

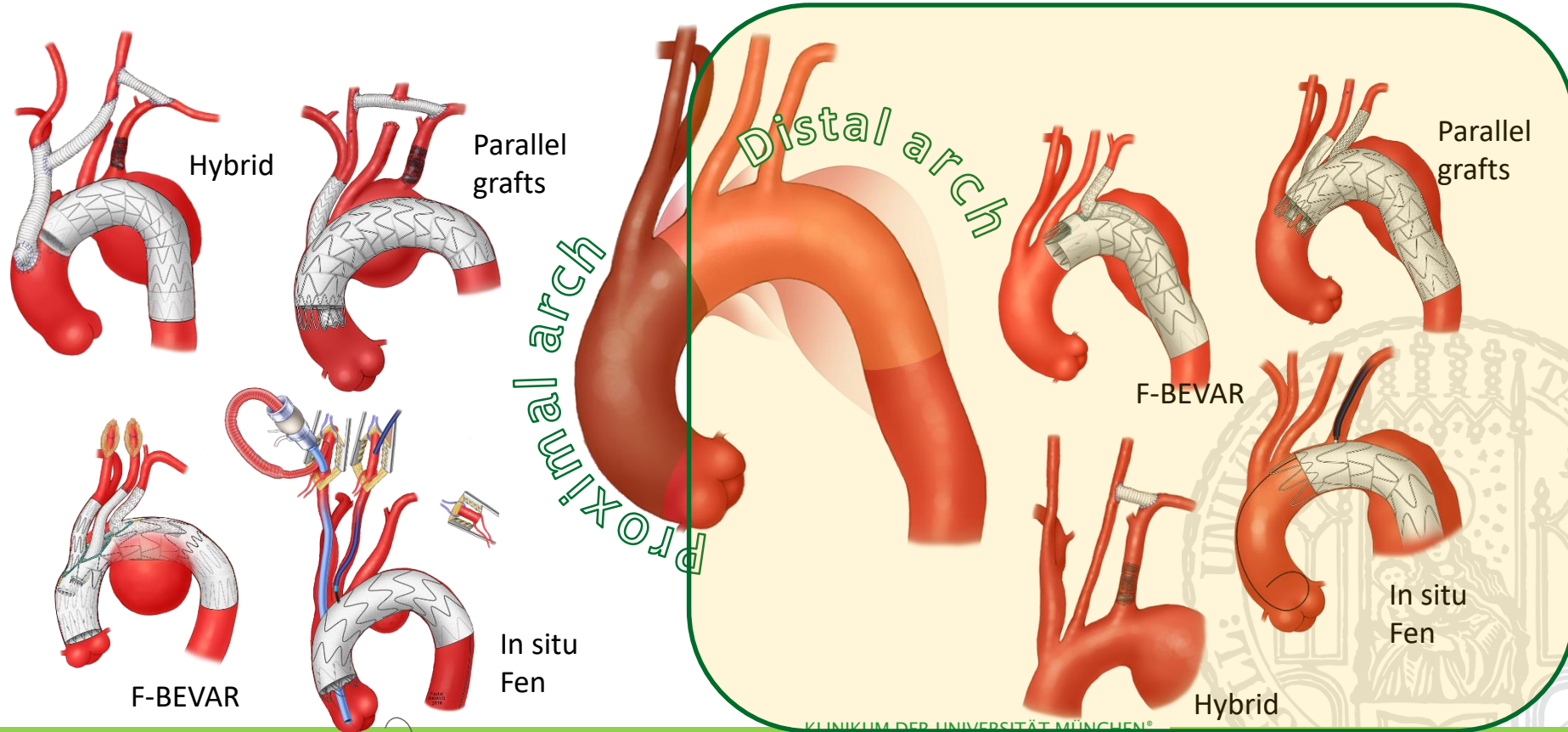
Single versus Multibranched Devices: Pros and Cons

Nikolaos Tsilimparis, Jan Stana, M. Pichlmeier, Ryan Gouveia e Melo

Univ. Prof. Nikolaos Tsilimparis
Head of Department of Vascular Surgery
University Aortic Center of
Ludwig Maximilian University Hospital Munich

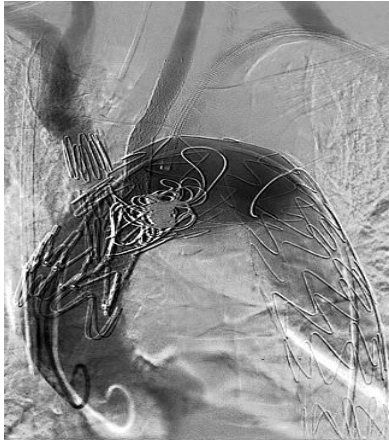
- proctoring speaking-fees, educational Grant, PI for Cook Medical
- Speaking fees and educational Grant for Bentley





Endovascular Repair of the distal aortic arch (Zone 1–2)

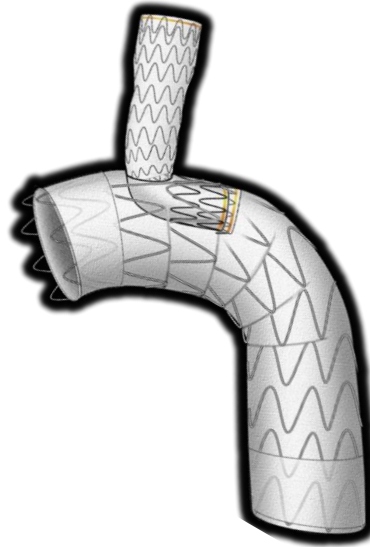
Chimney Grafts



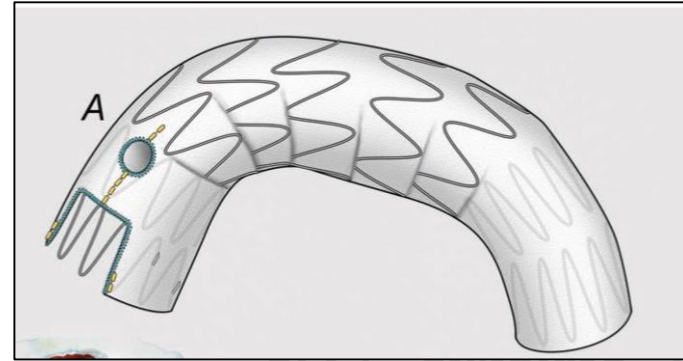
In-Situ Fenestration



branched TEVAR



Fenestrated TEVAR



Graphics: Courtesy of Gustavo Oderich

Bail-out options

F-TEVAR Multicenter Collaboration

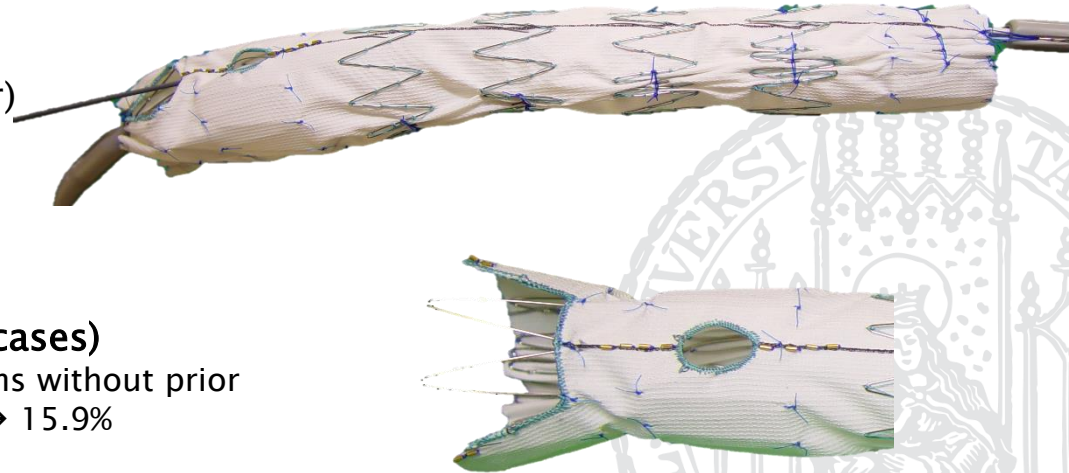
(Munich, Hamburg, Uppsalla, Frankfurt, Birmingham, Malmö)

108 total patients

Pre-Loaded Fenestrated Thoracic Endografts for Distal Aortic Arch Pathologies: Multicentre Retrospective Analysis of Short and Mid Term Outcomes

Nikolaos Tsilimparis ^{a,*,†}, Carlota F. Prendes ^{a,†}, Guido Rouhani ^b, Donald Adam ^c, Nuno Dias ^d, Jan Stana ^a, Fiona Rohlfis ^e, Kevin Mani ^f, Anders Wanhainen ^{g,h}, Tilo Kölbel ^e

- **30-DAY MORTALITY:** 3.7% (3 retrograde type A, 1 cardiac arrest)
- **STROKE RATE:** 7.5% (5.6% major, 1.9% minor)
- **SCI:** 3.7% → Permanent SCI: 0.9%
- **RETROGRADE AORTIC DISSECTION:** 2.7% (3 cases)
All in patients with post-type B dissecting aneurysms without prior aortic surgery (19 patients in total). In this cohort → 15.9%

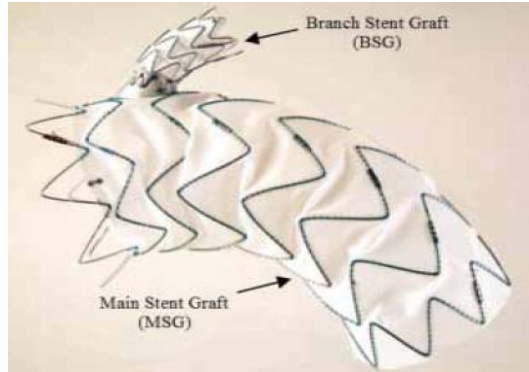


Single Branched Arch Endografts – distal repair

Off-the-shelf
single branched

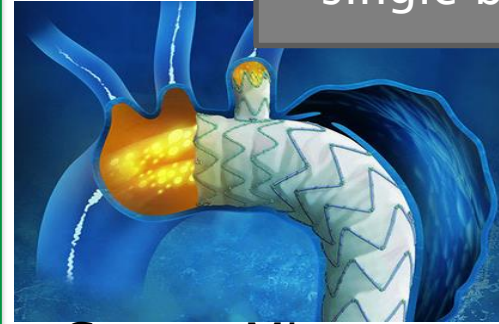


Gore IBD

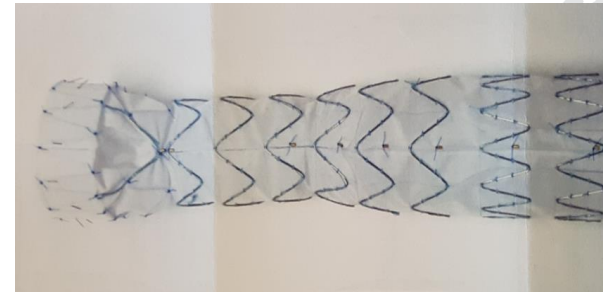


Mona LSA Medtronic

Custom-made
single branched



Castor, Microport



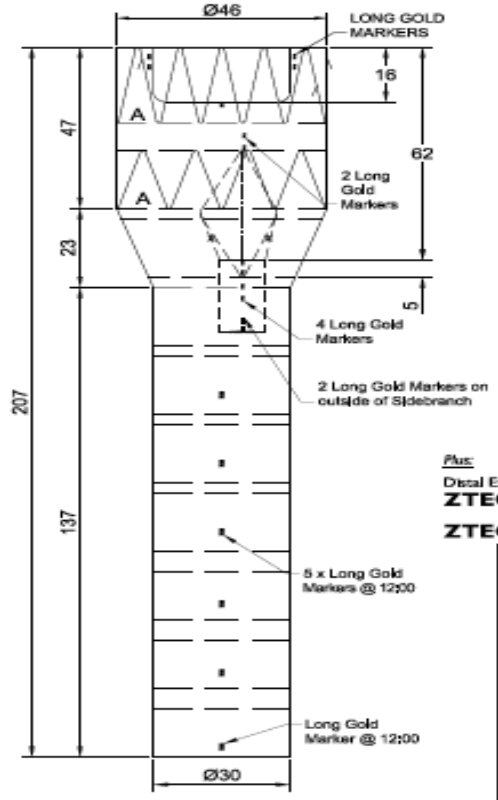
Cook retrograde branch



Inoue

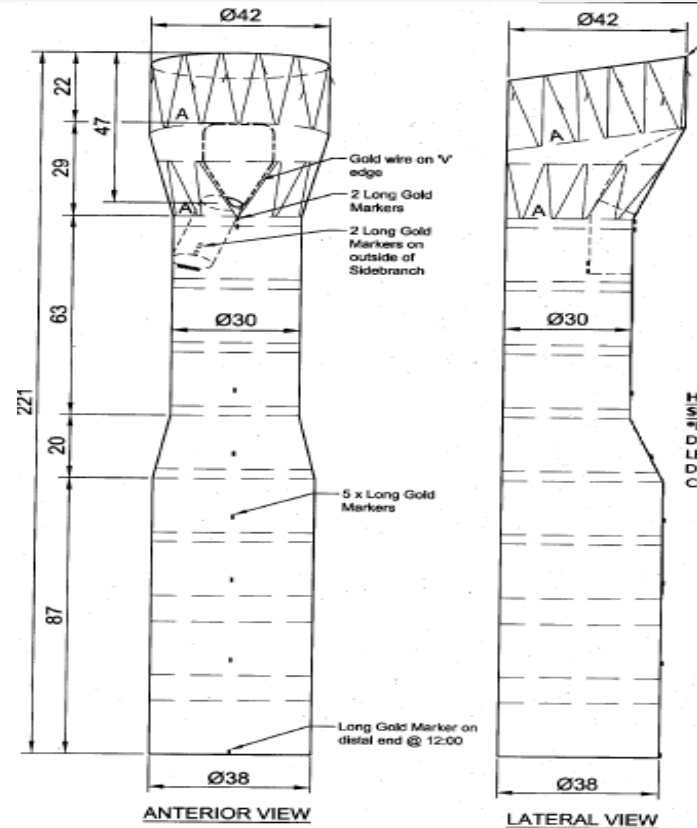
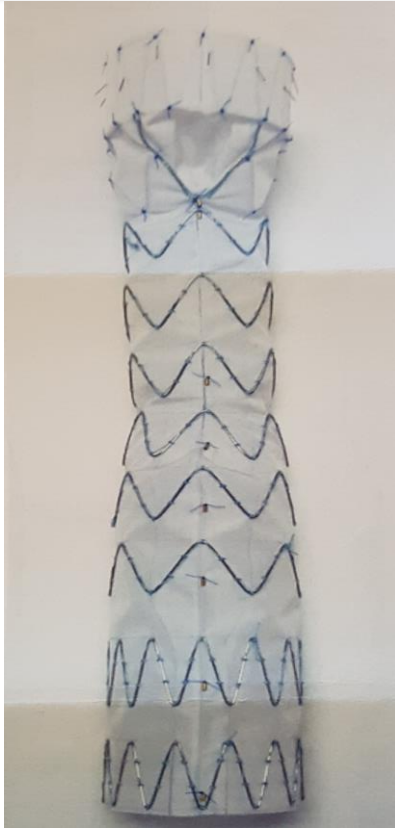
Single Branch

Cook CMD Designs: Scallop + Retrograde LSA-Branch



- No data available
- Concerns about reduced landing zone due to scallop

Cook CMD Designs: Retrograde helical branch



Applicability of a standardized thoracic endograft with a single branch for the left subclavian artery to treat aortic disease involving the distal arch

Justine Mouglin, MD,^a Jonathan Sobocinski, MD, PhD,^b Jarin Kratzberg, PhD,^c Dominique Fabre, MD, PhD,^a and Stéphan Haulon, MD, PhD,^a *Le Plessis-Robinson and Lille, France; and West Lafayette, Ind*

Retrograde spiral inner branch (20 mm long, at 12:00)
LSA branch with preloaded system

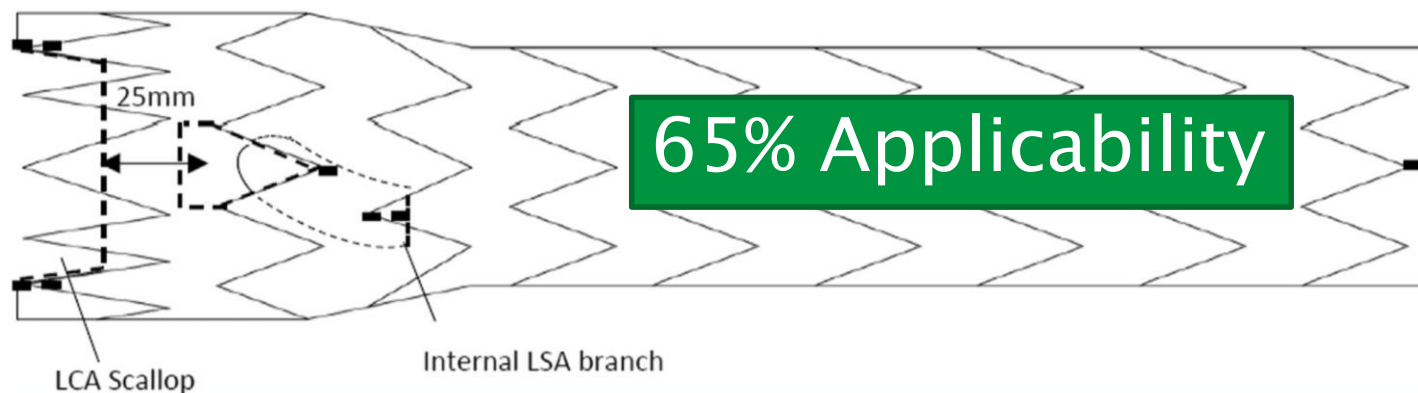


Fig 3. Proposed off-the-shelf (OTS) thoracic endograft for subclavian perfusion. LCA, Left carotid artery; LSA, left subclavian artery.

- Off-the-shelf
- Diameter 21 – 53 mm
- One retrograde branch 8 – 20 x 60 mm
- Distal portal edge distance 20 - 25 - 40 mm
- Device length 10 – 20 cm



Multicenter US study (n=22)

- 10 fusiform aneurysms
- 12 sacular aneurysms

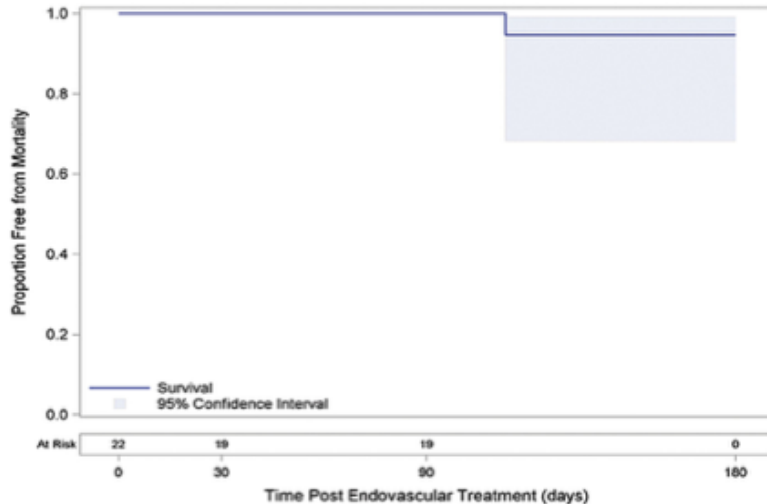
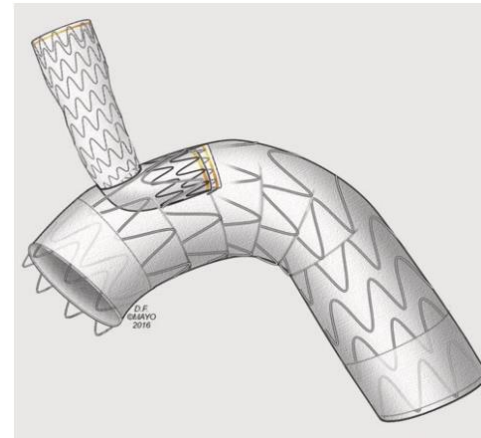


Fig 3. Kaplan-Meier survival curve. In this study, 1 patient died at 4 months of a concomitant ascending aortic aneurysm rupture, thus yielding a 6-month Kaplan-Meier estimated survival of 94.7%.

Branched Endovascular Therapy of the Distal Aortic Arch: Preliminary Results of the Feasibility Multicenter Trial of the Gore Thoracic Branch Endoprosthesis

Himanshu J. Patel, MD, Michael D. Dake, MD, Joseph E. Bavaria, MD, Michael J. Singh, MD, Mark Filinger, MD, Michael P. Fischbein, MD, PhD, David M. Williams, MD, Jon S. Matsumura, MD, and Gustavo Oderich, MD

Departments of Cardiac Surgery and Radiology, University of Michigan Frankel Cardiovascular Center, Ann Arbor, Michigan; Department of Cardiothoracic Surgery, Stanford University Hospitals, Palo Alto, California; Department of Surgery, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania; Department of Surgery, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania; Department of Surgery, Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire; Department of Surgery, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin; and Department of Surgery, Mayo Clinic, Rochester, Minnesota



Gore TBE Branch
Courtesy GS Oderich

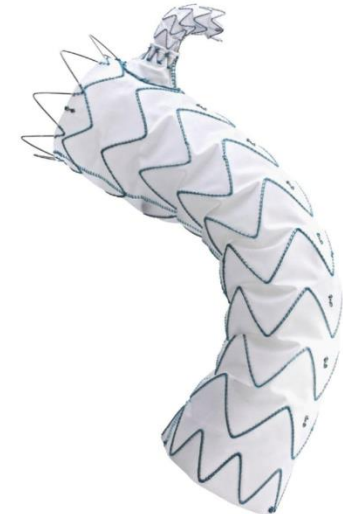
Pre-market FDA approved study

- 9 patients
- 100% technical success
- 4 endoleaks
 - 2 type II
 - 2 undetermined
- No major strokes
- 4 minor strokes in three patients
- No other major complications
- No left arm ischemia or death at 30 days

Results of the Valiant Mona LSA early feasibility study for descending thoracic aneurysms

Eric E. Roselli, MD,^a Frank R. Arko III, MD,^b and Matthew M. Thompson, MD,^c on behalf of the Valiant Mona LSA Trial Investigators, *Cleveland, Ohio; Charlotte, NC; and London, United Kingdom*

(J Vasc Surg 2015;62:1465-72.)



Japanese Study

- 64 patients with single branch
- 100% technical success

Thoracic endovascular aortic repair with branched Inoue Stent Graft for arch aortic aneurysms

Junichi Tazaki, MD,^a Kanji Inoue, MD,^b Hirooki Higami, MD,^c Nobuya Higashitani, MD,^c Masanao Toma, MD,^d Naritatsu Saito, MD,^a Masahide Kawatou, MD,^e and Takeshi Kimura, MD,^a Kyoto, Otsu, and Amagasaki, Japan



(J Vasc Surg 2017;66:1340-8.)

Table III. Thirty-day adverse events

Event	Overall (N = 89), No. (%)	Single branch (n = 64), No. (%)
Thirty-day mortality	4 (4.5)	2 (3.1)
Stroke	14 (16)	5 (7.8)
Aortic dissection	2 (2.2)	2 (3.1)
Paraplegia	1 (1.1)	1 (1.6)
Transfusion	12 (14)	8 (13)
Systemic embolization	2 (2.2)	0
Access injury	11 (12)	9 (14)



Original
Article

Early Outcomes of Left Subclavian Artery Revascularization Using Castor Single-Branched Stent-Graft in the Treatment of Type B Aortic Dissection or Intramural Hematoma

Too good to be true?
Extensive LSA manipulation

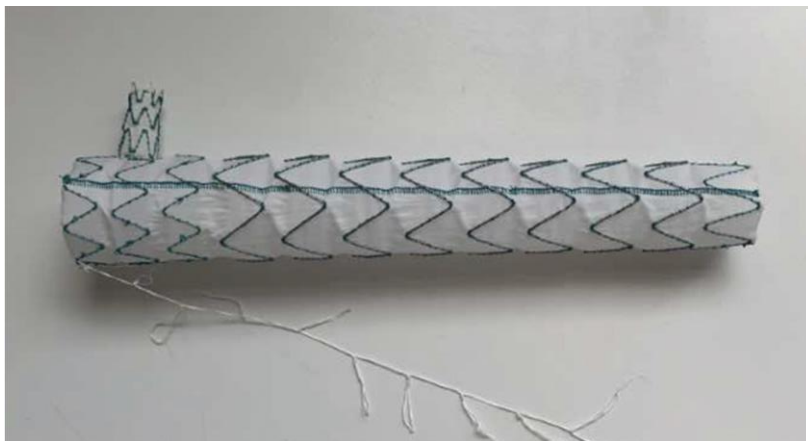
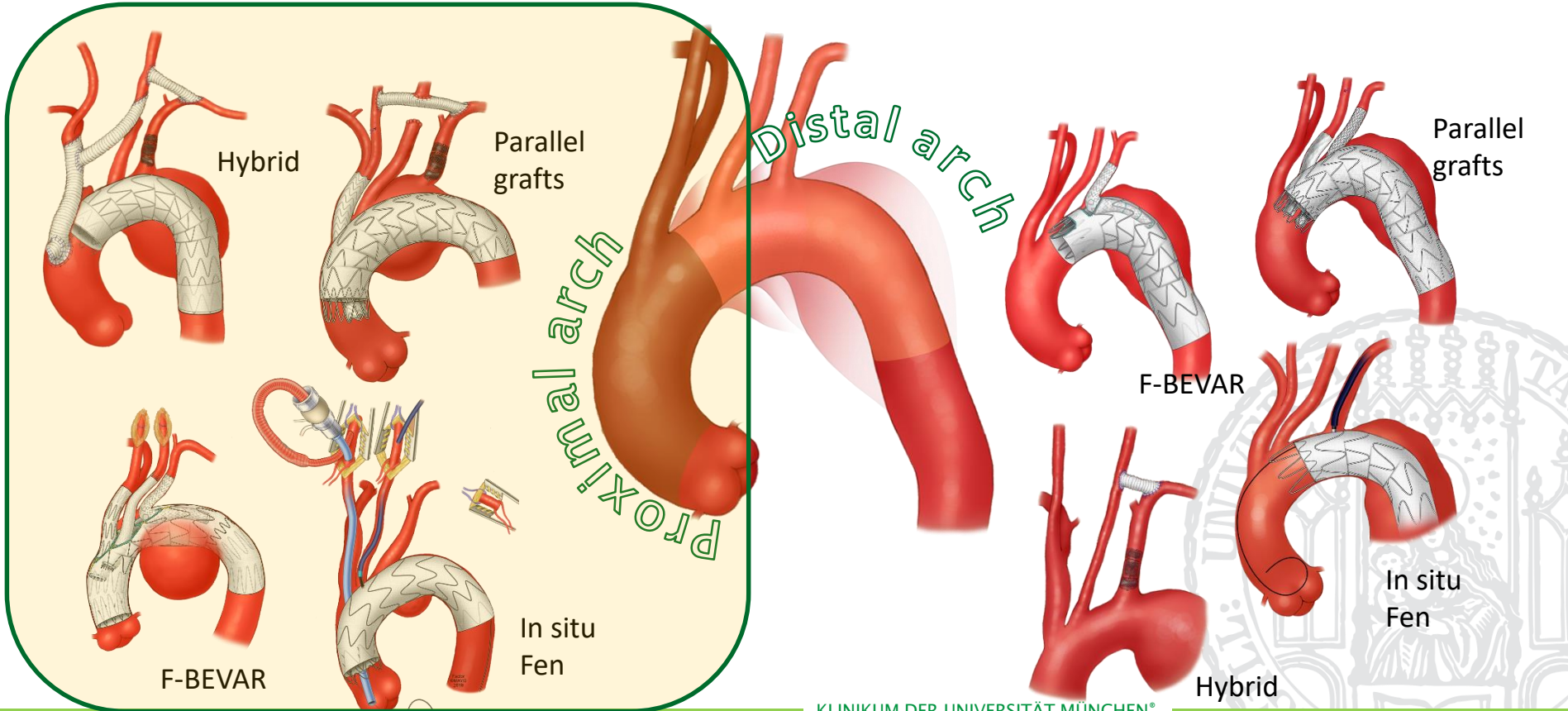


Table 4 30-day complications after TEVAR

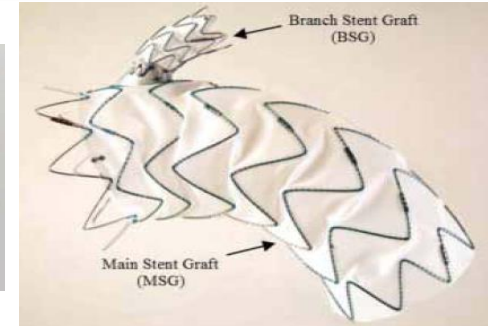
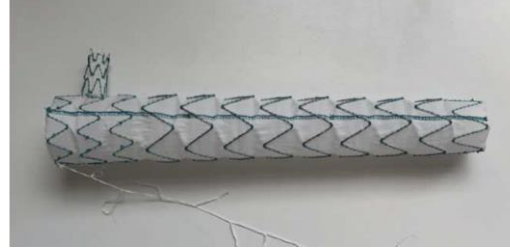
	LSA-covered group (n = 61)	LSA-revascularized group (n = 73)	P value
30-day mortality	3/61 (4.9%)	1/73 (1.4%)	0.33
30-day aortic-related mortality	0/61 (0%)	0/73 (0%)	–
Stroke	5/61 (8.2%)	0/73 (0%)	0.018
Ischemic symptoms of the left arm	7/61 (11.5%)	0/73 (0%)	0.003
Paraplegia	0/61 (0%)	0/73 (0%)	–
P-SINE	0/61 (0%)	0/73 (0%)	–
D-SINE	0/61 (0%)	0/73 (0%)	–

D-SINE: distal stent graft-induced new entry; LSA: left subclavian artery; P-SINE: proximal stent graft-induced new entry; TEVAR: thoracic endovascular aortic repair

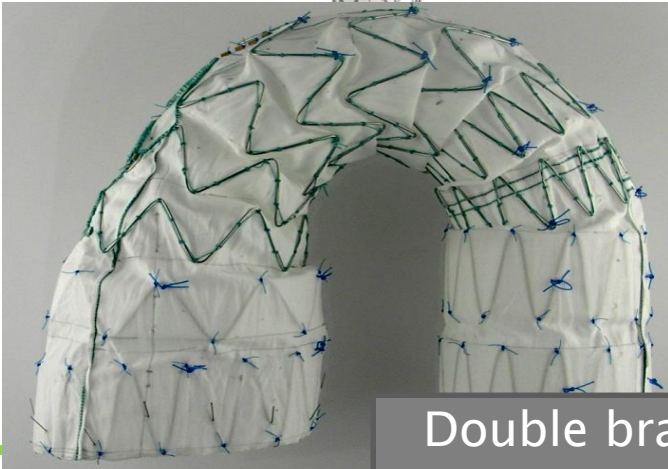
73 patients: 0% Stroke, 1,4% mortality



Branched Arch Endografts – proximal repair



Single branched

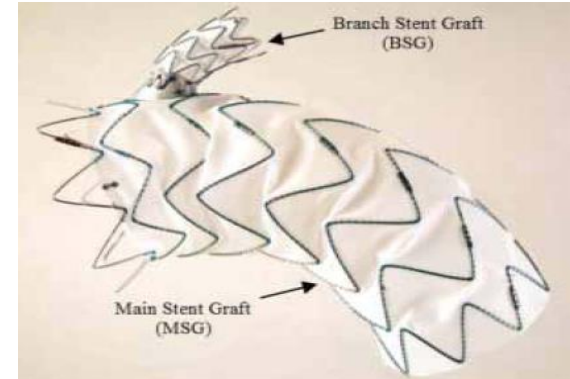
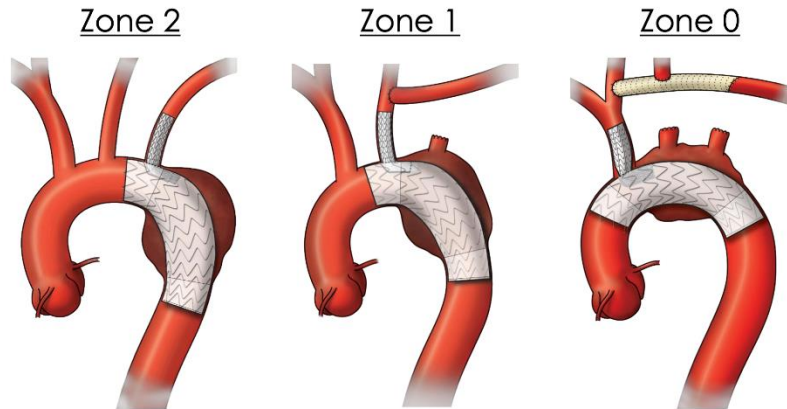


Double branched

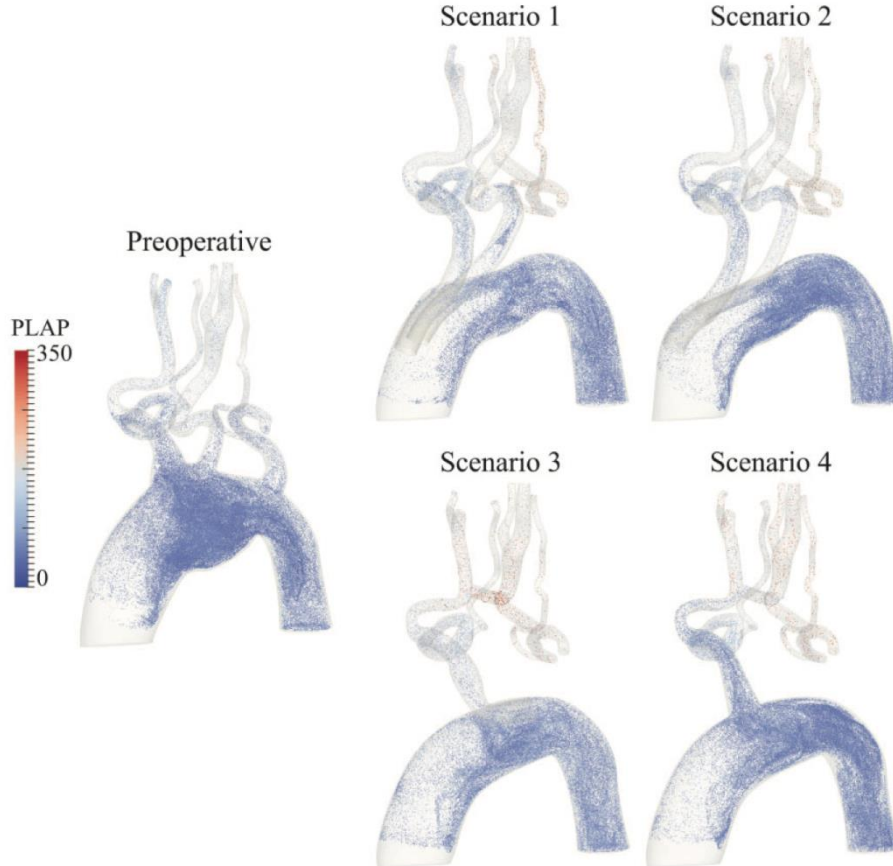


Triple branched

Both the GORE and Medtronic Single branch can be used for proximal arch if adjunctive cervical debranching is performed



Are the hemodynamics the same?



European Journal of Cardio-Thoracic Surgery 0 (2018) 1–8
doi:10.1093/ejcts/ezy068

ORIGINAL ARTICLE

Cite this article as: van Bakel TM, Arthurs CJ, van Herwaarden JA, Moll FL, Eagle KA, Patel HJ et al. A computational analysis of different endograft designs for Zone 0 aortic arch repair. Eur J Cardiothorac Surg 2018; doi:10.1093/ejcts/ezy068.

A computational analysis of different endograft designs for Zone 0 aortic arch repair†

Theodorus M. van Bakel^{a,b,c,*}, Christopher J. Arthurs^d, Joost A. van Herwaarden^c, Frans L. Moll^c, Kim A. Eagle^e, Himanshu J. Patel^f, Santi Trimarchi^b and C. Alberto Figueroa^{a,g}

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^b Thoracic Aortic Research Center, Policlinico San Donato IRCCS, University of Milan, San Donato Milanese, Milan, Italy

^c Department of Vascular Surgery, University Medical Center Utrecht, Utrecht, Netherlands

^d Division of Imaging Sciences and Biomedical Engineering, King's College London, London, UK

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Received 6 November 2017; received in revised form 16 January 2018; accepted 24 January 2018

Double branch performed better:

- Lower blood shear forces
- Higher cervical blood flow

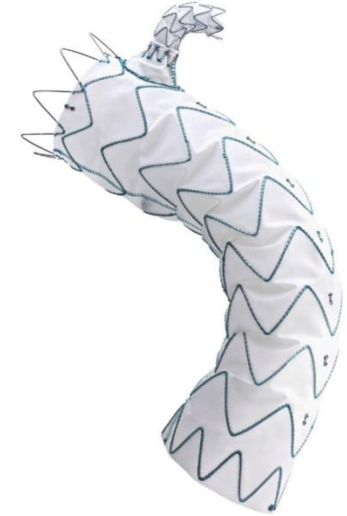
US early feasibility study

- 9 patients
- No strokes during debranching surgery
- 100% technical success
- No 30-day mortality or SCI
- Cerebrovascular events → 2 patients
- No type I/III endoleaks

Management of arch aneurysms with a single-branch thoracic endograft in zone 0



Michael D. Dake, MD,^a Joseph E. Bavaria, MD,^b Michael J. Singh, MD,^c Gustavo Oderich, MD,^d Mark Filinger, MD,^e Michael P. Fischbein, MD, PhD,^f Jon S. Matsumura, MD,^g and Himanshu J. Patel, MD^h



NEXUS™ Anatomical indications

Ascending Aorta

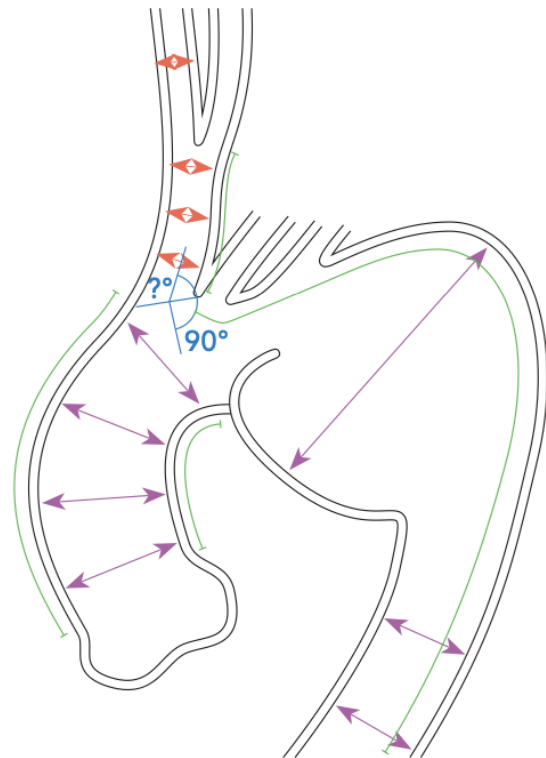
- Diameter of 29-39 mm
- Landing zone length of at least 30 mm

Descending Aorta

- Diameter of 26-40 mm
- Landing zone length of at least 30 mm

Brachiocephalic trunk

- Diameter of 11.5-18.5 mm
- Landing zone length of at least 20 mm
- Take off angle between the brachiocephalic artery and the aortic arch perpendicular should be $\geq 125^\circ$



are bent inwards to provide atraumatic durable fixation

Multicenter study – 28 patients

- Procedure success: 100%
- Arch aneurysms (60.7%) and Chronic Dissections (21.4%)
- 30-day mortality: **7.1%**
- Stroke: 3.6% (all non-disabling)
- No late aneurysm-related death
- Device related re-interventions: **10.7%** (12 months)

NEXUS Arch

A Multicenter Study Evaluating the Initial Experience with a Novel Aortic Arch Stent Graft System

Planer, David MD^{*}; Elbaz-Greener, Gabby MD^{*}; Mangialardi, Nicola MD^{†,‡}; Lindsay, Thomas MD[§]; D'Onofrio, Augusto MD[¶]; Schelzig, Hubert MD^{||}; Chaykovska, Lyubov MD^{**,††}; Hill, Andrew MD^{‡‡}; Holden, Andrew MD^{‡‡}; Antonello, Michele MD[¶]; Tan, Kong T. MD[§]; Orrico, Matteo MD^{†,‡}; Ronchey, Sonia MD[‡]; Marmur, Yaniv BSc^{§§}; Pecoraro, Felice MD^{¶¶}; Lachat, Mario MD^{**,††}

[Author Information](#) ☺

Annals of Surgery: March 04, 2021 - Volume - Issue -
doi: 10.1097/SLA.0000000000004843



What is the impact of cervical debranching?

From the Society for Clinical Vascular Surgery



Trends and outcomes of thoracic endovascular aortic repair with open concomitant cervical debranching

Kirthi S. Bellamkonda, MSc,^a Sameh Yousef, MD,^b Naiem Nassiri, MD,^c Alan Dardik, MD, PhD,^c
Raul J. Guzman, MD,^c Arnar Geirsson, MD,^b and Cassius I. Ochoa Chaar, MD, MS, FACS,^c *New Haven, Conn*

n=	CCB n(%)	CCSB+CCB n(%)	p=
Total morbidity	34	31	
	12 (35.3)	21 (67.7)	p<0.01
Specific Adverse Events			
Wound Infection	1 (2.9)	0 (0.0)	0.34
Pneumonia	3 (8.8)	3 (9.7)	0.91
Unplanned intubation	3 (8.8)	8 (25.8)	0.07
Failed vent weaning	4 (11.8)	9 (29.0)	0.08
Cardiac arrest	3 (8.8)	3 (9.7)	0.91
Bleeding	9 (26.4)	15 (48.4)	0.06
DVT/thrombophlebitis	0 (0.0)	1 (3.2)	0.29
Renal Failure	0 (0.0)	0 (0.0)	
Stroke	3 (8.8)	4 (12.9)	0.6
Sepsis	1 (2.9)	2 (6.5)	0.51
Overall Mortality	3 (8.8)	7 (22.6)	0.12
Readmission (2010-2017)	0 (0.0)	1 (3.2)	0.29
Length of stay, mean±SEM	11.1 ± 2.2	12.61 ± 2.32	0.62

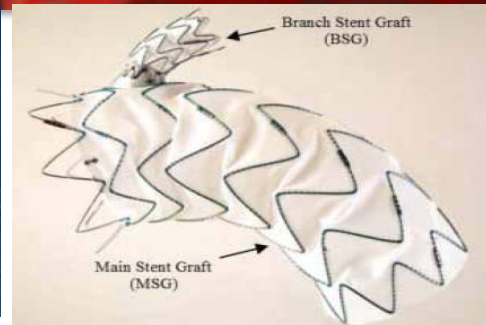
Table IV. Independent risk factors associated with mortality on multivariable analysis

Risk factor	OR (95% CI)
Two bypasses vs TEVAR only	4.33 (1.75-10.73)
Two bypasses vs 1 bypass	3.44 (1.24-9.51)
One bypass vs TEVAR only	1.26 (0.76-2.09)
Older age	1.74 (1.41-2.13)
Male sex	0.87 (0.66-1.15)
Functional dependent status	1.48 (1.00-2.19)
Smoking	1.21 (0.88-1.65)
Hypertension	0.68 (0.47-0.98)
Congestive heart failure	1.12 (0.53-2.39)
Dialysis dependency	2.61 (1.57-4.33)
Anesthesia	0.70 (0.34-1.45)
ASA class	2.24 (1.62-3.10)
Emergency case	3.66 (2.73-4.90)

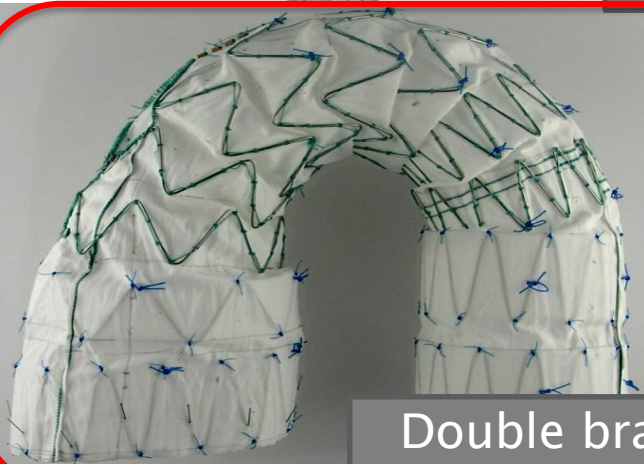
ASA, American Society of Anesthesiologists; CI, confidence interval; OR, odds ratio; TEVAR, thoracic endovascular aortic repair.
Boldface values represent statistical significance.

TEVAR + Carotid-carotid BP+C-S BP = 23% Mortality

Branched Arch Endografts



Single branched



Double branched

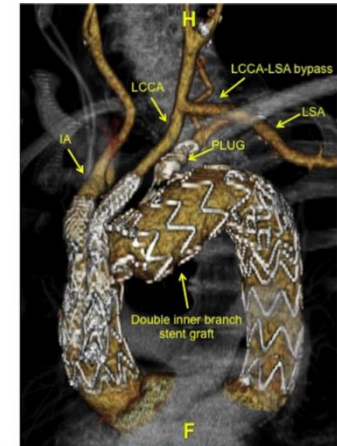
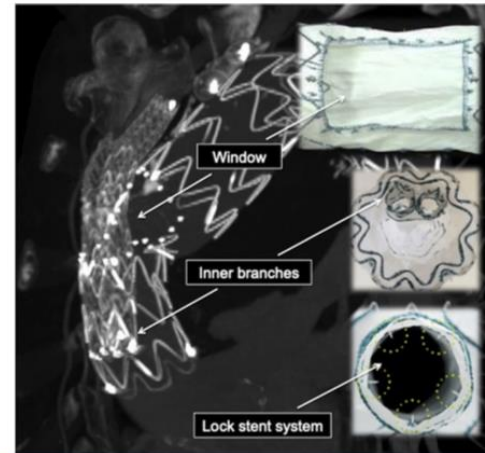
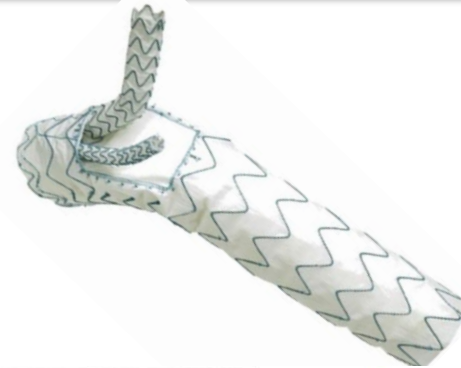


Triple branched

Terumo Relay Aortic Double Branch (inner branch)

Characteristics:

- Double branched graft
- Requires one cervical debranching
- Single window (cannulation easy while maintaining cerebral perfusion)
- Self oriented pre-curved
- Dual sheath technology



iTalian Reglstry of doUble inner branch stent graft for arch PatHology (the TRIUmPH Registry)

Ciro Ferrer, MD,^a Piergiorgio Cao, MD, FRCS,^b Carlo Coscarella, MD,^c Michelangelo Ferri, MD,^d Luigi Lovato, MD,^e Stefano Camparini, MD,^f and Luca di Marzo, MD,^a TRIUmPH Registry Investigators,^{*} Rome, Turin, Bologna, and Cagliari, Italy

Study from 9 Italian centers

- 24 patients included
- Technical success: 95.8%
- 30-day mortality: **16.7%**
- Stroke: **12.5%**
- Retrograde dissection: **8.3%**
- Early re-intervention: 16.7% (4% ascending aorta replacement)



Terumo Relay Aortic Double Branch

European Journal of Cardio-Thoracic Surgery 00 (2021) 1–7
doi:10.1093/ejcts/ezab160

ORIGINAL ARTICLE

Cite this article as: Czerny M, Berger T, Kondov S, Siepe M, Saint Lebes B, Mokrane F *et al.* Results of endovascular aortic arch repair using the Relay Branch system. Eur J Cardiothorac Surg 2021; doi:10.1093/ejcts/ezab160.

Results of endovascular aortic arch repair using the Relay Branch system

Martin Czerny^{a,*}, Tim Berger^a, Stoyan Kondov^a, Matthias Siepe^a, Bertrand Saint Lebes^b, Fatima Mokrane^b, Herve Rousseau^b, Mario Lescan^c, Christian Schlensak^c, Mateja Andic^c, Constatijn Hazenberg^d, Trijntje Bloemert-Tuin^d, Sue Braithwaite^e, Joost van Herwaarden^d, Alexander Hyhlik-Dürr^f, Yvonne Gossiau^f, Luís Mendes Pedro^g, Pedro Amorim^g, Toru Kuratani^h, Stephen Cheng^g, Robin Heijmenⁱ, Emma van der Weijde^j, Eliza Pleban^k, Piotr Szopiński^k and Bartosz Rylski^a

ENDOVASCULAR AORTIC
SURGERY

from <https://academic.oup.com/ejcts>

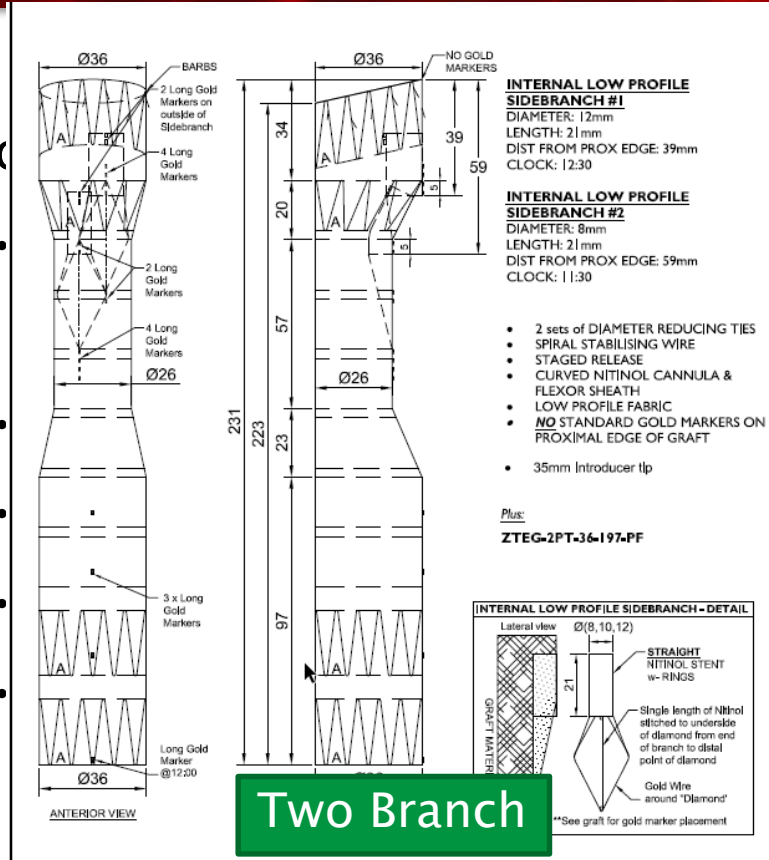
Patients	N = 43
Underlying aortic disease	
Aneurysm, n (%)	31 (72)
Other	12 (28)
Presumed aetiology, n (%)	
Degenerative	26 (61)
Post-dissection	7 (16)
PAU	8 (19)
Unknown	2 (5)

Multicenter study: Germany, France, Netherlands, Portugal, Japan, Hong Kong, Poland

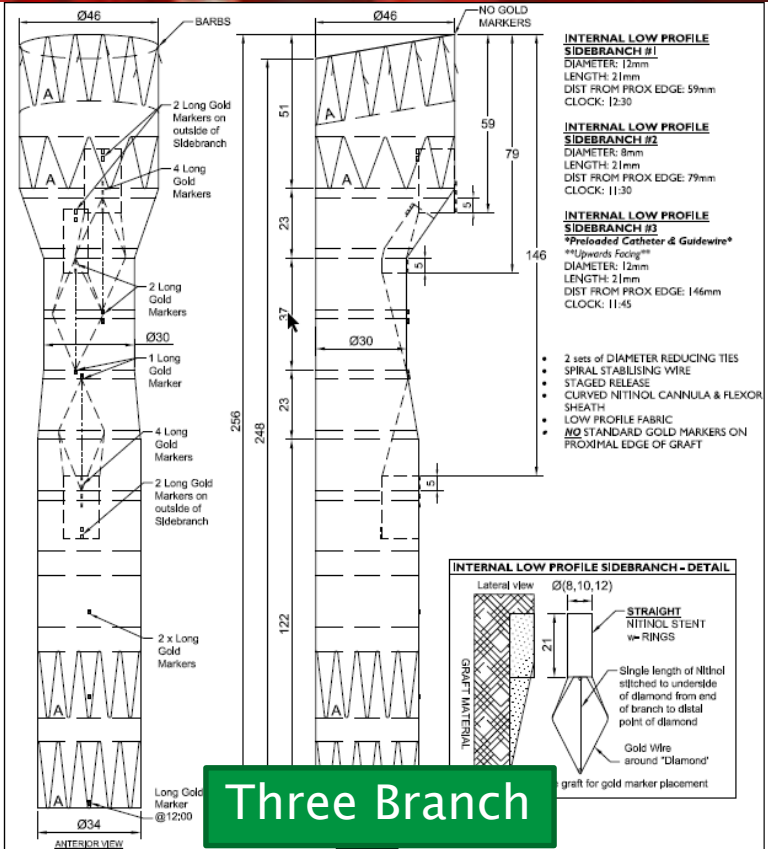
- 43 patients
- In hospital mortality: 9%
- Disabling stroke: **7% (19% non disabling)**
- Early type I endoleak in 4%



COOK Arch Branch Graft (a-Branch)



d branch
Zenith
nts

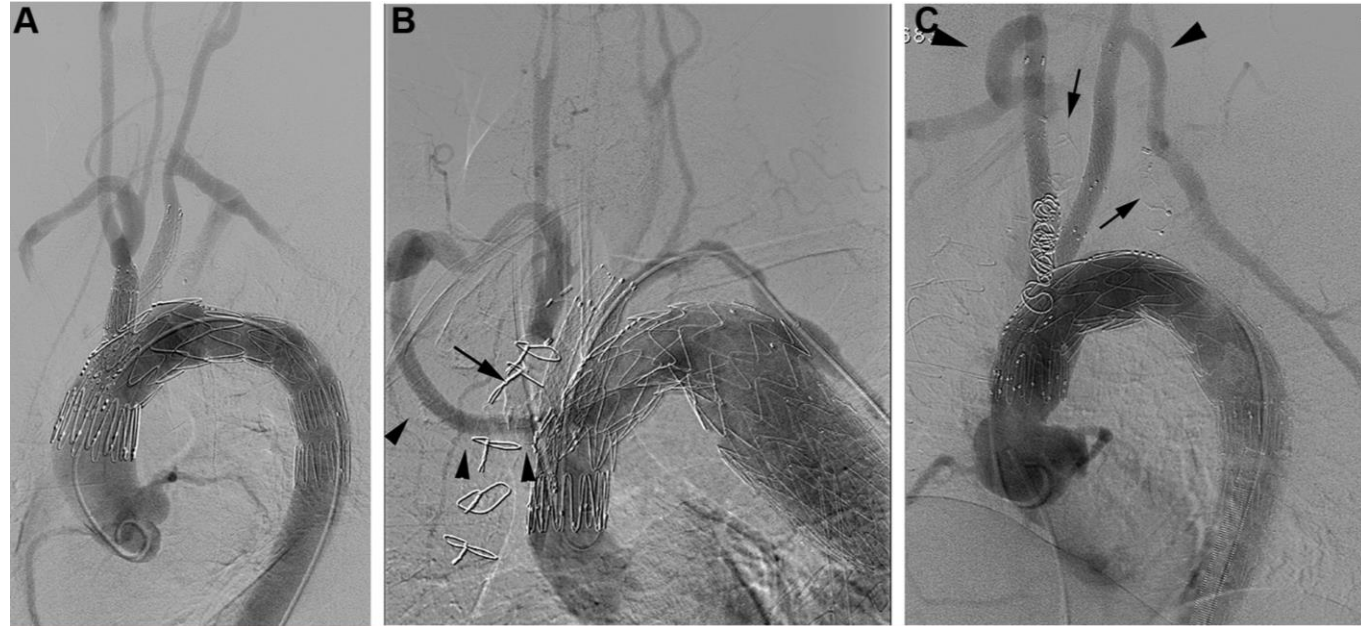


Single-center experience with an inner branched arch endograft

Nikolaos Tsilimparis, MD, PhD,^a Christian Detter, MD, PhD,^b Yuk Law, MD, PhD,^a Fiona Rohlfes, MD,^a Franziska Heidemann, MD, PhD,^a Jens Brickwedel, MD,^a Yskert von Kodolitsch, MD, PhD,^c E. Sebastian Debus, MD, PhD,^a and Tito Kölbel, MD, PhD,^a Hamburg, Germany

2012–2017:

- N = 54
- Urgent 20%
- 30d-Mortality: 3 (5.5%)
- Major Stroke: 3 (5.5%)



Endovascular Treatment of Post Type A Chronic Aortic Arch Dissection With a Branched Endograft

Early Results From a Retrospective International Multicenter Study

Dorian Verscheure, MD,* Stéphan Haulon, MD, PhD,* Nikolaos Tsilimparis, MD, PhD,†
Timothy Resch, MD, PhD,‡ Anders Wanhainen, MD, PhD,§ Kevin Mani, MD, PhD,§ Nuno Dias, MD, PhD,‡
Jonathan Sobocinski, MD, PhD,¶ Matthew Eagleton, MD,|| Marcelo Ferreira, MD,**
Geert Willem Schurink, MD, PhD,†† Bijan Modarai, MD, PhD,‡‡ Said Abisi, MD,‡‡
Piotr Kasprzak, MD, PhD,§§ Donald Adam, MD,¶¶ Stephen Cheng, MD, PhD,|||
Blandine Maurel, MD, PhD,*** Tomasz Jakimowicz, MD,††† Amelia Claire Watkins, MD,‡‡‡
Björn Sonesson, MD, PhD,‡ Martin Claridge, MD,¶¶ Dominique Fabre, MD, PhD,* and Tilo Kölbel, MD, PhD†

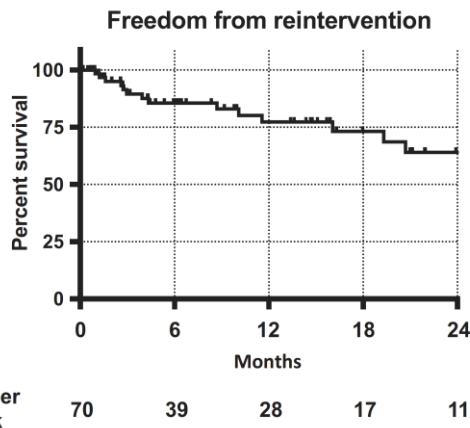
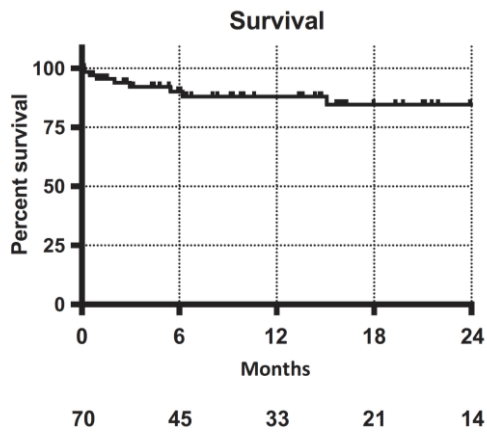
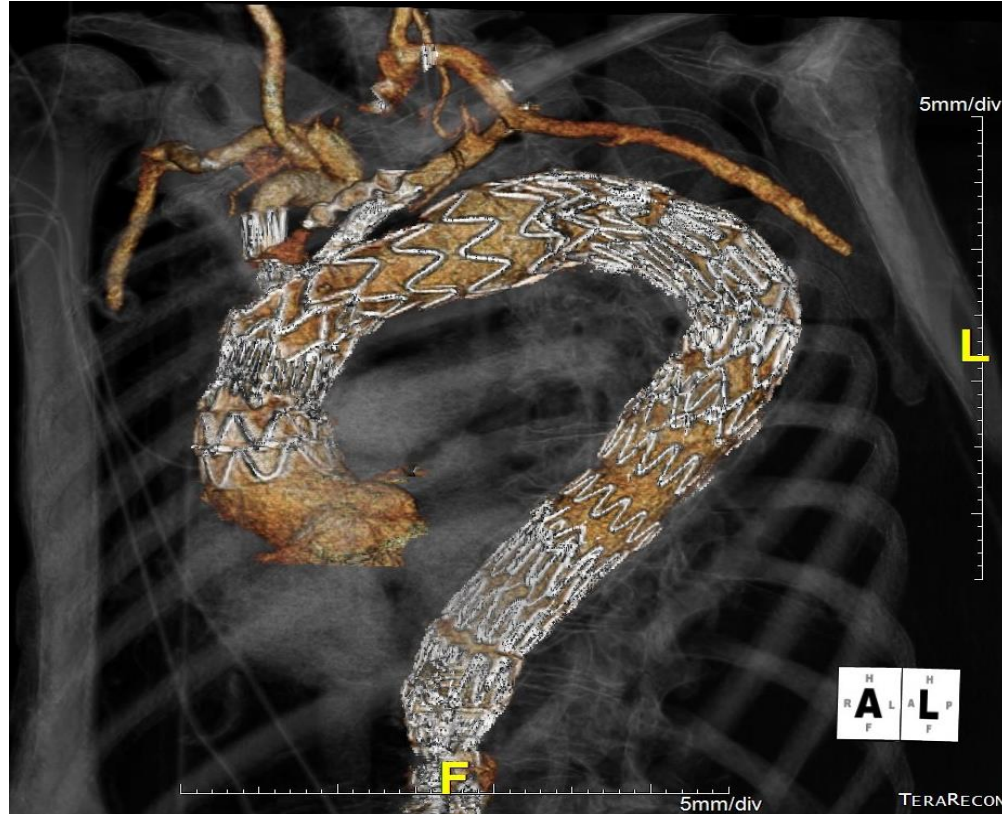


TABLE 4. Postoperative Outcomes (median [interquartile range] or n [%])

Perioperative mortality	2 (2.9%)
Permanent stroke	2 (2.9%)
Spinal cord ischemia	0
Cardiac events	3 (4.3%)
Dialysis	2 (2.9%)
Early reintervention	12 (17.1%)
Endoleak	2
Pericardial drainage	2
Vascular access	8
Late reintervention	20 (28.6%)
Distal disease	10
Endoleak	9
Coarctation	1
Side branch occlusion	0
Length of stay, d	9.5 (6–12.8)
Follow-up, d	301 (138–642)
Late mortality	8 (11.4%)
Nonaortic cause	7
Possible aortic cause	1

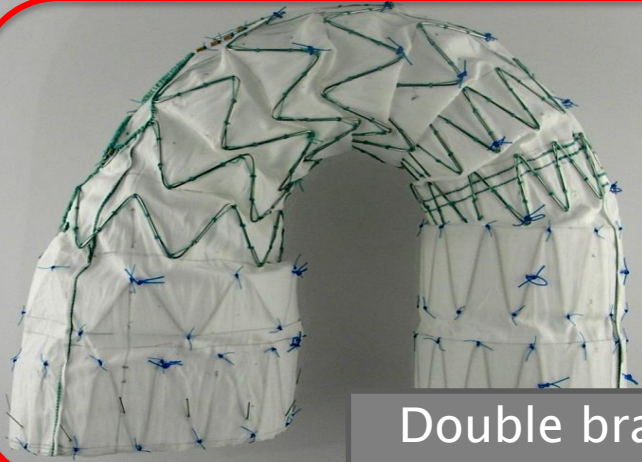
Mortality 3%
Major Stroke: 3%

Double Arch Branch Device



Triple Arch Branch Device





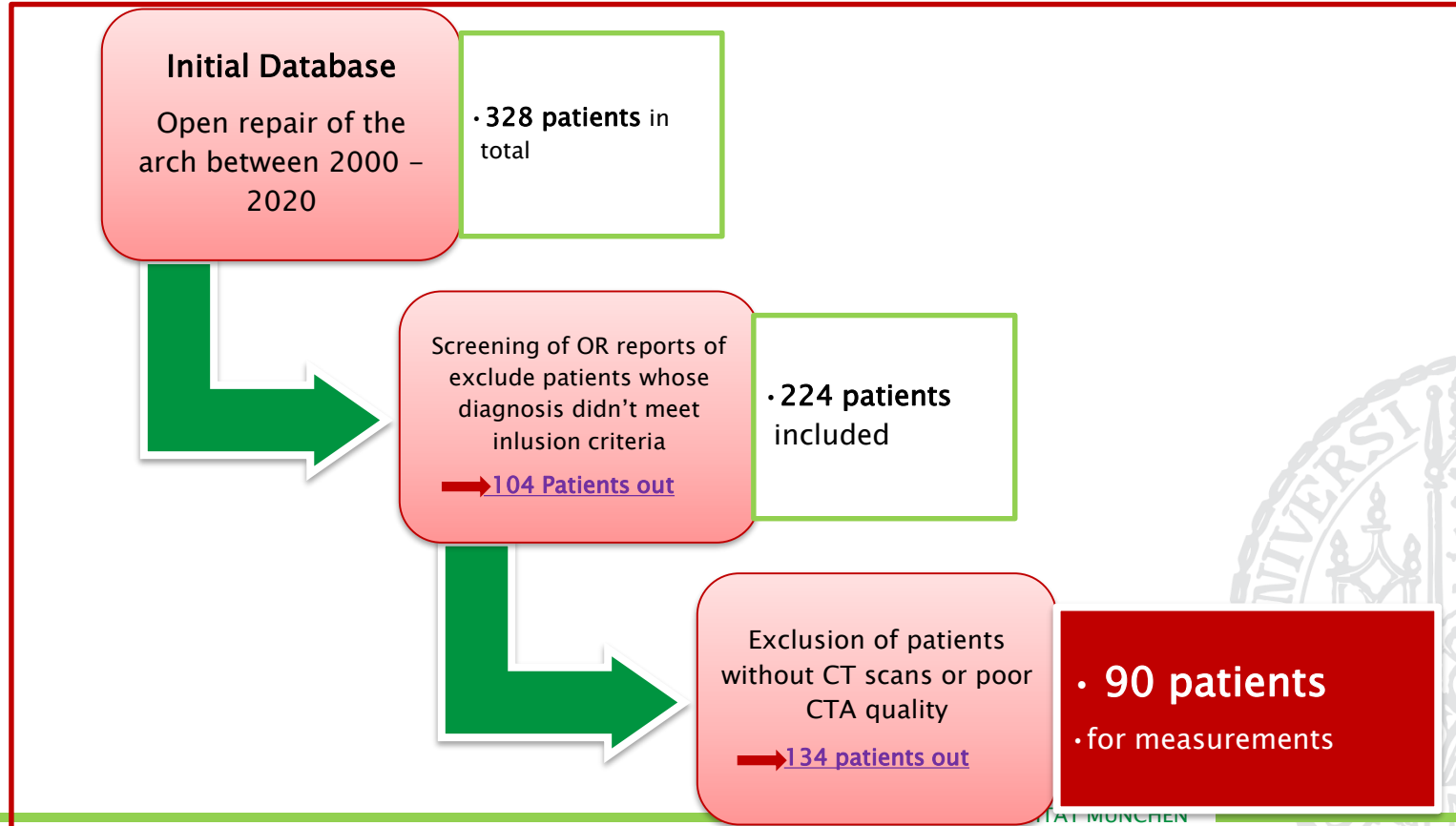
Double branched



Triple branched

How About Suitability?

How many patients currently being submitted to OSR would be suitable with these grafts?



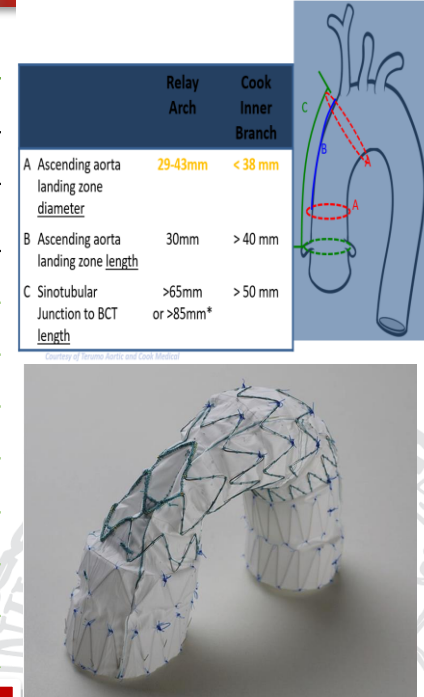
Anatomical suitability for the Cook Triple or double branched device in Zone 0

Anatomical suitability for Cook's Zenith Inner branch arch endograft (IBAE)

Criterion	N° of patients (%)	
	Cook 2-IBAE	Cook 3-IBAE
→ PLZ Diameter 24-38mm	45 (50%)	45 (50%)
→ PLZ Length \geq 40mm	43 (48%)	43 (48%)
STJ-BCT outer curve \geq 50mm	90 (100%)	90 (100%)
BCT diameter \leq 20 mm	81 (90%)	81 (90%)
BCT length \geq 20mm	88 (98%)	88 (98%)
LSA diameter \leq 20	-	83 (82%)
LSA sealing length $>$ 20	-	82 (91%)
→ All criteria	32 (36%)	28 (31%)

36% Feasibility
Double Arch Branch

31% Feasibility
Triple Arch Branch

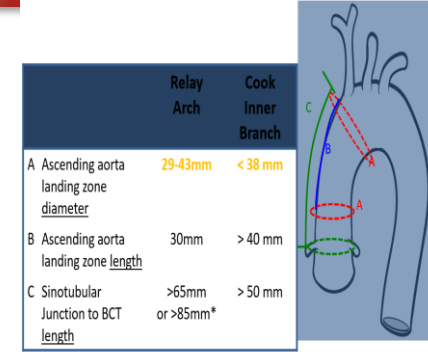


Anatomical suitability for the Bolton double branched device in Zone 0

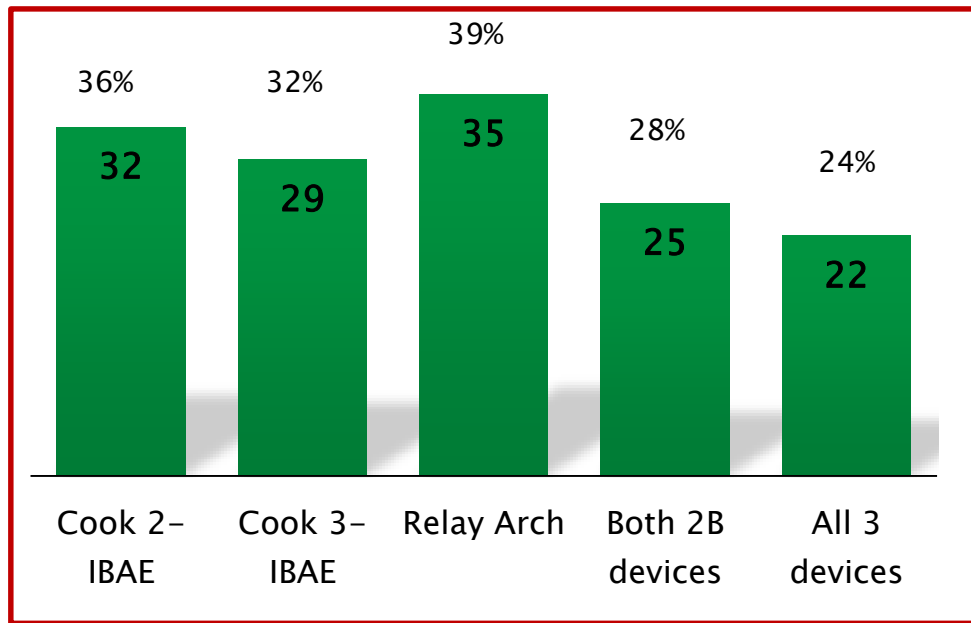
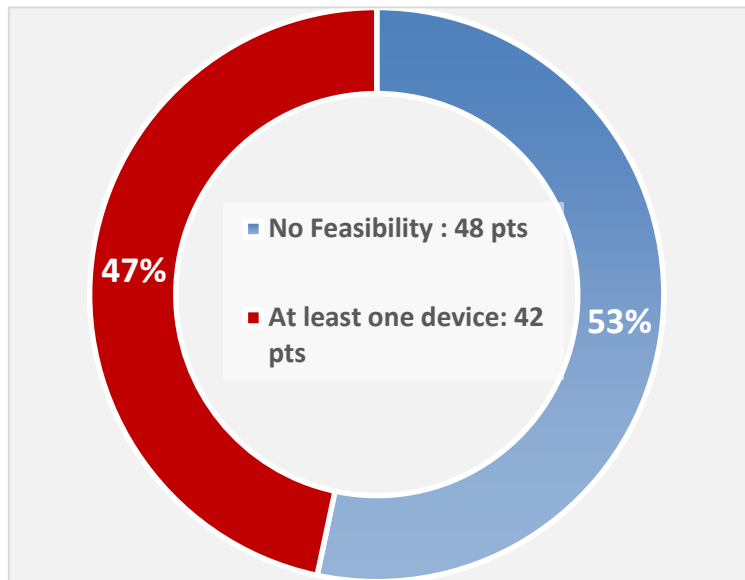
Anatomical suitability for Terumo's RELAY ARCH endograft

Criterion	N° of patients (%)
→ PLZ Diameter 28–43mm	47 (52%)
→ PLZ Length \geq 30mm	52 (58%)
STJ–BCT outer curve \geq 70mm	84 (93%)
Aortic \varnothing at BCT level \geq 28mm	86 (96%)
BCT diameter \leq 20 mm	81 (90%)
BCT length \geq 25mm	81 (90%)
BCT – LCCA < 45	89 (99%)
→ All criteria	35 (39%)

36% Feasibility
RELAY double Arch Branch



Anatomical suitability for a triple or double branched device in



47% feasibility
At least one arch branch device

Off-the-shelf multibranched endograft for total endovascular repair of the aortic arch

Côme Bosse, MD,^a Tilo Kölbel, MD, PhD,^b Justine Mougin, MD,^a Jarin Kratzberg, PhD,^c
Dominique Fabre, MD, PhD,^a and Stéphan Haulon, MD, PhD,^a *Le Plessis-Robinson, France; Hamburg, Germany;*
and Bloomington, Ind

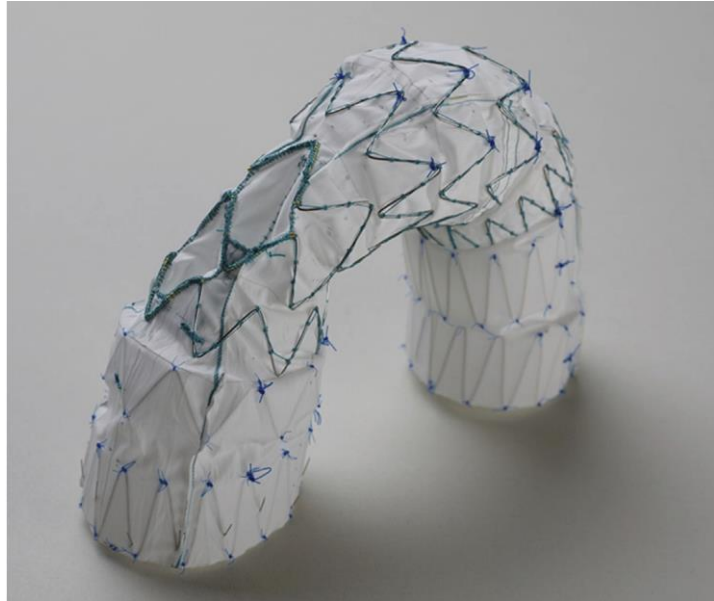
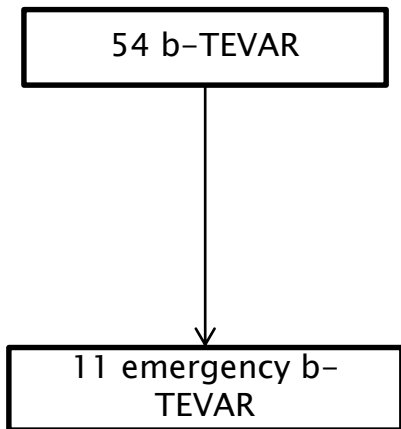


Table IV. Five proposed off-the-shelf configurations

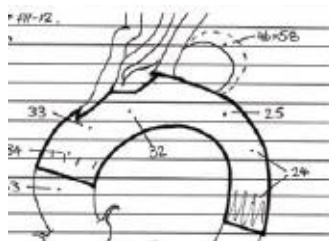
Proximal diameter, mm	Distal diameter, mm	Length, mm	No. of proximal sealing stents
38	30	211	1
42	32	211	1
42	32	211	2
46	36	211	1
46	36	211	2

Emergency Use of Branched Thoracic Endovascular Repair in the Treatment of Aortic Arch Pathologies

Yuk Law, FRCS, Tilo Kölbel, PhD, Christian Detter, MD, Fiona Rohlfs, MD, Yskert von Kodolitsch, MD, Vladimir Makaloski, MD, Eike Sebastian Debus, PhD, Nikolaos Tsilimparis, MD



CMDs from other patients
n=8

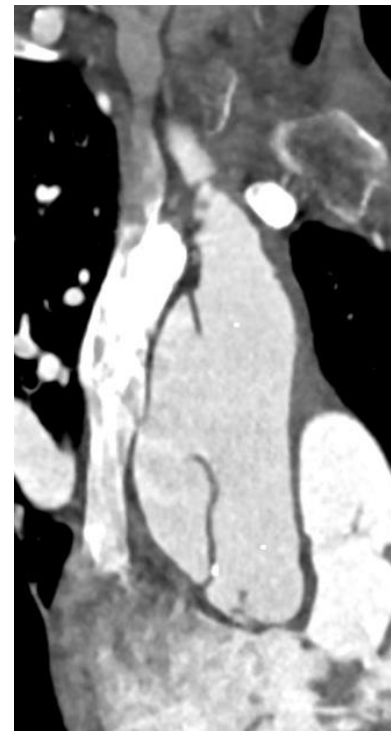
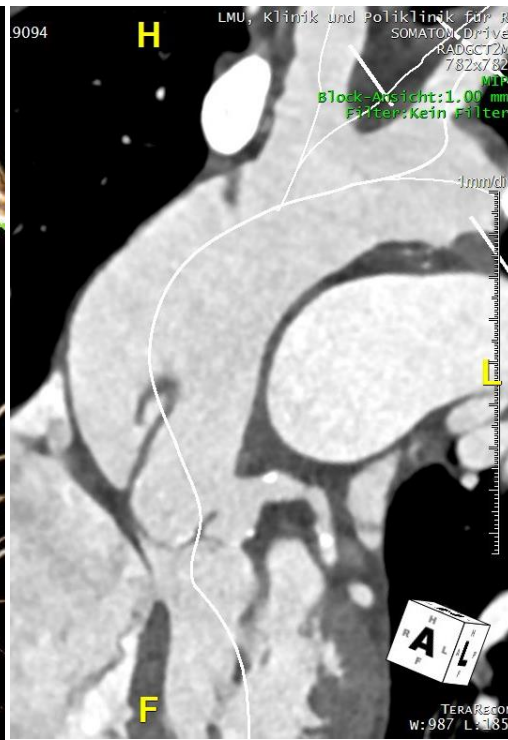
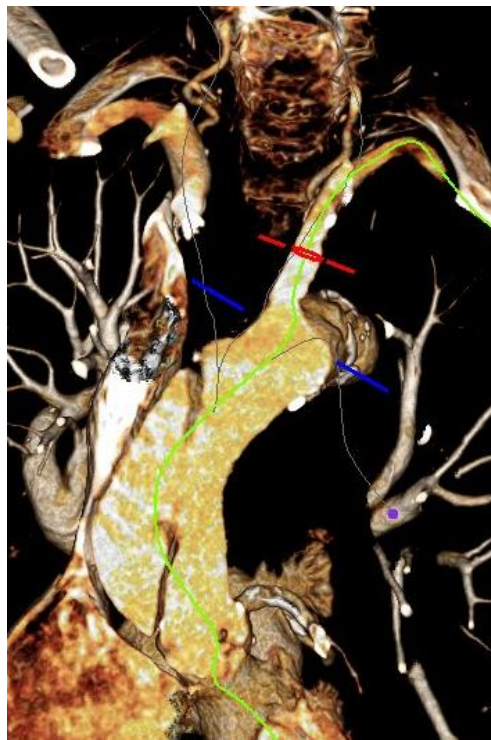


CMDs used earlier n=3

Table 2. Operative and Early Postoperative Outcomes

Outcomes	Values
Technical success	11 (100)
Operative time, minutes	351 ± 155 (218–680)
Intraoperative packed cell transfusion, units	0.8 ± 1.4 (0–4)
Volume of contrast used, Vispaque 270, mL	148 ± 59 (75–274)
Fluoroscopy time, minutes	47 ± 18 (24–74)
Dose area product, Gy/cm ²	117 ± 107 (35–333)
Length of ICU stay, days	4 ± 9 (2–30)
Length of hospital stay, days	14 ± 12 (5–45)
Thirty-day mortality	1 (9)
Perioperative complications	
Systemic inflammatory response syndrome	1 (9)
Respiratory failure	2 (18)
Renal injury	1 (9)
Stroke	1 (9)
Pericardial effusion	1 (9)
Pleural bleeding	1 (9)
Retroperitoneal hematoma	1 (9)
Early reintervention	5 (45)

Aortic Case Report during the COVID-19 Pandemic



Triple Arch Branch device from another patient

Device: BRANCH-ARCH-DEVICE
Component: G38371 - THORACIC-ASCENDING-BRANCH

PAGE 2 of 4

INTERNAL LOW PROFILE

SIDEBRANCH #1

DIAMETER: 12mm
LENGTH: 21mm
DIST FROM PROX EDGE: 39mm
CLOCK: 12:30

INTERNAL LOW PROFILE

SIDEBRANCH #2

DIAMETER: 8mm
LENGTH: 21mm
DIST FROM PROX EDGE: 59mm
CLOCK: 11:30

INTERNAL LOW PROFILE

SIDEBRANCH #3

UPWARDS FACING

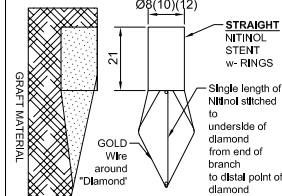
Preloaded Catheter & Guidewire
DIAMETER: 10mm
LENGTH: 21mm
DIST FROM PROX EDGE: 126mm
CLOCK: 12:30

- 2 x sets of DIAMETER REDUCING TIES
- SPIRAL STABILISING WIRE
- STAGED RELEASE
- CURVED NITINOL CANNULA & FLEXOR SHEATH
- LOW PROFILE FABRIC
- **NO** STANDARD GOLD MARKERS ON PROXIMAL EDGE OF GRAFT

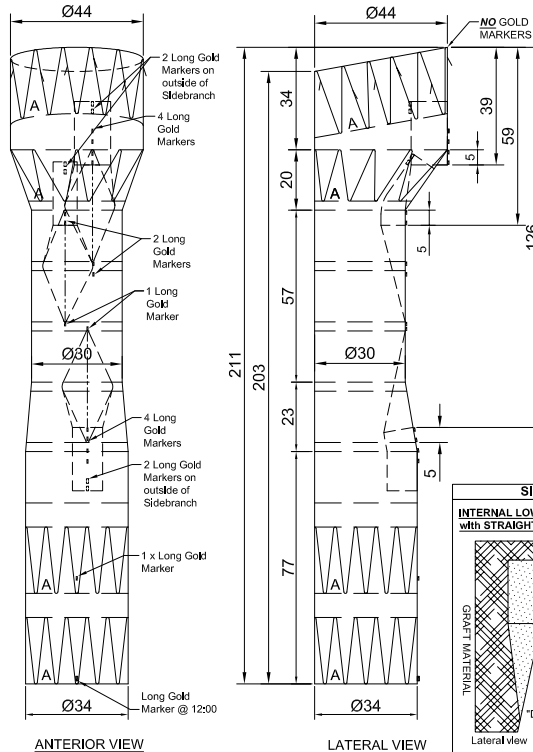
SIDEBRANCH 1, 2 & 3

INTERNAL LOW PROFILE SIDEBRANCH

with STRAIGHT NITINOL WIRE



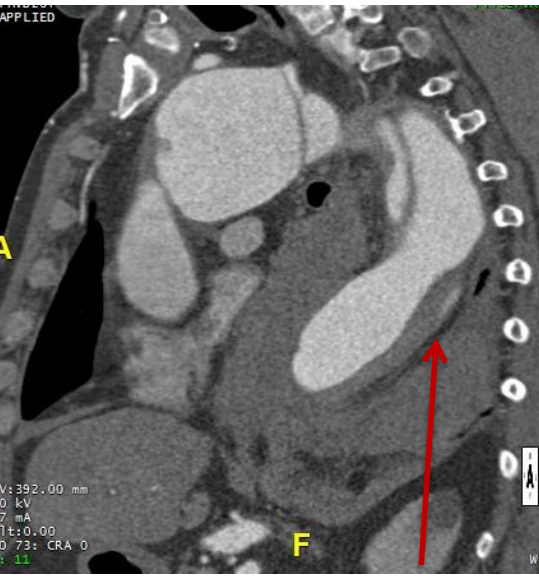
**See graft for gold marker placement



Final Angiogram and CTA

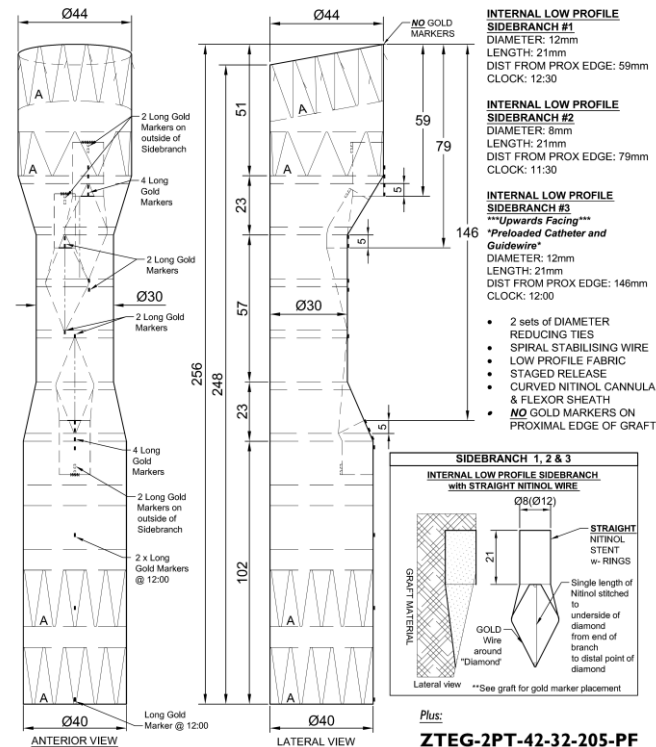


Case presentation

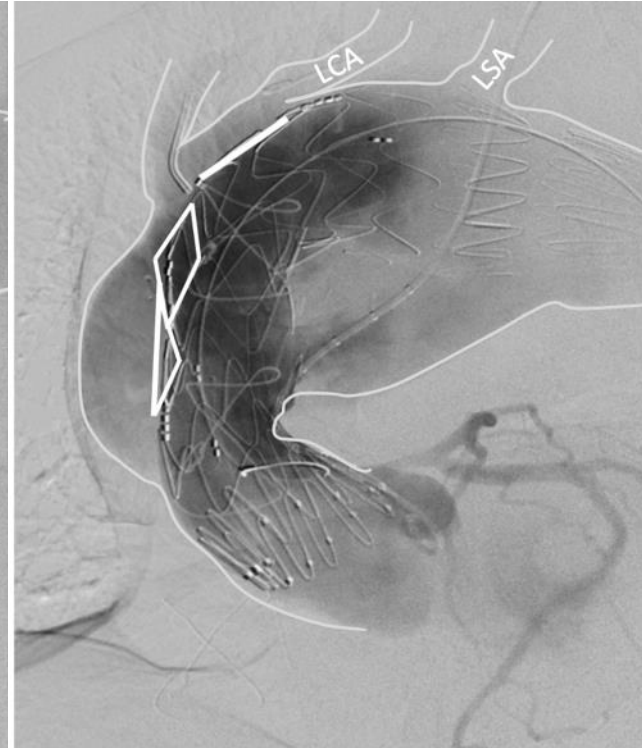
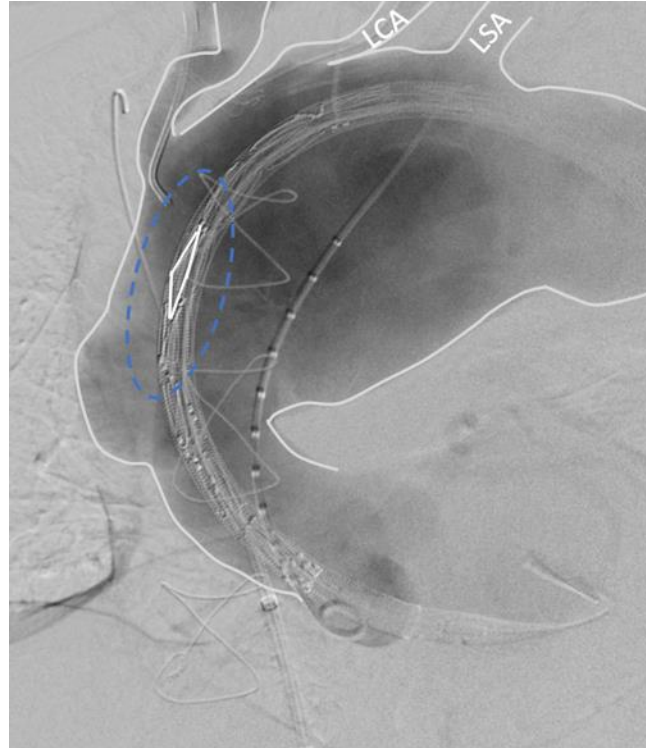


- ❖ Chronic Type A dissection (previously wrapped)
- ❖ Ruptured descending aorta with mediastinal hematoma and hemothorax
- ❖ 7cm aortic arch aneurysm.

Rupture of the descending thoracic aorta, chronic type A dissection and arch aneurysm

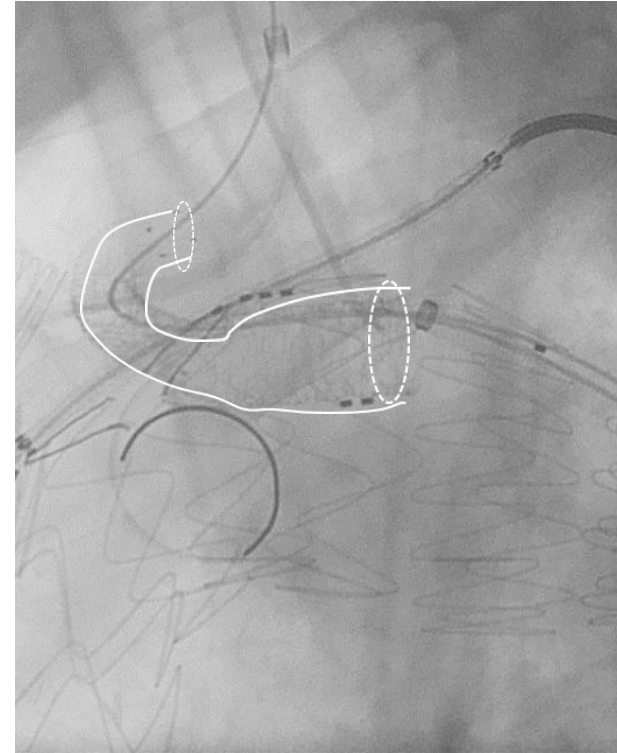
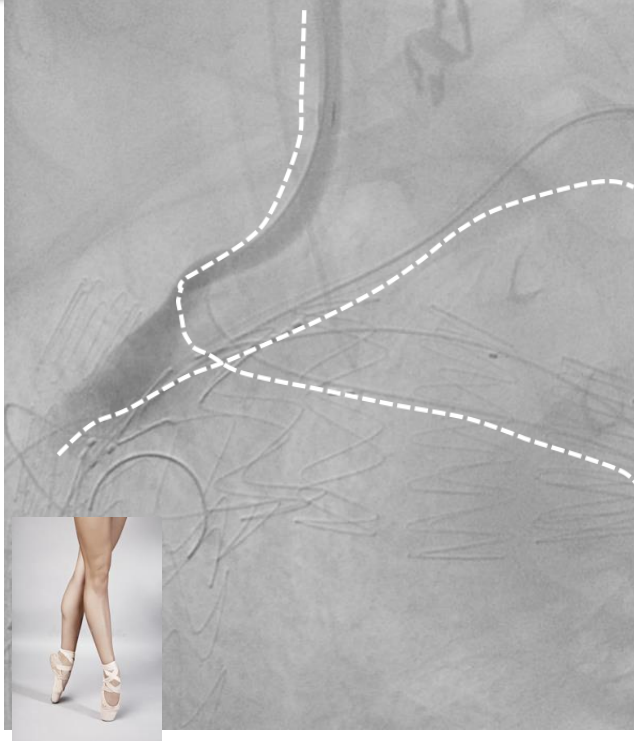


- Deployment of the SG in a healthy proximal landing zone precluded the normal branches retrograde cateterization



Case – Endo post Arch repair

- Inverting the 2 (LCC) and 3 (LSA) branches position
- Similar to a crossing legs ballerina maneuver

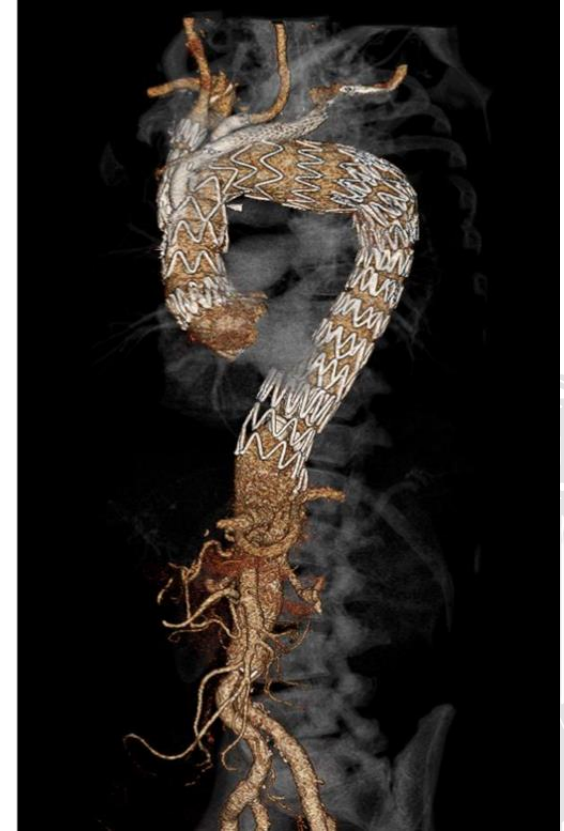


- Deployed a candy-plug device in the distal thoracic false lumen to prevent backflow and filling upwards.



Case – Endo post Arch repair

- Post-procedural and 12 m FU CT scans





Single-Branch Grafts



Pros

- Better for the distal arch
- Higher feasibility than multibranched
- Fewer procedural steps
- Lower endovascular repair operation times

Cons

- Need for surgical debranching which is associated with increased cost, complications and logistics
- Difficult to use in emergency setting for zone 1 or 0
- Altered hemodynamics (extra-anatomic)



Multi-Branch Grafts

Pros

- Better for the proximal arch
- Better hemodynamics (direct flow)
- Less/no need for cervical debranching procedures
- Feasible in emergency settings
- Maintains contralateral cerebral perfusion when stenting and ballooning carotid and innominate bridging stents

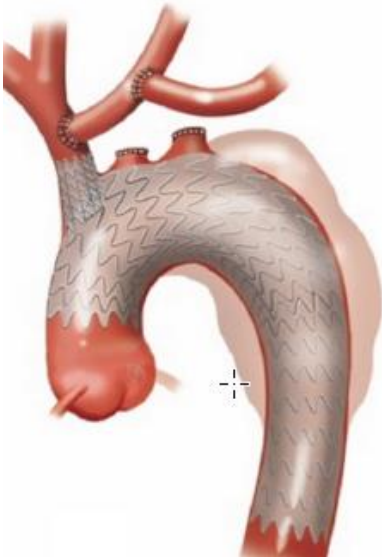
Cons

- Technically more demanding (longer learning curve)
- Less overall feasibility
- Need for multiple access when performing the repair



Evolution of endovascular arch repair

Single
branch



Double
Branch



Triple
Branch





Thank you