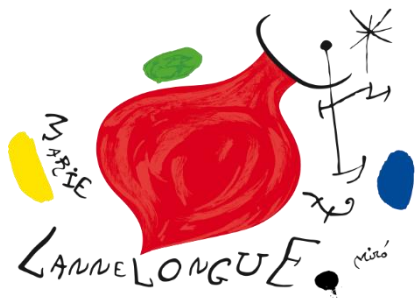


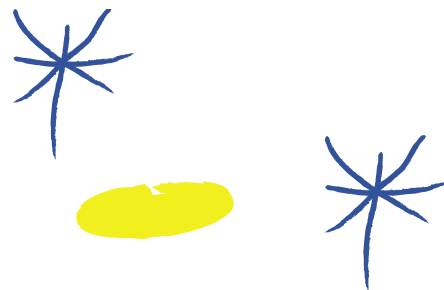
Update On Total Endovascular Arch Repairs Using Cook Multibranched Devices

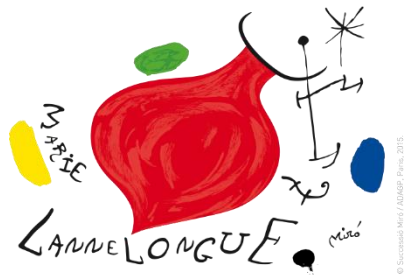
Stéphan Haulon, D. Fabre,
J. Mougin, A. Girault, D. Boulate, D. Mitilian, P. Charbonneau
J Guihaire, R Ramadan, P Deleuze

Centre de l'Aorte, Hôpital Marie Lannelongue,
Université Paris Saclay, France



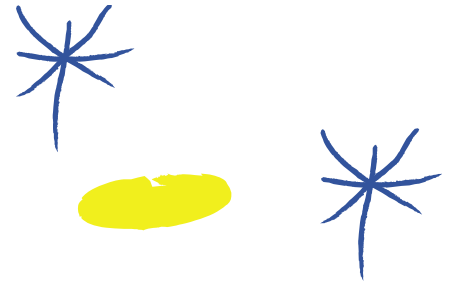
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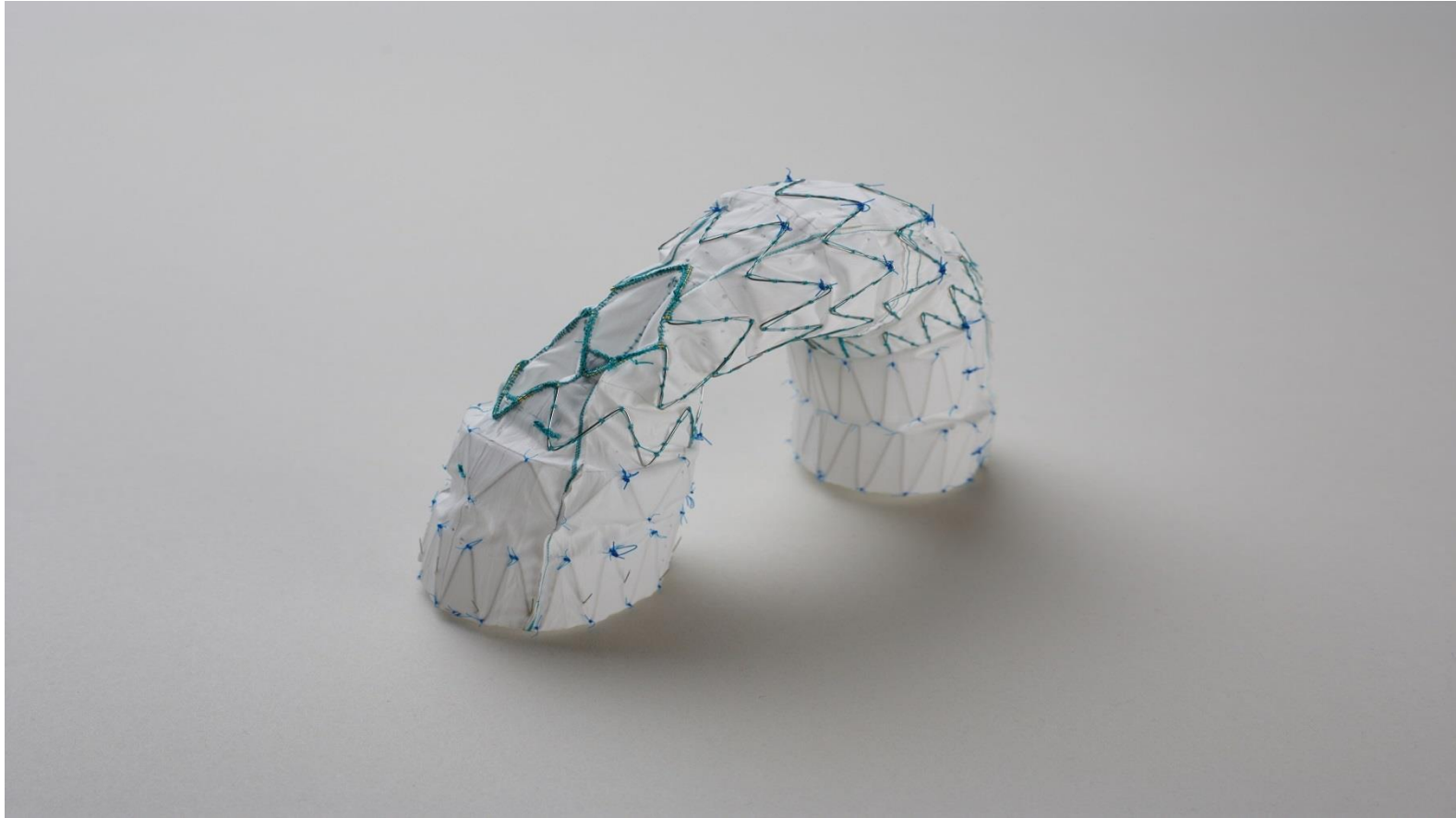


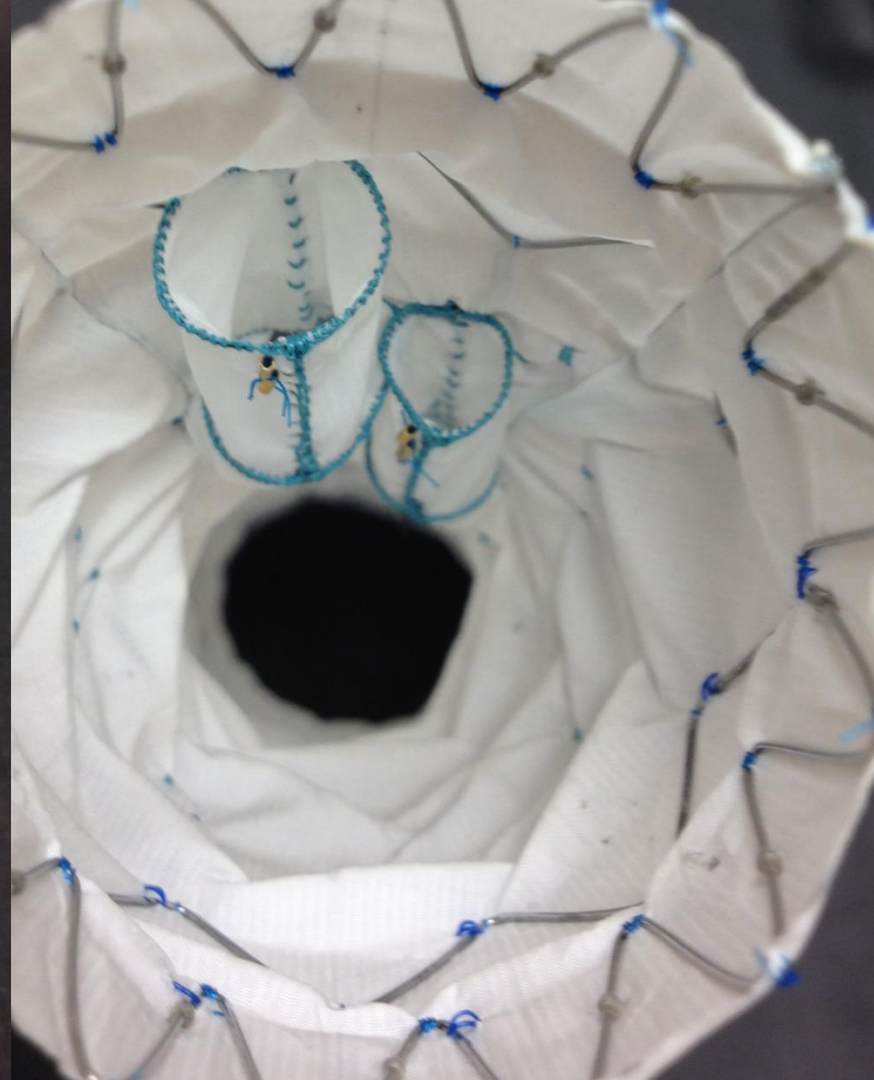
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Disclosures



- Research support, Consulting
 - Cook Medical, GE Healthcare, Bentley







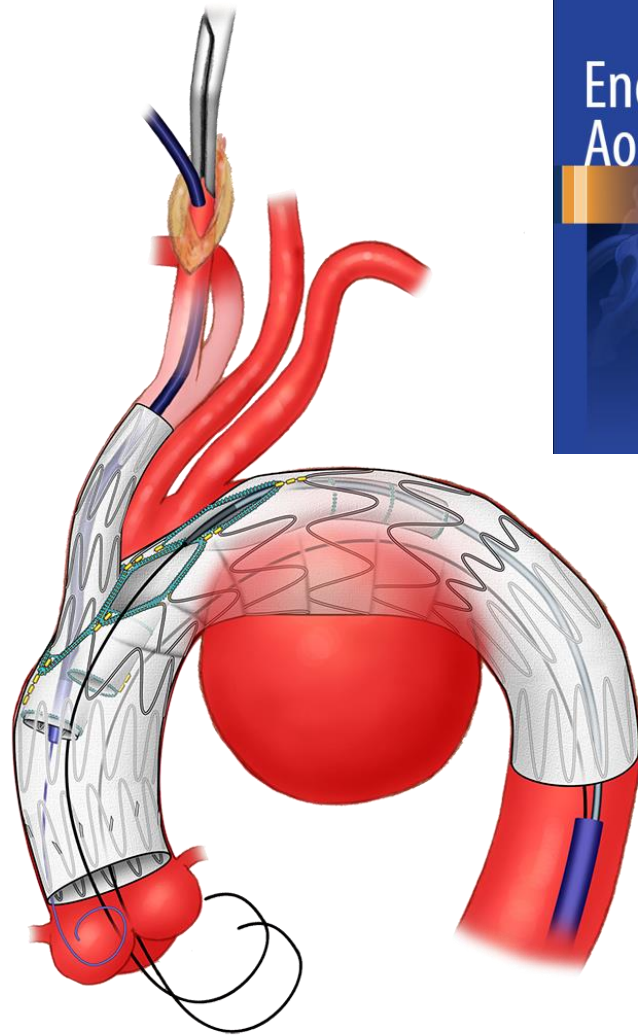
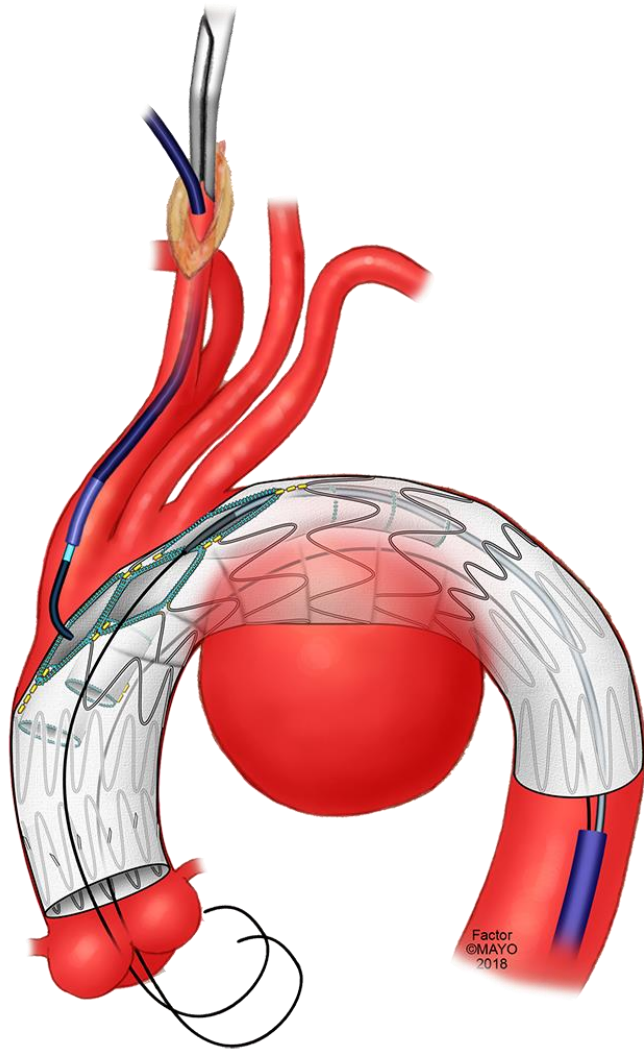
Gustavo S. Oderich
Editor

Endovascular Aortic Repair

Current Techniques with
Fenestrated, Branched
and Parallel Stent-Grafts

Illustrated by David Factor

Springer



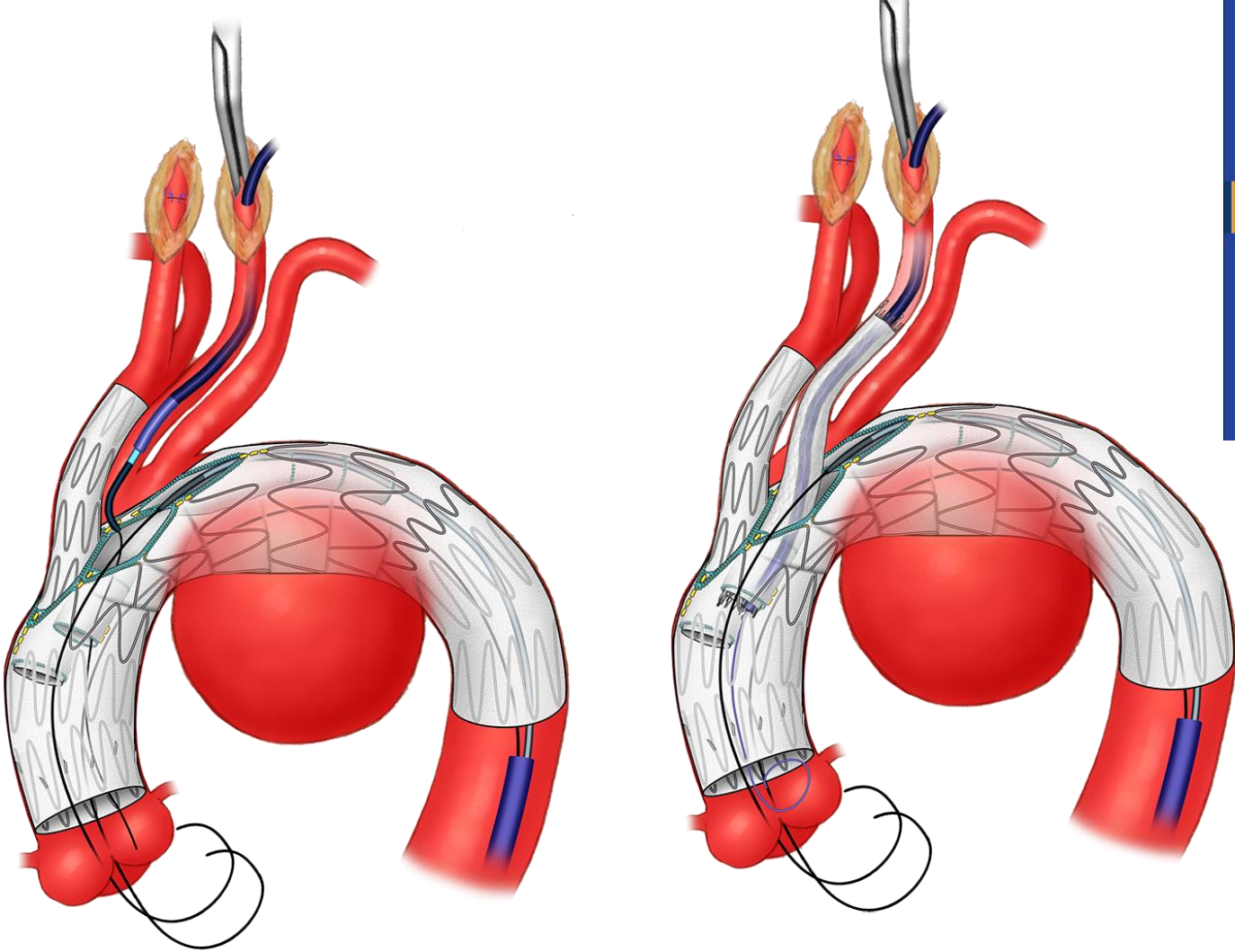
Gustavo S. Oderich
Editor

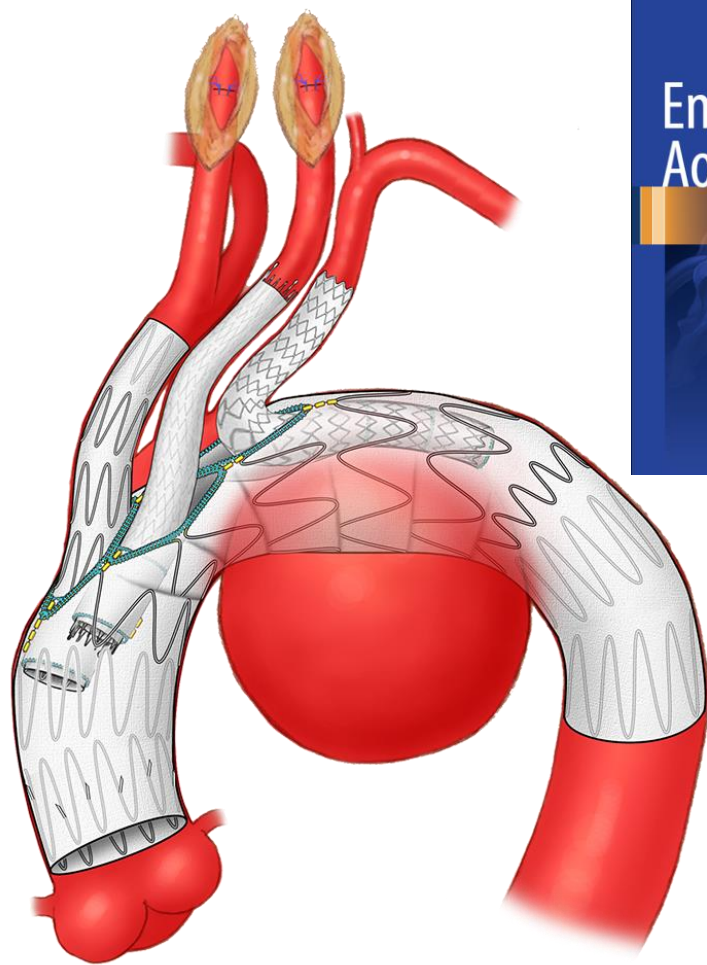
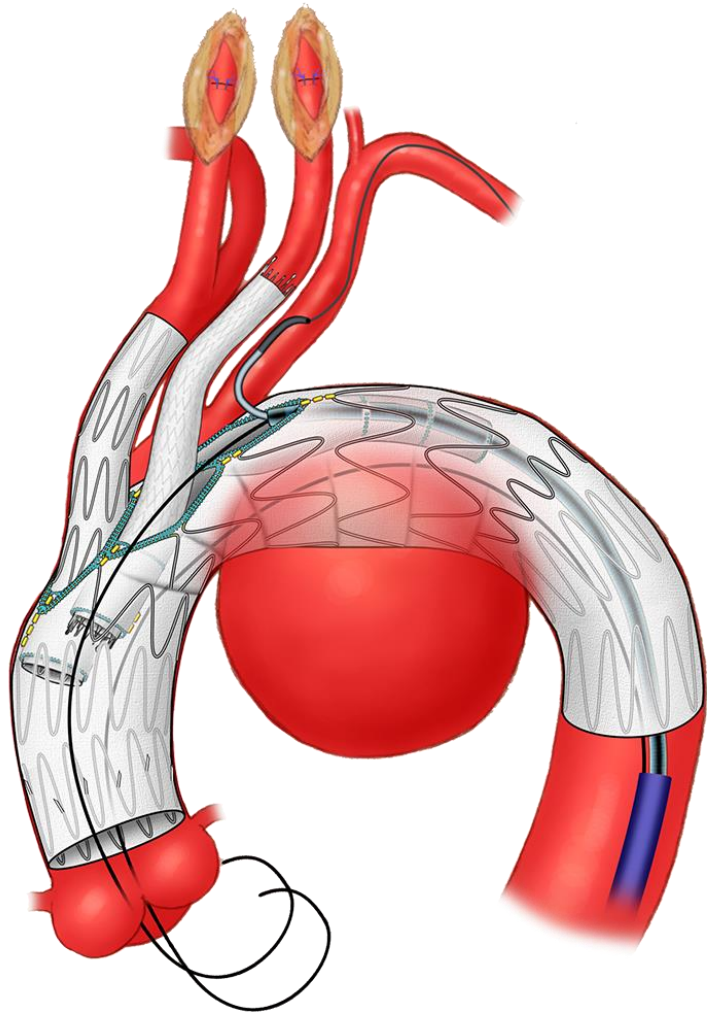
Endovascular Aortic Repair

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Endovascular Aortic Repair

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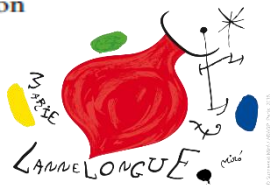
Global experience with an inner branched arch endograft

Stéphan Haulon, MD, PhD,^a Roy K. Greenberg, MD,^b Rafaëlle Spear, MD,^a Matt Eagleton, MD,^b Cherrie Abraham, MD,^c Christos Lioupis, MD,^c Eric Verhoeven, MD, PhD,^d Krassi Ivancev, MD,^c Tilo Kölbel, MD, PhD,^f Brendan Stanley, MD,^g Timothy Resch, MD,^h Pascal Desgranges, MD, PhD,ⁱ Blandine Maurel, MD,^a Blayne Roeder, PhD,^j Timothy Chuter, MD,^k and Tara Mastracci, MD^b

Background: Branched endografts are a new option to treat arch aneurysm in high-risk patients.

Methods and results: We performed a retrospective multicenter analysis of all patients with arch aneurysms treated with a new branched endograft designed with 2 inner branches to perfuse the supra aortic trunks. Thirty-eight patients were included. The median age was 71 years (range, 64-74 years). An American Society of Anesthesiologists score of 3 or 4 was reported in 89.5% (95% confidence interval [CI], 79.7-99.3) of patients. The 30-day mortality rate was 13.2% (95% CI, 2.2-24.2). Technical success was obtained in 32 patients (84.2% [95% CI, 72.4-95.9]). Early secondary procedures were performed in 4 patients (10.5% [95% CI, 0.7-20.3]). Early cerebrovascular complications were diagnosed in 6 patients (15.8% [95% CI, 4.0-27.6]), including 4 transient ischemic attacks, 1 stroke, and 1 subarachnoid hemorrhage. The median follow-up was 12 months (range, 6-12 months). During follow-up, no aneurysm-related death was detected. Secondary procedures during follow-up were performed in 3 patients (9.1% [95% CI, 0.0-19.1]), including 1 conversion to open surgery. We compared the first 10 patients (early experience group) with the subsequent 28 patients. Intraoperative complications and secondary procedures were significantly higher in the early experience group. Although not statistically significant, the early mortality was higher in the early experience group (30% [95% CI, 0.0-60.0]) versus the remainder (7.1% [95% CI, 0.0-16.9]; $P = .066$). Being part of the early experience group and ascending aortic diameter ≥ 38 mm were found to be associated to higher rates of combined early mortality and neurologic complications.

Conclusions: Our preliminary study confirms the feasibility and safety of the endovascular repair of arch aneurysms in selected patients who may not have other conventional options. Clinical trial registration information: Thoracic IDE NCT00583817, FDA IDE# 000101. (J Thorac Cardiovasc Surg 2014; ■:1-8)



Editor's Choice — Subsequent Results for Arch Aneurysm Repair with Inner Branched Endografts, ☆

R. Spear ^a, S. Haulon ^{a,*}, T. Ohki ^b, N. Tsilimparis ^c, Y. Kanaoka ^b, C.P.E. Milne ^a, S. Debus ^c, R. Takizawa ^b, T. Kölbel ^c

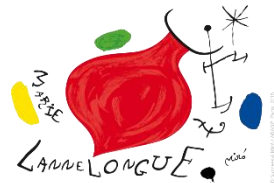
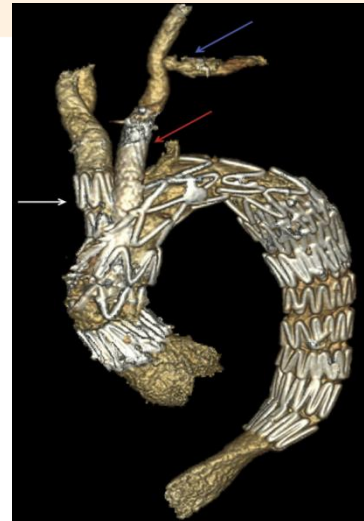
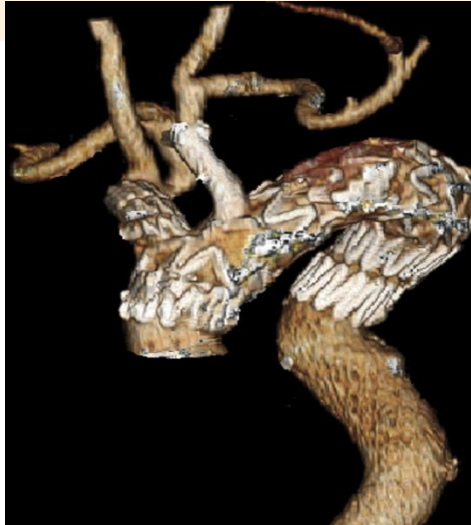
^a Aortic Centre, CHRU Lille, France

^b Vascular Surgery, Jikei University, Tokyo, Japan


^c German Aortic Center, University Heart Center Hamburg, Germany

WHAT THIS STUDY ADDS

This study reports early outcomes following endovascular repair of arch aneurysms in patients unfit for open surgery and is the first evaluation of arch aneurysm endovascular repair performed after the initial learning curve.



Case series of aortic arch disease treated with branched stent-grafts

R. E. Clough¹ , R. Spear¹, K. Van Calster¹, A. Hertault¹, R. Azzaoui¹, J. Sobocinski¹, D. Fabre² and S. Haulon^{1,2}

¹Aortic Centre, Hôpital Cardiologique, Centre Hospitalier Régional Universitaire (CHRU) de Lille, Lille Cedex, and ²Department of Aortic and Vascular Surgery, Hôpital Marie Lannelongue, Le Plessis-Robinson, France

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Background: Surgical repair of aortic arch pathology is complex and associated with significant morbidity and mortality. Alternative approaches have been developed to reduce these risks, including the use of thoracic stent-grafts with fenestrations or in combination with bypass procedures to maintain supra-aortic trunk blood flow. Branched stent-grafts are a novel approach to treat aortic arch pathology.

Methods: Consecutive patients with aortic arch disease presenting to a single university hospital vascular centre were considered for branched stent-graft repair (October 2010 to January 2017). Patients were assessed in a multidisciplinary setting including a cardiologist, cardiac surgeon and vascular surgeon. All patients were considered prohibitively high risk for standard open surgical repair. The study used reporting standards for endovascular aortic repair and PROCESS (Preferred Reporting of Case Series in Surgery) guidelines.

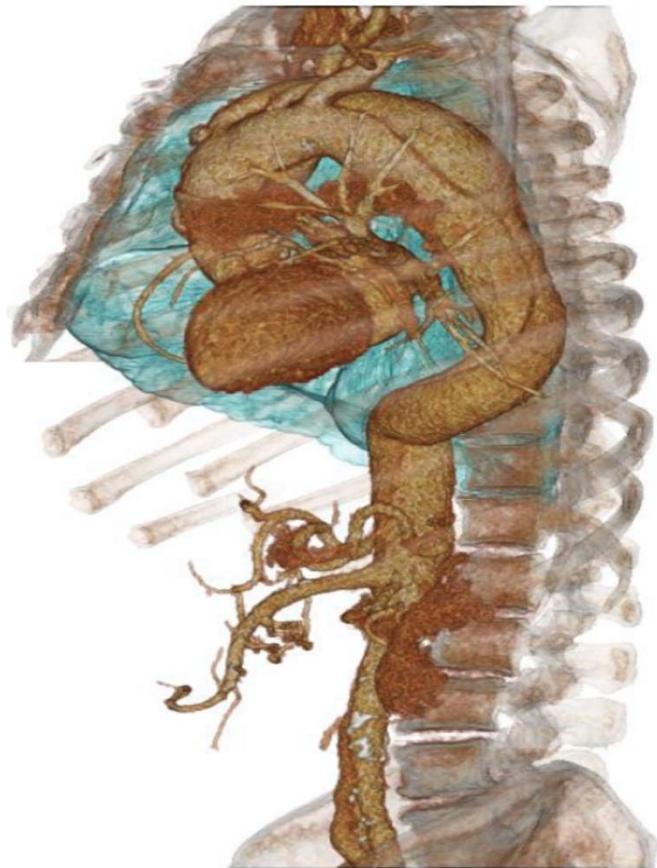
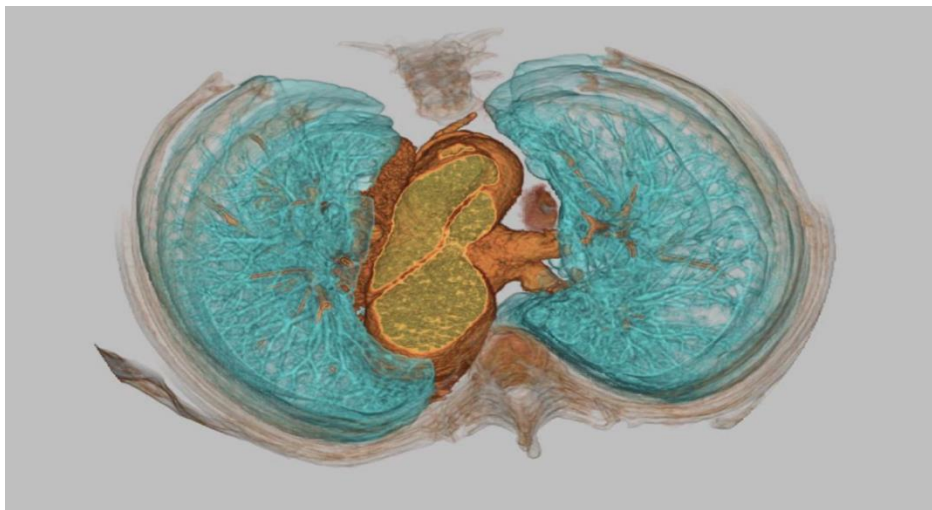
Results: Some 30 patients (25 men) underwent attempted branch stent-graft repair. Mean age was 68 (range 37–84) years. Eighteen patients had chronic aortic dissection, 11 patients had an aneurysm and one had a penetrating ulcer. Fourteen patients had disease in aortic arch zone 0, six in zone 1 and ten in zone 2. Twenty-five patients had undergone previous aortic surgery and 24 required surgical revascularization of the left subclavian artery. Technical success was achieved in 27 of 30 patients. Four patients had an endoleak (type Ia, 1; type II, 3). The in-hospital mortality rate was three of 30. Mean length of follow-up was 12.0 (range 1.0–67.8) months, during which time 12 patients required an aortic-related reintervention.

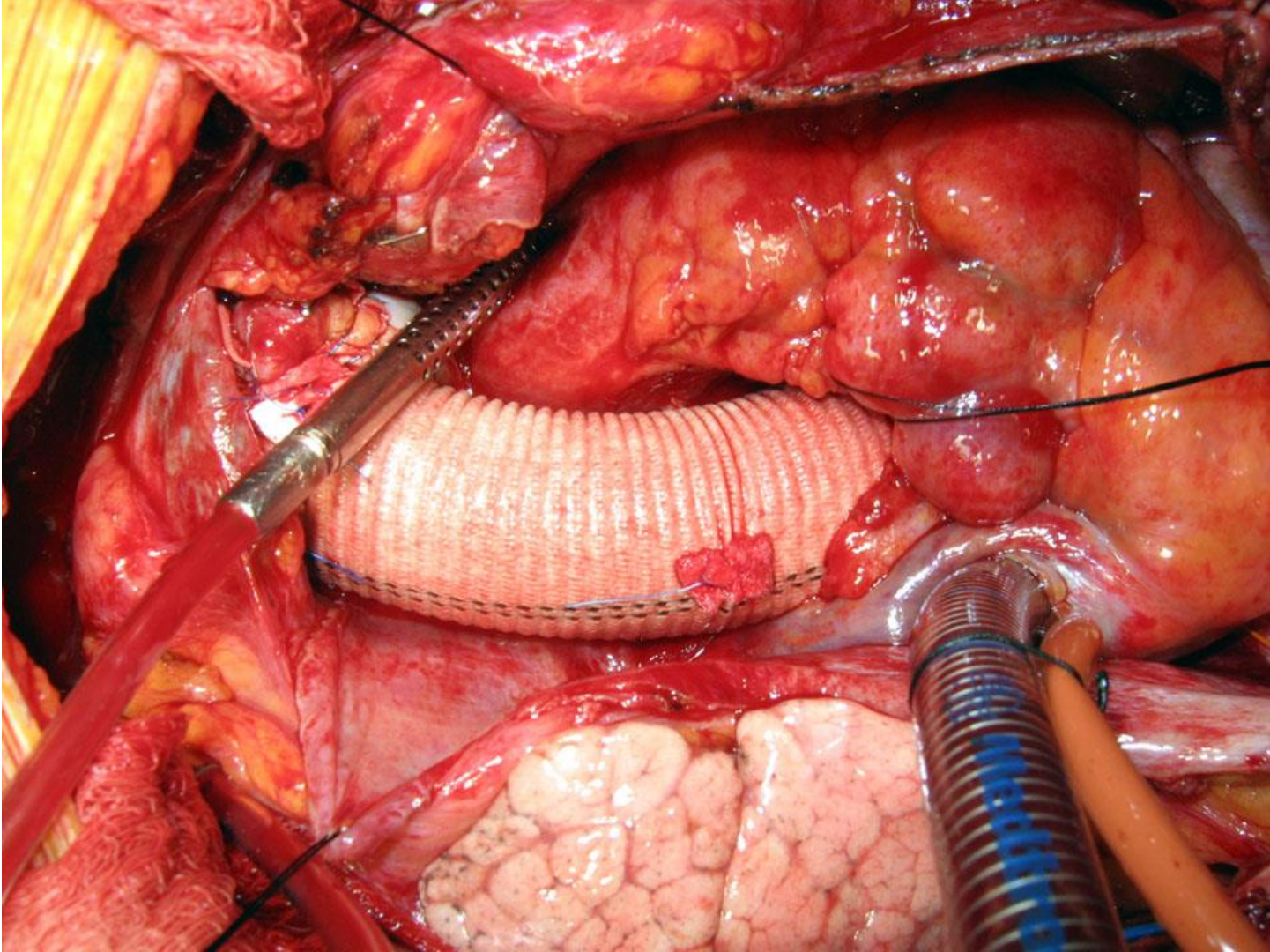
Conclusion: Repair of aortic arch pathology using branched stent-grafting appears feasible. Before widespread adoption of this technology, further studies are required to standardize the technique and identify which patients are most likely to benefit.

Paper accepted 20 July 2017

Published online in Wiley Online Library (www.bjvs.co.uk). DOI: 10.1002/bjvs.10681

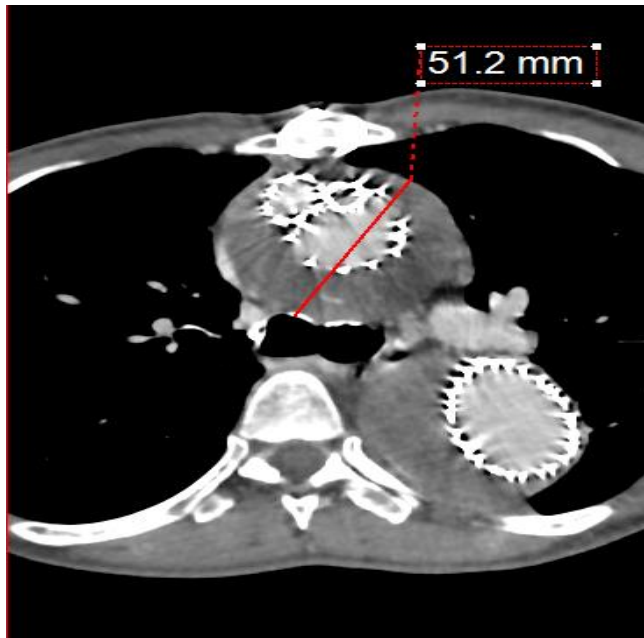








Pre-operative CT



2-year control



Inner Branched Arch Endografts following Ascending Open Repair

- 70 patients
- 100% prior acute Type A Open Repair
- In-hospital combined mortality and stroke rate was 4% (n=3)
 - one minor stroke, one major stroke causing death, and one death following multi-organ failure.
- Technical success rate was 97%



ORIGINAL ARTICLE

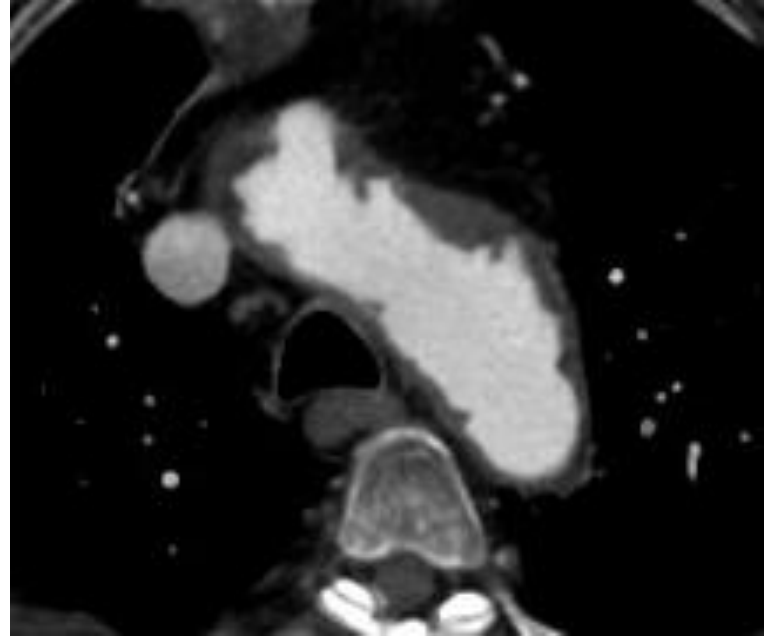
Endovascular Treatment of Post Type A Chronic Aortic Arch Dissection With a Branched Endograft

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,*** Thomasz *Jakimowicz*, MD,††† Amelia Claire *Watkins*, MD,‡‡‡
Björn *Sonesson*, MD, PhD,‡ Martin *Claridge*, MD,¶¶ Dominique *Fabre*, MD, PhD,* and Tilo *Kölbels*, MD, PhD†

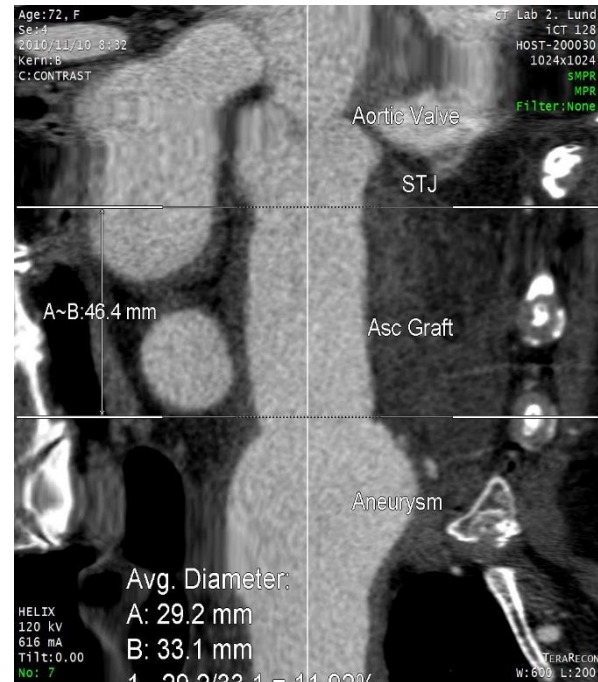


Reduce Stroke Risk



PROXIMAL SEAL - No Compromise!

- Prox neck length > 25mm
- Asc Aorta diam < 38mm



Previous Ascending Repair

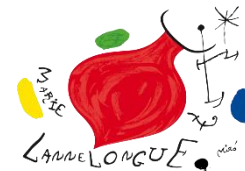


Table 2. Ascending Aorta (Proximal Landing Zone) Variables

Variables	No.	Mean	SD	Range
Measurements				
Maximum diameter of graft in AA, mm	73	33.4	3.2	26–42
Length from coronary sinus to				
Distal anastomosis, mm	73	42.1	20.4	2–85
IA, mm	73	52.3	19.7	9–99
		Median	Q1, Q3	Range
Length from distal anastomosis to IA, mm	73	7	0, 17	0–54

Landing zone characteristics	Yes No. (%)	No No. (%)
Suitable proximal landing zone?	52/73 (71.2)	21/73 (28.8)
Reasons for unsuitability		
AA graft too short (<40 mm)	15/21 (71.4)	
Major kink (≥ 90 degrees) in AA graft	5/21 (23.8)	
AA graft diameter too large (>38 mm)	1/21 (4.8)	

AA = ascending aorta; IA = innominate artery; Q1 = quartile 1 (25th percentile); Q3 = quartile 3 (75th percentile); SD = standard deviation.

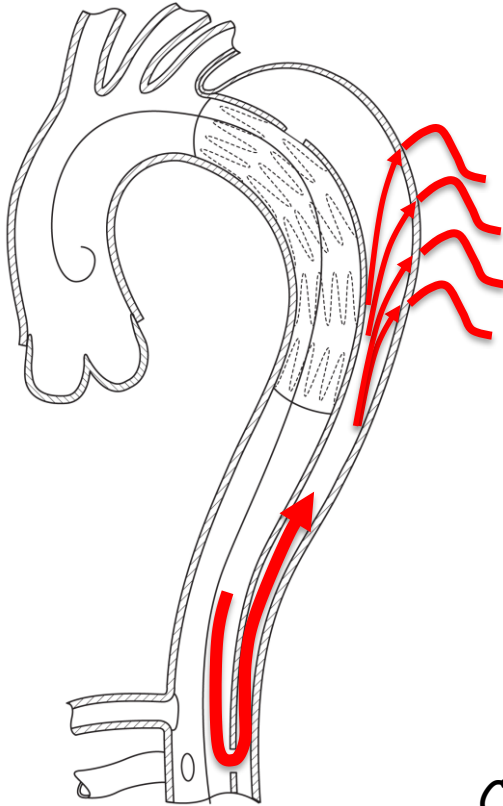


Inner Branched Arch Endografts following Ascending Open Repair

- 70 patients, prior acute Type A Open Repair
- Median follow up: 301 (IR, 138 - 642) days
- 20 (29%) patients underwent secondary interventions:
 - 9 for endoleak correction
 - 10 distal extensions to the thoracic or thoracoabdominal aorta



Distal Seal in Chronic Dissections?

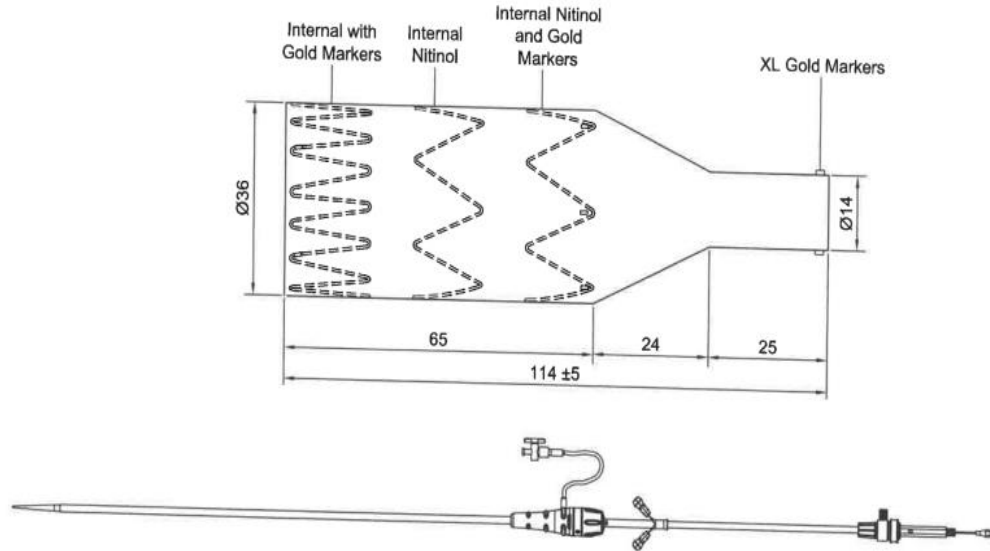


- Perfusion and pressure unchanged in false lumen
- Presence of Intercostals originating from false lumen
- False lumen back flow to Intercostals

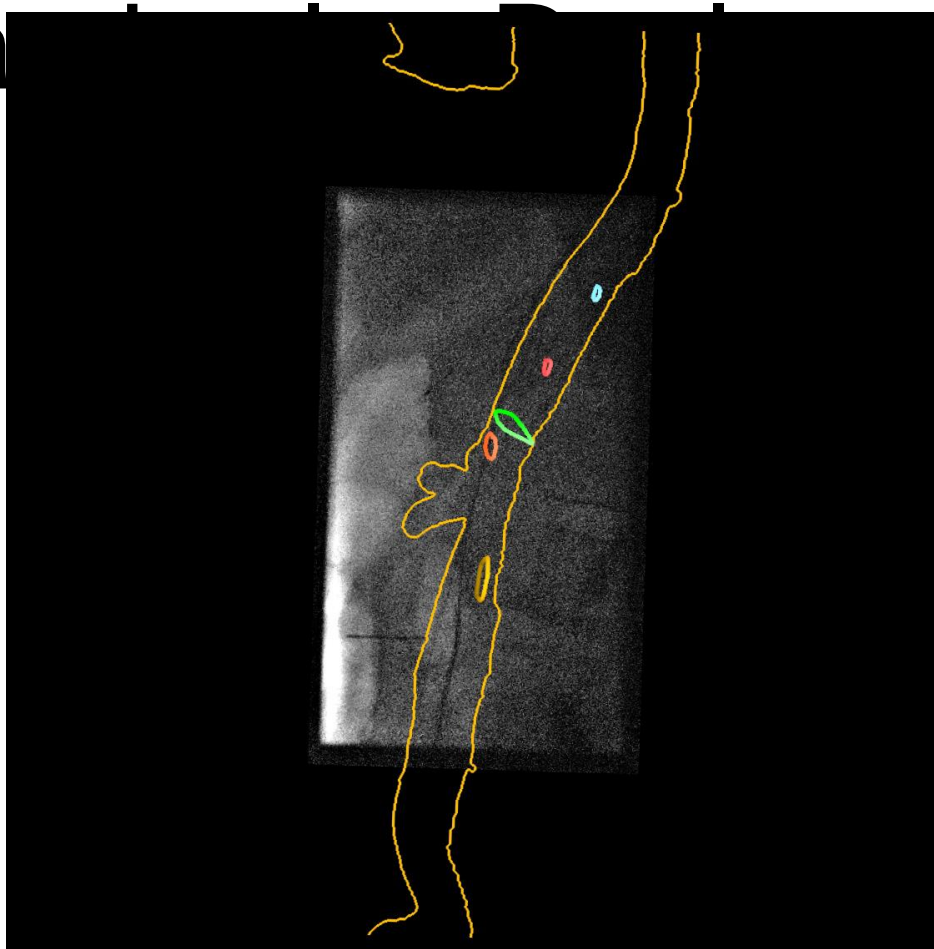
Courtesy Tilo Kölbel



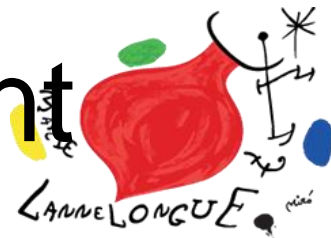
False Lumen Occlusion

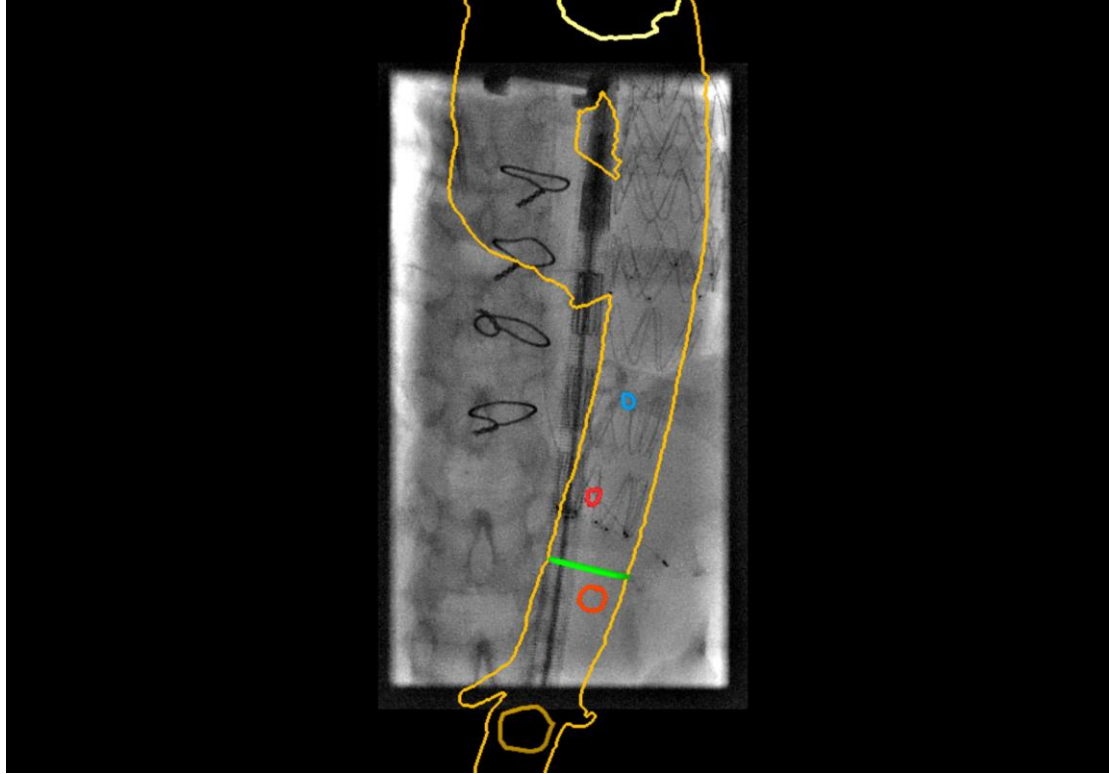


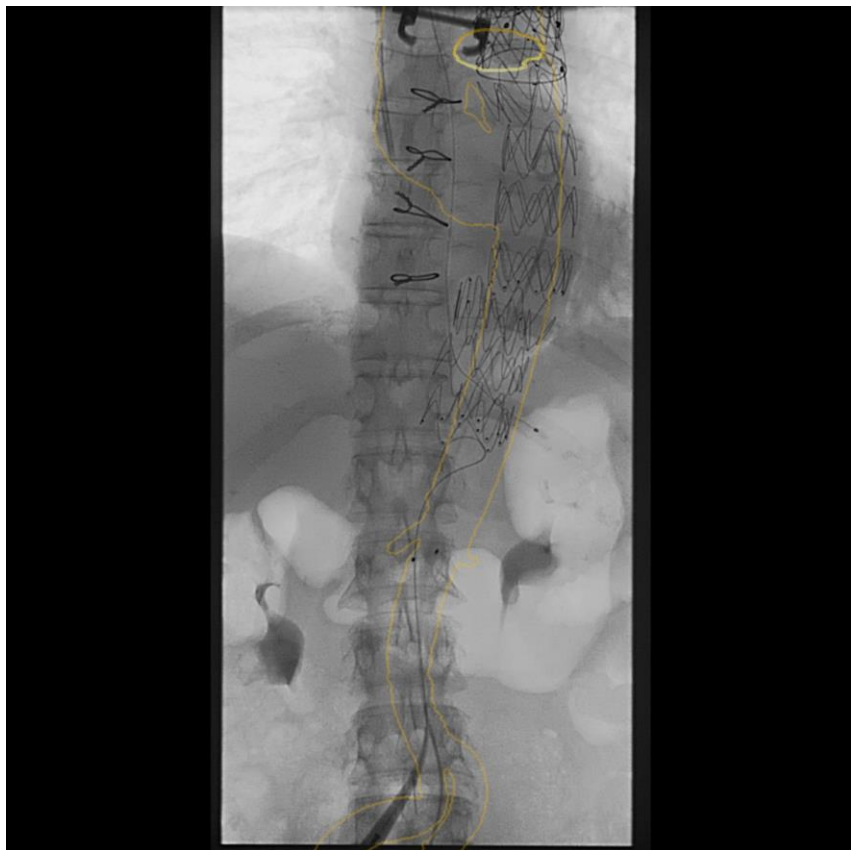
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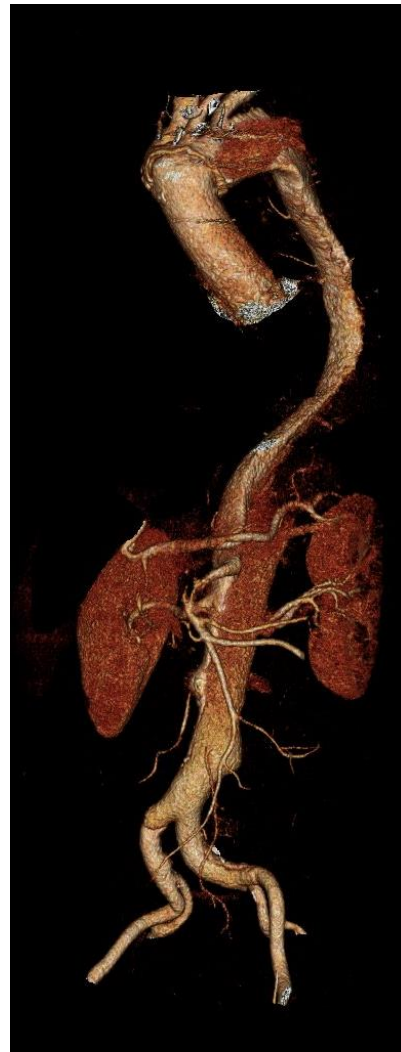
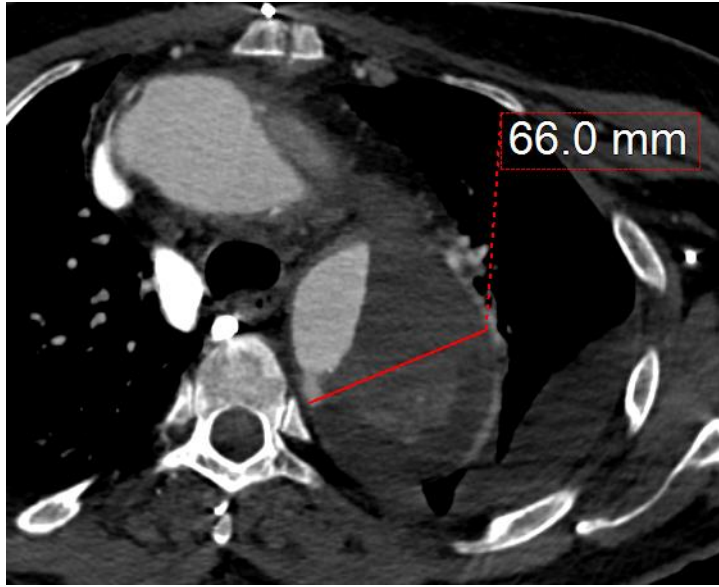






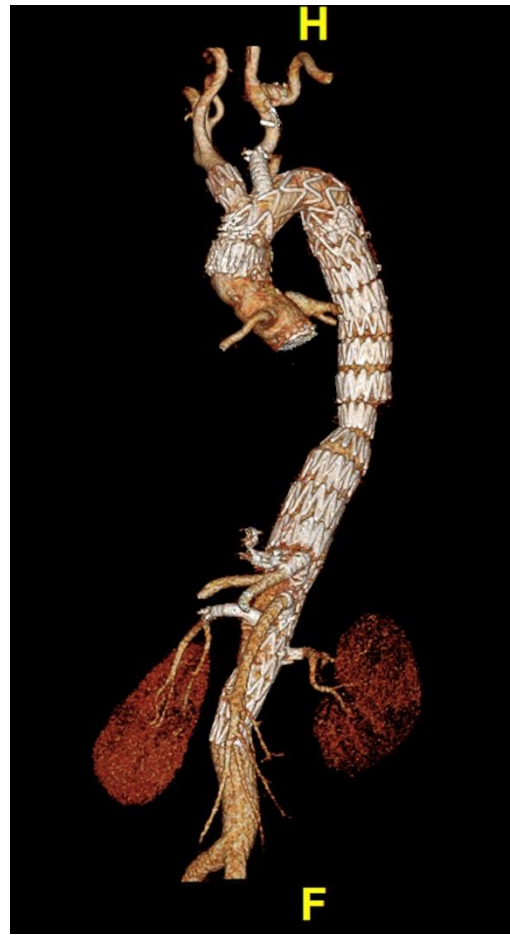
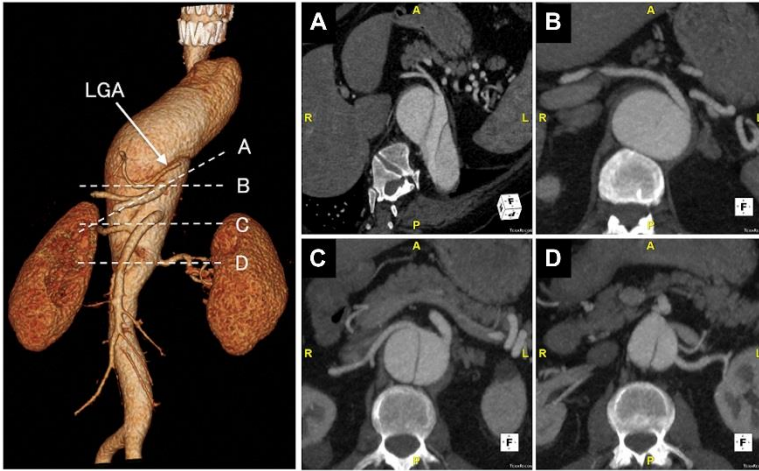
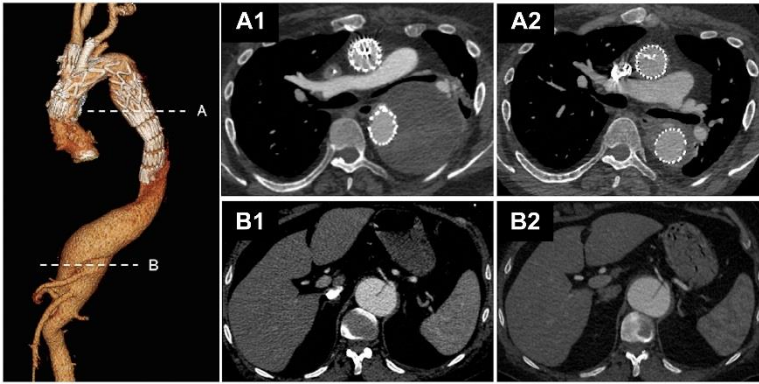


CANDY PLUG IN FALSE LUMEN

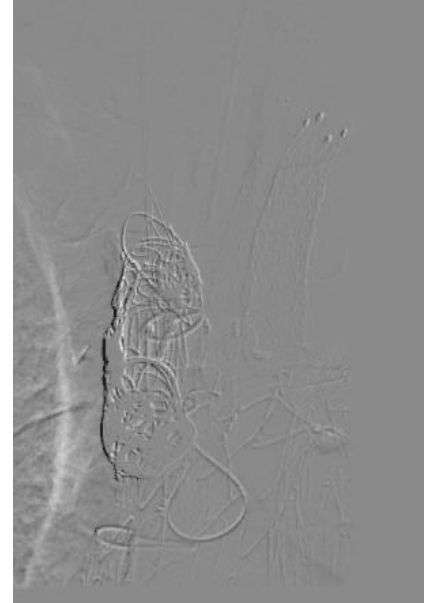
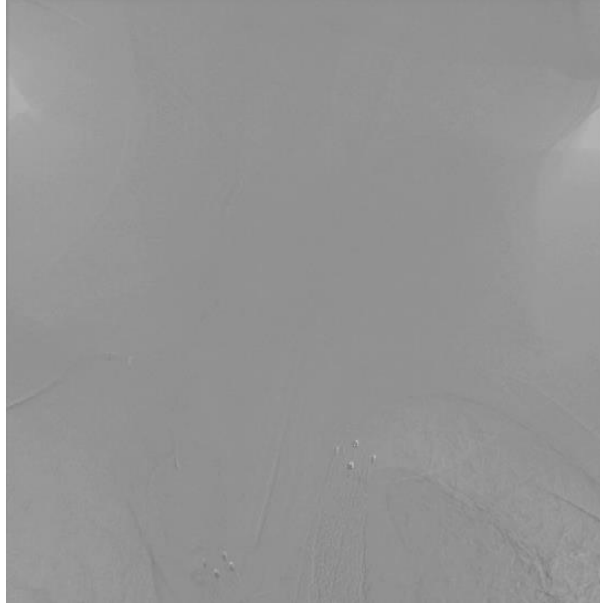
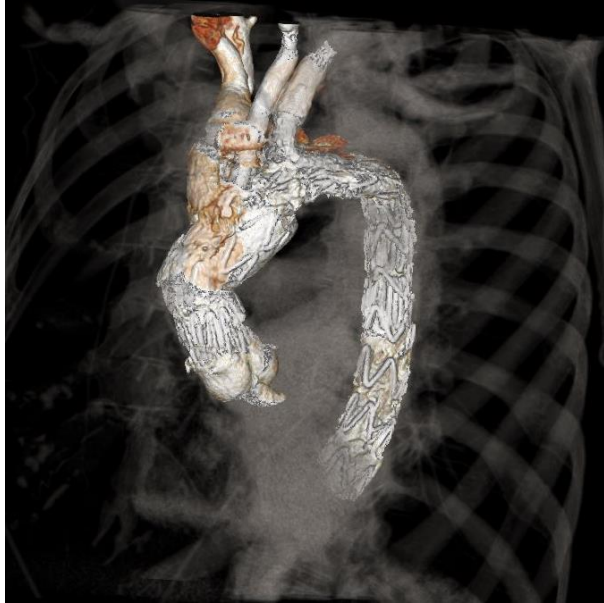


February 2014

April 2015







Off the Shelf?

- **METHODS:** retrospective analysis of all (n= 286) custom-made aortic arch branched endografts implanted between 2013 and early 2018 provided by the Cook Planning Center (Cook Medical, London, UK)

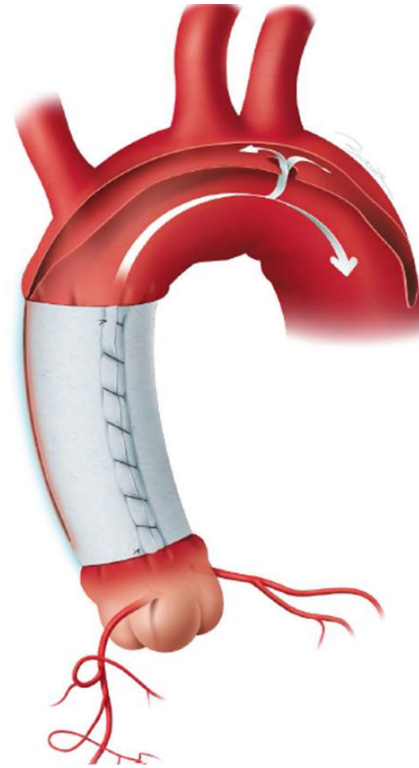
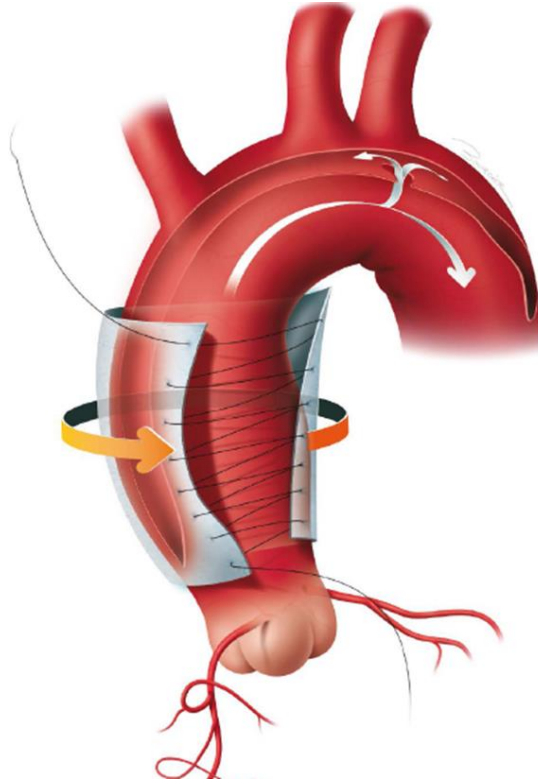


Off the Shelf?

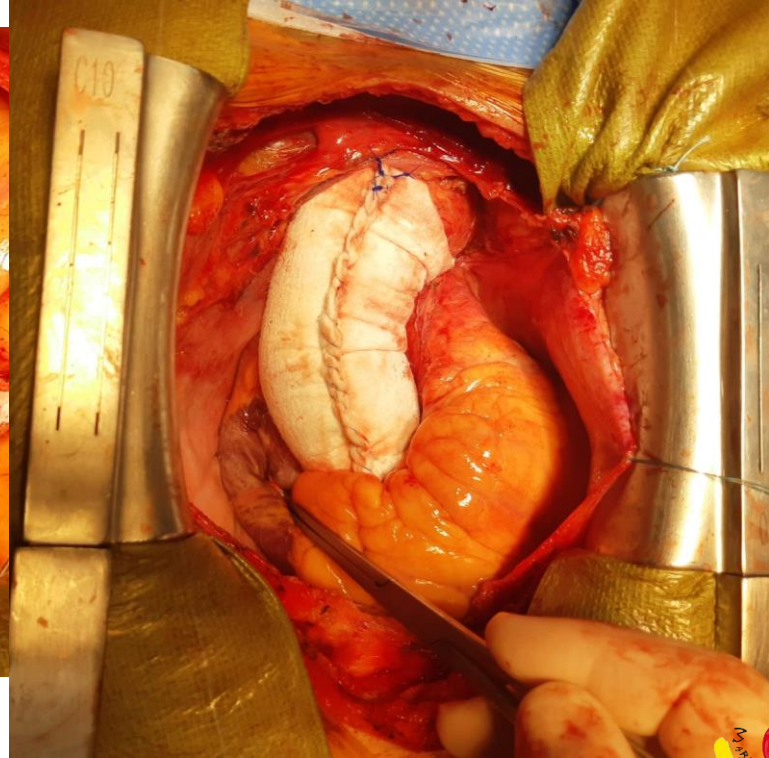
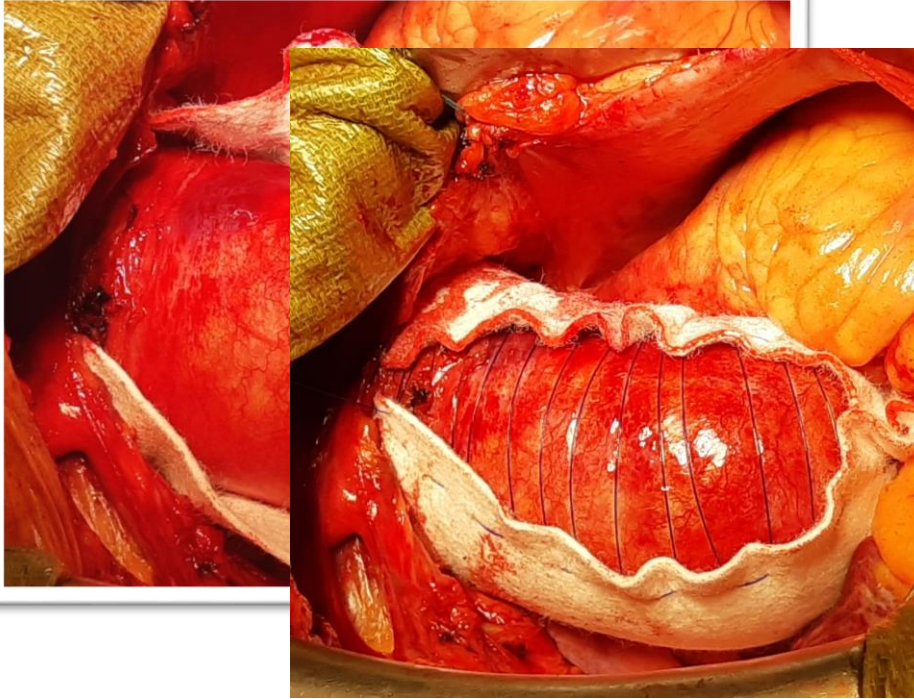
- Five standardized off-the-shelf endografts can cover a majority of aortic arch anatomies
- Option for acute cases
- Reduce sizing/manufacturing process



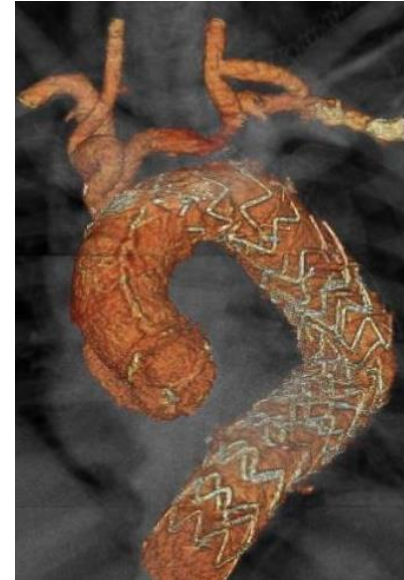
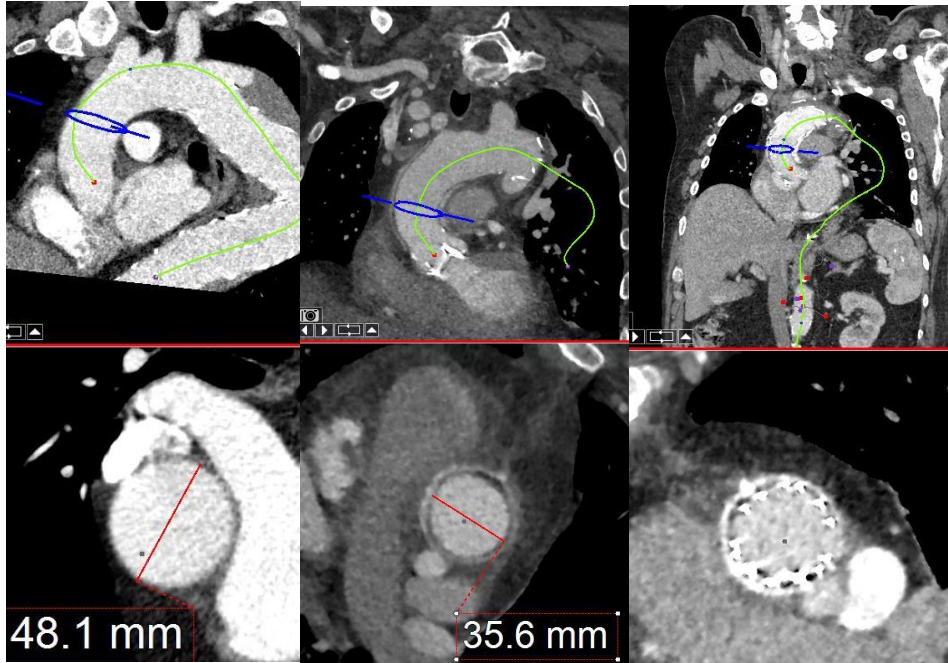
Off Pump Wrapping Ascending Aorta



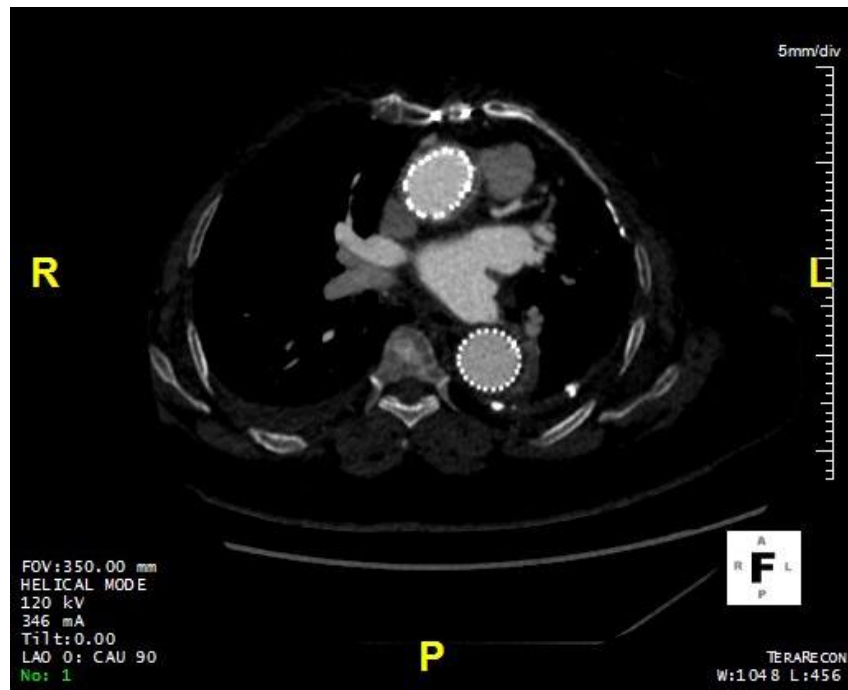
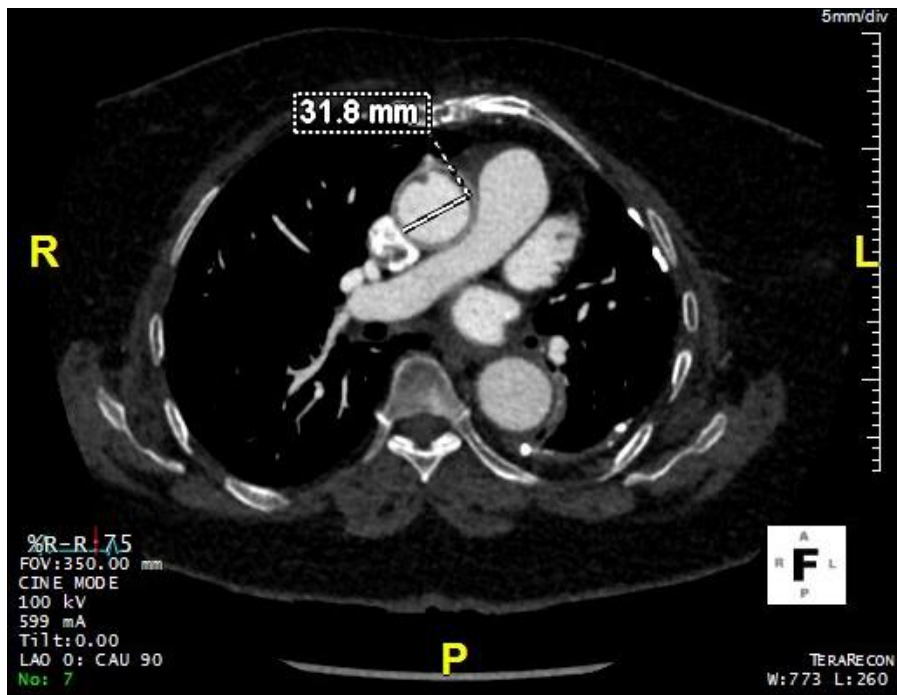
Off Pump Wrapping Ascending Aorta

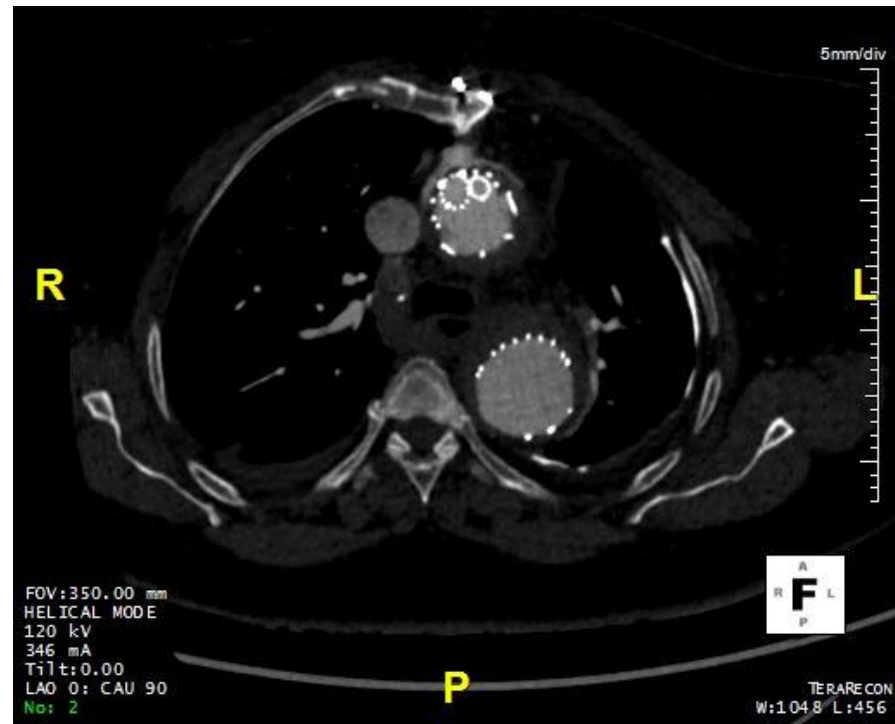
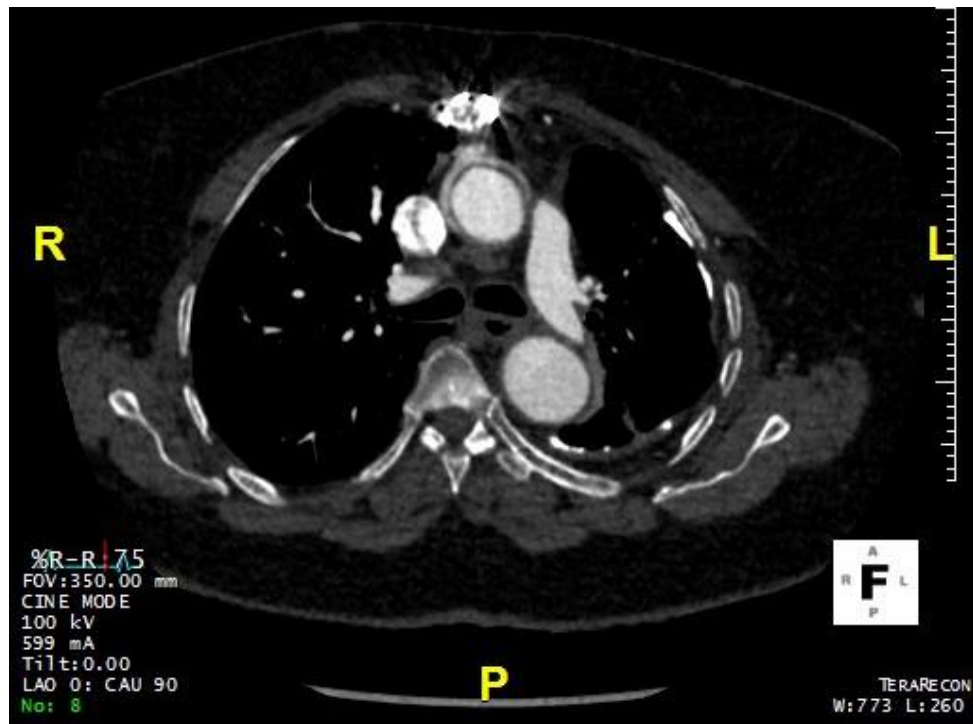


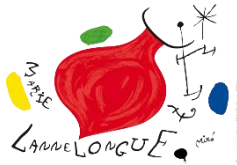
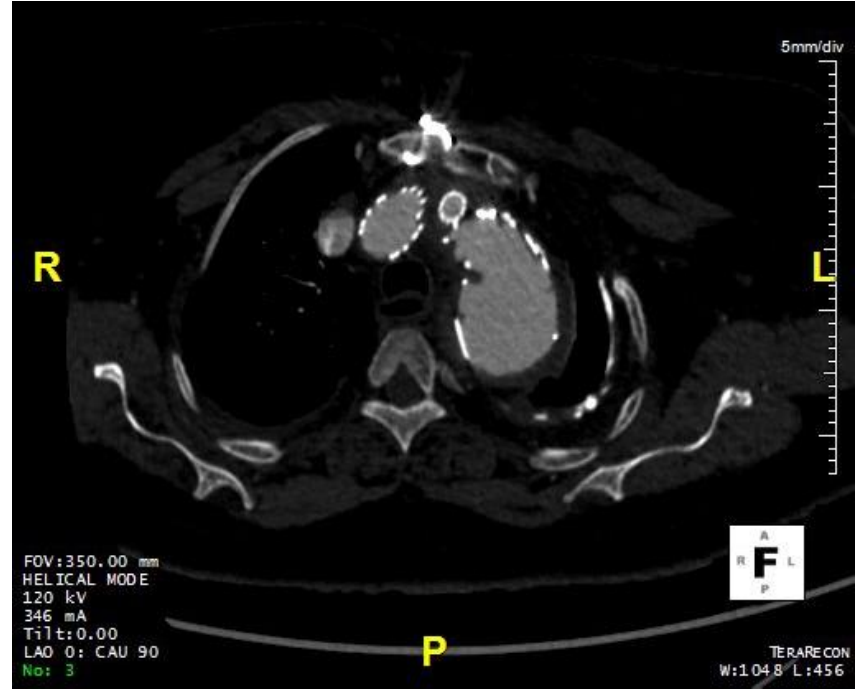
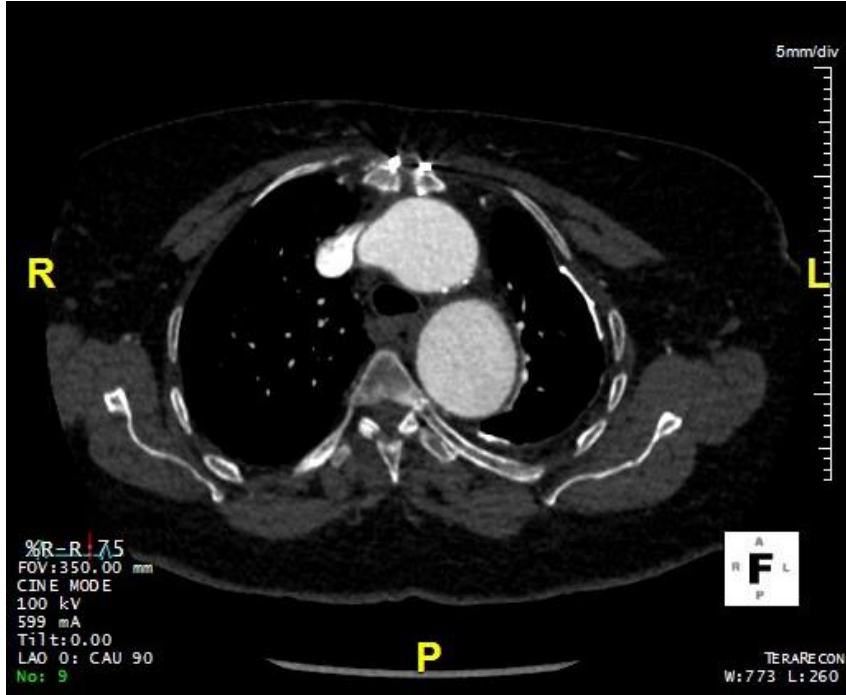
Teflon Wrapping of the Aorta





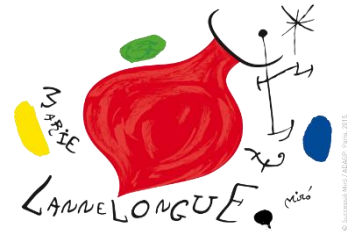






Conclusions

- Patient selection
- No compromise landing zones
- Staged procedures



CONCLUSIONS

- OTS device
- High volume centers performing both techniques

