



IX Congresso
Novas Fronteiras
em Medicina
Cardiovascular

22 a 24 de Fevereiro 2019

The Village Praia
D'El Rey - Óbidos

How should we **tailor open procedures** in the arch to
allow and facilitate
future endovascular repairs of the distal thoracic aorta

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No disclosures

How should we tailor open procedures in the arch to allow and facilitate future endovascular repairs of the distal thoracic aorta

Álvaro Laranjeira Santos
Cirurgia Cardíaca. Hospital de Santa Marta CHLC

- Complex aortic pathology
- **Patient tailored surgical strategy**
- Hybrid procedures
- 1st open repair - ascending /arch debranching
- Delayed stentgraft repair on distal aorta
- Native ascending aorta and arch are hostile LZ for TEVAR
- 1st GOAL Reduce the surgical risk
- 2nd GOAL Improve late outcomes

Acute type A aortic dissection

Arch and proximal descending aneurysms

!

How should we tailor open procedures in the arch to allow and facilitate future endovascular repairs of the distal thoracic aorta

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acute type A aortic dissection

The recommended extent of surgical resection and arch reconstruction is an **ongoing controversy**

Proximal ascending / hemiarch repair leaves a dissected thoracic aorta with a **patent distal FL** in as many as **80%** of patients

Residual FL flow is determinant for aortic dilation

However...

The growth of the distal aorta is slow and **redo is uncommon**

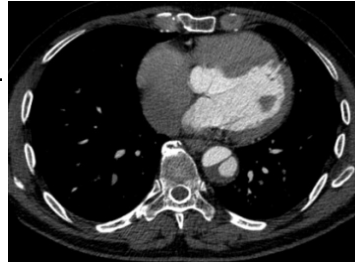
Proximal ascending / hemiarch repair

operation 2006

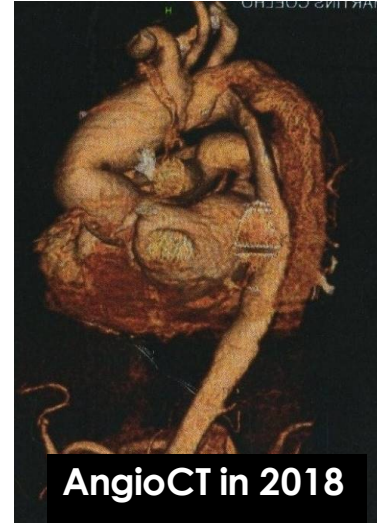


AngioCT in 2018

12 Y later

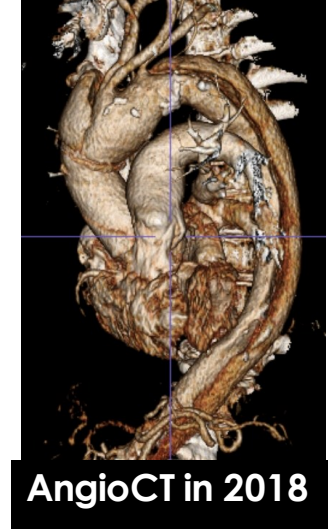


2008



10 Y later

2010



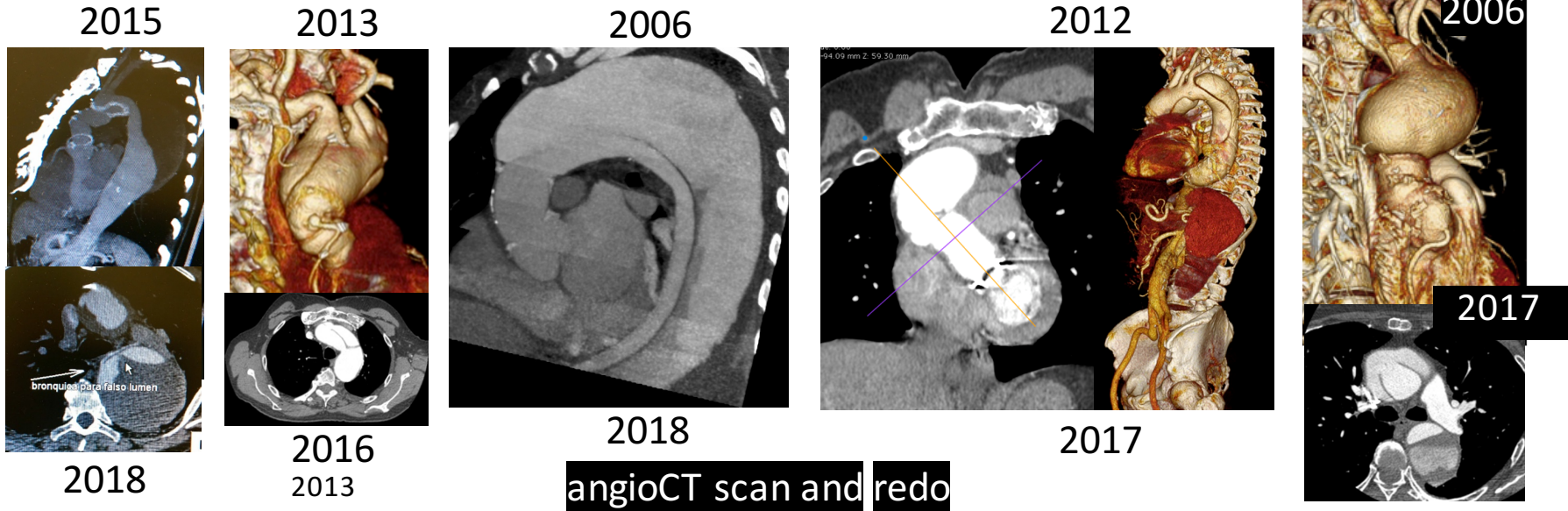
8 Y later

In a large % pts - there is a trend for positive aorta remodeling after **FL complete thrombosis**

However ... in 30% cases

The residual dissected aorta is prone to progressive aneurysm development and need for reoperation / reintervention at a later time

operation



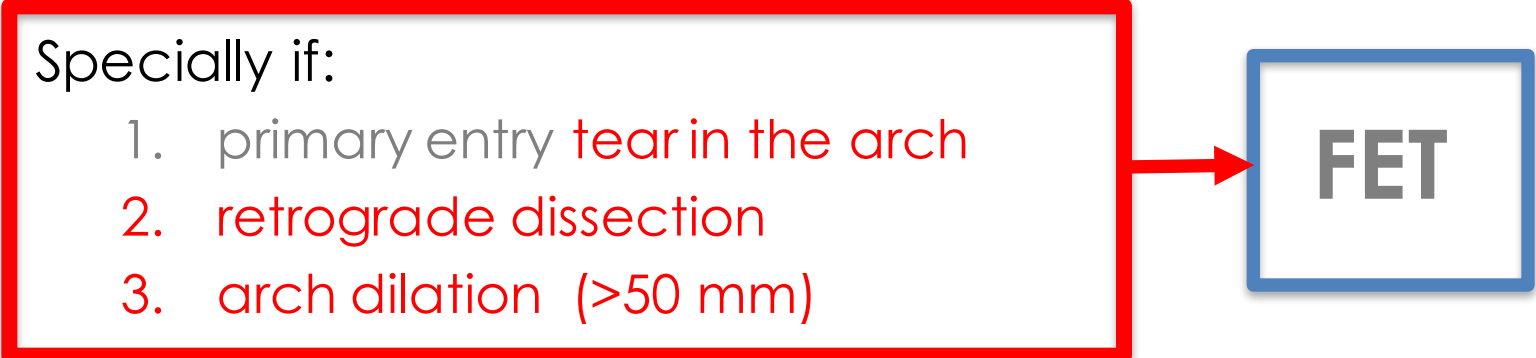
Why ? Additional entry tears in the arch or further and new entry tears could be induced, during the distal suture line in very fragile tissues

This emphasizes the importance of addressing arch intimal tears at the time of the 1st operation.

Recently several reports are trending towards a more extensive resection of the dissected arch believing in a long-term favorable outcome

Specially if:

1. primary entry **tear in the arch**
2. **retrograde dissection**
3. **arch dilation (>50 mm)**



```
graph LR; A["1. primary entry tear in the arch  
2. retrograde dissection  
3. arch dilation (>50 mm)"] --> B["FET"]
```

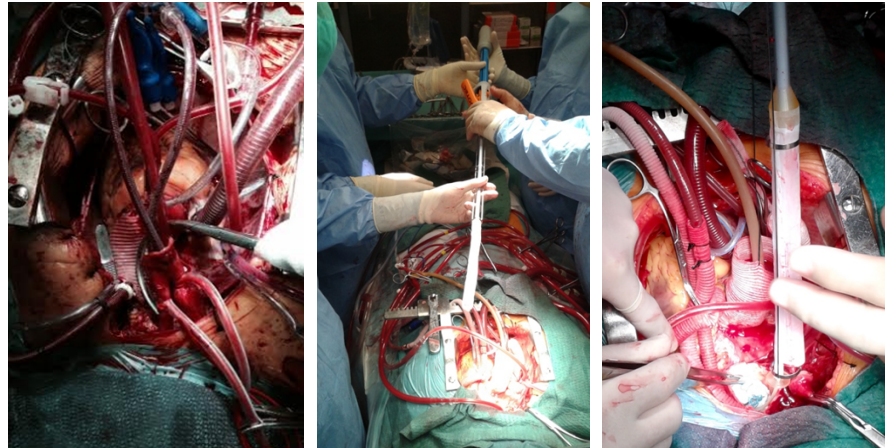
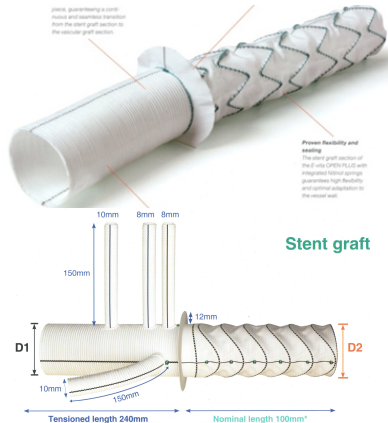
FET

FET associated almost 100% **FL thrombosis** of the covered area

FET could be an excellent option however ...some **constraints**

An **emergent situation** requires at the minimum:

- **Experienced and trained** (+/-) full team in OR
- A comprehensive angioCT scan for a **careful planning**
- A **guide-wire in the TL** assessed by radioscapy (hybrid room) or TOE
- Have different size **hybrid prosthesis on the shelf**
- Custodiol © AVAILABLE is very useful



Personal
experience

51 FET

When these are not possible
in **emergent** surgery

There are alternative strategies!

How should we tailor open procedures in the arch to allow and facilitate future endovascular repairs of the distal thoracic aorta

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Cirurgia Cardíaca. Hospital de Santa Marta CHLC

When these are not possible
in emergent surgery

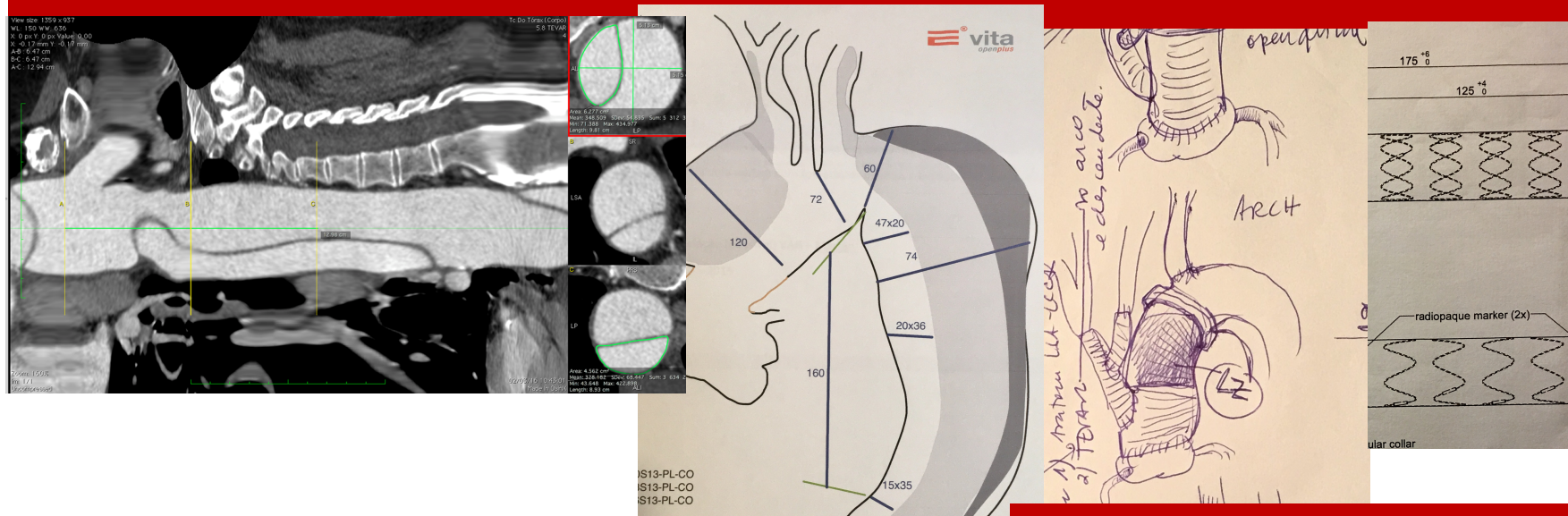
There are alternative strategies!

My strategy in selected pts:

Open procedure in the arch to allow and facilitate
future endovascular repairs of the distal thoracic aorta

The goal

Gain time for a long-run correct planning, looking for the advantages of a complete arch repair, without the potential drawbacks and risk factors inherent of an emergent surgery



How I do it ?

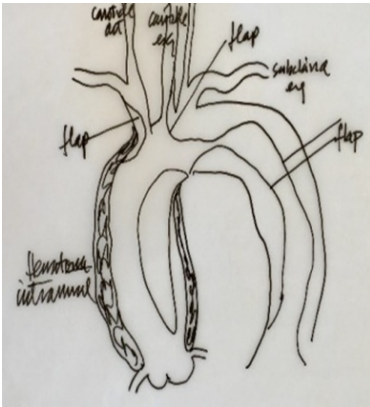


AM, 64 yo male, acute chest pain

Previous history: Smoking, HBP

Angio CT scan: Ascending aorta 50 mm. Circumferential intramural hematoma. **Flap** in the ascending aorta. **Type A acute dissection** extending to the arch and thoraco-abdominal aorta. Epi-aortic vessels dissected. Pericardial effusion. **Tear in the aortic arch**

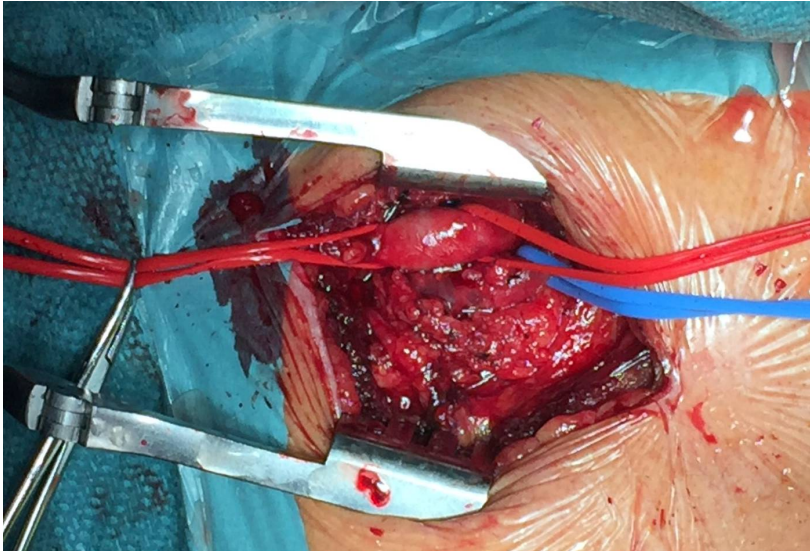
TOE: Flap in the ascending aorta. Moderate aortic regurgitation. LVEF normal. Pericardial effusion. Tear ?



Emergent surgical procedure

July 2017

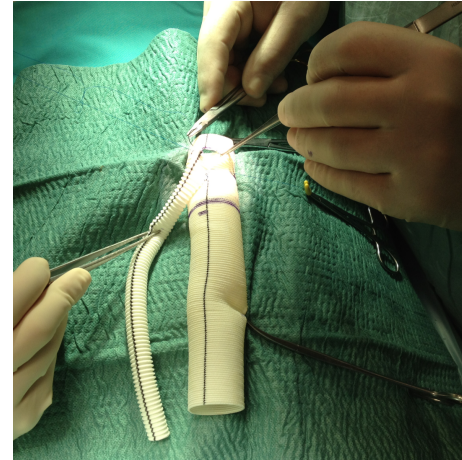
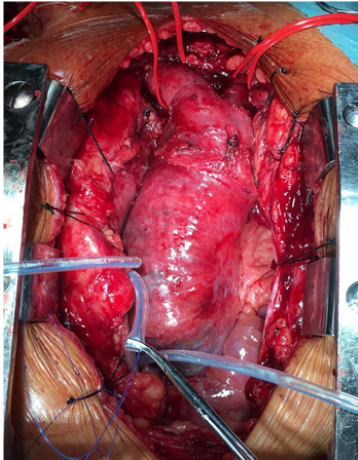
- RSA exposure



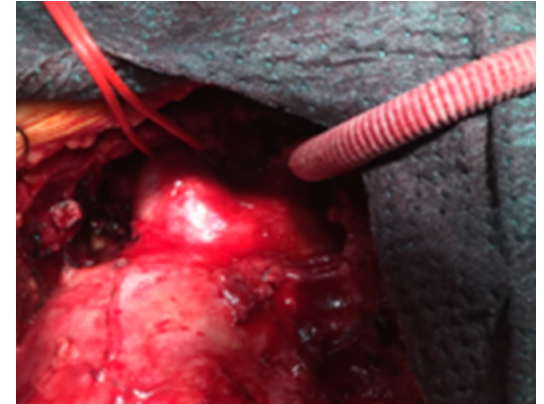
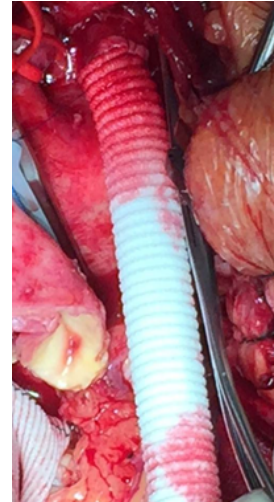
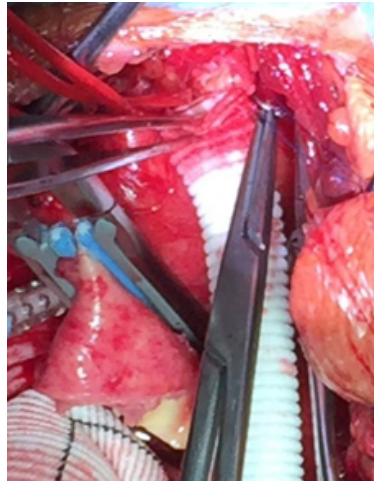
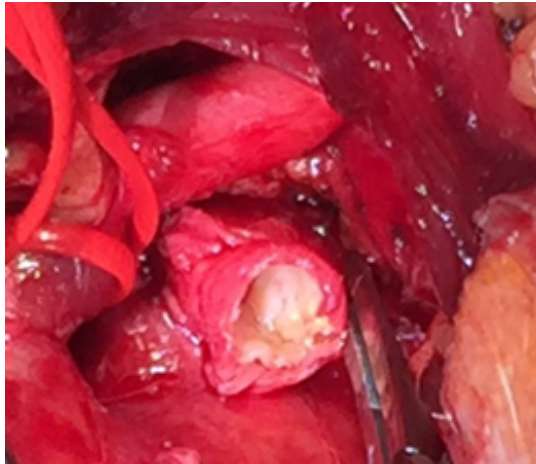
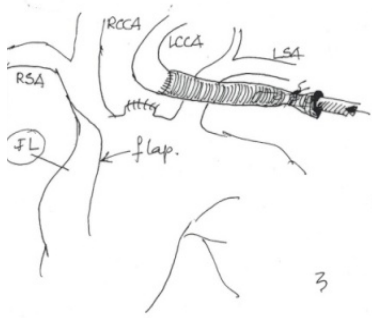
Antegrade flow
Seldinger
EOPA cannula

- Sternotomy

- Exposure & measurement of epi-aortic vessels diameter
- Construction of a bi/trifurcated patient tailored conduit
- Heparin
- RSA arterial and RA venous cannulation. LV vent
- Retrograde cardioplegia catheter



- LCCA debranching + dacron graft anastomosis



- **CPB On.** Immediately starting independent LCCA perfusion
- Cool to 26°C central (bladder)
- *LSA debranching + dacron graft anastomose. Independent LSA perfusion*
- Aorta crossclamp & cardioplegia

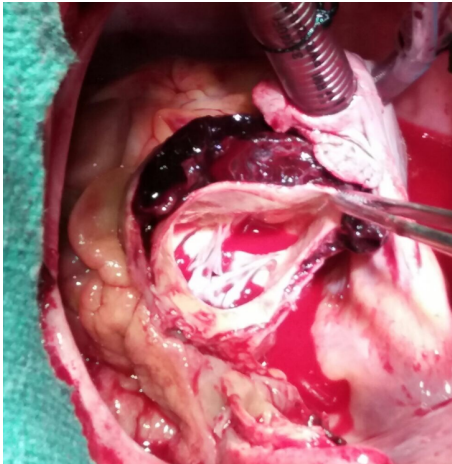
Intra-operative findings:

Aorta dilation with intramural hematoma.

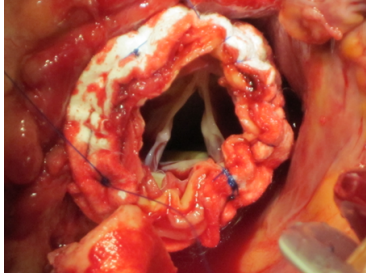
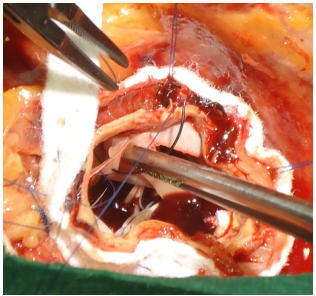
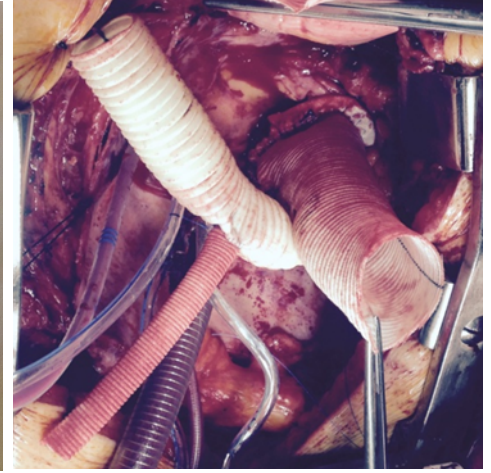
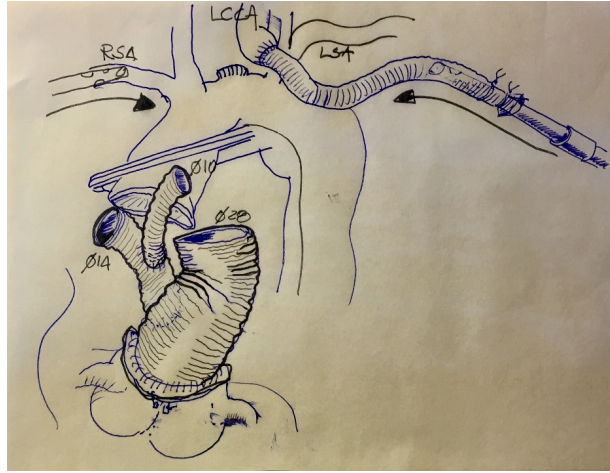
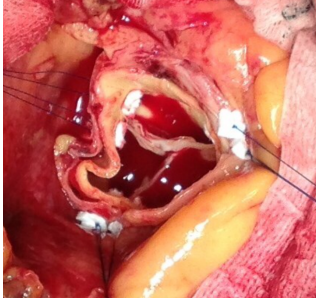
No entry tear identified in the ascending aorta

After circulatory arrest, there is a large tear in the arch

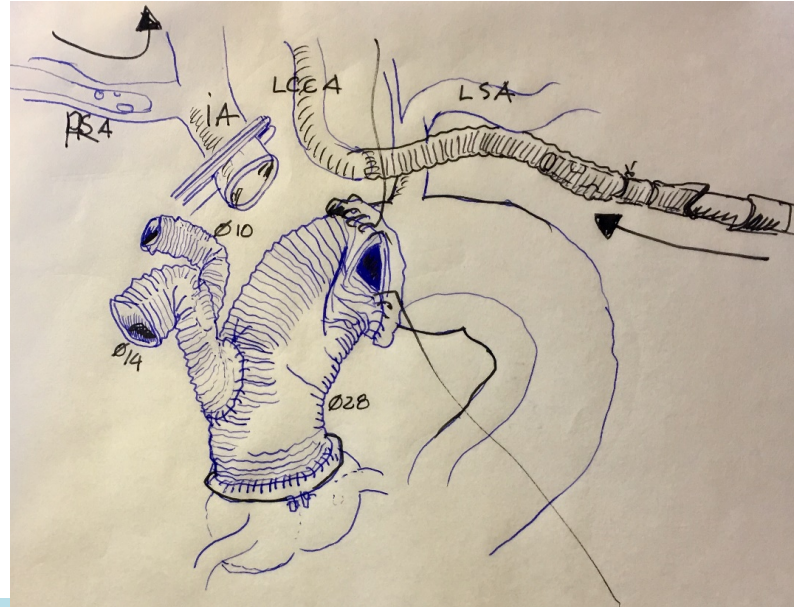
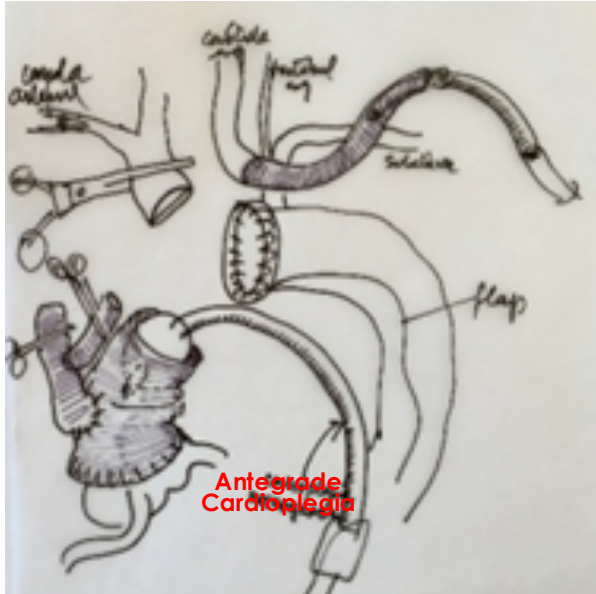
? type nAnB dissection or type B dissection with retrograde extension



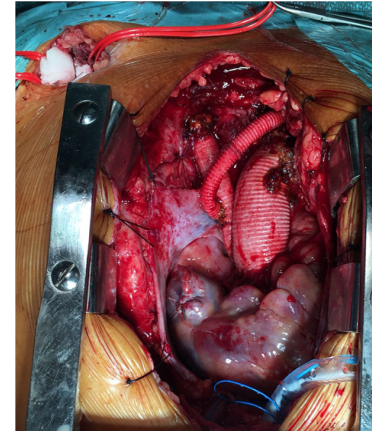
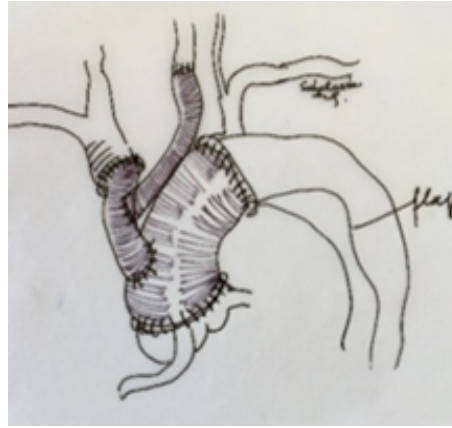
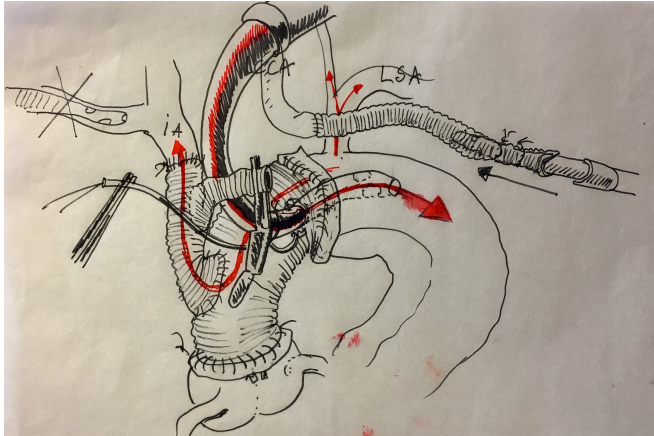
- Aortic valve or root procedure. **RESUSPENSION**
- **Ascending aorta procedure**. Sandwich tech. **Customized graft**



- at 26°C, Cardio Circulatory Arrest
- IA clamping. RSA cerebral perfusion. Independent LCCA perfusion
- Resect the arch
- Open distal anastomosis - Sandwich technique



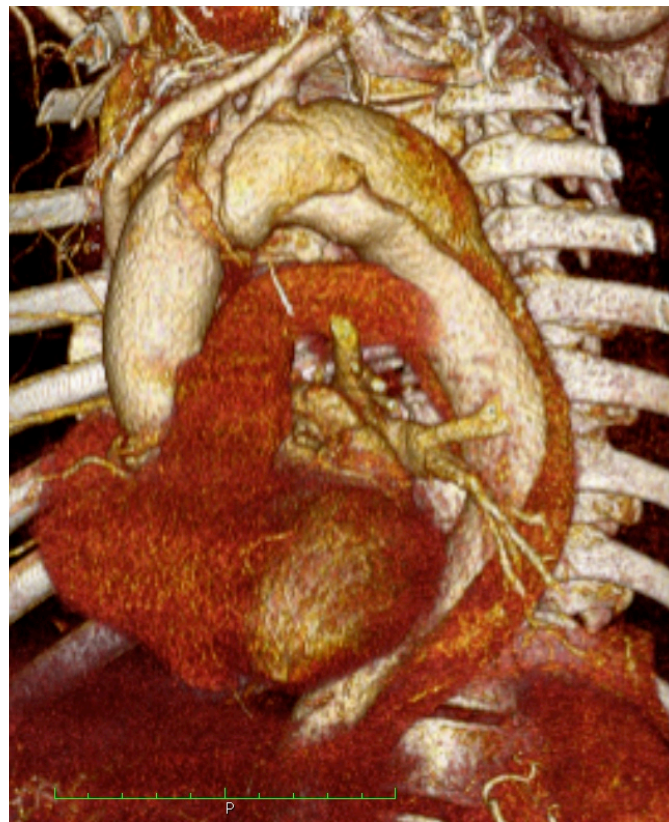
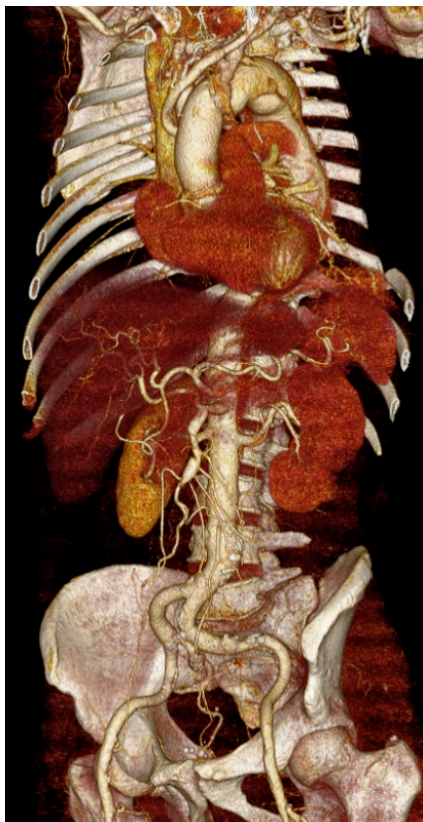
- Switch to **arterial cannula in the graft** and start **distal antegrade perfusion**.
- Warming during **anastomosis to IA and LCCA**. Re-routing completed
- **CPB off**. Ultra-Filtration. Hemostasis. Protamin. Closure



Final result allows us to **postpone treatment decisions**:

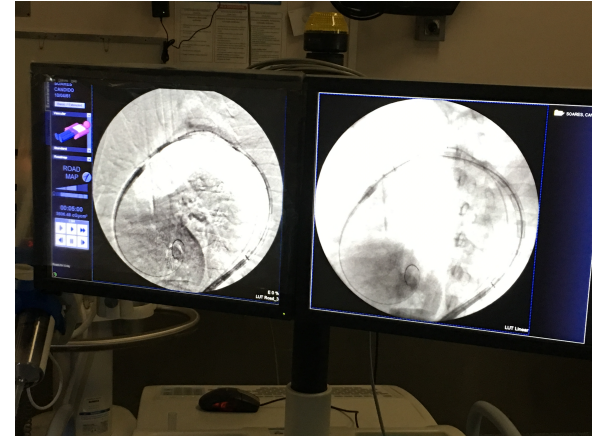
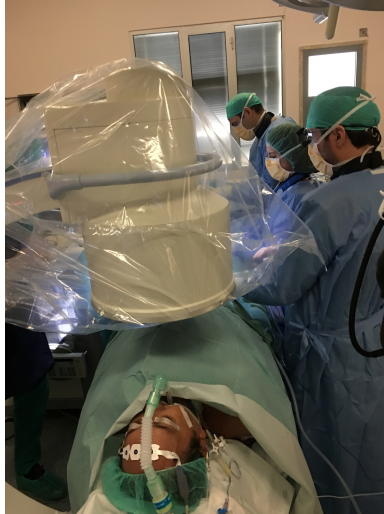
- Additional TEVAR? Promoting FL thrombosis. **Safe LZ with enough length**
- **Possibility of LSA-LCCA by-pass** or... plug /coverage

Post-operative CT scan 3D reconstructions



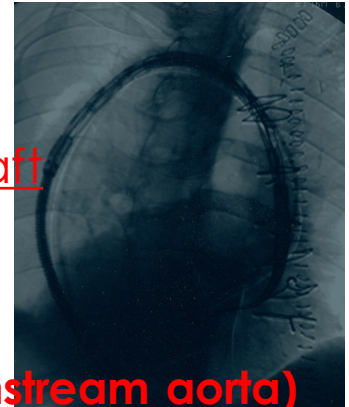
TEVAR 3 months later

Oct 2017

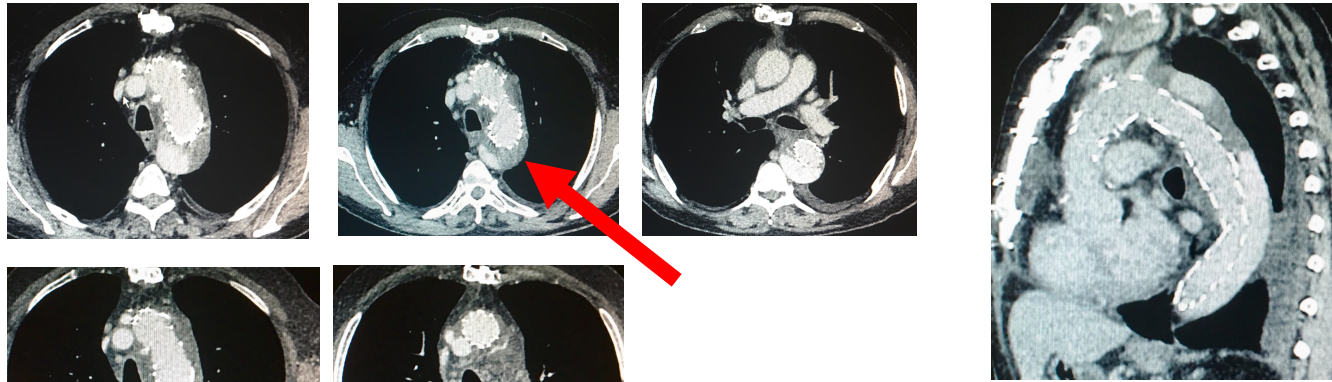


- Left femoral access
- 1st Cook Zenith ZTA-PT 36-32 /161 LZ 0 inside the dacron graft
- 1st Cook Zenith ZDEG-PT 36-26 /194
- Overlapping, ballooning

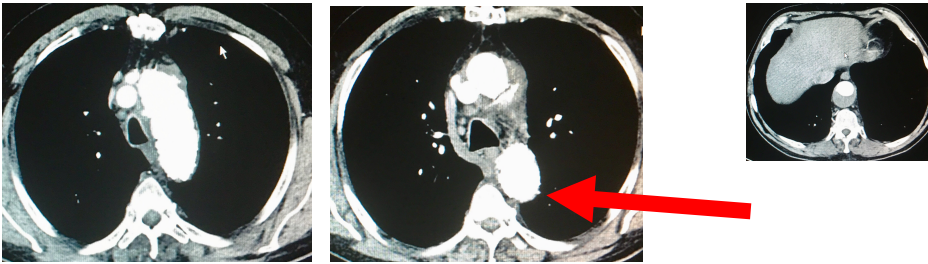
(if necessary possibility of PETTICOAT & STABILIZE technique downstream aorta)



Immediately after TEVAR angioCT scan. Partial FL thrombosis

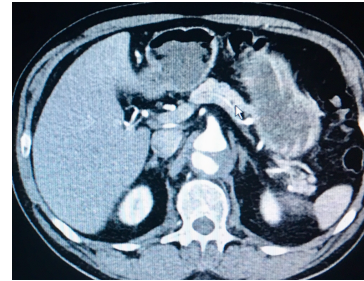


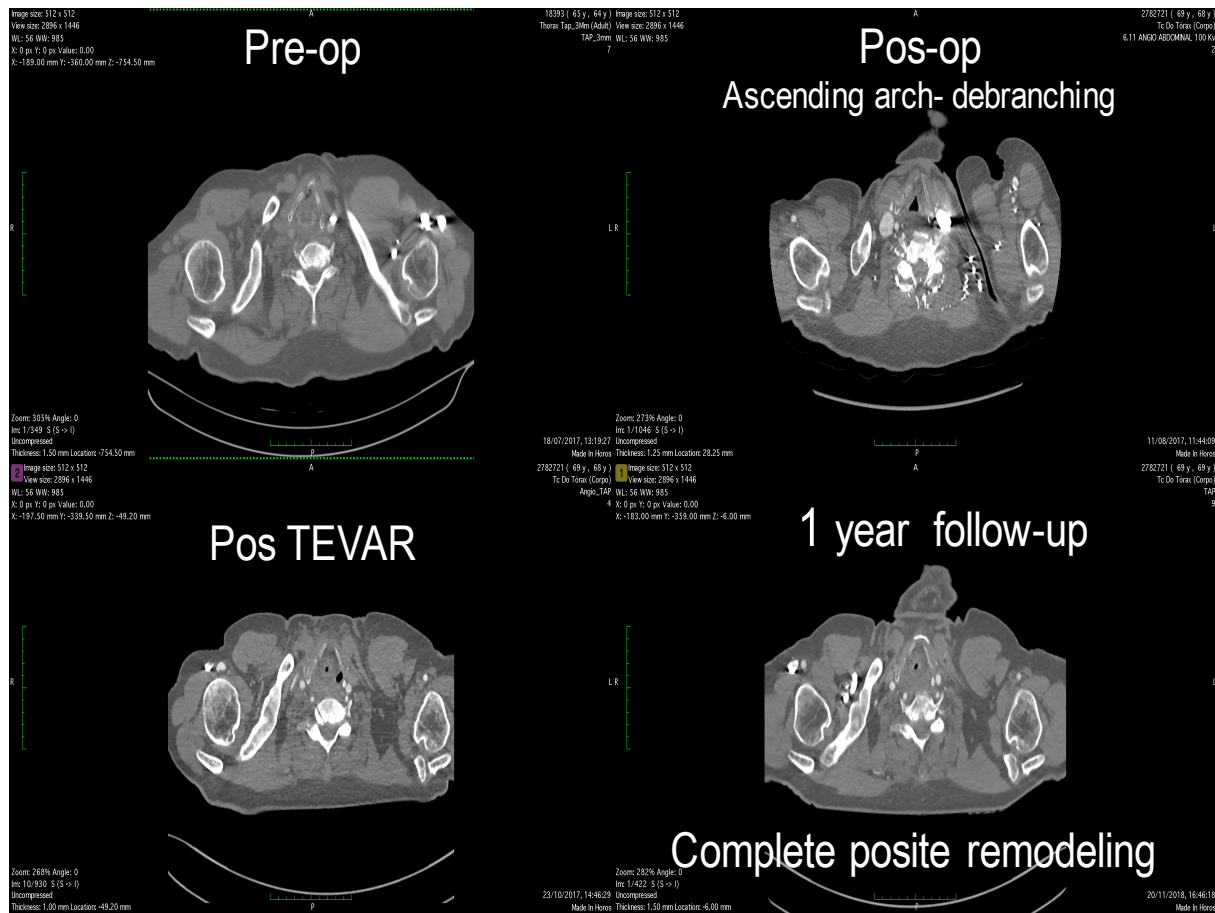
6 months after TEVAR angio CT scan



1 Year POS TEVAR angio CT scan

FL thrombosis: Aortic positive remodeling

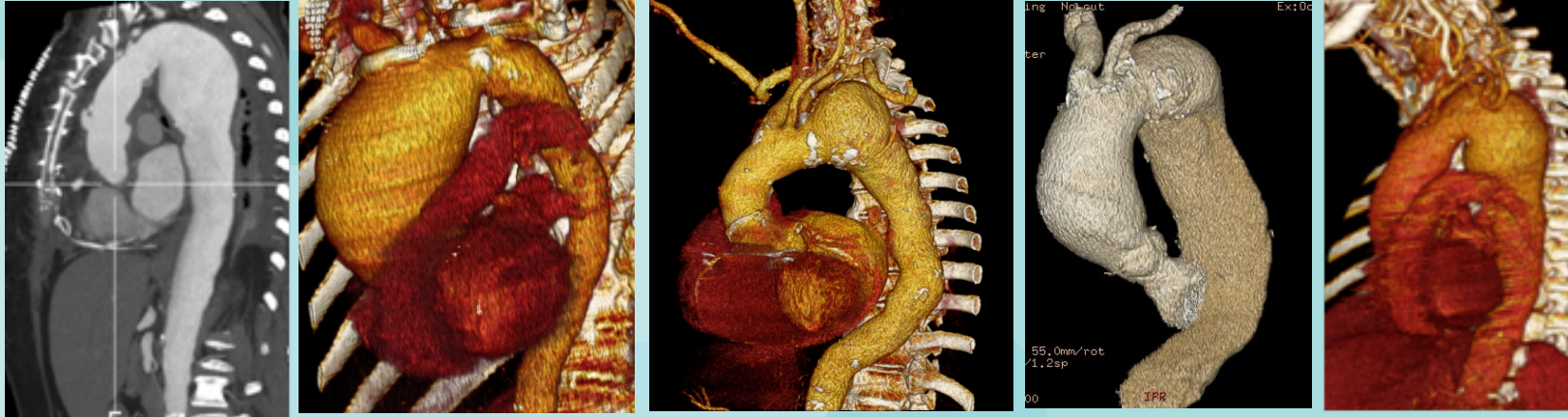




How should we tailor open procedures in the arch to allow and facilitate future endovascular repairs of the distal thoracic aorta

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Arch and proximal descending aneurysms



In patients unfit for FET

- Age (> 75)
- Co-morbidities

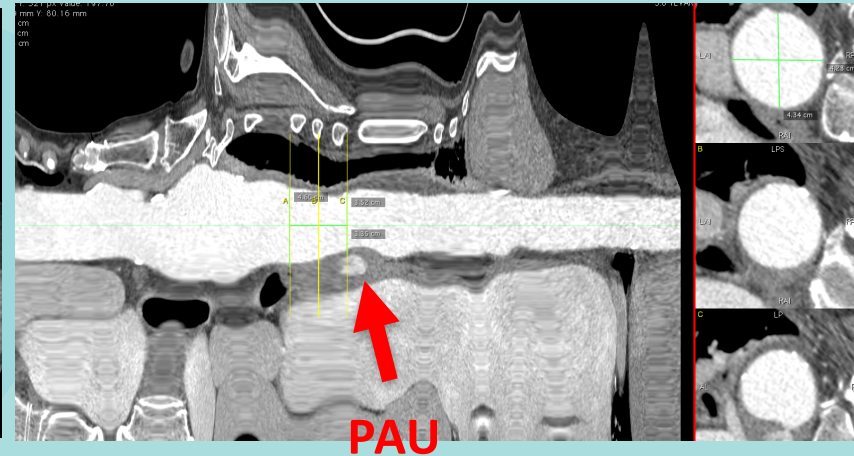
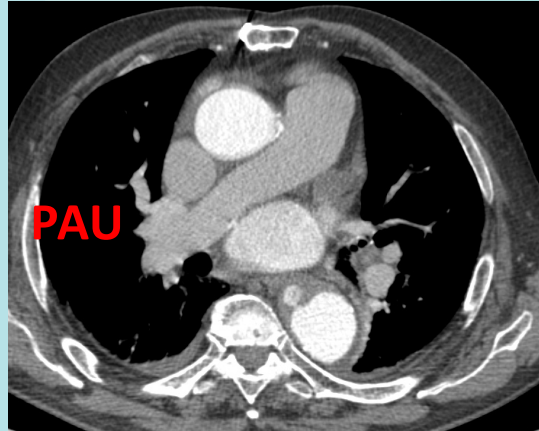
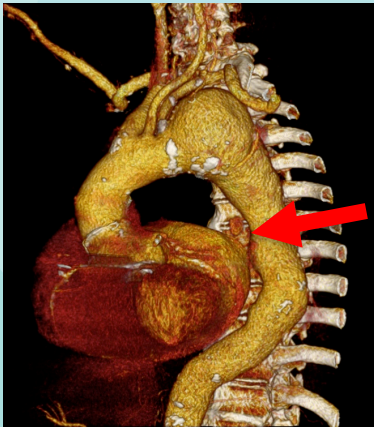
How should we tailor open procedures in the arch to allow and facilitate future endovascular repairs of the distal thoracic aorta

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VR, male, 82 YO, arch and proximal descending aorta aneurysm (60mm),
impending rupture PAU in the distal descending aorta

Past clinical history

1st Operation 2009 AVR, MV annuloplasty, CABGx1



How should we tailor open procedures in the arch to allow and facilitate
future endovascular repairs of the distal thoracic aorta

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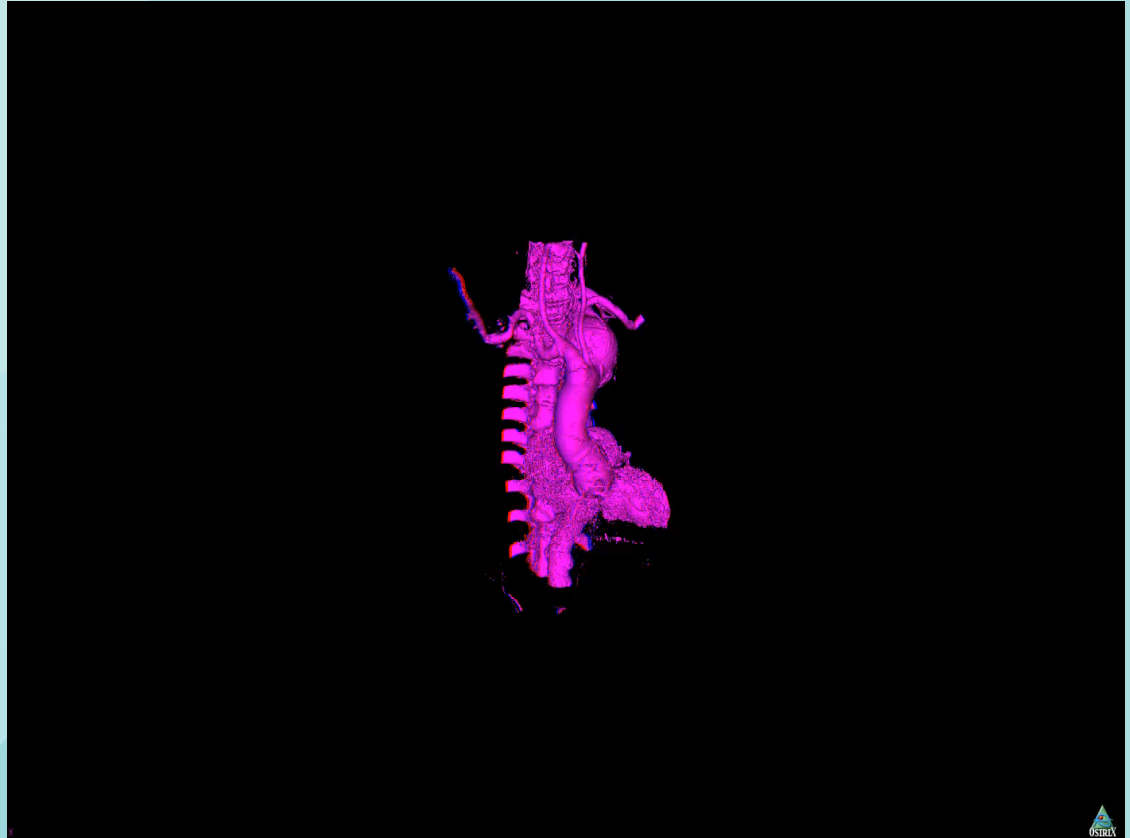
impending rupture PAU in the distal descending aorta

Challenges:

- Age
- Redo
- Magnitude of surgery

Important to address PAU

- TEVAR not possible
- No Proximal LZ



How should we tailor open procedures in the arch to allow and facilitate future endovascular repairs of the distal thoracic aorta

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VR, male, 82 YO, arch and proximal descending aorta aneurysm (60mm), impending rupture UPA in the distal descending aorta

1st Operation REDO 5-8-2016

- Ascending aorta and arch replacement
- Customized 2 side-branches graft
- IA . LCCA debranching
- HCA 26°C. Bilateral ASCP
- Major PO complication – Pneumonia

2nd Endovascular 17-8-2016 (12 days after)

- 2 stentgrafts Cook Zenith Alpha
- Proximal LZ in the customized conduit distal to the side-branches take-off
- Distal LZ in the distal descending aorta
- Ballooning
- Discharged 25-8-2016

Outcame: died Sept 2018 Stroke (85yo)



How should we tailor open procedures in the arch to allow and facilitate future endovascular repairs of the distal thoracic aorta

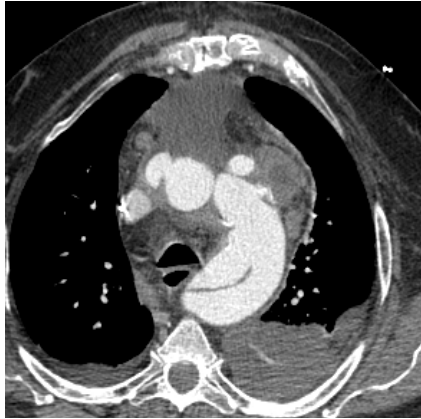
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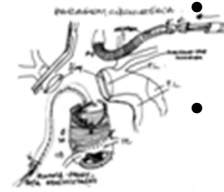
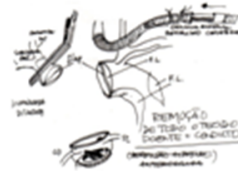
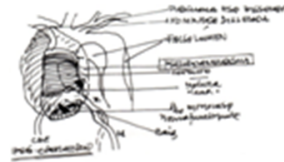
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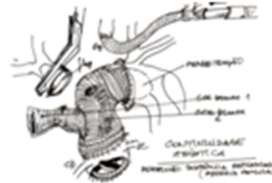
HF, male, 70 YO, ascending aorta pseudoaneurysm (90x80mm), impending rupture



1st operation 2005 - AS - AVR mechanical prosthesis
2nd operation 2014 - acute TAAD – Proximal repair
3rd operation **14-9-2016** Pseudoaneurysm -



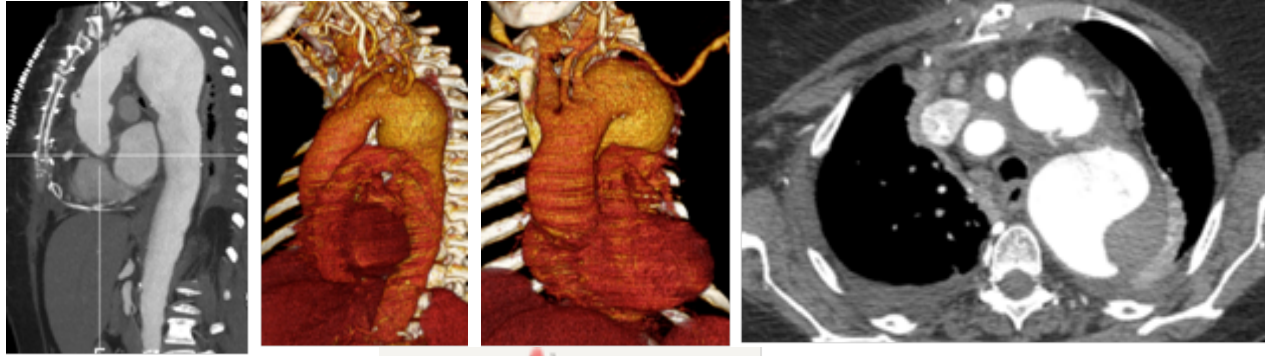
- Ascending aorta and arch replacement
- Customized 2 side-branches graft
- IA . LCCA debranching
- HCA 26°C. Bilateral ASCP
- Flap fenestration
- No complications
- Discharged
- Readmission 2 months
- infection



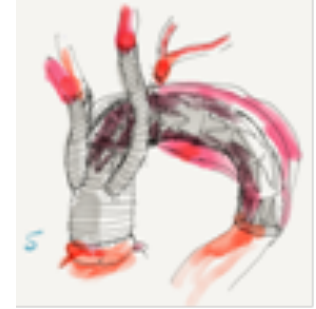
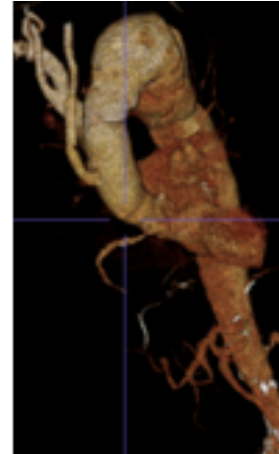
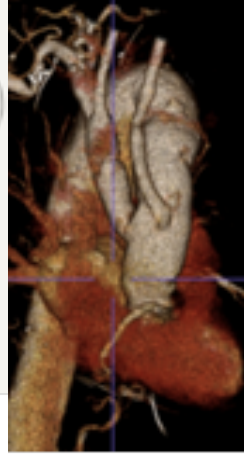
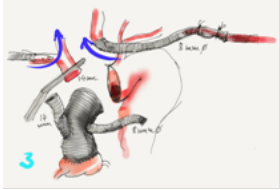
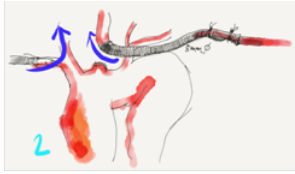
Outcome: died March 2017
Sepsis (6 months)



RM, female, 77 YO, descending aorta aneurysm (65mm). Arch gothic morphology



Final result
After 2nd stage TEVAR



In common

High surgical risk. Mandatory for patient tailored strategy

For different reasons they are unfit for FET

Surgical approach

- 1 Custom made ascending aorta conduit
- 2 Epi-aorta vessels debranching & extra-anatomic re-routing
- 3 Open distal anastomosis (Zone 2) HCA 26°C, bilateral ASCP
- 4 Appropriate length landing zone creation, for potential **delayed** distal aorta endovascular repair. TEVAR and potentially (in acute TAAD) for PETTITCOAT and STABILIZE techniques

Results

2016-2018

14 pts

9 males

age 55-82 (74)

Pathology

acute TAAD

5

chronic TAAD

3

Arch/descending An

6

6 pts didn't complete 2nd stage TEVAR:

2 deaths (1 pneumonia / 1 sepsis)

2 no distal aorta enlargement noticed (follow-up)

2 are pending operation

8 pts completed the procedure. TEVAR. No complications

1 later death (not related to procedure ?)

100% of survivors are under follow-up in out-patient clinic

Conclusions

This technique seems appealing, reproducible and easy to accomplish

May be useful for selected patients in Centers where there are some institutional and logistics constraints to extensive arch resection in acute settings

The great advantage is to postpone final decisions to a stabilized patient situation and to gain time to have a comprehensive full picture diagnostic

This is just a personal experience



5 FIFTH THORACIC AORTA LISBON SYMPOSIUM

SAVE THE DATE

THURSDAY

NOVEMBER 21st

2019

HOTEL REAL STA. EULÁLIA ALBUFEIRA | ALGARVE

SYMPOSIUM DIRECTOR

ÁLVARO LARANEIRA SANTOS



SOCIEDADE PORTUGUESA
DE CIRURGIA
CARDIO-TORÁCICA E VASCULAR