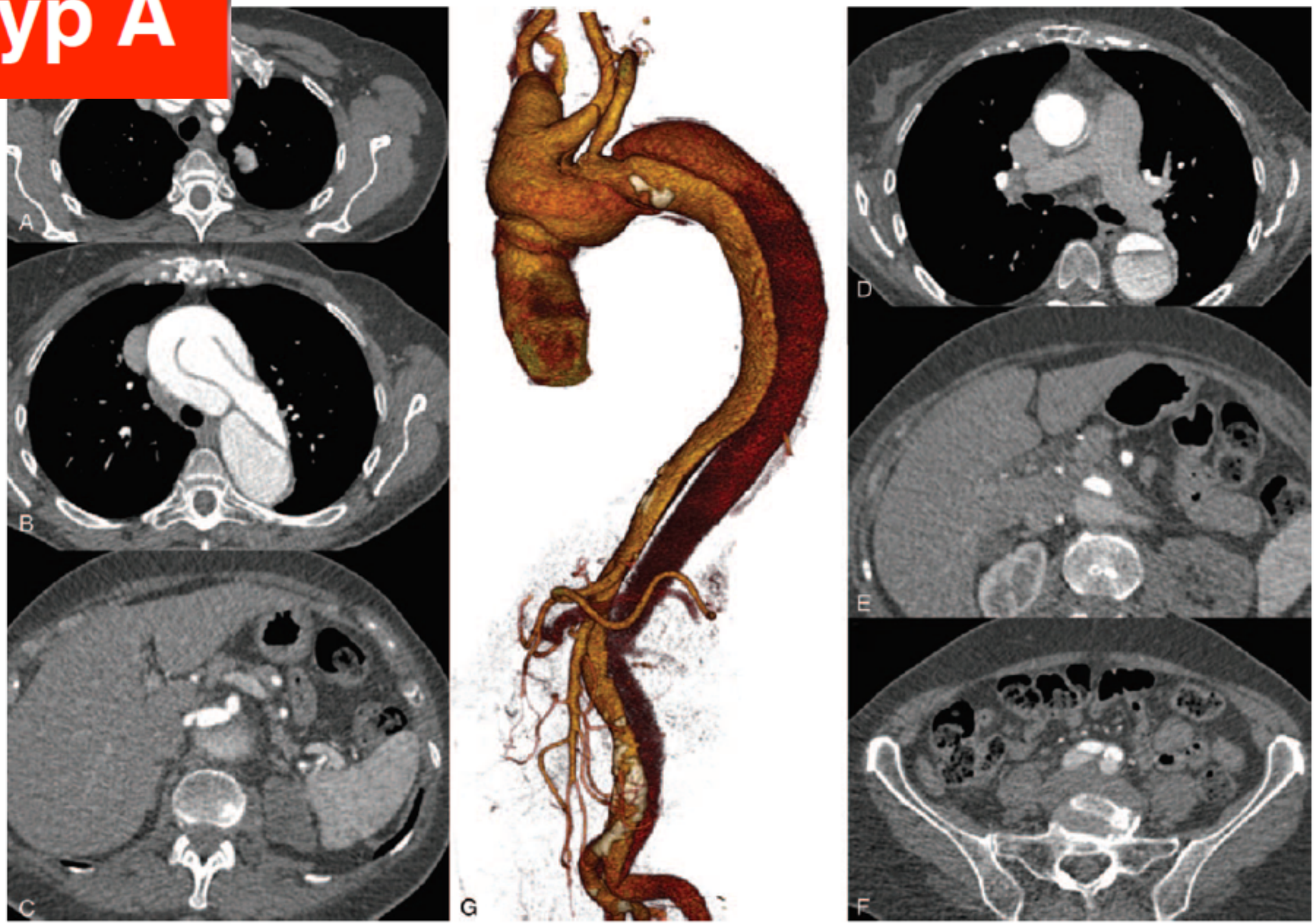
- **50% zdegeneruje w 5 lat w typie B**
- **60% zdegeneruje w 6 lat w typie B**
- **5-70% zdegeneruje w typie A**

Typ B



DEGENERACJA

Typ A



gure 1. A computed angiotomography of aortic dissection before surgery (G). The aortic arch (B), the innominate artery (A), the left common carotid artery (A) and th iliac arteries are dissected (F). The true lumen in the thoracic and visceral aorta is severely compressed (C, D). The left renal artery is completely detached (E).

Typ A

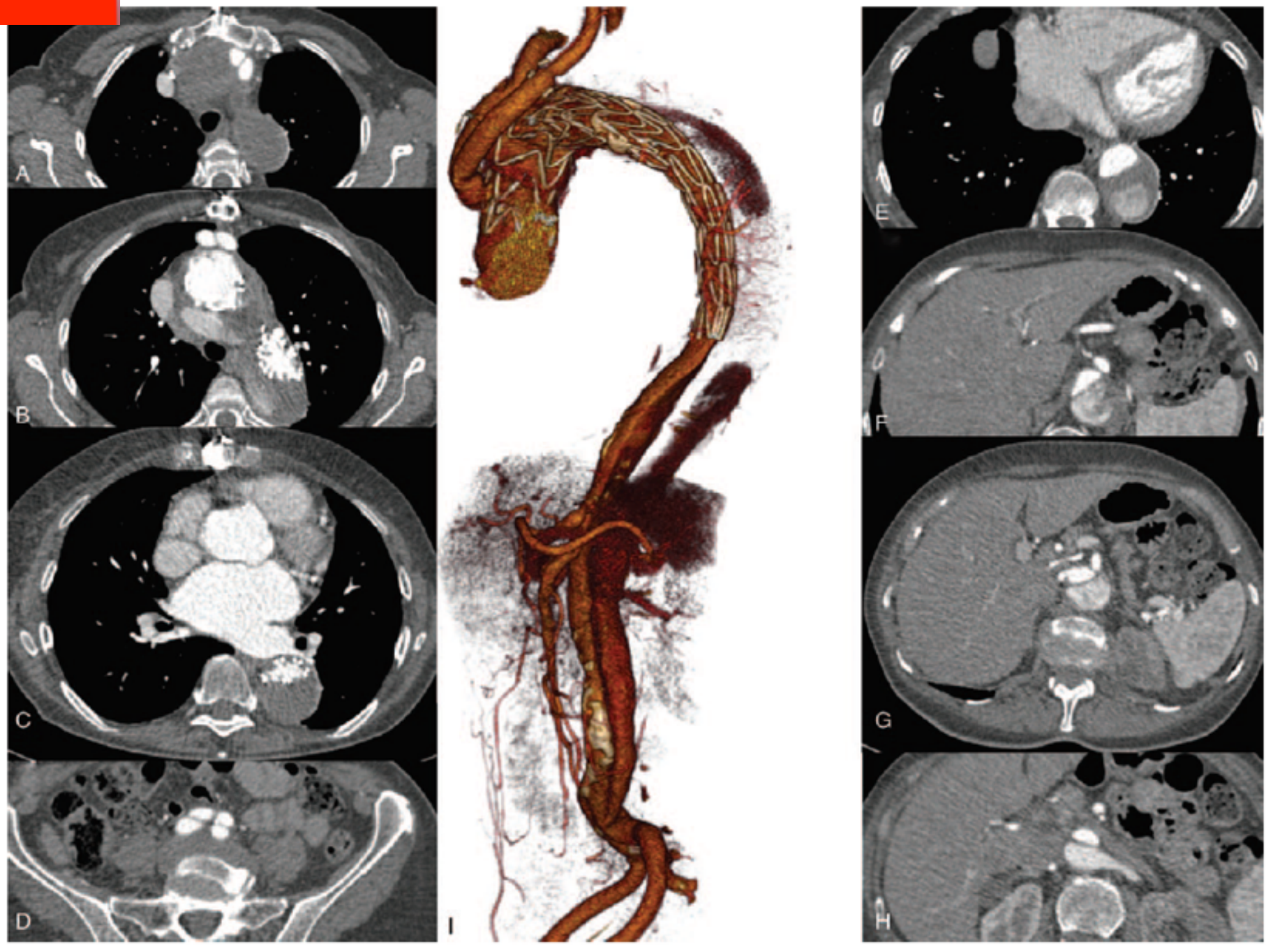


Figure 2. The degeneration of a dissected aorta after arch debranching, from computed angiotomography (I). The aortic arch size increases (A). The false lumen (FL) is partially perfused (B) and compressed TL in thoracic and visceral aorta (C, G). Distal re-entry supplies the flow inside the FL of both iliac arteries (D). FL is partially thrombosed in the thoracic and visceral aorta (E, F). The left renal artery is still patent and supplied from FL (H).

EACTS 2012

"The only important types of endoleaks after TEVAR in the treatment of aortic dissection are type Ia (ante- grade perfusion of the false lumen) and type II (perfusion of distal entry tears) **should not be considered endoleaks**".

ESVS 2017

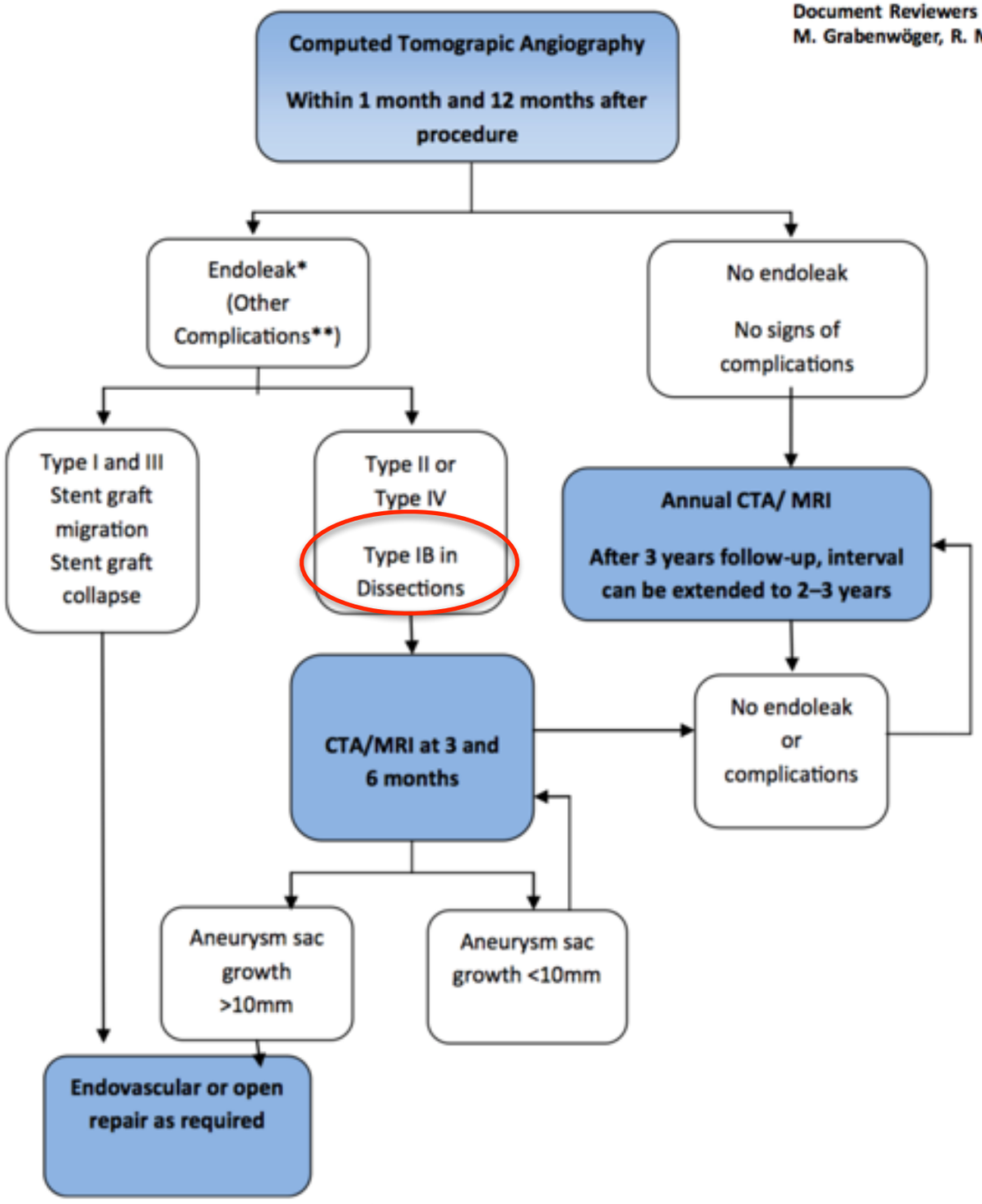
Guidelines have emphasized the role of the type IB endoleak. This might be responsible for rapidly progressing aortic dilatation and **should be treated either by open or endovascular methods**

Eur J Vasc Endovasc Surg (2017) 53, 4–52

Editor's Choice — Management of Descending Thoracic Aorta Diseases

Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)

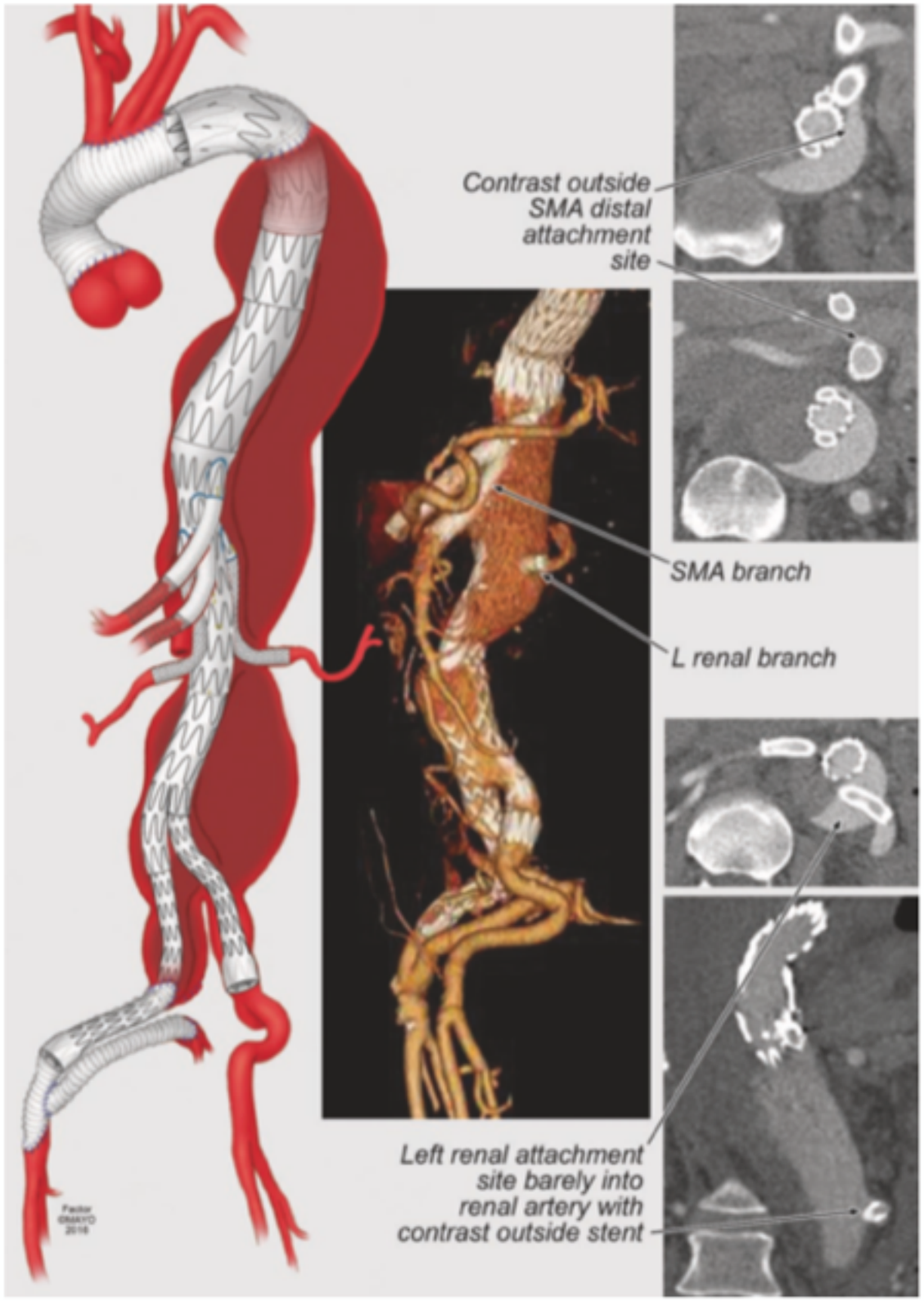
V. Riambau [a], D. Böckler [a], J. Brunkwall [a], P. Cao [a], R. Chiesa [a], G. Coppi [a], M. Czerny [a], G. Fraedrich [a], S. Haulon [a], M.J. Jacobs [a], M.L. Lachat [a], F.L. Moll [a], C. Setacci [a], P.R. Taylor [a], M. Thompson [a], S. Trimarchi [a], H.J. Verhagen [a], E.L. Verhoeven [a], ESVS Guidelines Committee [b] P. Kolh, G.J. de Borst, N. Chakfé, E.S. Debus, R.J. Hinchliffe, S. Kakkos, I. Koncar, J.S. Lindholt, M. Vega de Ceniga, F. Vermassen, F. Verzini, Document Reviewers [c] P. Kolh, J.H. Black III, R. Busund, M. Björck, M. Dake, F. Dick, H. Eggebrecht, A. Evangelista, M. Grabenwöger, R. Milner, A.R. Naylor, J.-B. Ricco, H. Rousseau, J. Schmidli

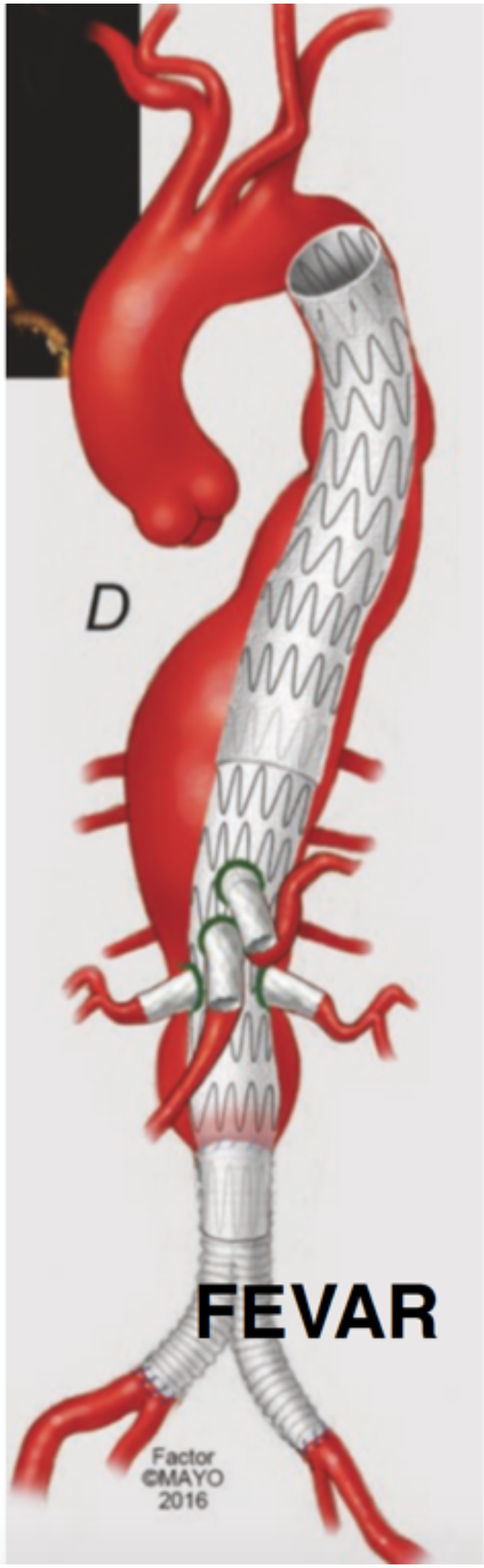


ESVS 2017

Typ B


BEVAR


Contrast outside SMA distal attachment site
SMA branch
L renal branch
Left renal attachment site barely into renal artery with contrast outside stent


D
FEVAR
Factor
©MAYO
2016

A MOŻE MOŻNA TANIEJ I BEZPIECZNIEJ?

Step I — AngioCT (Vascular / Cardiac Surgeon involved)

Type A — Cardiac Surgery

Type B — Vascular Surgery

Step II

- Ascending Aorta Treatment
- Next step planning
- cooperation feed back
- -Device require.
  -Waiting list
  -Stand by
- Descending Aorta Treatment

Step III — AngioCT (only after cardiac surgery)

Step IV — Clinical Assessment

- Complicated <2weeks
- Symptomatic +risk factors 2-9 weeks
- Asymptomatic No risk factors >9weeks

- CERN
  - e-Petticoat
  - Step II supply
- 3 months
- AngioCT
  - \+ Progresion Risc factors
  - 0

Step V — WWM (angio CT - 3 / 6 / 12 months)

Step IV

Clinical Assessment

Complicated <2weeks

Rupture
(intramural hematoma, hemothorax)
Malperfusion
(NOMI- nausea, abdominal pain, diarrhoe)
Acute Limb Ischemia
Hypertension
(refractory)
Pain

Symptomatic +risk factors 2-9 weeks

Hypertension
(poorly controled)
Pain (reccurence)

Asymptomatic No risk factors >9weeks

AngioCT

Progresion:
growth size >1cm/y
aneurysmtic deterioration

Risk factors:
tear>10mm
inner curve tear
inital size>4cm
Fusiform Index>0.64
False lumen>22mm
Partial thrombosis
Age<60y
Ha/Pain

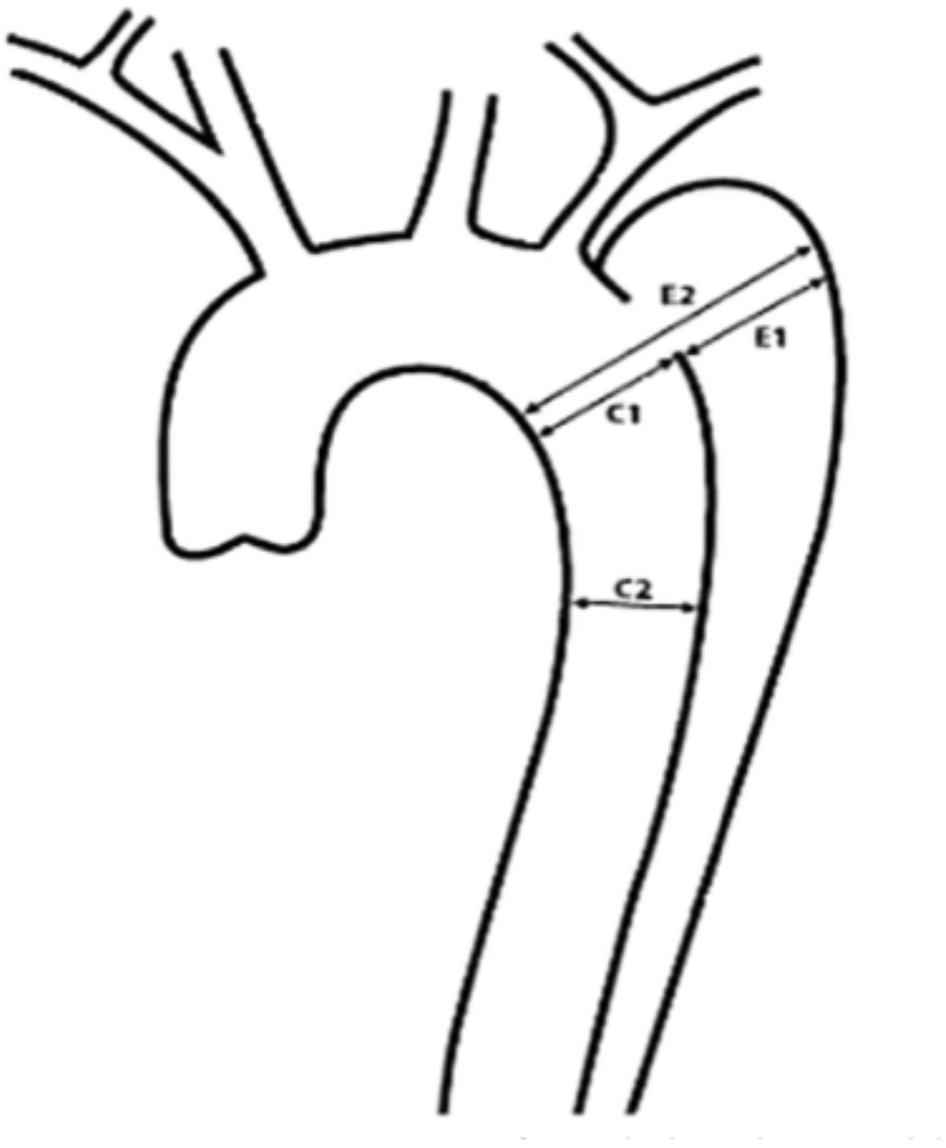
CERN

Progresion
Risc factors

Timing for treatment of Aortic Dissection

Acute <2weeks
Subacute 2-6 weeks (max 9 weeks)
Chronic >6 weeks (max 9 weeks)

Griep-1999,Ewangelista-2012,Hollier1998,Sueyoshi2004,Kudo-2014,Loeve-2012, Weis-2012, Marui-2007, Song -2007, Tanaka 2014, Timarachi-2010, VonBogenjen2014, Fattori-2013, Heijmen-2014)


E2
E1
C1
C2

ALICE

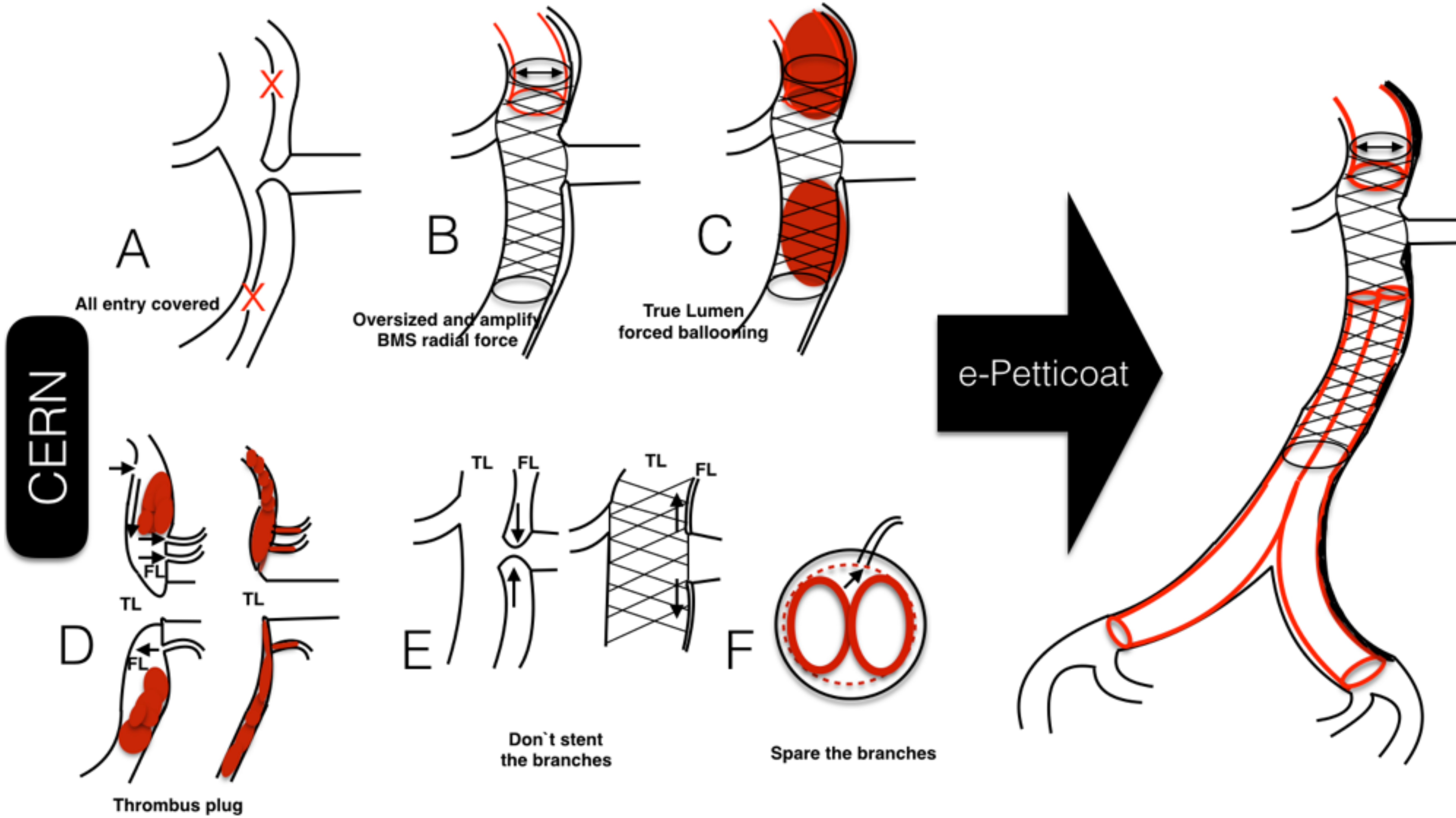
CMS

TLAS

Complete Entry

CERN

Re-Entry Neutralization



CERN
A
All entry covered
B
Oversized and amplify
BMS radial force
C
True Lumen
forced ballooning
e-Petticoat
D
TL
FL
TL
FL
TL
Thrombus plug
E
TL
FL
TL
FL
Don`t stent
the branches
F
Spare the branches

Jugaar

Extended Petticoat Strategy in Type B Aortic Dissection

Arkadiusz Kazimierczak *, **Paweł Rynio**

Department of Vascular Surgery, Pomeranian Medical University in Szczecin, Szczecin, Poland

INTRODUCTION

Type B aortic dissection (TBAD) can fail to remodel in the long term, and may lead to complications necessitating re-intervention. Presented here is an "extended" provisional extension to induce complete attachment (e-PETTICOAT) technique. It is an alternative to thoracic endovascular aortic repair (TEVAR), standard PETTICOAT, and stent assisted balloon induced intimal disruption and relamination (STABILISE) techniques to treat TBAD with distal re-entry localised in iliac arteries that might then contribute to retrograde false lumen perfusion leading to aneurysmal progression. The technique has been applied to induce favourable remodelling through such long aorto-iliac segments affected by TBAD.

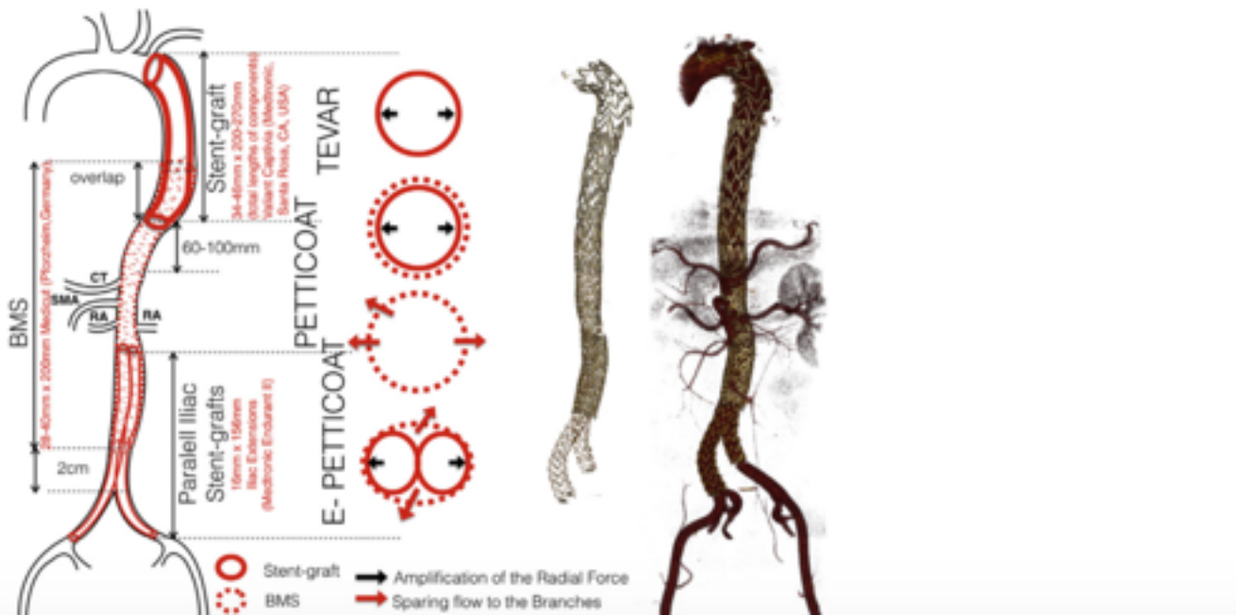
SURGICAL TECHNIQUE

The thoracic stent graft (SG) is deployed proximally to close the entry tear, with a prior distal bare metal self expandable stent (BMS) deployed over the distal thoracic and abdominal aorta in this case. SG/BMS balloon molding is then carried out to re-expand the true lumen and maximise intimal adherence to these devices. Finally, two covered stents are placed within the abdominal BMS as parallel iliac stent grafts, starting just below the renal artery and terminating below the distal tear, including down to the iliac bifurcation (Fig. 1).

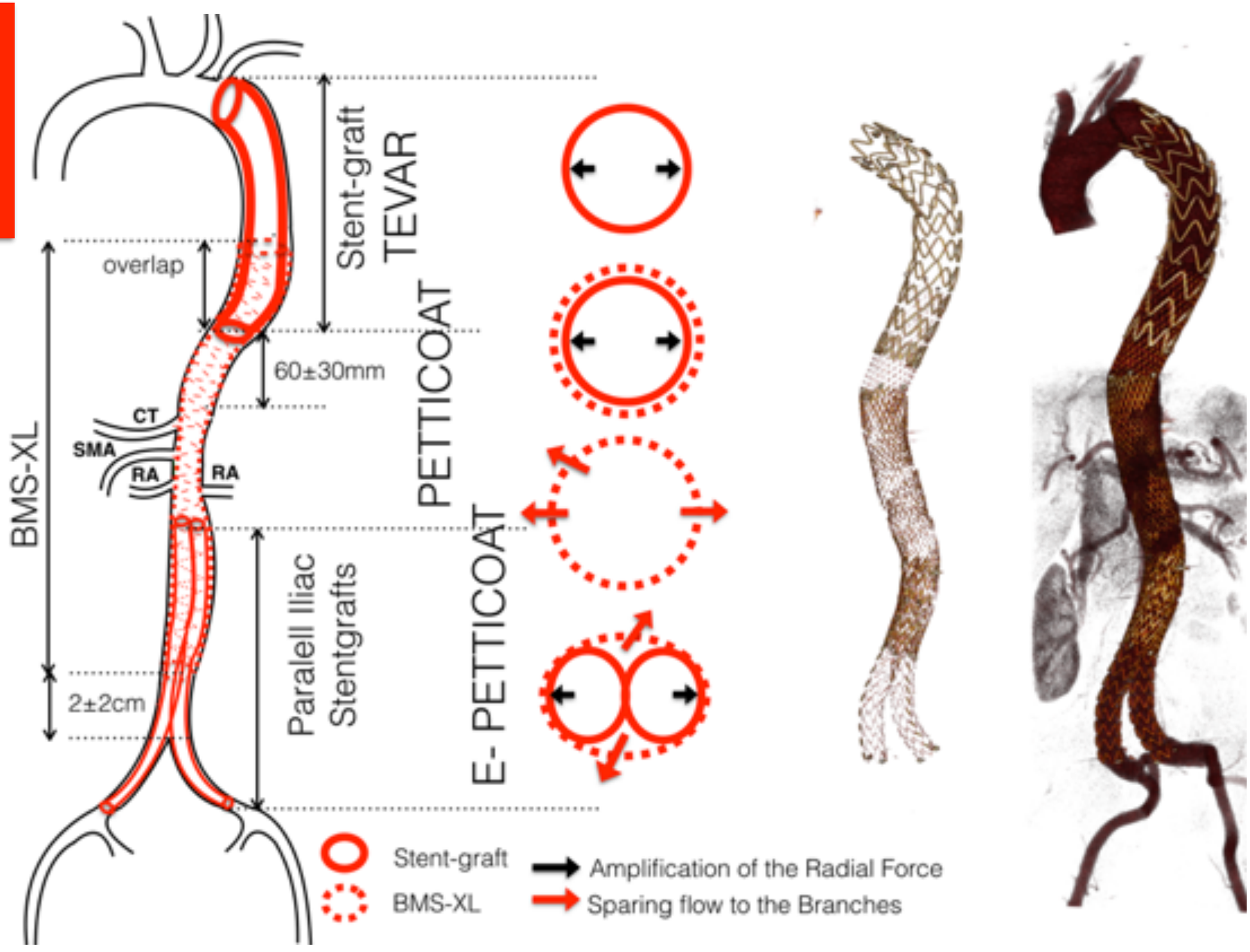
This method adds radial force to the abdominal BMS (if the configuration allows SG deployment within the BMS as shown here, though typically it is BMS into SG) and keeps intercostal and other branches open. Distally, this is effectively covered endovascular reconstruction of aortic bifurcation (CERAB). This may reattach dissection membranes overall. This technique was successfully used in 23 acute complicated and 19 fast degenerating extensive TBADs. Limitations of applicability include abdominal aortic diameter $\geq$ 46 mm (maximum available BMS size) and where the visceral branch supply is only from the false lumen.

DISCUSSION

Extended PETTICOAT is a technique that provides diffuse mechanical aorto-iliac support when treating extensive TBAD. However, continuing studies are required to support this concept and its long-term success.



Typ B



Extended Petticoat strategy in type B aortic dissection. European Journal of Vascular and Endovascular Surgery.2018, 10.1016/j.ejvs.2018.07.038

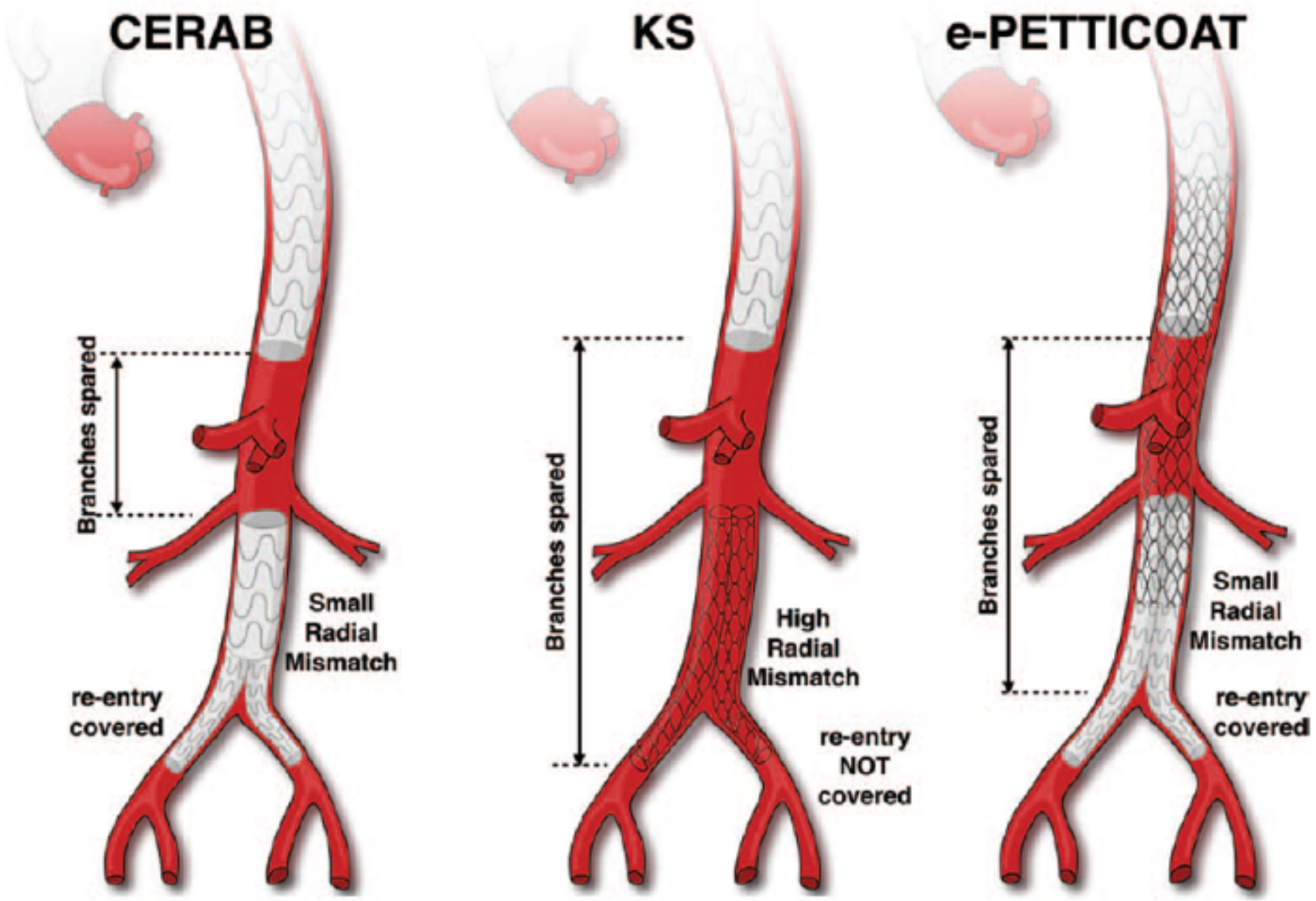
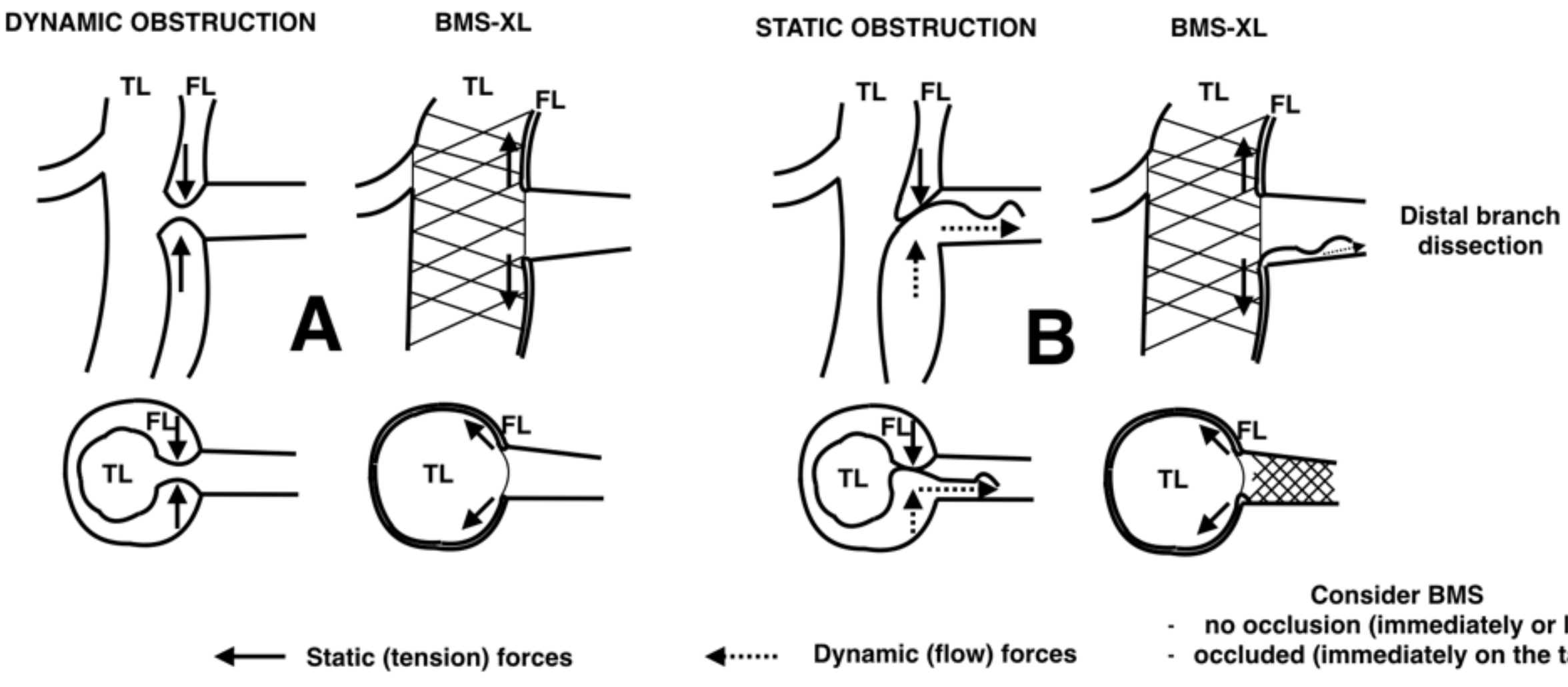
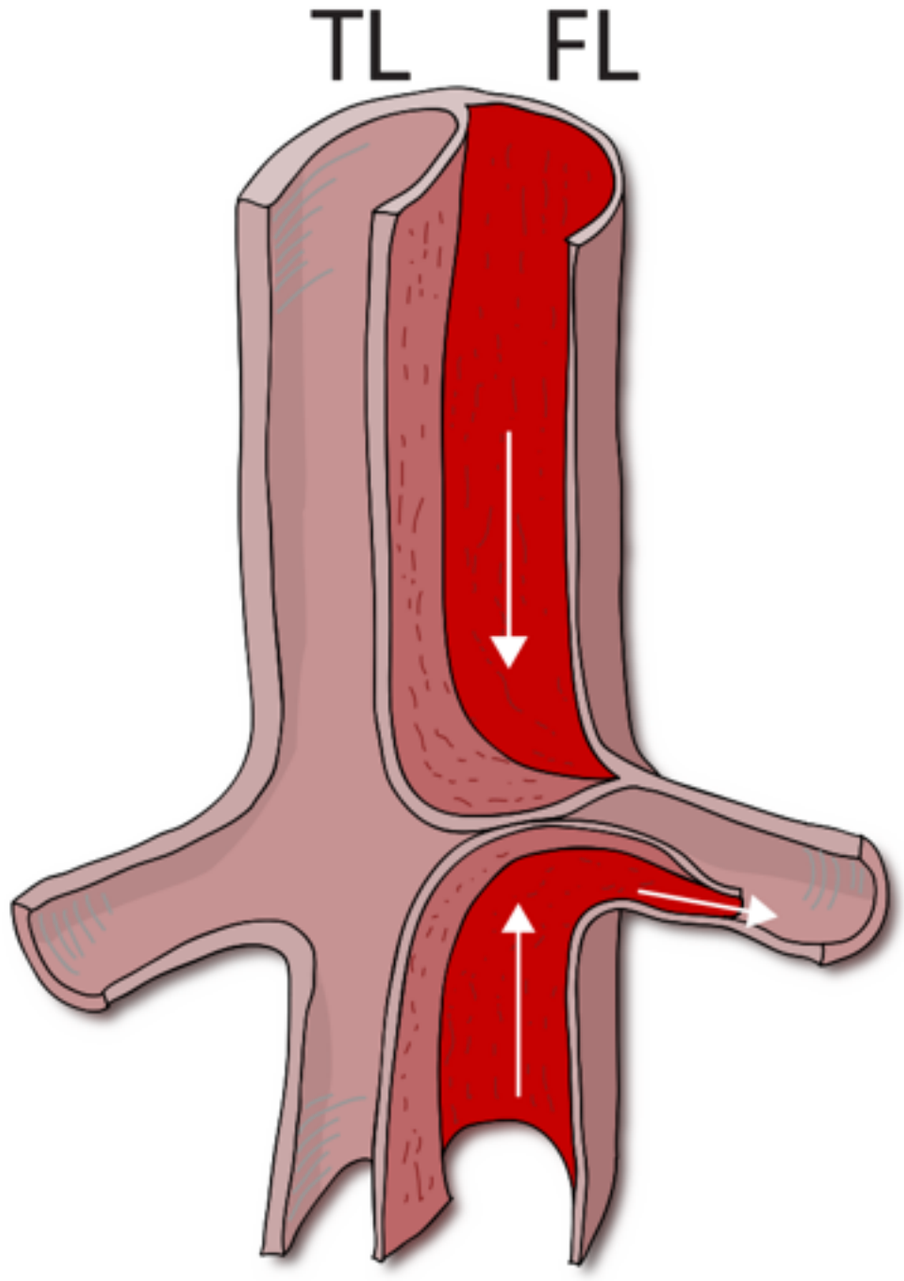


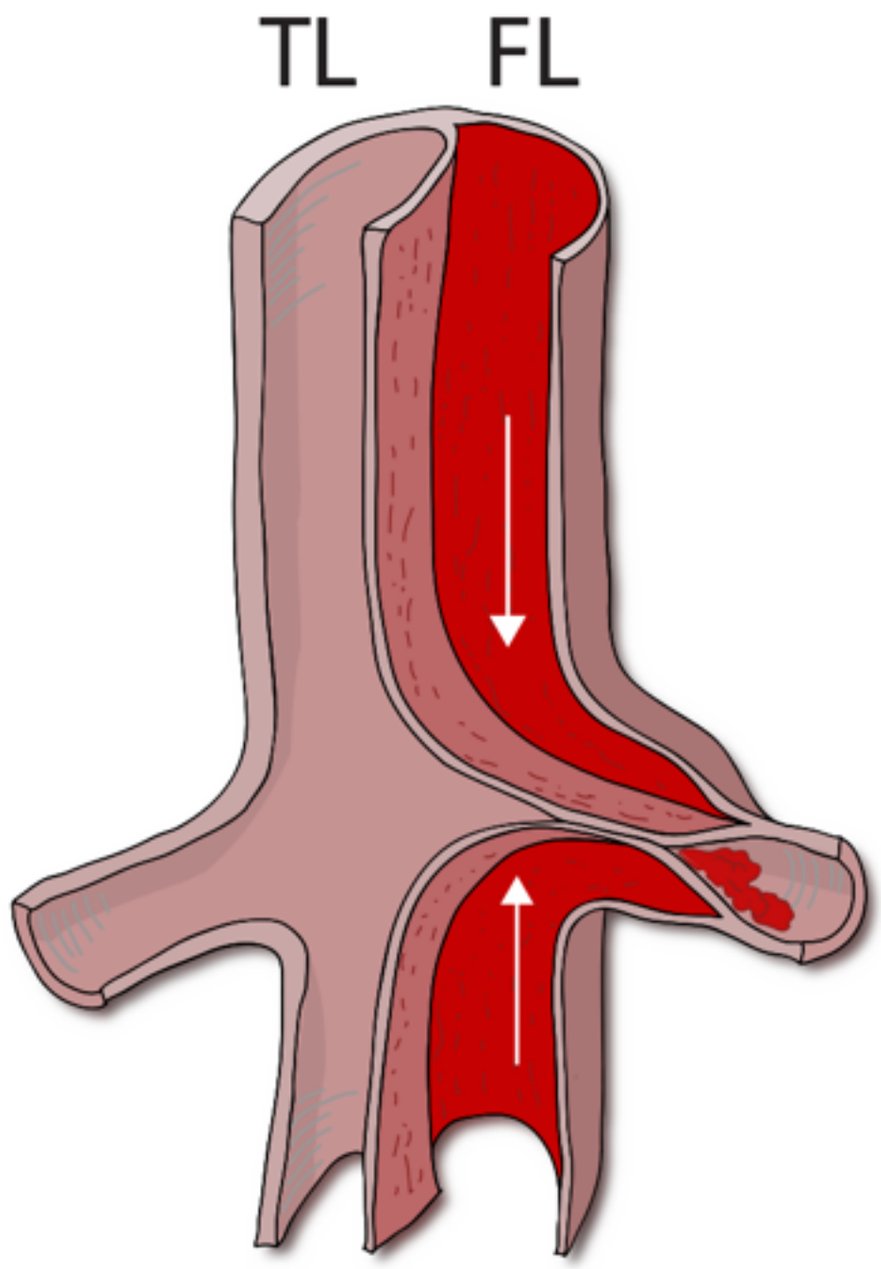
Figure 5. Illustration of the difference between a covered endovascular reconstruction of aortic bifurcation (CERAB), kissing stent (KS), and extended provisional extension for the induced complete attachment (e-PETTICOAT) technique.

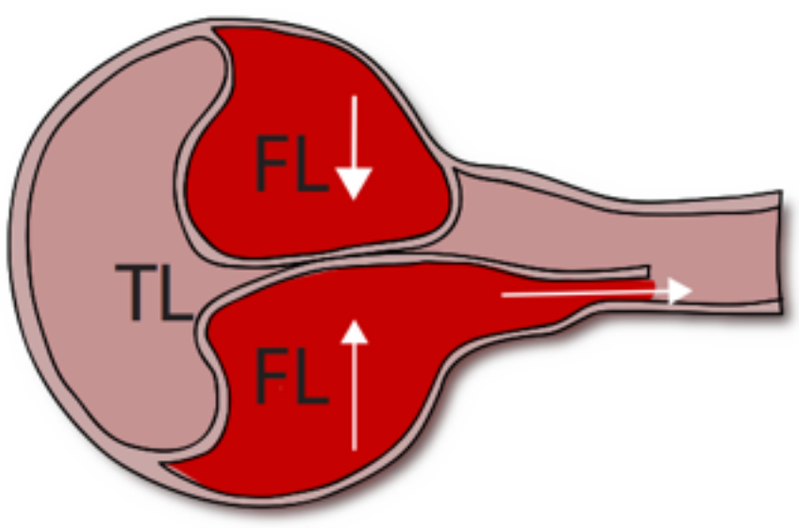
Naczynia trzewne

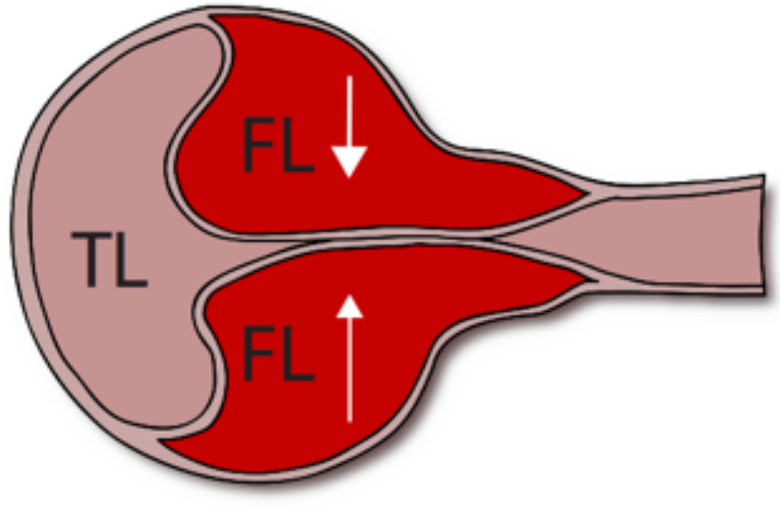


Naczynia trzewne

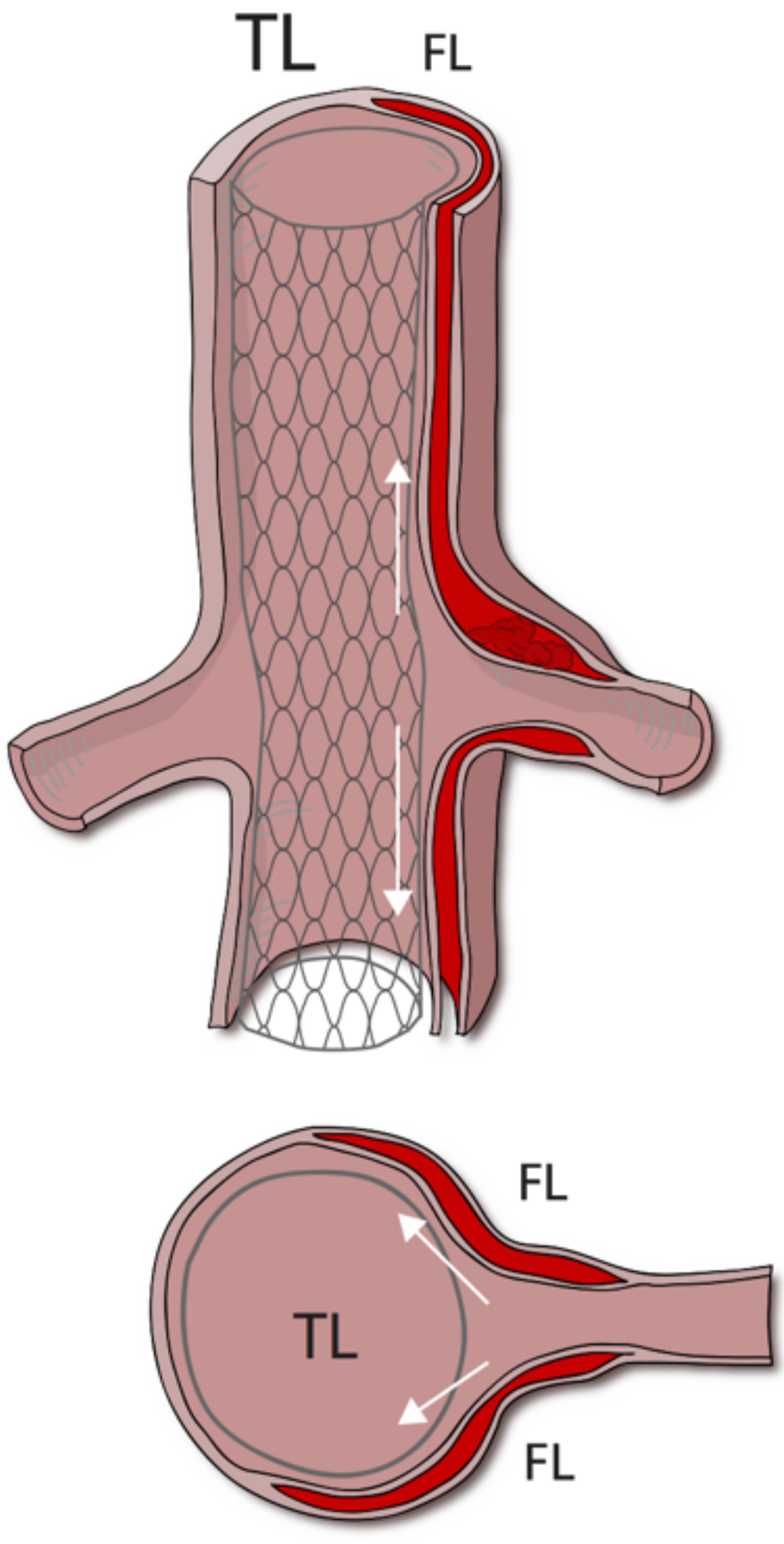








Naczynia trzewne



Typ A

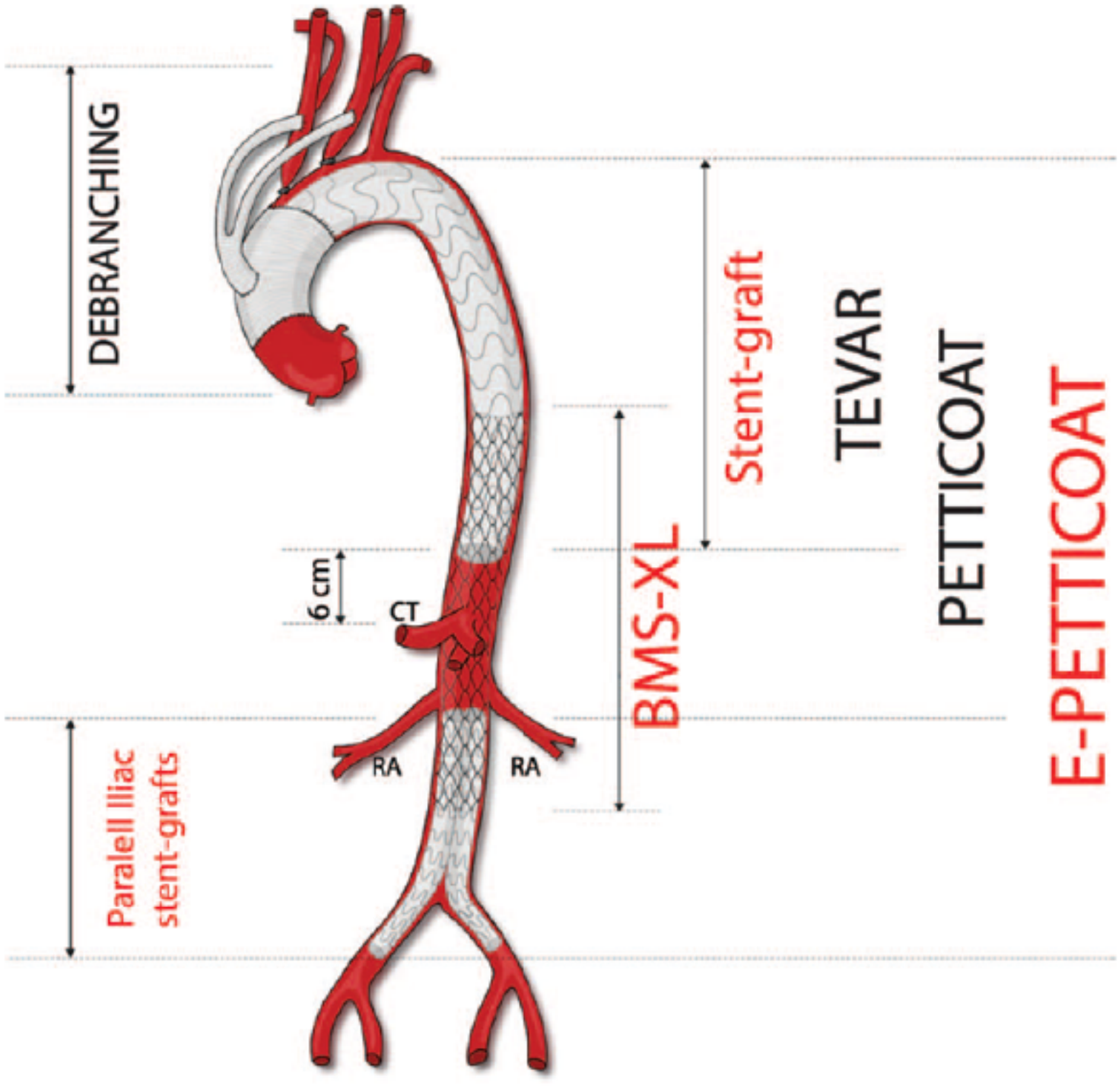


Figure 3. An extended provisional extension for the induced complete attachment technique.

Typ A

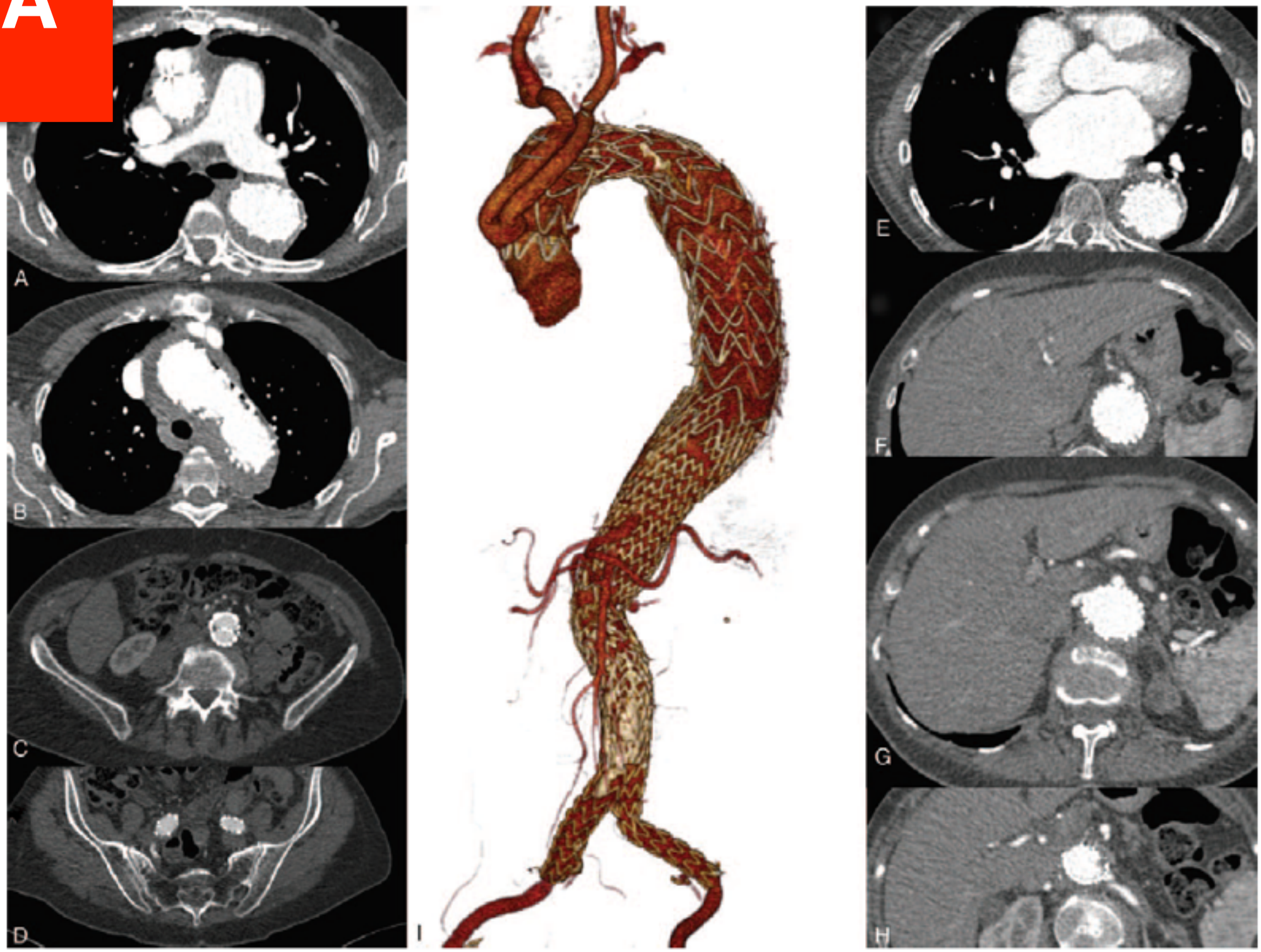


Figure 4. A computed angiotomography volumetric rendering of favorable aortic remodeling after an extended provisional extension for the induced complete attachment technique (I). Complete true lumen (TL) restoration and thrombosis of the FL occurred in the ascending aorta (A), as well as in the aortic arch (B), thoracic (E), visceral (F, G, H) and infra-renal segment (C, D). All visceral arteries remain patent (F, G, H). Left renal artery arises from the TL (H).

Typ A

Clinical Case Report

Medicine®

OPEN

Favorable remodeling after hybrid arch debranching and modified provisional extension to induce complete attachment technique in type a aortic dissection

A case report

Arkadiusz Kazimierczak, MD, PhD[a,*], Tomasz Jedrzejczak, MD, PhD[b], Paweł Rynio, MD[a], Szymon Waligórski, MD, PhD[b]

Abstract

Rationale: Type A aortic dissection (TAAD) usually requires emergency open repair of the ascending aorta. In cases of diffuse dissection that spreads along the descending and abdominal aorta (type I, DeBakey classification), the risk of aneurysmal degeneration varies between 30% and 50% during 5 years and increases even higher during a longer follow-up. Those patients might require complex intervention to prevent aortic rupture. A combination of hybrid arch debranching and the extended provisional extension to induce complete attachment (e-PETTICOAT) technique might be an available alternative in such cases. This is the first report of the successful use of the e-PETTICOAT technique for treating degenerative, diffuse TAAD.

Patient concerns: Acute chest pain and syncope were the initial symptoms of diffuse TAAD in our 66-year-old female patient. Open replacement of the ascending aorta followed by surgical arch debranching was performed as a staged procedure. Unfortunately, progressive aneurysmal degeneration was revealed 6 months later in the thoracic, abdominal, and infrarenal aorta with the recurrence of chest and lumbar pain.

Diagnoses: Computed angiotomography revealed severe aneurysmal degeneration of aortic dissection in the thoracic and abdominal aorta.

Intervention: The e-PETTICOAT enabled good remodeling and stopped degeneration.

Outcome: At the 2-year follow-up, good remodeling with complete false lumen thrombosis and a stable aortic size were confirmed.

Lesson: Lifelong follow-up in extensive TAAD should be considered. The e-PETTICOAT technique is an available alternative to fenestrated endovascular aortic repair for degenerative TAAD, as it promotes favorable remodeling after successful surgery of the ascending aorta.

Abbreviations: BEVAR = branched endovascular aortic repair, BMS-XL = extra large bare metal stent, CERAB = covered endovascular reconstruction of aortic bifurcation, CTA = computed angiotomography, e-PETTICOAT = extended provisional extension to induce complete attachment, FEVAR = fenestrated endovascular aortic repair, FL = false lumen, IA = innominate artery, KS = kissing stents, LCCA = left common carotid artery, LRA = left renal artery, PETTICOAT = provisional extension to induce complete attachment, RRA = right renal artery, TAAD = type A aortic dissection, TL = true lumen.

Keywords: Aortic dissection, CERAB, Kissing stents, modified PETTICOAT, PETTICOAT

Typ B

Clinical Case Report

Medicine®

OPEN

Endovascular stenting of a complicated type B aortic dissection in an 11-year-old patient

Case Report

Arkadiusz Kazimierczak, MD, PhD[a,*], Paweł Rynio, MD[a], Piotr Gutowski, MD, PhD[a], Tomasz Jedrzejczak, MD, PhD[b]

Abstract

Rationale: Endovascular aortic repair in children in the case of aortic dissection (AD) is currently unavailable. This is the first report of aortic dissection type B in an 11-years old child treated in endovascular way.

Patient concerns: Complicated AD. Since bowel malperfusion and aortic rupture the surgery was necessary in emergency.

Diagnoses: Computed angio tomography.

Intervention: The modified PETTICOAT technique (Provisional Extension To Induce Complete Attachment) was used.

Outcome: Full recovery.

Lessons: For the first-time telescope modification were used, to allow aorta to grow with a child. Such a strategy seems to be possible with long overlap and lack of oversizing between implants.

Abbreviations: AD = aortic dissection, Angio-CT = angio computed tomography, BMS-XL = bare metal stents extra large, BMT = best medical treatment, CT = celiac trunk, FL = false lumen, LCCA = left common carotid artery, LRA = left renal artery, LSA = left subclavian artery, PETTICOAT = provisional extension to induce complete attachment, RA = renal artery, RRA = right renal artery, SMA = superior mesenteric artery, TEVAR = thoracic endovascular aortic repair, TL = true lumen.

Keywords: aortic dissection, children, PETTICOAT, stent, stent-graft

Typ B

Modyfikacja teleskopowa klasycznej techniki: „STABILIZE”

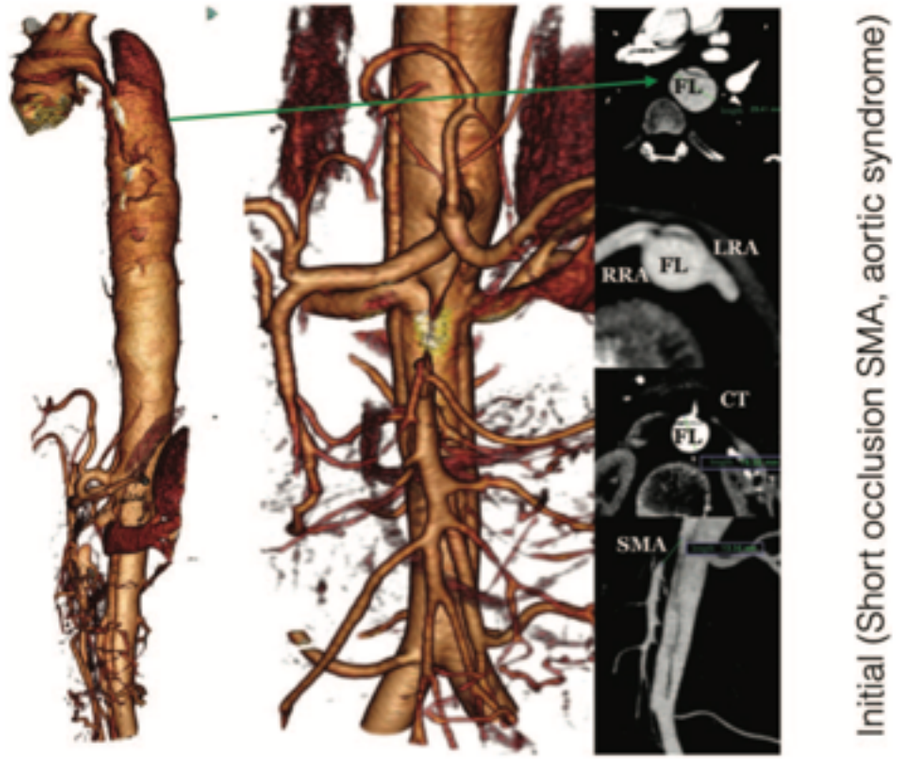


Figure 1. True-lumen collapse.

size, 200 mm length) were deployed to the thoracic and visceral aorta ending 1 cm below RA, followed by Medtronic Vailant II (Medtronic, Santa Rosa, CA, USA; VAMF2828C156TE) below LSA with long overlap (10 cm) with BMS-XL. Force ballooning of the graft was performed to restore normal TL size and close FL completely (Initially, implants were highly compressed below the LSA). Angiography showed no endo-leak, patent CT, and both RA. SMA remained occluded. Therefore, stenting and ballooning

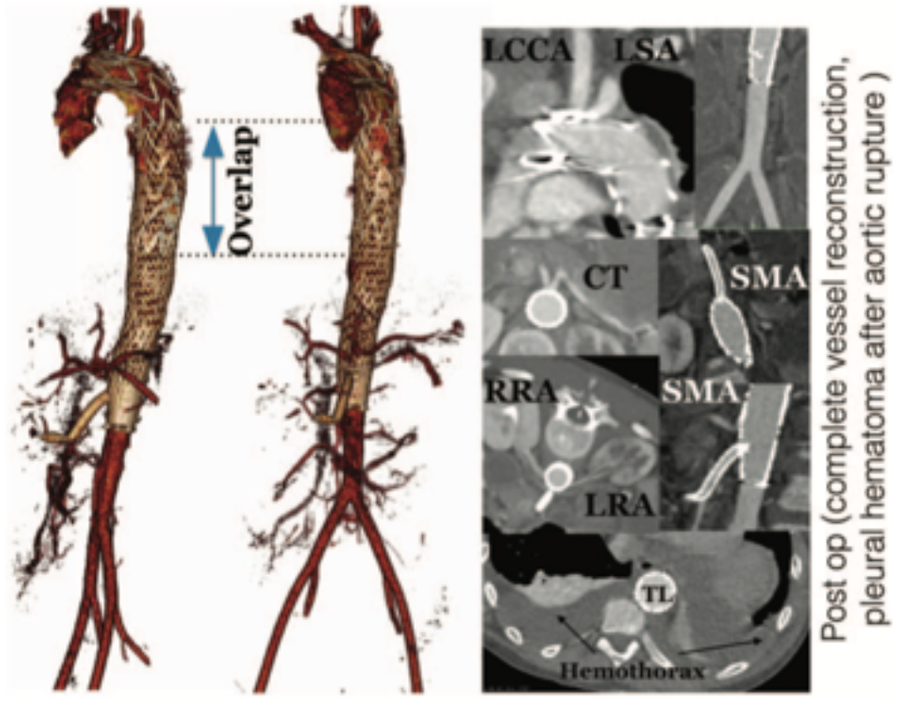


Figure 2. Aorta after endovascular treatment.

CO ROBIMY W SZCZECINIE? DOŚWIADCZENIA WŁASNE

-Aortic Team z Kardiochirurgami

-Konsultujemy możliwie wszystkie rozwarstwienia

-Leczymy zawsze objawowe, powikłane, zagrożone

-Niepowikłane i bezobjawowe zawsze kontrolujemy

KIEDY LECZENIE ZABIEGOWE?

Powikłane
Objawowe

-pękające (pending rupture)
-pęknięte
-malperfuzja
-bólowe
-nieopanowane nadciśnienie

Degenerujące

-średnica aorty >5cm

-rosnące >5mm/6 mcy

Zagrożone

Szybko rosnące >1 czynnik ryzyka:

-średnica aorty >4cm
-FL size >22
-ból, nadciśnienie
-entry >1cm
-entry na krzywiźnie mniejszej
-Fusiform index >0.65

Step I

AngioCT (Vascular / Cardiac Surgeon involved)

Type A
Cardiac Surgery

Type B
Vascular Surgery

Step II

Ascending Aorta Treatment

Next step planning

cooperation feed back

-Device require.
-Waiting list
-Stand by

Descending Aorta Treatment

Step III

AngioCT (only after cardiac surgery)

Step IV

Clinical Assessment

Complicated <2weeks

Symptomatic +risk factors 2-9 weeks

Asymptomatic No risk factors >9weeks

CERN

e-Petticoat
Step II supply

3 months

AngioCT

Progresion
Risc factors

0

Step V

WWM (angio CT - 3 / 6 / 12 months)

Exclusion for E-PETTICOAT

Kiedy e-Petticoat nie może być wykonany:

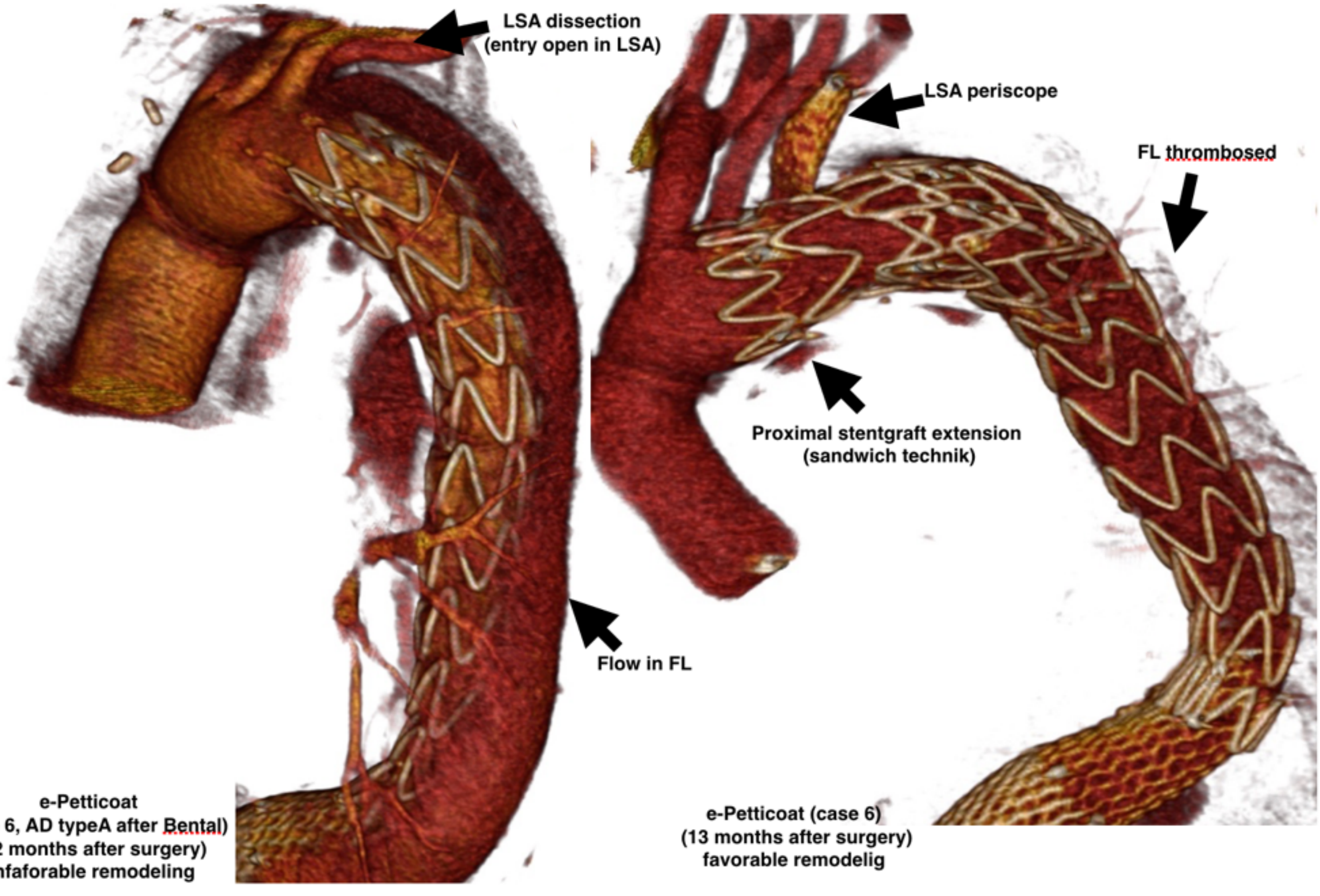
Proksymalna „landing zone" >44mm

Max rozmiar aorty na poziomie CT >40mm

Kiedy ostrożnie

Oderwane wloty do naczyń trzewnych

Rozwarstwiona LSA



e-Petticoat
(case 6, AD typeA after Bental)
(12 months after surgery)
unfaforable remodeling

e-Petticoat (case 6)
(13 months after surgery)
favorable remodelig

Doświadczenia własne

E-PETICOAT

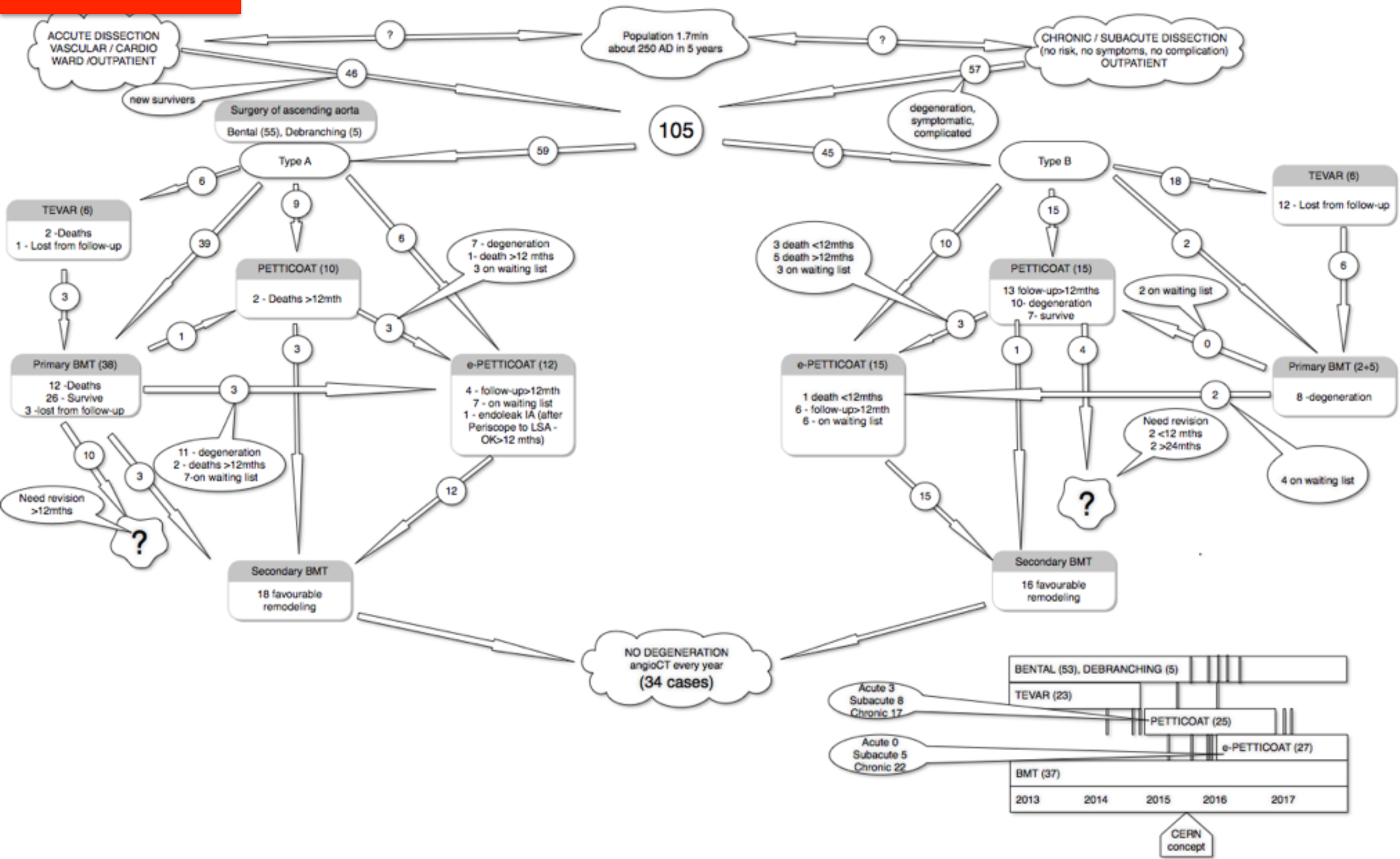
56 chorych

Type B:
Acute
Chronic

Type A
Acute
Chronic

>3 years of follow-up

Doświadczenia własne



Doświadczenia własne

Różnice w postępowaniu z naczyniami trzewnymi

-Nie stentujemy rozwarstwionych naczyń trzewnych
dopóki nie są statycznie zamknięte

-Stentujemy zamknięte naczynia trzewne dopiero po implantacji BM-XL

-Stentujemy t. biodrową zewnętrzną jeśli rozwarstwiona

Doświadczenia własne

Różnice wobec „STABILIZE”

-Ballonning tylko w krytych stentach

-W BMS-XL ostrożnie poszerzać do średnicy nominalnej

-Intencjonalne rozerwanie „intimy" akceptowalne, ale nie konieczne

Doświadczenia własne

Różnice wobec PETTICOAT

- modo He (prewencja SIDR i > siły radialnej)

- Długa zakładka (teleskop)

-TEVAR 5-6 cm nad CT (protekcja rdzenia)

-BMS aż do rozwidlenia aorty (<radial mismatch i protekcja lędźwiówek i krzyżówek)

-„iliac extensions” od nerek do biodrówek

Doświadczenia własne

Włączenie Kardiochirurgów do leczenia endowskularnego

-Aortic team ogląda CT przed operacją Kadiochir.
-Planowanie reperfuzji na stole
-Planowanie drugiego kroku
- Różnice w kaniulacji (wiedza tajemna)

Doświadczenia własne

Różnice wobec klasycznej oceny TK

-Oprócz pomiaru średnic
-Zawsze pomiar objętościowy (TL/FL).
ROI w Osirix.

Volumetric analysis of type B aortic dissections treated with thoracic endovascular aortic repair

Gregory A. Stanley, MD,[a] Erin H. Murphy, MD,[a] Martyn Knowles, MD,[a] Mihaila Ilves, MD,[a] Michael E. Jessen, MD,[b] J. Michael Dimaio, MD,[b] J. Gregory Modrall, MD,[a] and Frank R. Arko III, MD,[a] *Dallas, Tex*

Background: **Type B aortic dissections are being successfully treated by thoracic endovascular aortic repair (TEVAR). Postoperative false lumen patency has been associated with aneurysmal dilatation and rupture of the thoracic aorta, necessitating further intervention. This is the first volumetric analysis of type B aortic dissections comparing patients with and without false lumen thrombosis (FLT) after TEVAR. We hypothesized that a greater increase in postoperative true lumen volume will lead to FLT, and without this change, false lumen patency will result.**

Methods: **Preoperative and postoperative computed tomography angiography (CTA) imaging was analyzed using three-dimensional reconstruction to measure the short- and long-axis diameter and cross-sectional area of the true lumen, false lumen, and total aorta. Measurements were taken at 5-cm intervals from the left subclavian artery to the aortic bifurcation. Pre- and postoperative volumetric data were calculated and compared in patients with and without postoperative FLT.**

Results: **Between 2006 and 2010, 132 patients underwent thoracic aortic stent grafting. Of these, 31 (23%) had thoracic endografting for type B aortic dissection. Pre- and postoperative CTA images were available for analysis in 23 patients with a mean age of 59 ± 14 years treated for acute, complicated (n = 8, 35%), and chronic (n = 15, 65%) indications. Mean follow-up imaging was 9 months (range, 1-39 months). Thirteen patients (56%) had postoperative FLT and 10 (43%) had persistent false lumen patency. The dissections involved the left subclavian artery (n = 12), visceral arteries (n = 14), renal arteries (n = 16), and iliac arteries (n = 15). The left subclavian artery was intentionally covered in 15 patients (65%). There were no significant differences in age, acute vs chronic dissection, branch vessel involvement, coverage of the left subclavian artery, or distal extent of the endograft between patients with and without postoperative FLT. Patients with postoperative FLT had a significantly smaller preoperative maximum thoracic aortic diameter (5.05 ± 1.0 vs 6.30 ± 1.4 cm; $P = .02$). Volumetric analysis demonstrated significantly smaller preoperative true lumen volume (141.3 ± 68 vs 230.5 ± 92 cm^3; $P = .01$) in patients with FLT, but no difference in preoperative false lumen volume. Patients with FLT had a significant increase in the volume percentage of the true lumen from 42.7% to 61.7% ($P = .02$) after stent graft repair, compared with an increase from 46.7% to 47.7% ($P = .75$) in patients with persistent false lumen patency.**

Conclusions: **This volumetric study of type B aortic dissection treated with TEVAR suggests that the ability of the**

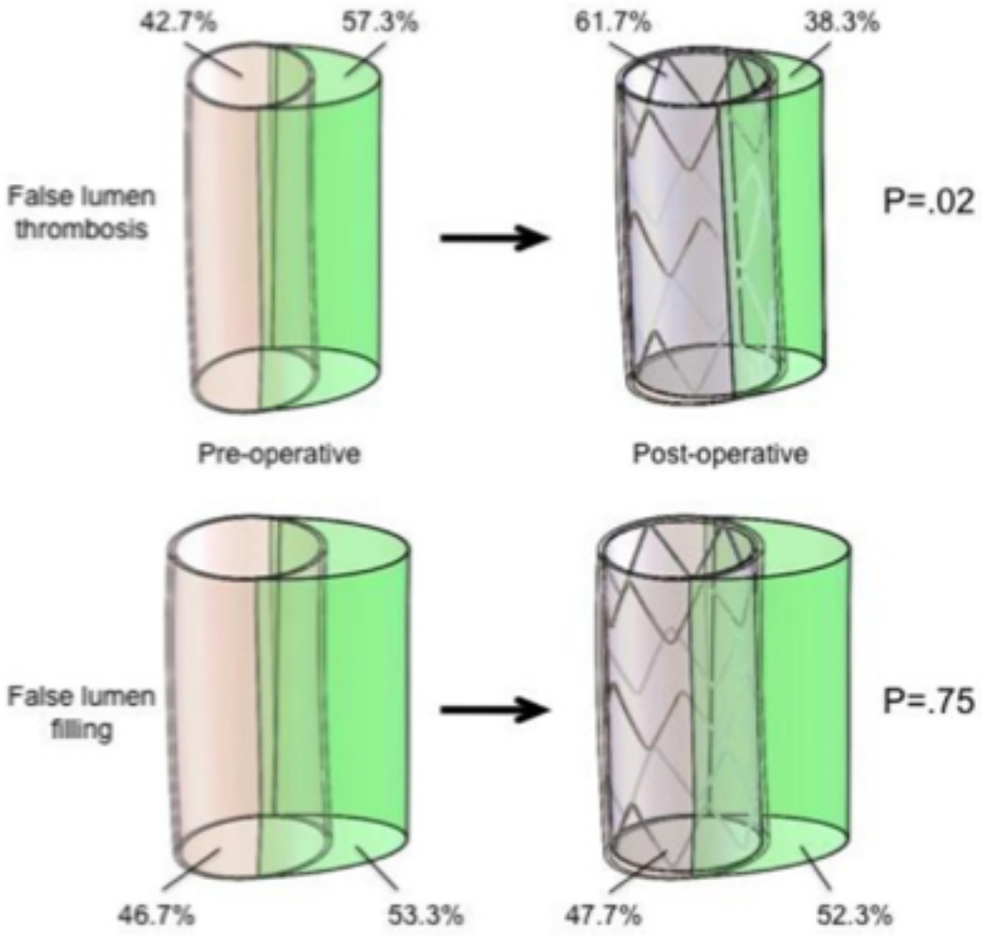
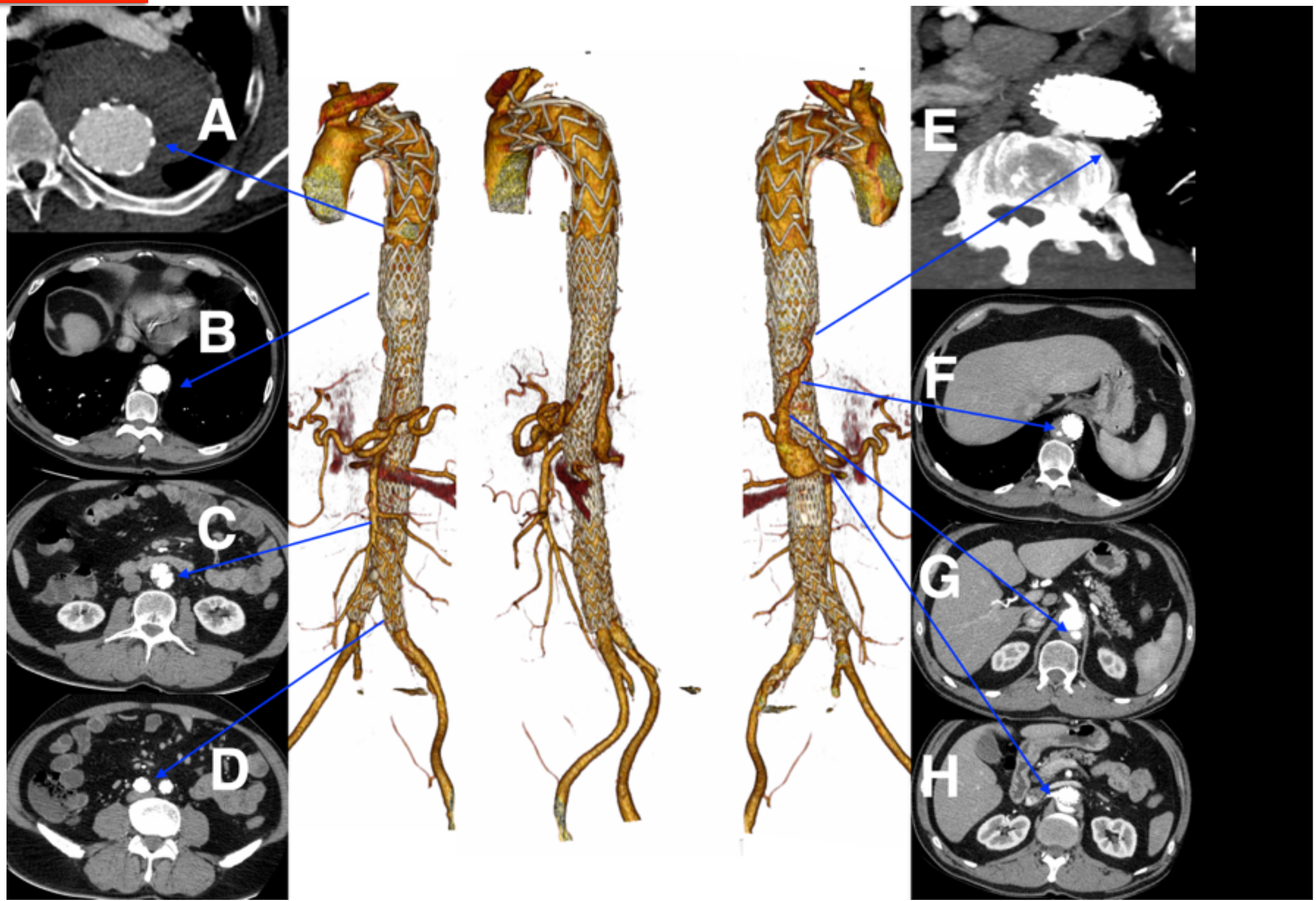


Fig 3. Schematic of changes in true lumen volume index (TLVi) and false lumen volume index (FLVi). Green shading represents the false lumen.

Niewiadome

EXAMPLE OF:
Focal False Lumen Perfusion



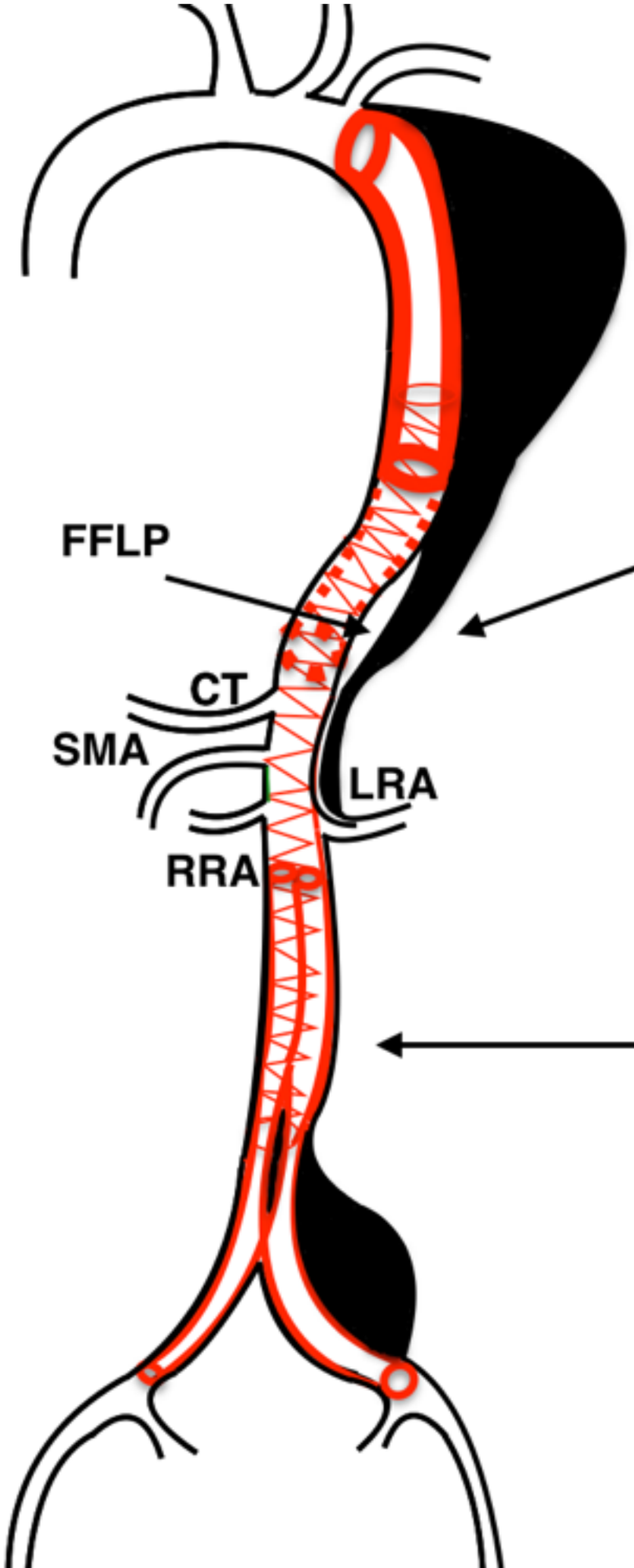
Niewiadome

Nie wiadomo czy ogniskowa perfuzja FL jest niebezpieczna (FFLP)

Na pewno chroni przed paraplegią

Trzeba ocenić to za 5 i 10 lat

FFLP (Focal False Lumen Perfusion)



FFLP maintain the flow to the tear/detached spinal and thoracic branches

Gutters between iliac parallel stent-grafts prevented the flow to the iliac/sacral arteries

Plany naukowe

- E-PETTICOAT technique in EJVES (Juggar-2018)
- E-PETTICOAT in type A AD after cardiac surgery.
- E-PETTICOAT (20 Chronic AD) -submitted in JVS
- E-PETTICOAT (17 Acute AD) - submitted in JEVT

Plany naukowe

- Porównanie z BEVAR/FEVAR (Polska/Niemcy)
- Porównanie TEVAR v E-PETTICOAT
- Porównanie PETTICOAT v E-PETTICOAT

PLANY

JOURNAL OF ENDOVASCULAR THERAPY
A SAGE Publication
An official publication of the ISEVS

Case Report

A 3-Dimensional Printed Aortic Arch Template to Facilitate the Creation of Physician-Modified Stent-Grafts

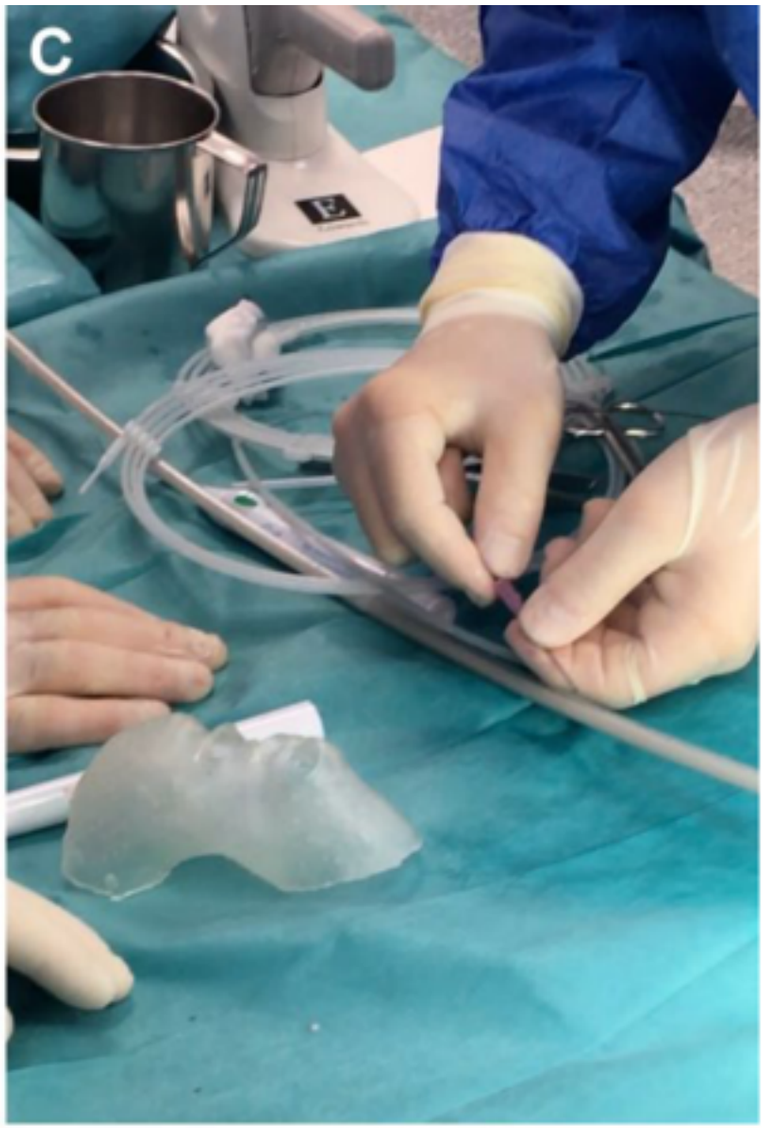
Pawel Rynio, MD, PhD[1], Arkadiusz Kazimierczak, MD, PhD[1], Tomasz Jedrzejczak, MD, PhD[2], and Piotr Gutowski, MD, PhD[1]

Journal of Endovascular Therapy
1–5

DOI: 10.1177/1526602818792266
www.jevt.org
SAGE


A

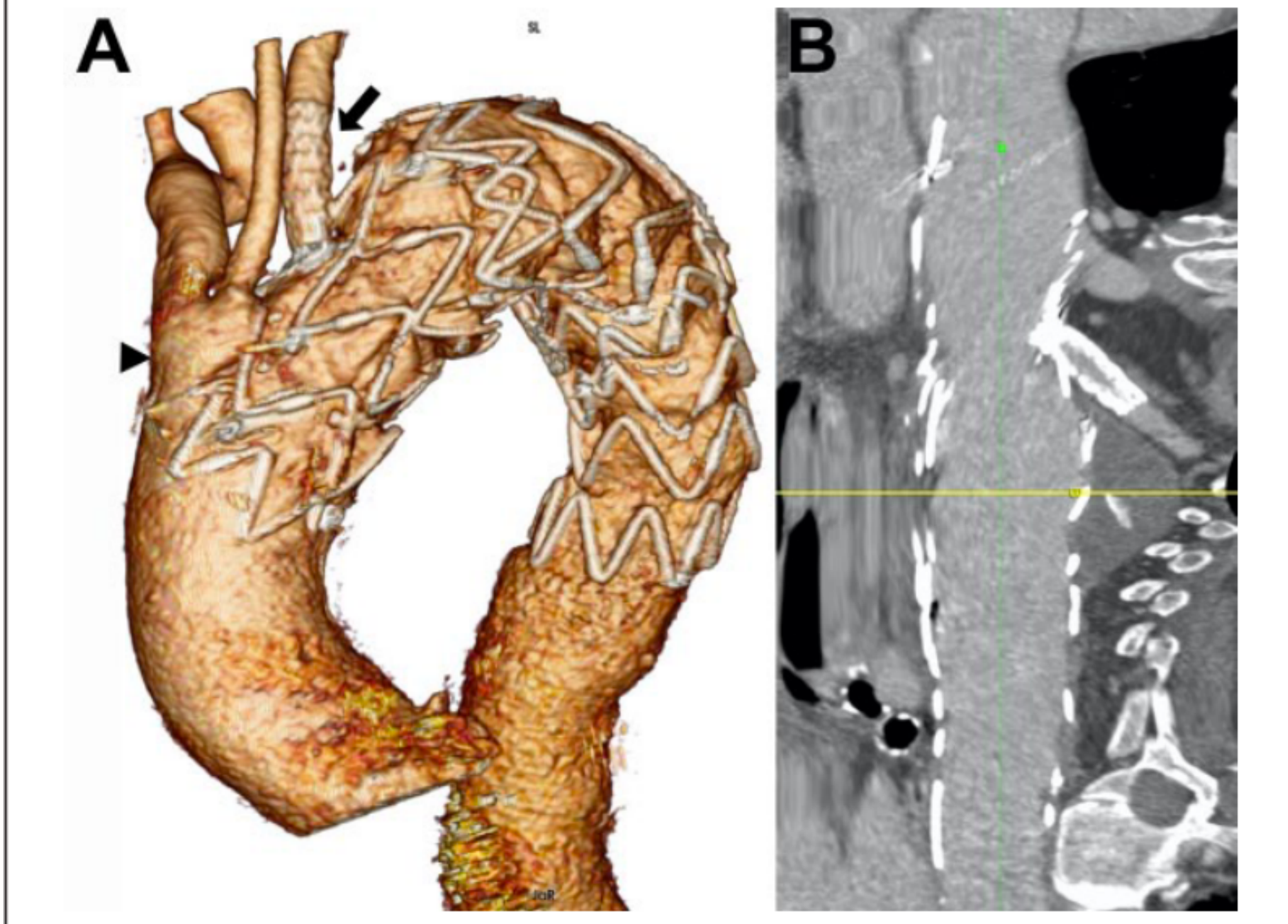

B


C


D

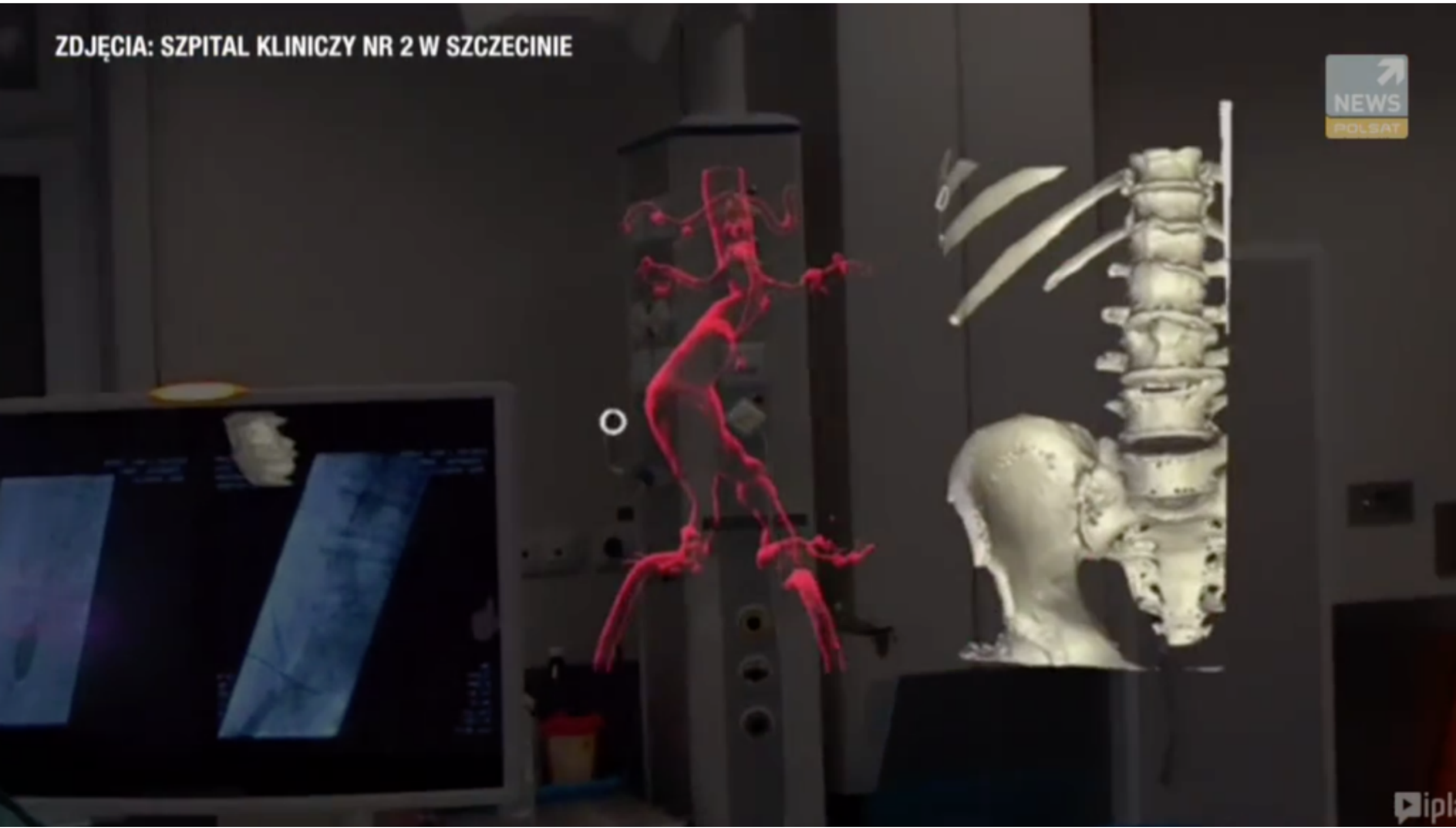

E


F


A
B

Wirtualna rzeczywistość

- Do nawigacji w FL/TL i w łuku aorty



Krajowy Rejestr Operacji Naczyniowych

Krajowy Rejestr
Operacji Naczyniowych

zs_rejestrator1

- Dashboard
- Pacjenci
- Zgody na zabieg
- Wniosek o usunięcie danych
- Historia wniosków
- Raporty
- Lekarze
- Ośrodek
- Kontakt do KRON

Witaj w systemie KRON!

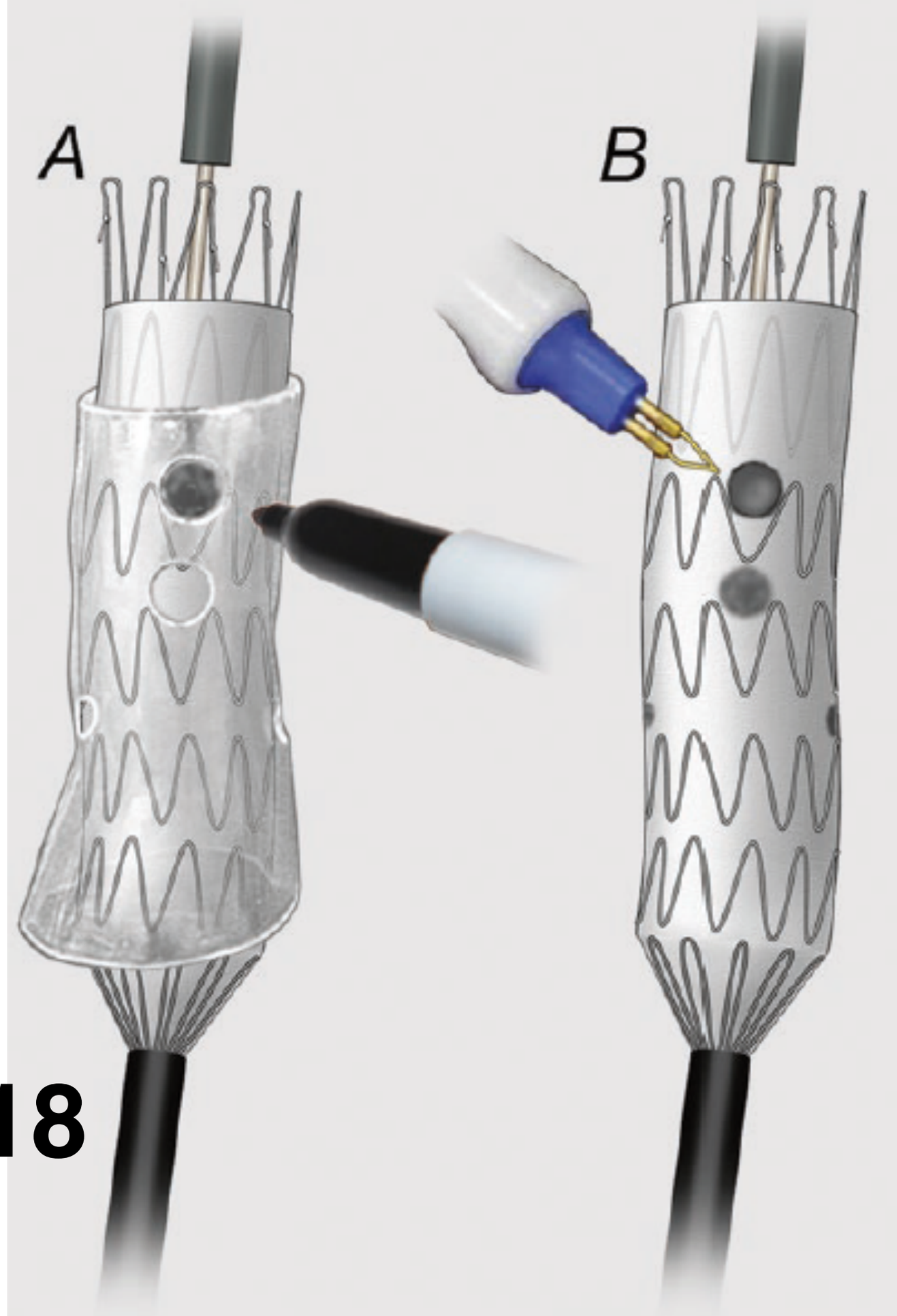
Głównym celem systemu KRON (Krajowy Rejestr Operacji Naczyniowych) jest cyfrowe gromadzenie danych dotyczących przeprowadzonych operacji naczyniowych.
Na podstawie danych będzie można przeprowadzać analizy, które przyczynią się w opracowywaniu skuteczniejszych metod prowadzenia hospitalizacji.

Jako **Rejestrator** możesz przede wszystkim w ramach swojego ośrodka rejestrować nowych pacjentów, dodawać nowe hospitalizacje oraz aktualizować wcześniejsze hospitalizacje.

W SZCZECINIE OD 2015

FEVAR
PMG
3D PRINT

start listopad 2018



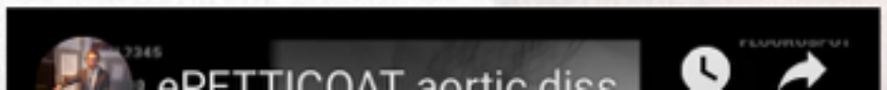
16.11.2018 (pierwszy FEVAR - PMG- 3D)

Klinika Chirurgii Naczyniowej, Ogólnej i Angiologii w Szczecinie
Al.Powstańców Wielkopolskich 72
70-111 Szczecin

Aby skontaktować się z nami
zadzwoń: 91 4661156
rejestracja do poradni: 91 4661322

Wideo

E-PETTICOAT - Nasza autorska metoda leczenia rozwarstwienia aorty



Klinika Chirurgii Naczyniowej w Szczecinie jest wiodącym ośrodkiem naczyniowym w regionie. Pracujący tu lekarze wykonują rocznie ponad 3000 zabiegów naczyniowych co czyni ich ekspertami w swojej dziedzinie. Stale

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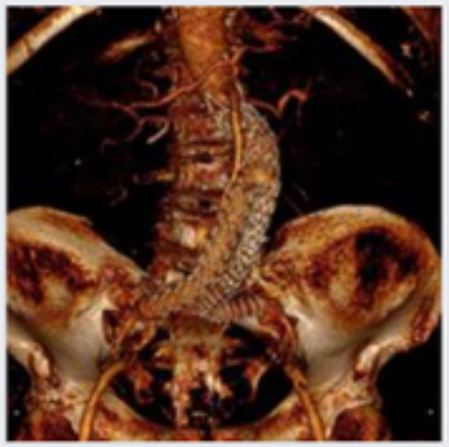
Hasło

Zaloguj się

Nie pamiętasz nazwy konta?



Klinika Chirurgii Naczyniowej, Ogólnej i Angiologii PUM

@chirurdzynaczyniowi

Lubię to! Udostępnij Wyślij wiadomość ...

Wyślij wiadomość

Dziękuję