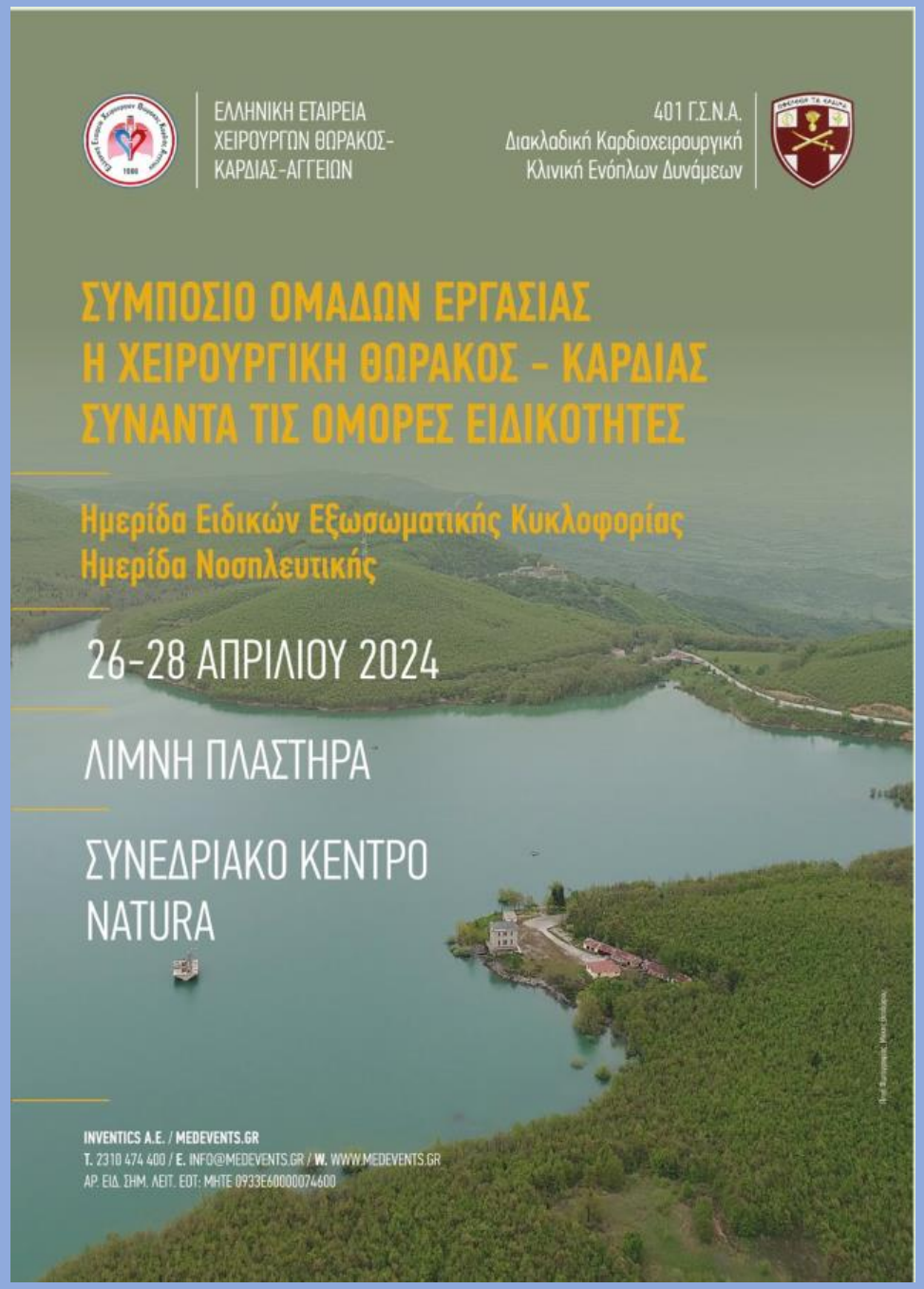


ΟΜΙΛΟΣ ΙΑΤΡΙΚΟΥ ΑΘΗΝΩΝ
Ιατρικό Κέντρο Αθηνών

ΚΕΝΤΡΟ ΧΕΙΡΟΥΡΓΙΚΗΣ ΘΩΡΑΚΙΚΗΣ ΑΟΡΤΗΣ

ΕΠΑΝΕΠΕΜΒΑΣΗ BENTALL ΚΑΙ ΜΕΡΙΚΗ ΑΝΤΙΚΑΤΑΣΤΑΣΗ ΤΟΞΟΥ ΜΕΤΑ ΑΠΟ ΧΕΙΡΟΥΡΓΙΚΗ ΔΙΟΡΘΩΣΗ ΟΞΕΩΣ ΔΙΑΧΩΡΙΣΜΟΥ ΑΟΡΤΗΣ ΤΥΠΟΥ STANFORD A

Α. ΝΤΕΜΗΣ, Ε. ΠΡΩΤΟΠΑΠΠΑΣ, Σ.ΟΙΚΟΝΟΜΙΔΟΥ, Γ. ΚΑΡΑΘΑΝΑΣΗΣ, Μ. ΠΑΝΑΓΙΩΤΟΥ.

Καρδιοχειρουργικό Τμήμα
Κέντρο Χειρουργικής Θωρακικής Αορτής
Ιατρικό Κέντρο Αθηνών

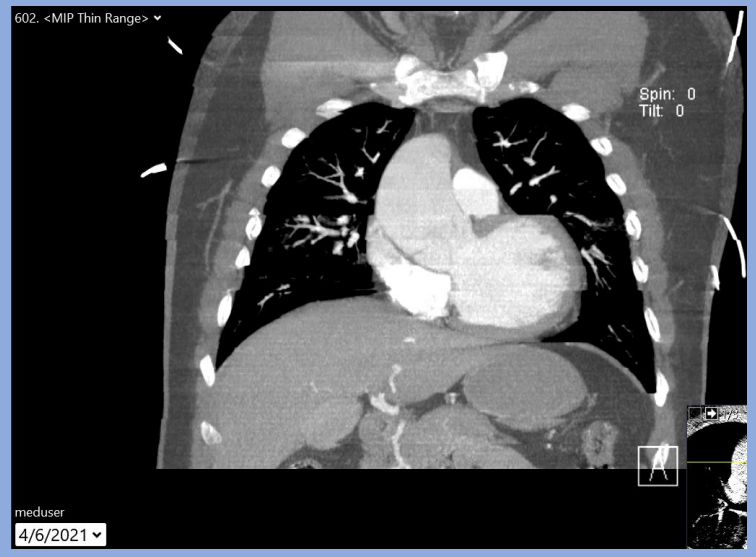
37 years old male patient
BMI 35 kgr/m2
HTN
(-) family history for aortopathy

Severe chest pain and loss of consciousness
Diagnosis: ATAAD from zone 0 to Zone 10 LCIA
Dissected IA, LCCA, 100% at distal LCCA, Brain CT (-)
Left renal artery perfused from the false-lumen

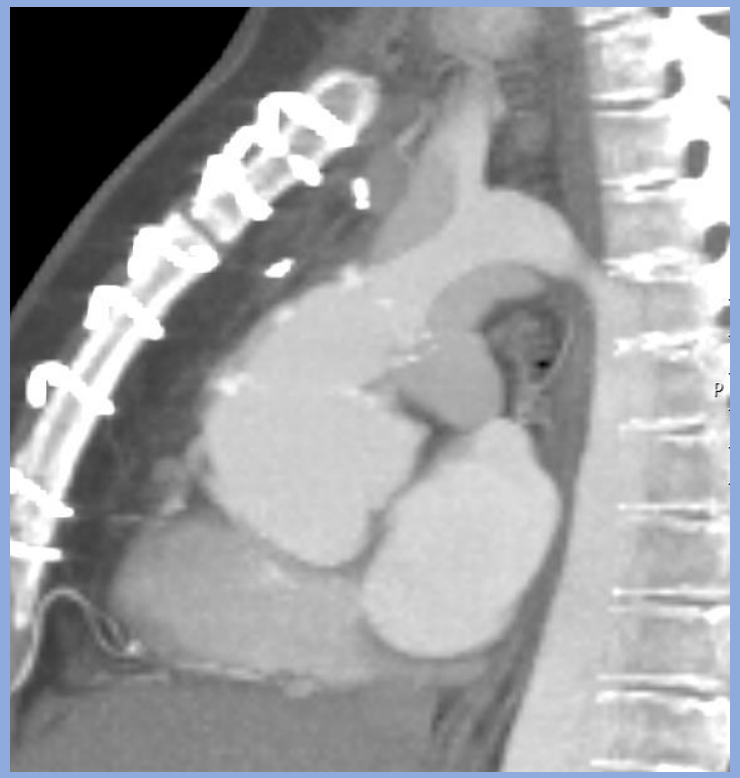
-DeBakey type I

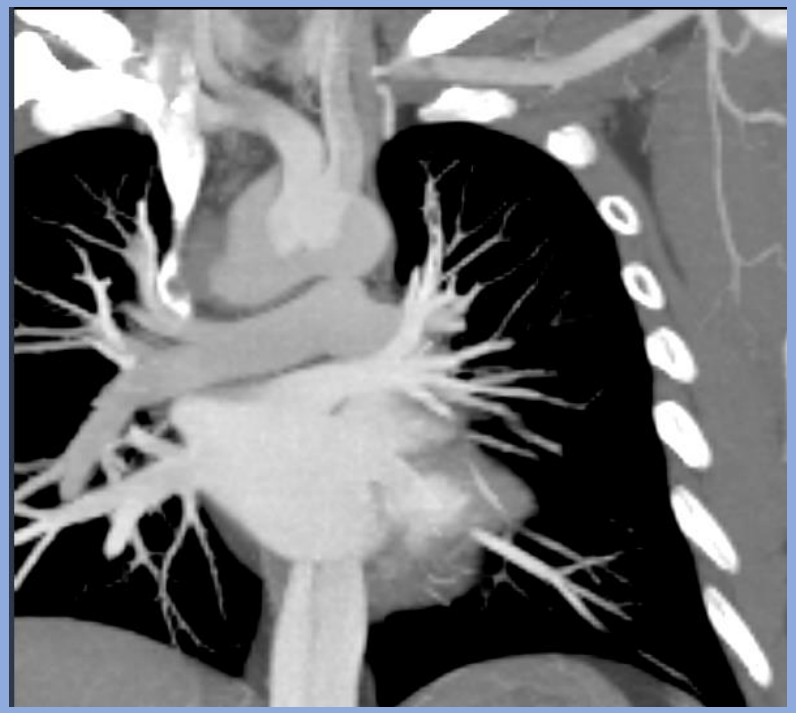
-Stanford type A
-SVS/STS classification : A 10

EACTS /TEM
classification: Type A E0 M 2 (+) M3 (-)
GERAADA SCORE 13%



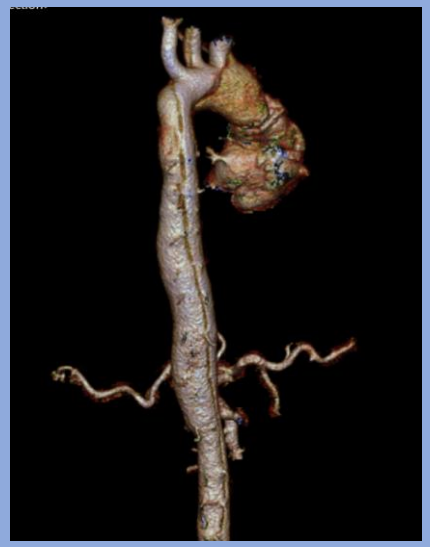
Surgery: Ascending Aorta replacement with moderate hypothermia,
RAXA cannulation,
Use of aortic clamp
Surgical glue.

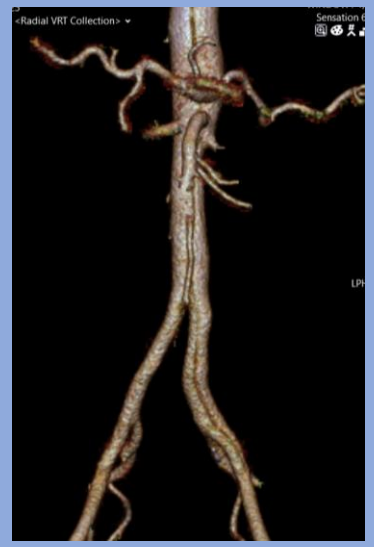




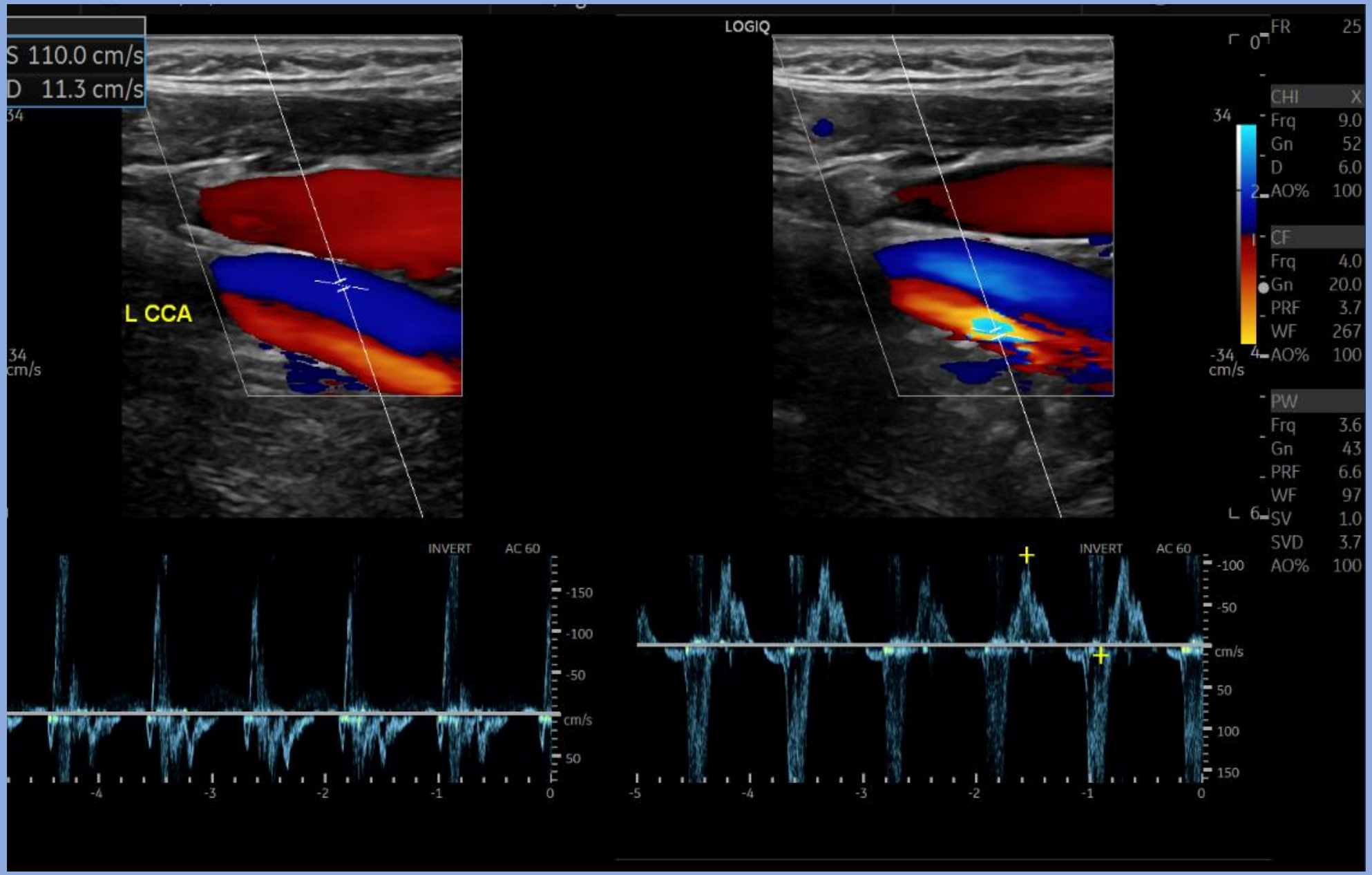
22 MONTHS POST-OP

NYHA CLASS II/III
Moderate AR
Root Enlargement 58mm

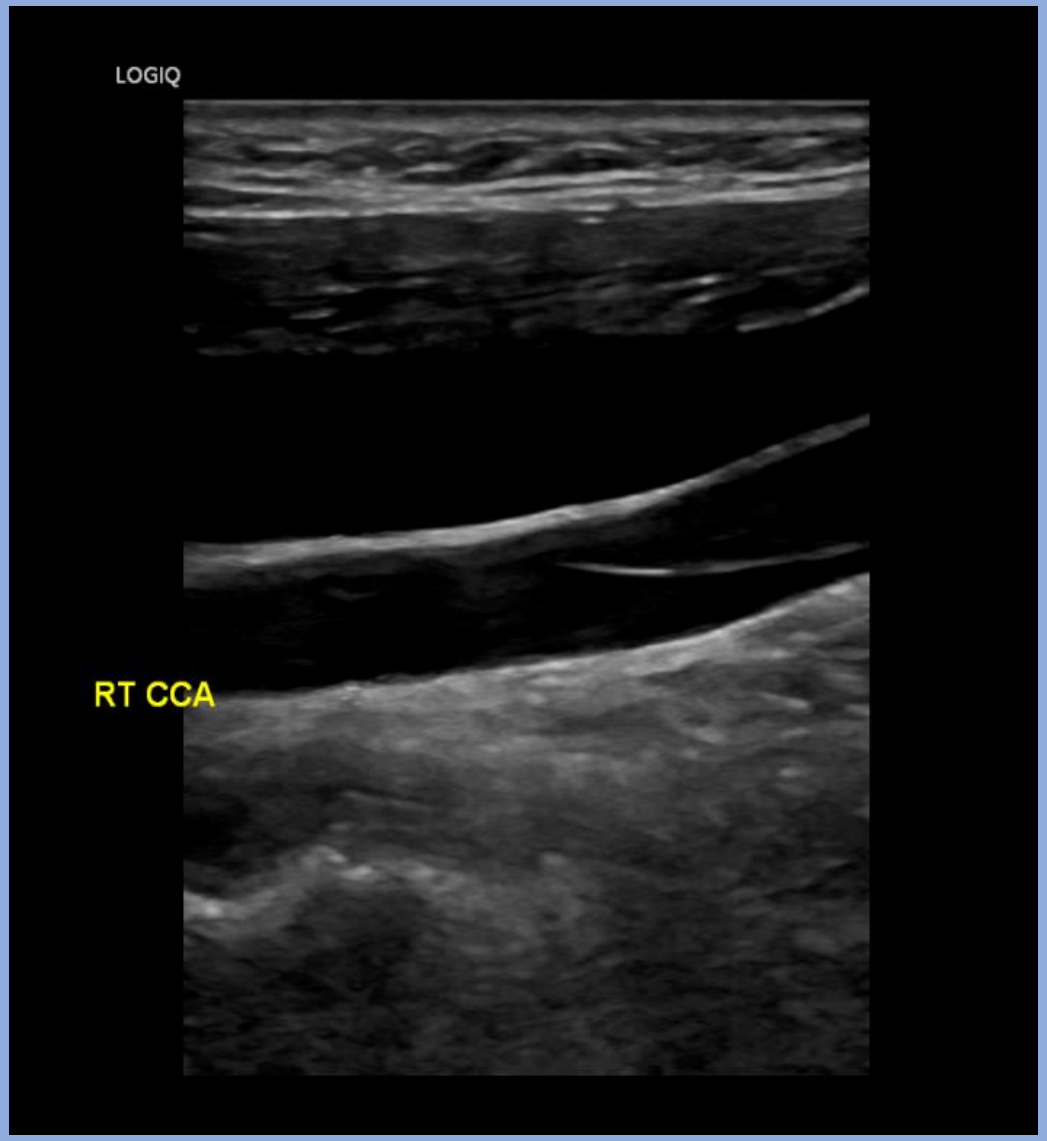


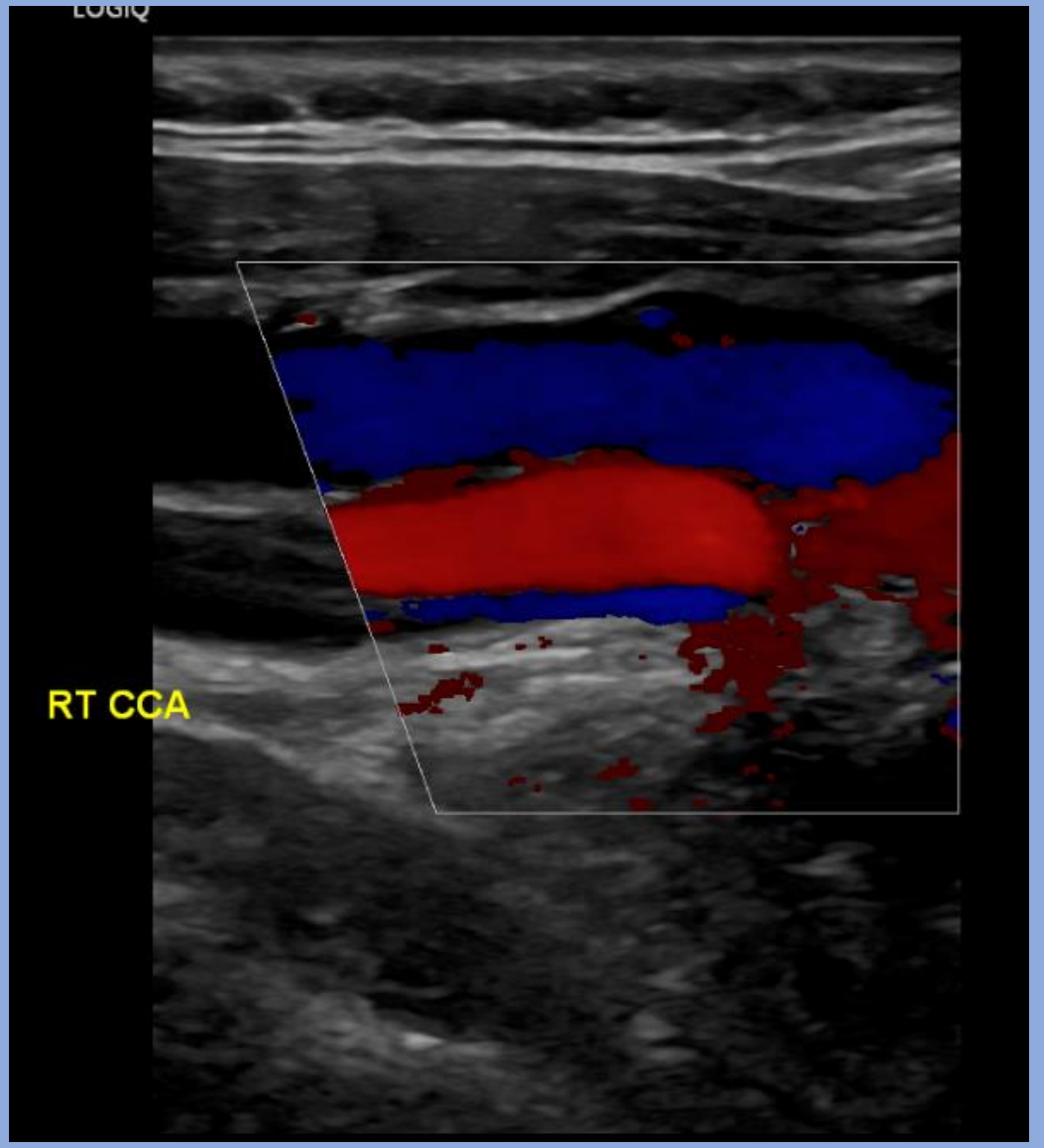


22 MONTHS POST-OP

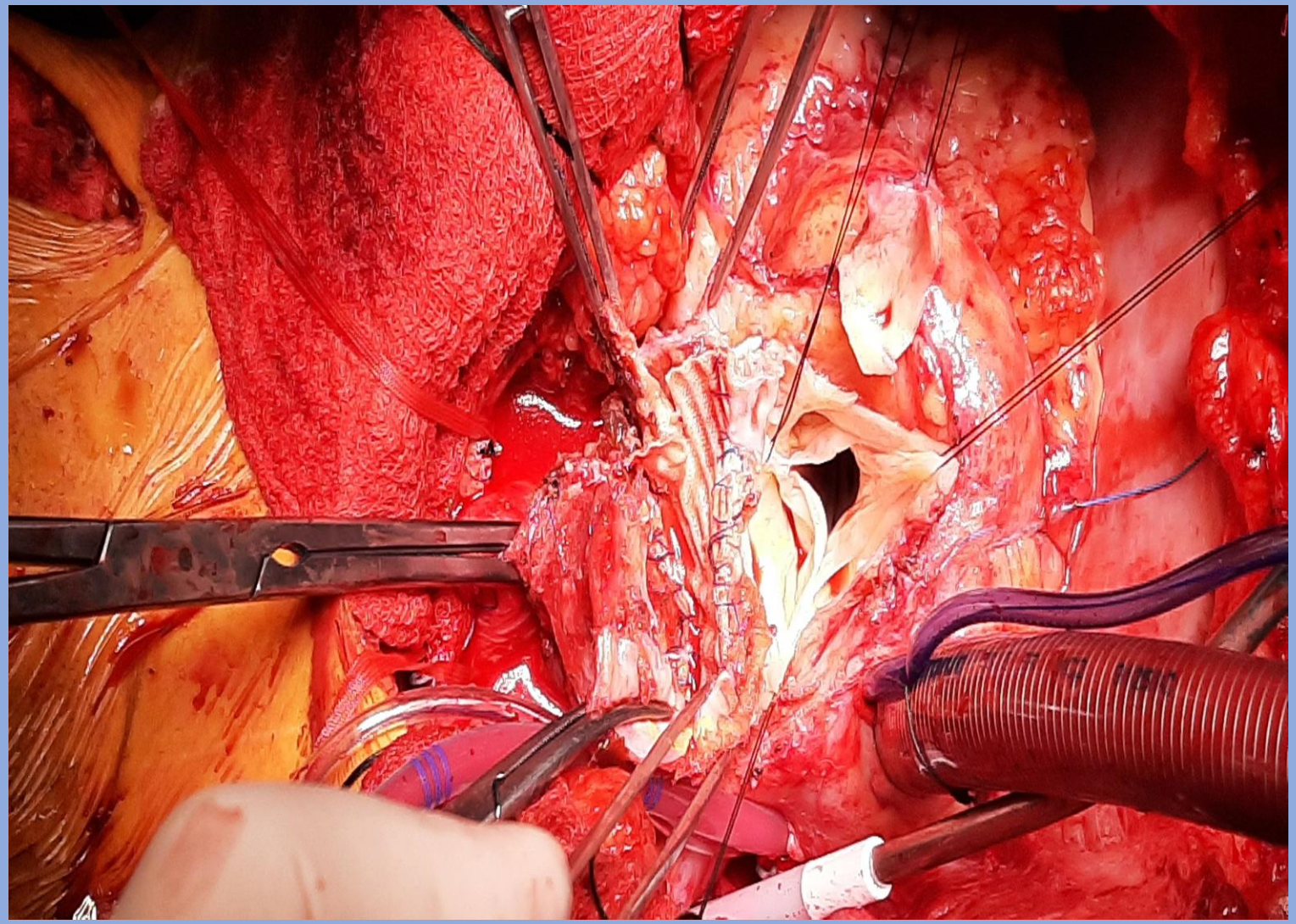


22 MONTHS POST-OP



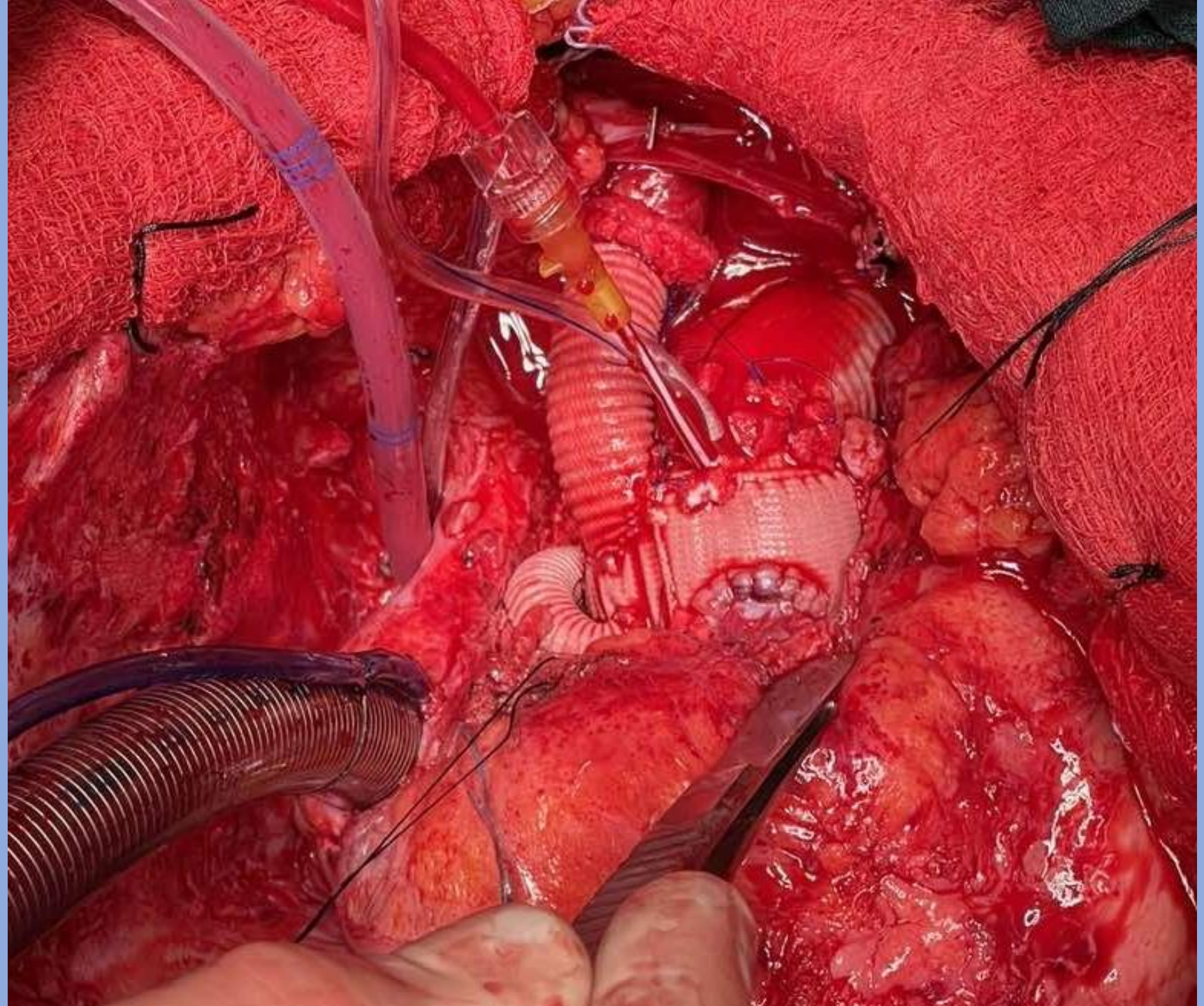


REDO AORTIC OPERATION

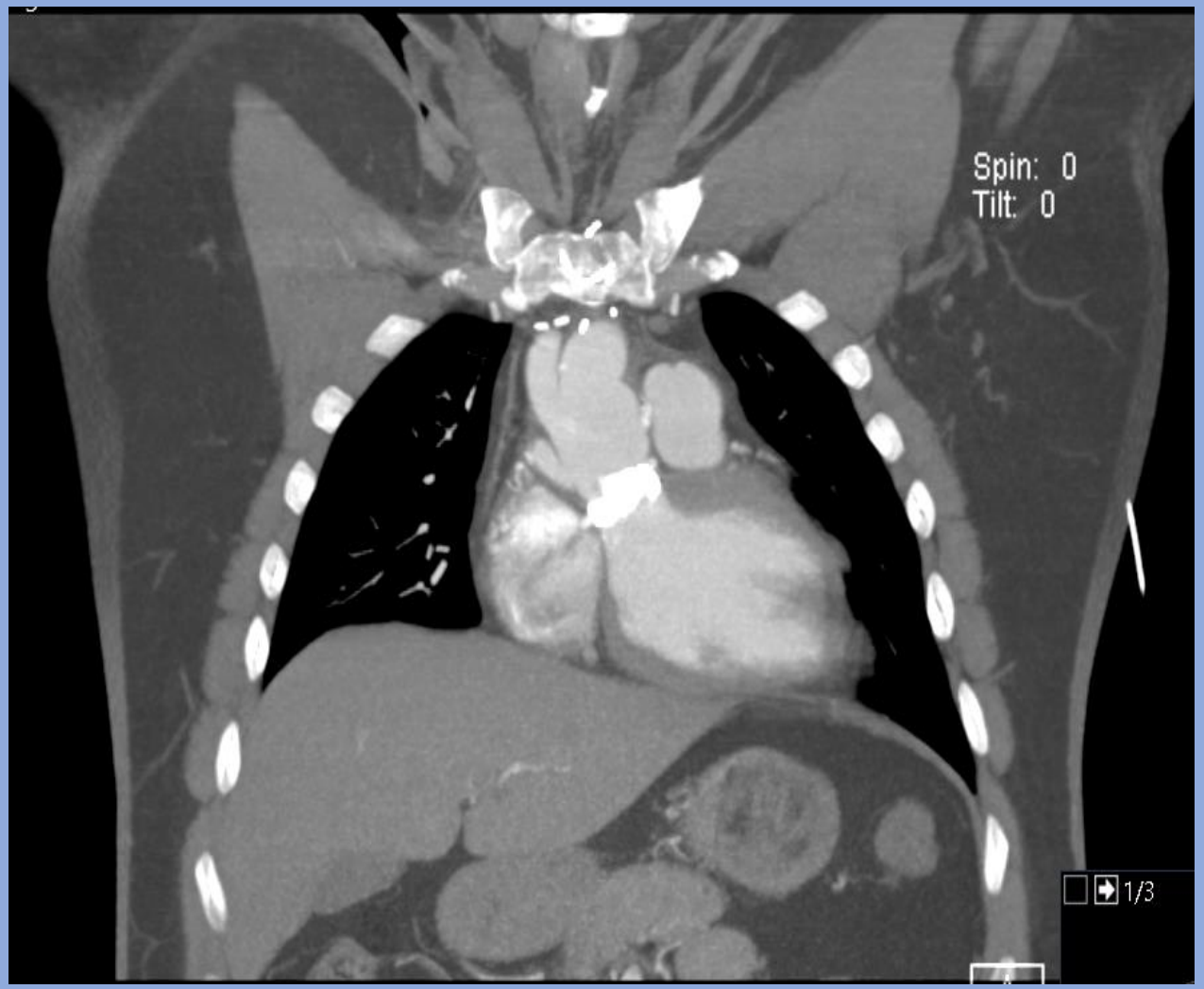


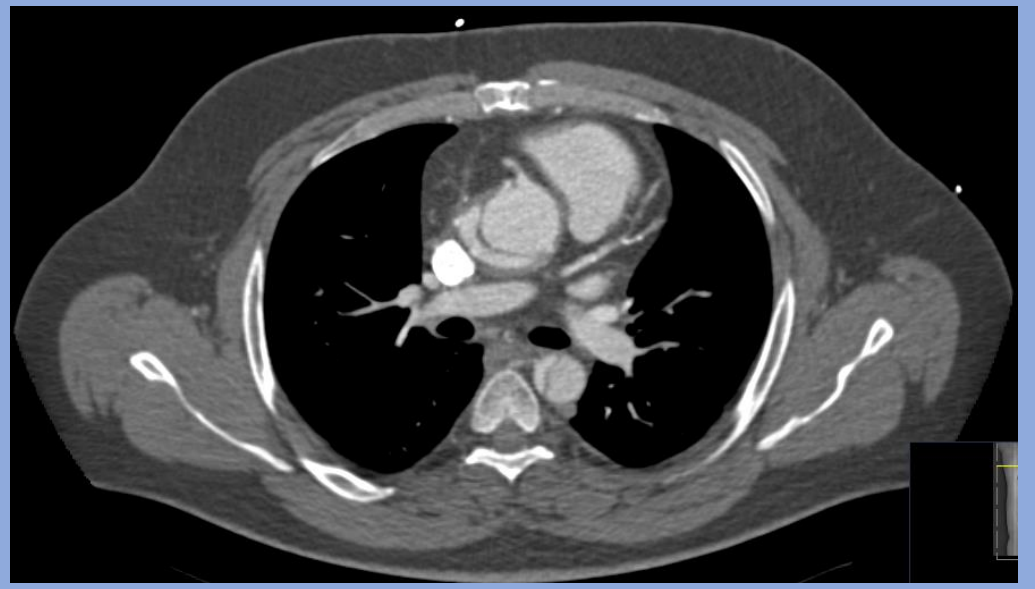
DHCA
Bilateral ACP

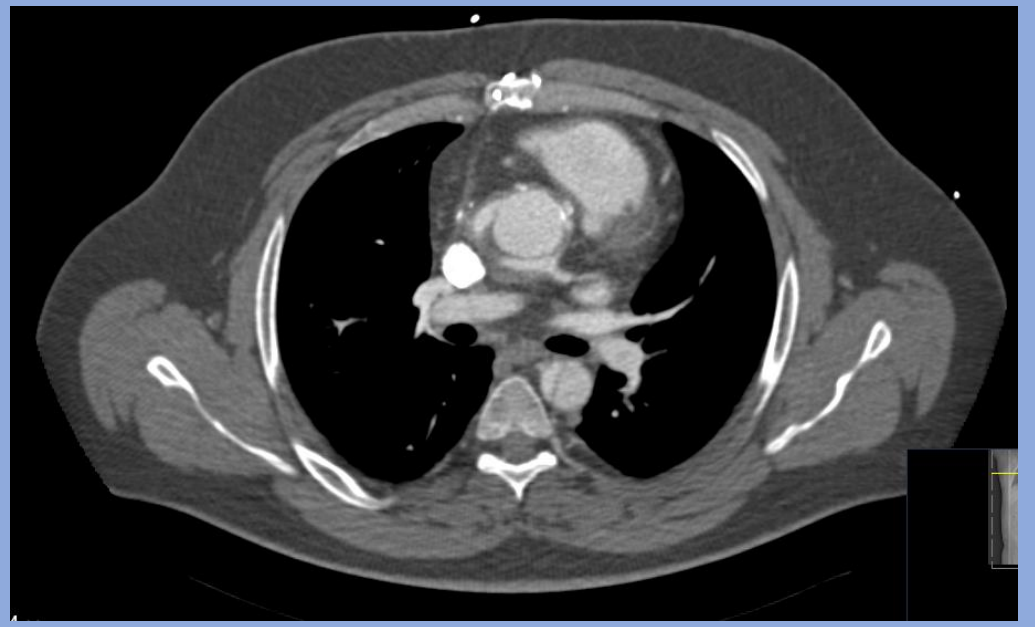
2 Arterial lines:
RAXA +RCFA



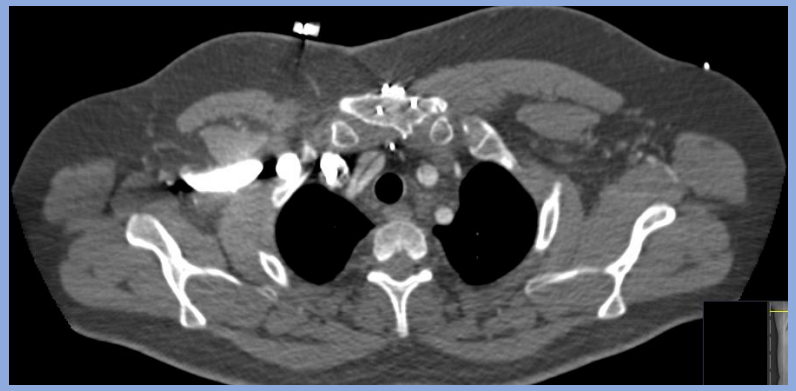
Redo Bentall
Semi- Cabrol
Partial Arch
Replacement
Proximal Innominate
artery replacement

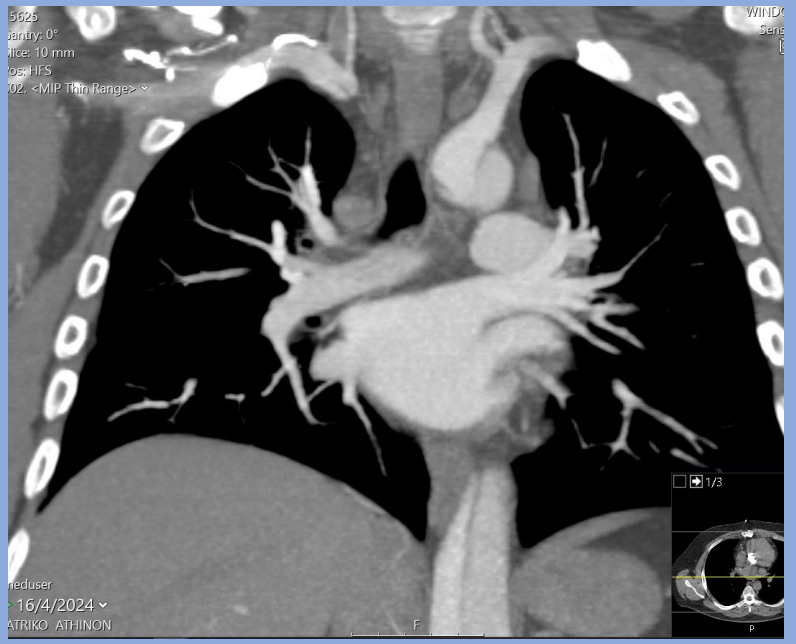

Spin: 0
Tilt: 0
1/3

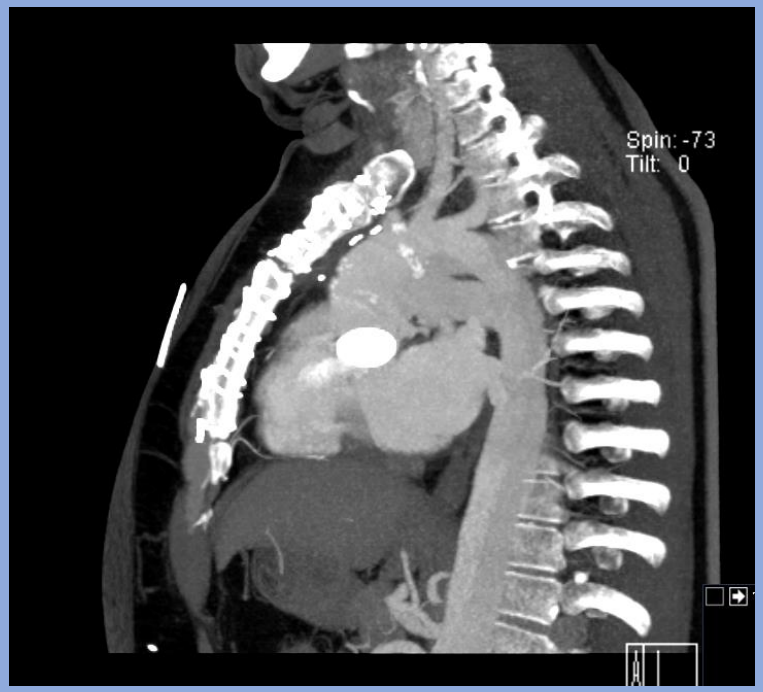




16/4/2024
2ND POST-OP YEAR








15625
503. <Radial VRT Collection>
H
16/4/2024
IATRIKO ATHINON
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IATRIKO ATHINON
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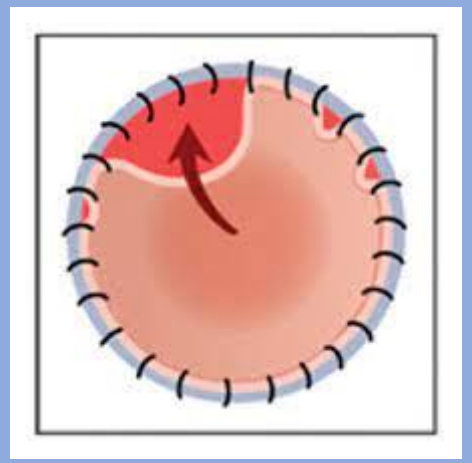
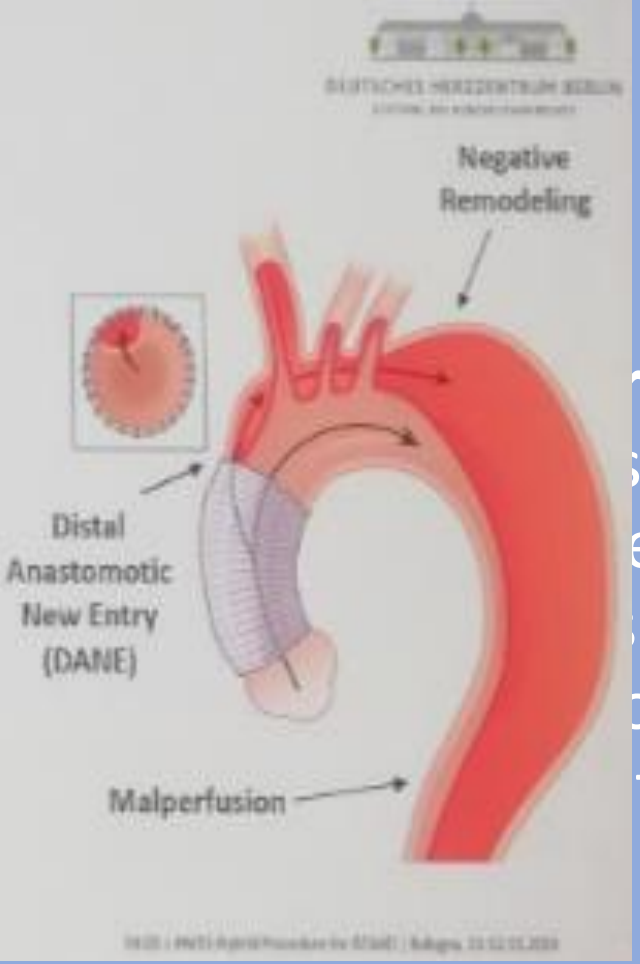


DANES acting as PET

The Pressurized FL

- Pressurization of the FL via the PET (Primary Entry Tear) leads to TL collapse, malperfusion and aortic growth primarily in the region adjacent to the PET.
- Due to the friability of the dissected aorta, between 50-70% of patients following STD hemiarch repair are left with a DANE acting as a PET.



ry after
section
er aortic
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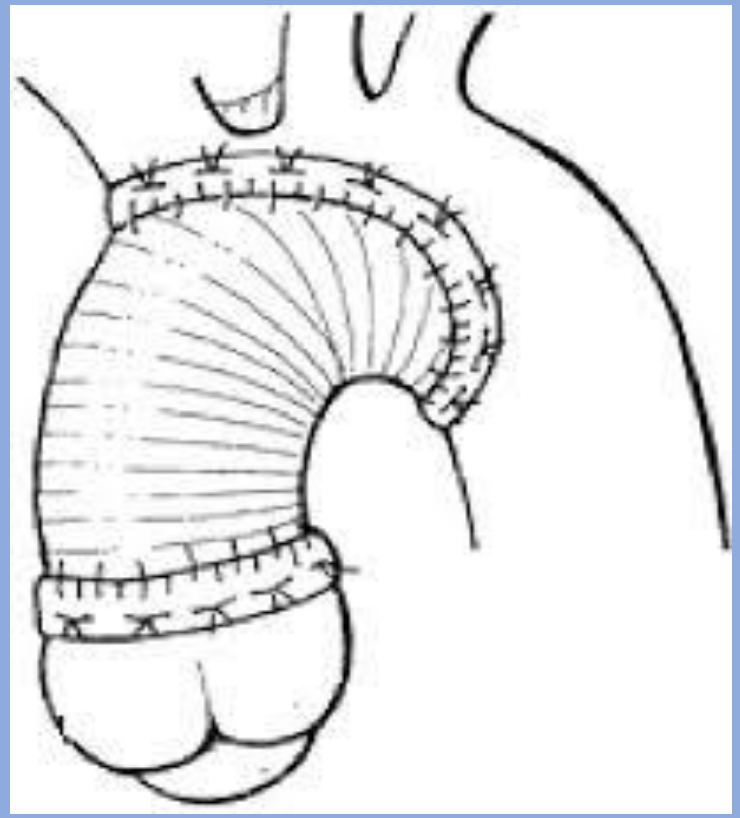
of the
for distal

Kentaro Tamura et al
European Journal of Cardio-Thoracic Surgery 52 (2017) 867–873

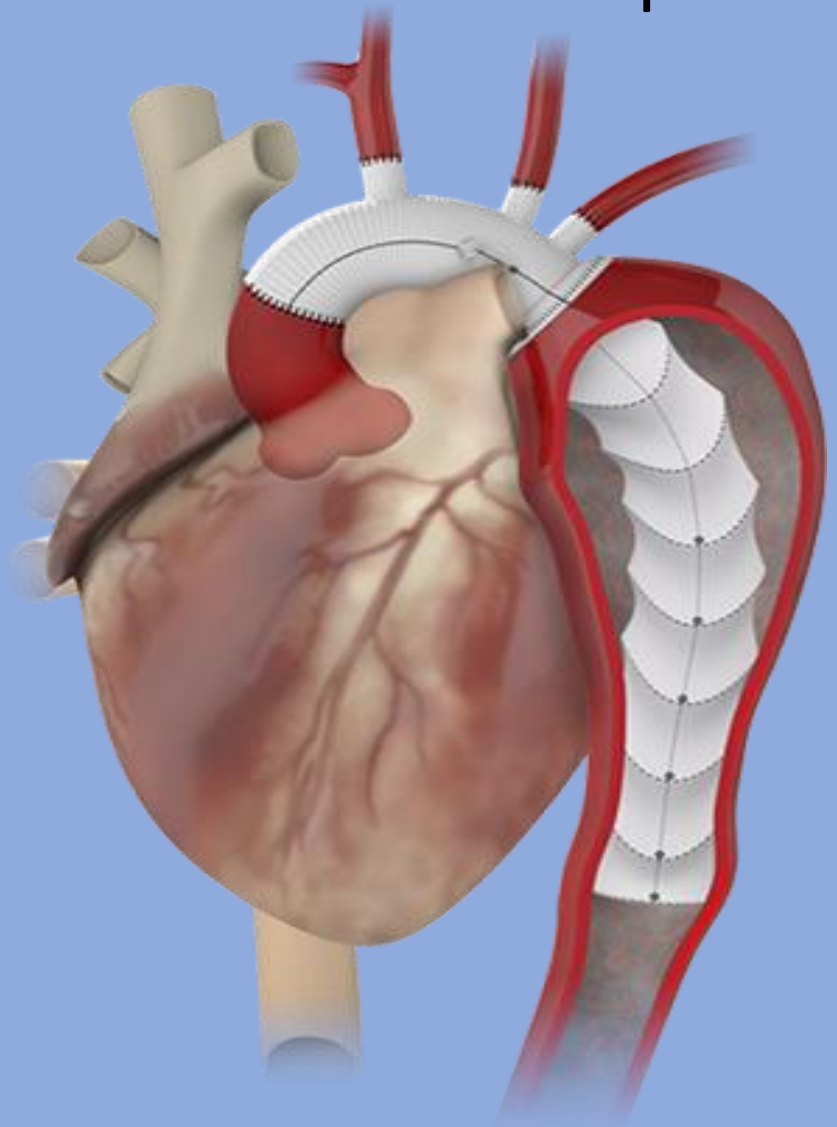
Hemi-arch replacement
'Arch light'

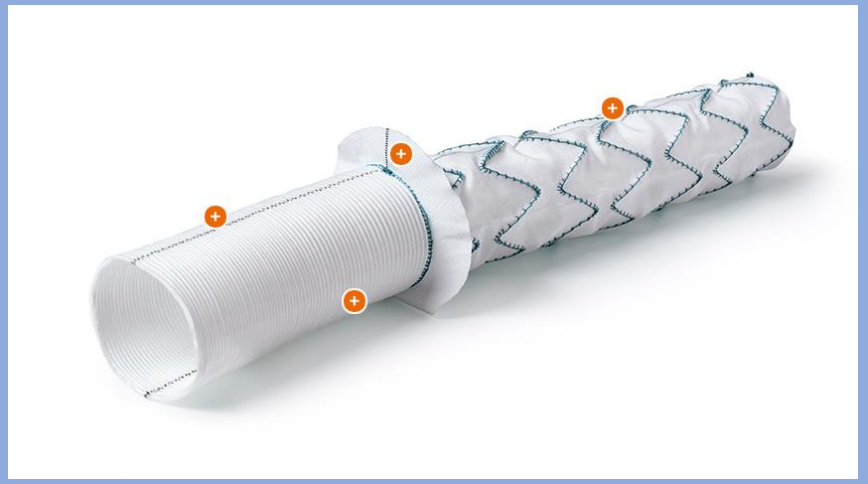


Distal re-operation rate after ‘Simple ‘ repair

- Bavaria et al, 2007 (USA), 26% Reoperation at 12 years
  - Included Debakey II
- Ishihara et al, 2009 (Japan), 27% Aortic Events at 5 years
- Di Bartolomeo et al, 2001 (Italy), 27% Reoperation at 7 years
- Griepp et al, (USA), 16% reoperation at 8 years
  - Included Debakey II

Frozen –Elephant Trunk FET



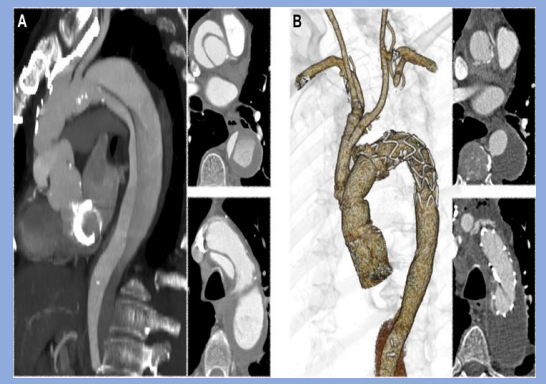


The ability to perform FET is not available everywhere, primarily due to :

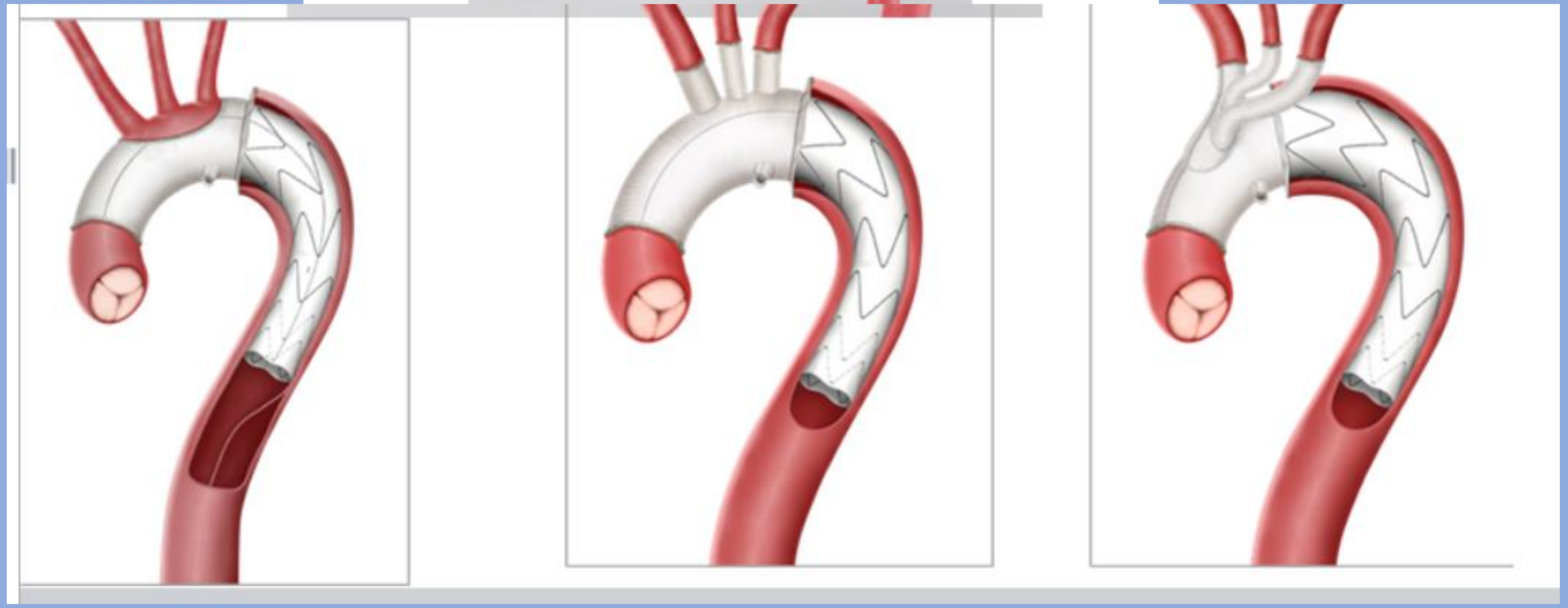
- cost of the devices
- need for surgical expertise at centers not familiar with the device.

It is a technique that when used to treat acute aortic dissection **can:**

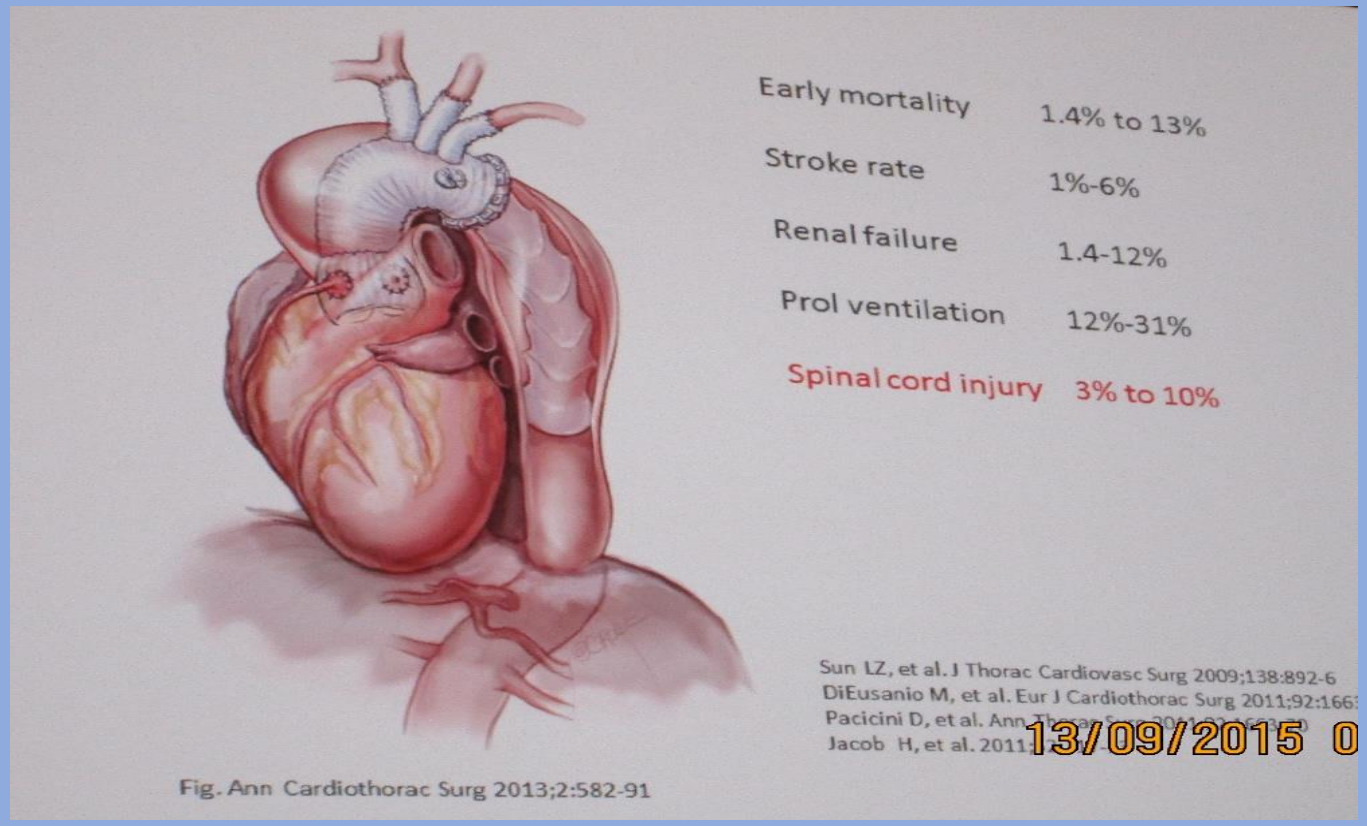
- **reduce distal aortic malperfusion**
- **enhance FL thrombosis**
- **prevent secondary aortic reinterventions**
- **and may improve survival.**

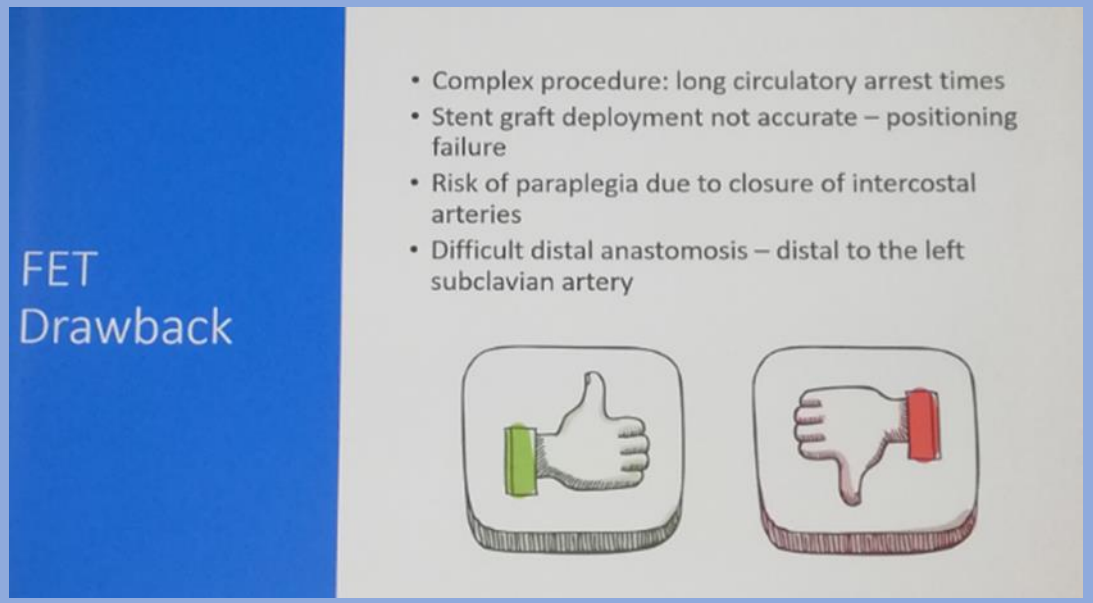


E-vita open NEO hybrid prosthesis



TOTAL ARCH REPLACEMEN FROZEN ELEPHANT TRUNK





enemy of good is perfect'.

AMDS Ascyrus Medical Dissection Stent

The ideal arch intervention to address acute type A aortic dissection complicated by malperfusion should address the following objectives:

(1) to relieve distal malperfusion by expanding the distal true lumen and depressurizing the false lumen

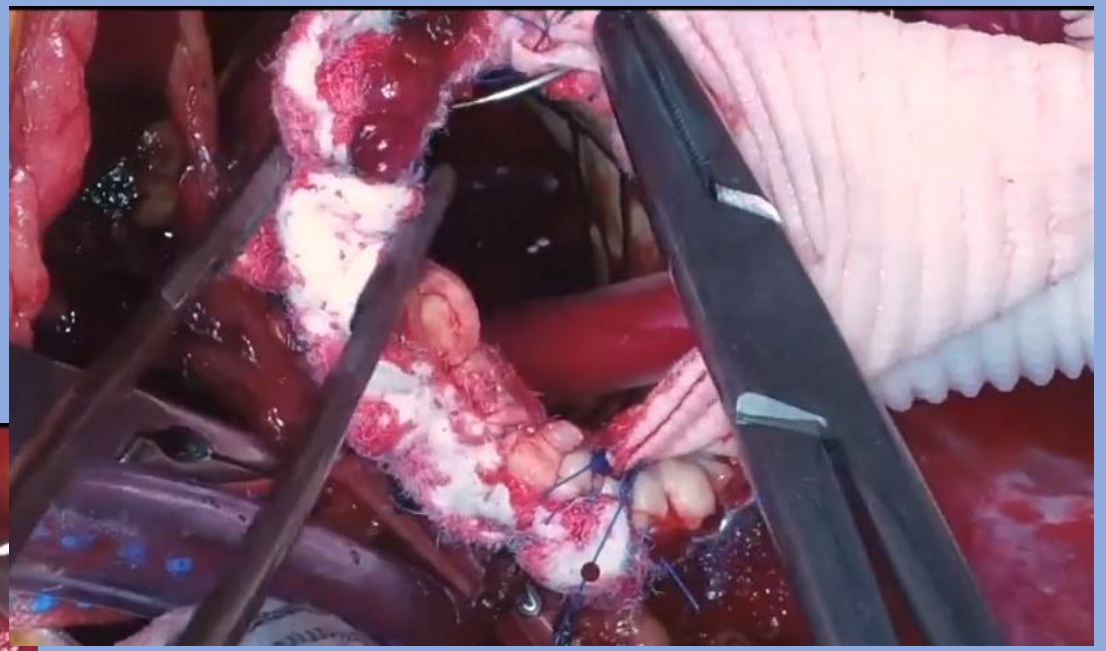
(2) to avoid compromising arch branches without requiring additional arch branch interventions

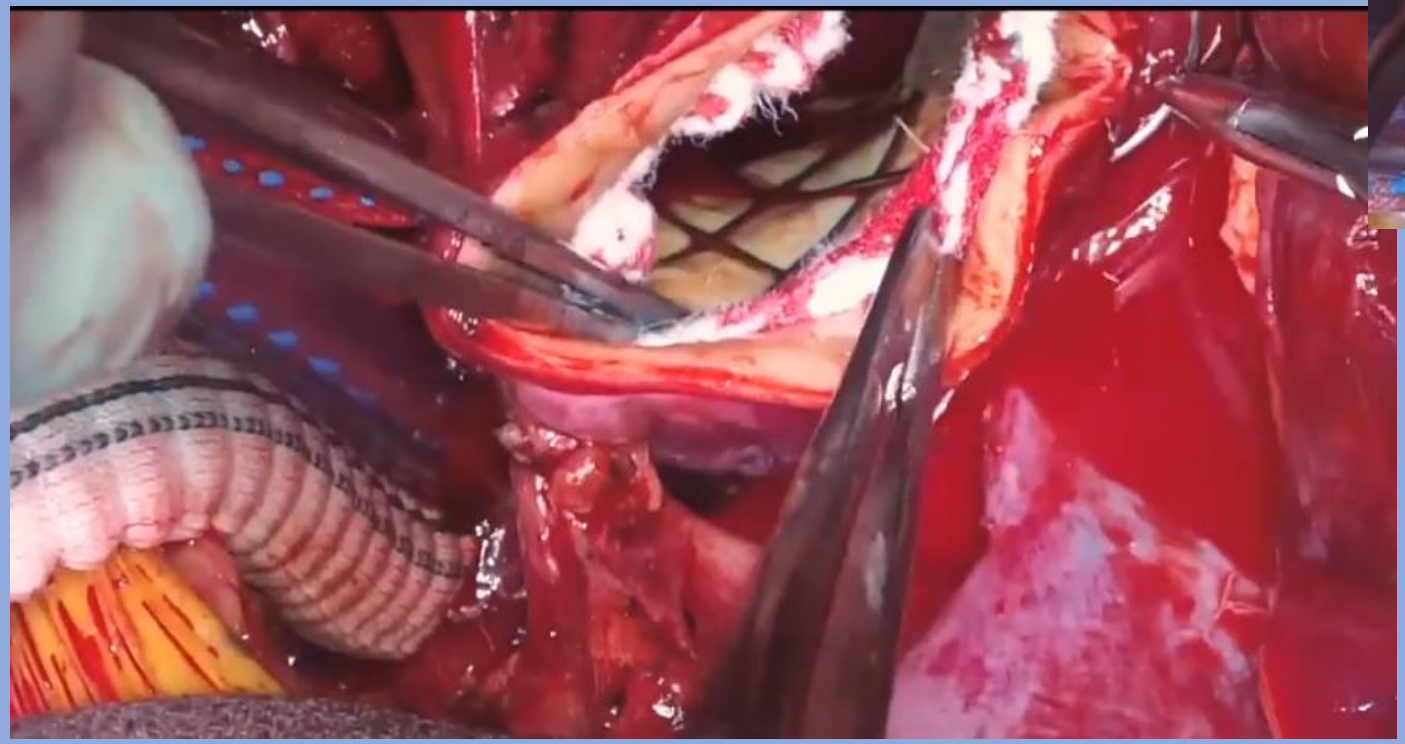
(3) to minimize the risk of spinal cord ischemia

(4) to minimize the operative duration and circulatory arrest time.

There is no need for X-Ray, fluoroscopy or hybrid room to use the AMDS system.

Repair of Acute Type A Dissection with Distal Malperfusion using a Novel Hybrid Arch Device

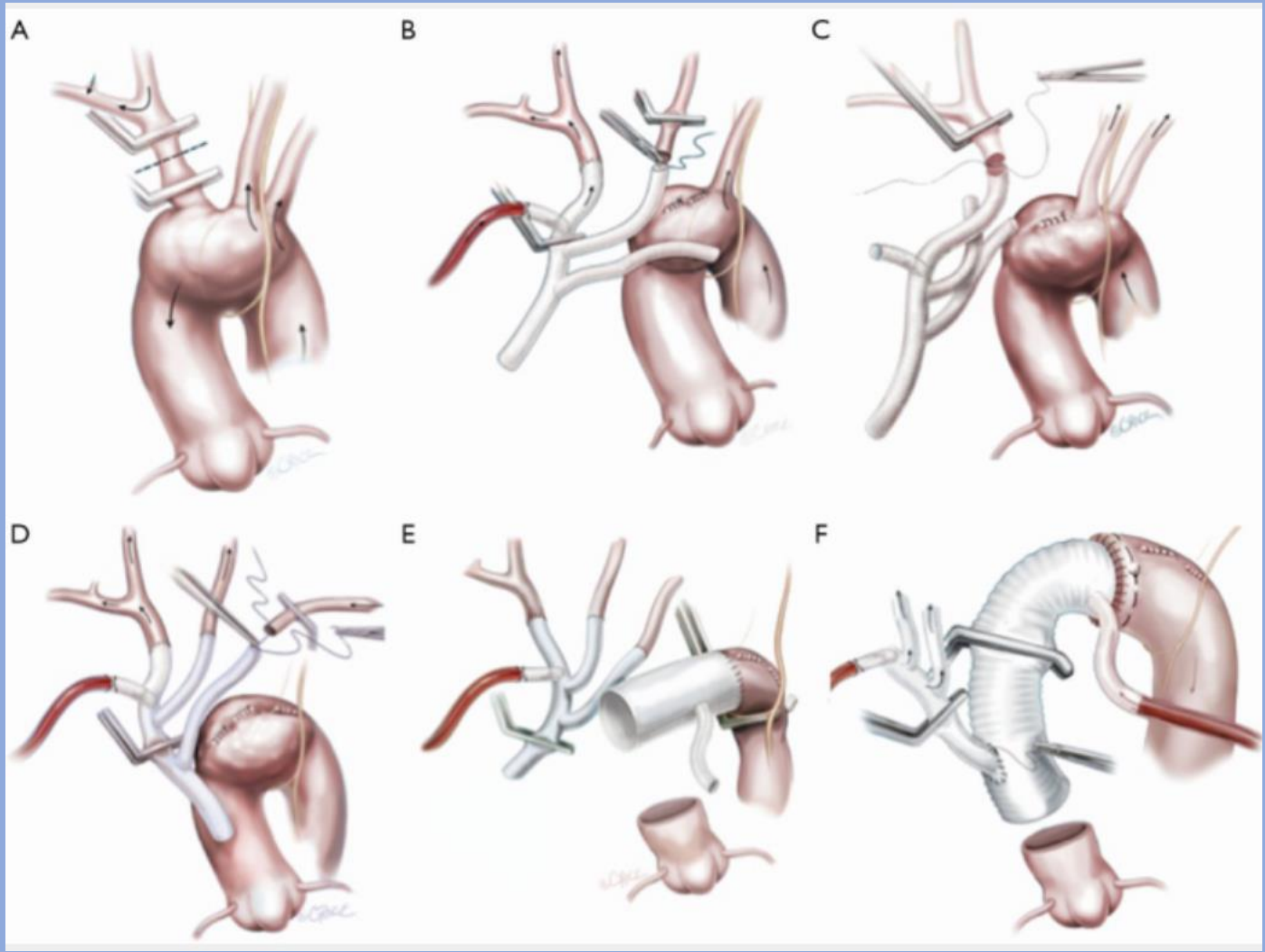




The AMDS device comes **pre-mounted on a delivery system**.

Total aortic repair: the new paradigm in the treatment of acute type A aortic dissection

George Matalanis[1], Nisal K. Perera[1], Sean D. Galvin[2]

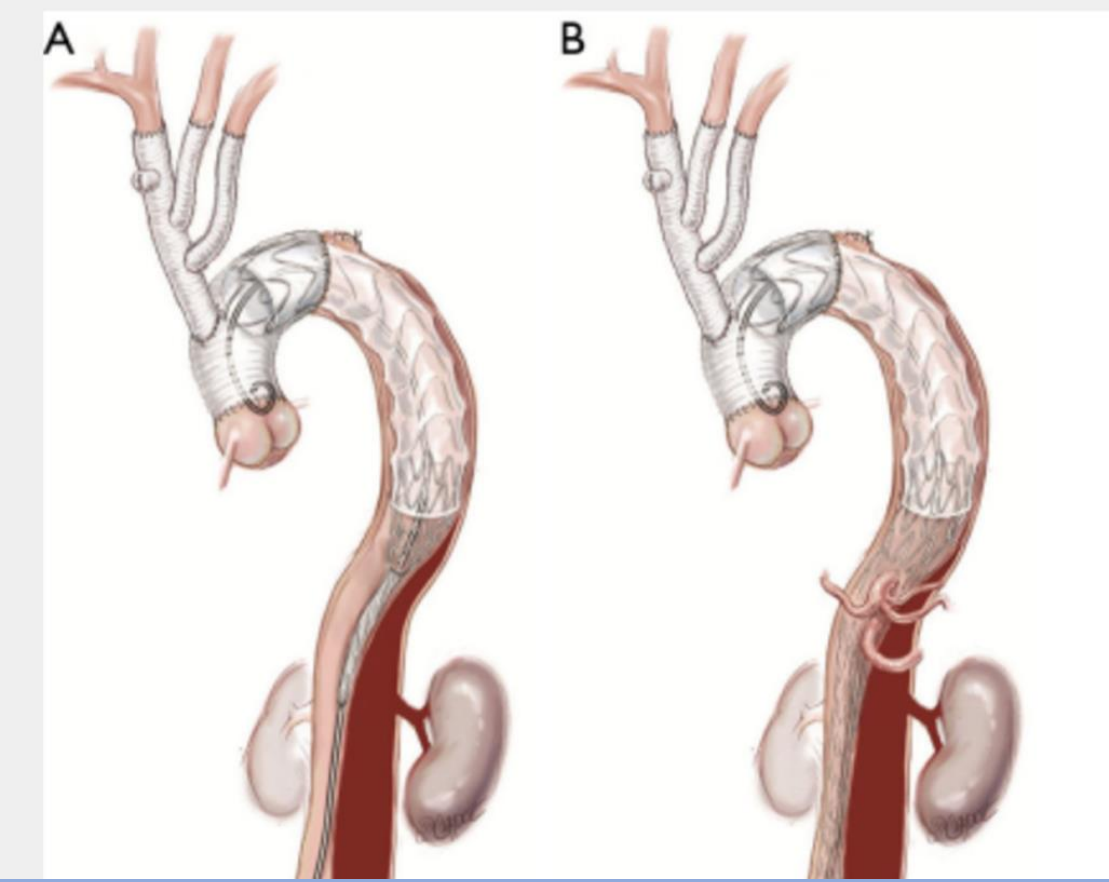


our current technique of Branch First Arch replacement and Total Aortic Repair

STABILIZE the thoracic-abdominal aorta

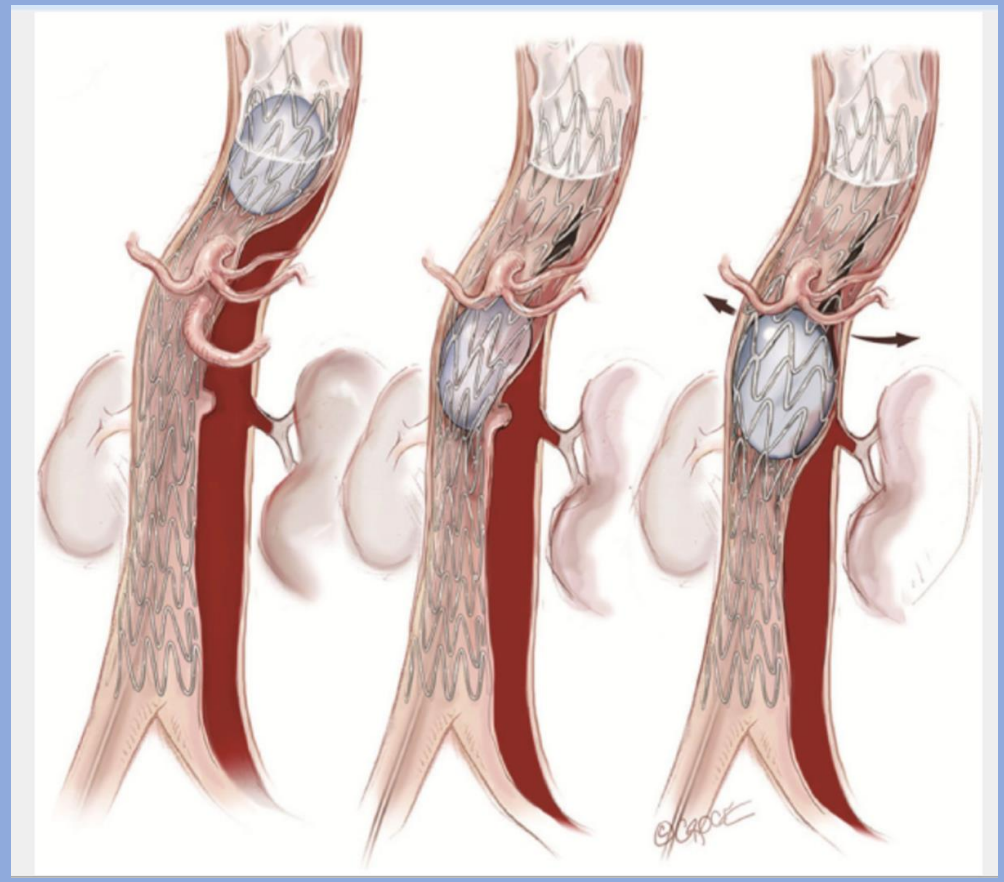
In patients with clinical or CTA features of TL compromise, we proceed as follows. Assuming the clinical situation allows, this **is done during the same hospital admission but after discharge from ICU, when the patient's neurology, circulation and renal function have returned to baseline.**

Covered stent grafts are deployed from the prepared Dacron landing zone to the diaphragm. The remaining thoracoabdominal aorta down to the aortic bifurcation is lined with uncovered 'dissection' stent grafts (Zenith Dissection Endovascular Stent, Cook Medical Inc., Bloomington, IN, USA). These are then are forcibly balloon-dilated to effect a complete rupture of the septum between TL and FL as per the STABILIZE protocol. This ensures pressure equalization between TL and FL and creates a uniluminal aortic channel and so abolishes malperfusion and removes the chronic driving force behind FL growth.



Covered stent grafts are deployed from the prepared Dacron landing zone to the diaphragm

During the same hospital admission but after discharge from ICU, when the patient's neurology, circulation and renal function have returned to baseline.



An angioplasty balloon is then used to sequentially **expand the bare metal stents and rupture the septum between the TL and FL** to create a single aortic channel.

Short-term Risk v Long-term Gain

VS enemy of good is perfect'.

Take home messages

- No place for aortic clamp in ATAAD surgery.

- The *proximal* and the *downstream* problems and the increased need for reoperation after an initial conservative operation.

- The role of DANES in pressurizing the FL

True lumen expansion in distal arch and DTA especially in chronic dissection is difficult without stenting .

EARLY MORTALITY IN OPERATED PATIENTS

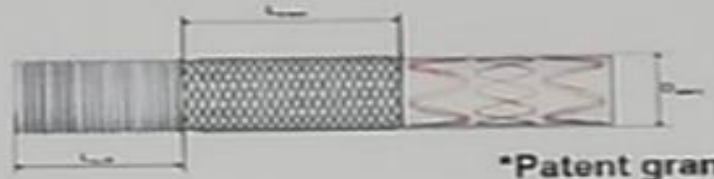
- Around 17% in multi-center studies (5-24%)

- GERAADA :17%
- IRAD :18%
- NORCAAD :16%

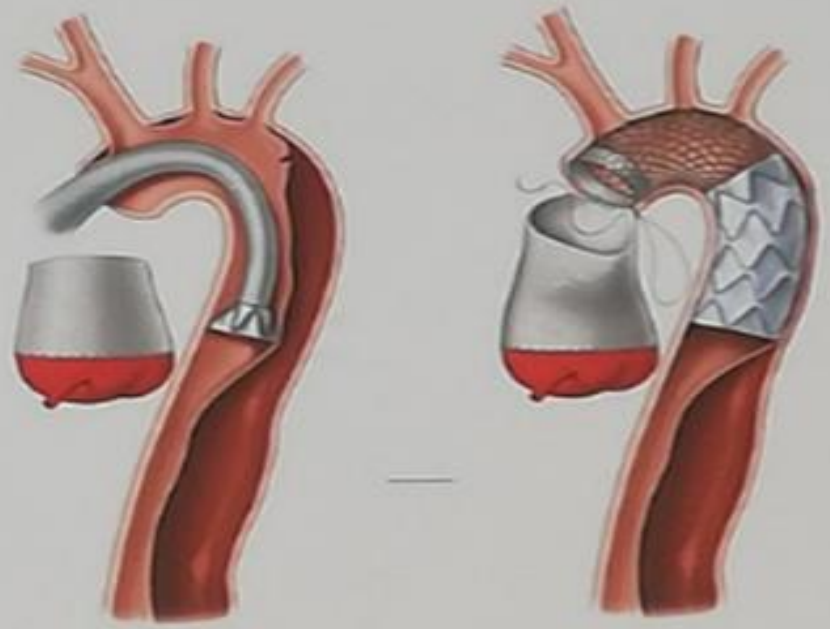
- Clinically stable patients with normal perfusion :around 3%
- Patients with unstable hemodynamics or preoperative malperfusion 18-40%

Heinz Jakob: Enovia (FET 'light')

Combination of FET with an uncovered Stent for the Arch



*Patent granted



Malperfusion of aortic branches

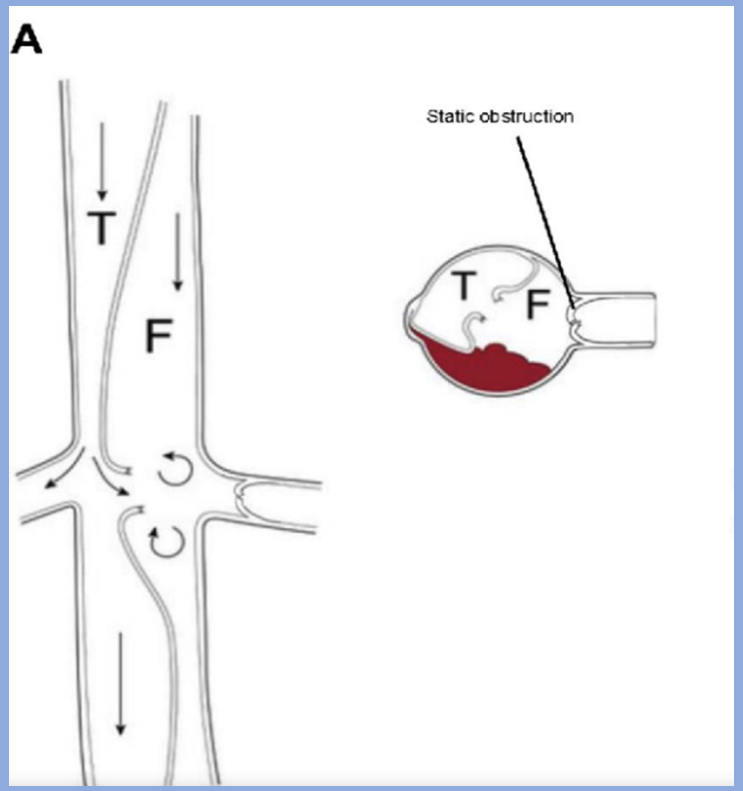
- Incidence of malperfusion (both dynamic and static) 25-50%
- IRAD REGISTRY : on admission
  - Acute renal failure :17,9%
  - Hypotension: 9,7%
  - Lower limb ischemia : 9,5%
  - Mesenteric ischemia and /or infarction : 7,4%
  - Spinal ischemia : 2,5%

Signs of malperfusion

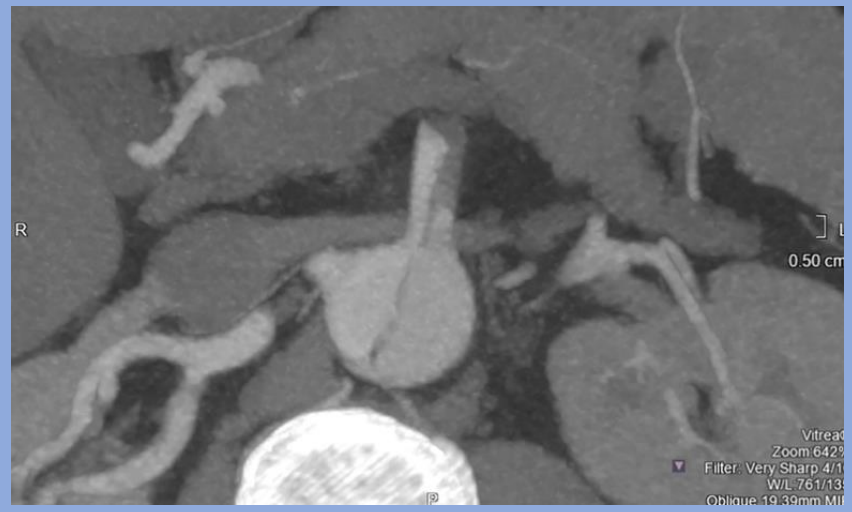
abdominal pain (61%)
lower-extremity weakness (27%)
nonpalpable lower-extremity pulses (24%) d
abnormal lactate, creatinine, liver enzymes, and creatine kinase levels.

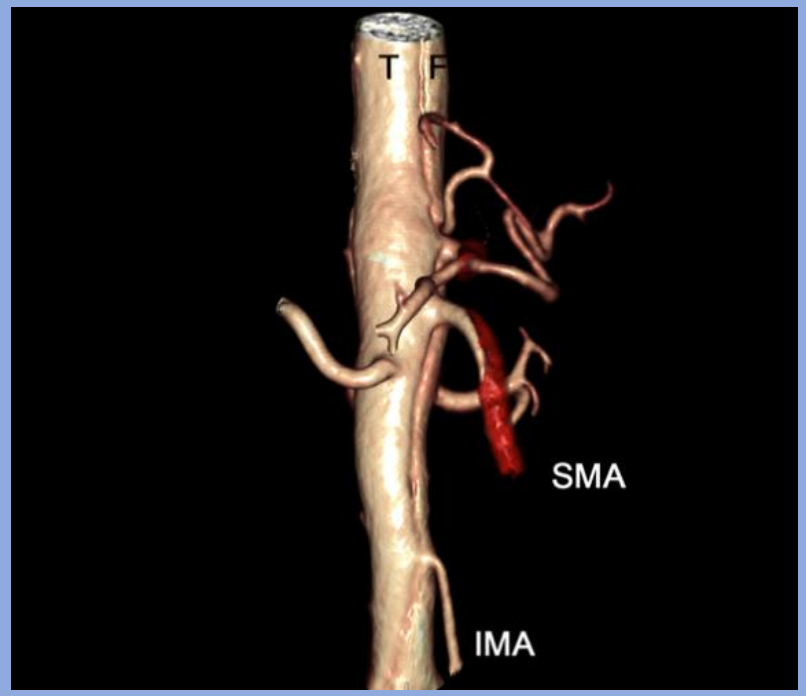
Arterial distributions affected :

spinal cord (2.7%)
celiac (24%)
superior mesenteric (40%)
renal (51%)
and iliofemoral (43%).



Static obstruction

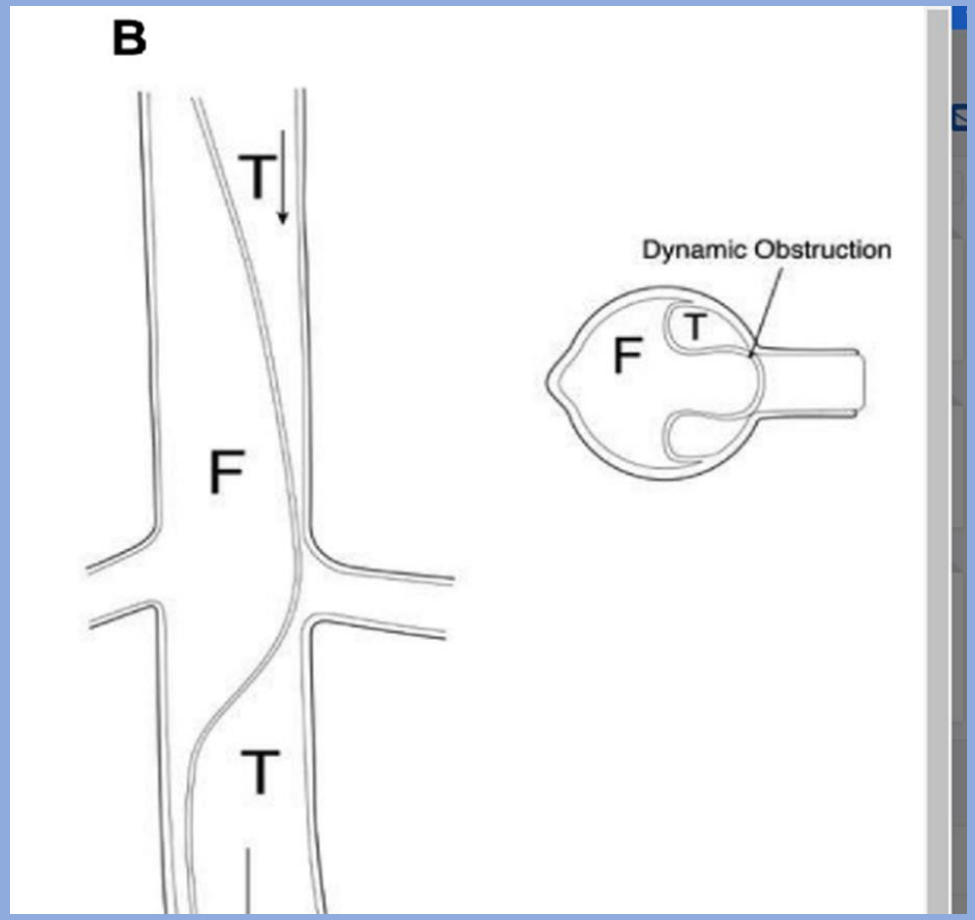




Static obstruction results from extension of the dissection flap into a branch vessel, frequently accompanied by false lumen thrombosis due to no or very small re-entry tear and occlusion of the true lumen, and is present throughout the cardiac cycle.
Total occlusion of a vessel, like the superior mesenteric artery (SMA), by a thrombosed false lumen can lead to thrombosis of the true lumen distal to the dissection. Furthermore, collateral flow to an obstructed SMA is often compromised by dissection-related compromise of the celiac trunk or inferior mesenteric artery.

Static obstruction usually requires stenting or other intervention (fenestration/thromboembolectomy/thrombolysis) of the affected branch vessel to restore flow.

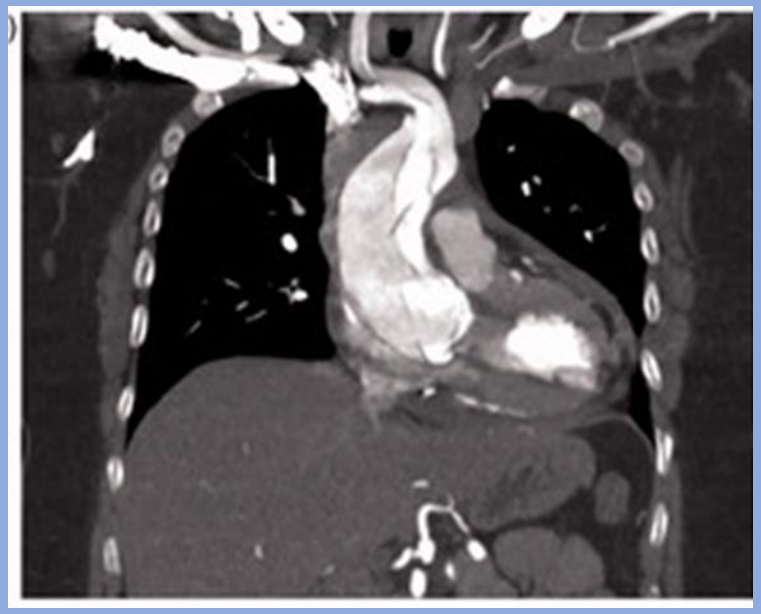
Dynamic obstruction



Dynamic malperfusion results from the dissection flap of a collapsed true lumen prolapsing across the origin of the branch vessel and obstructing flow

Dynamic obstruction can usually be resolved with restoration of the true lumen with a proximal operation for type A Dissection or TEVAR endograft covering the intimal tear or aortic fenestration/stenting.

TAAD and Cerebral Malperfusion



- **Head and neck CTA** for the important differentiation between CCA and ICA occlusion
- The **presence or absence of ICA occlusion** is highly prognostic and impacts the course of surgery
- ICA occlusion may represent a critical marker for predicting neurologic outcomes whereas CCA occlusion or comatose state should Not preclude emergent TAAD surgery
- It is critically important to ***distinguish between reversible cerebral ischemia and infarction with BRAIN PERFUSION SCANN***

Type AAD and Cerebral Malperfusion

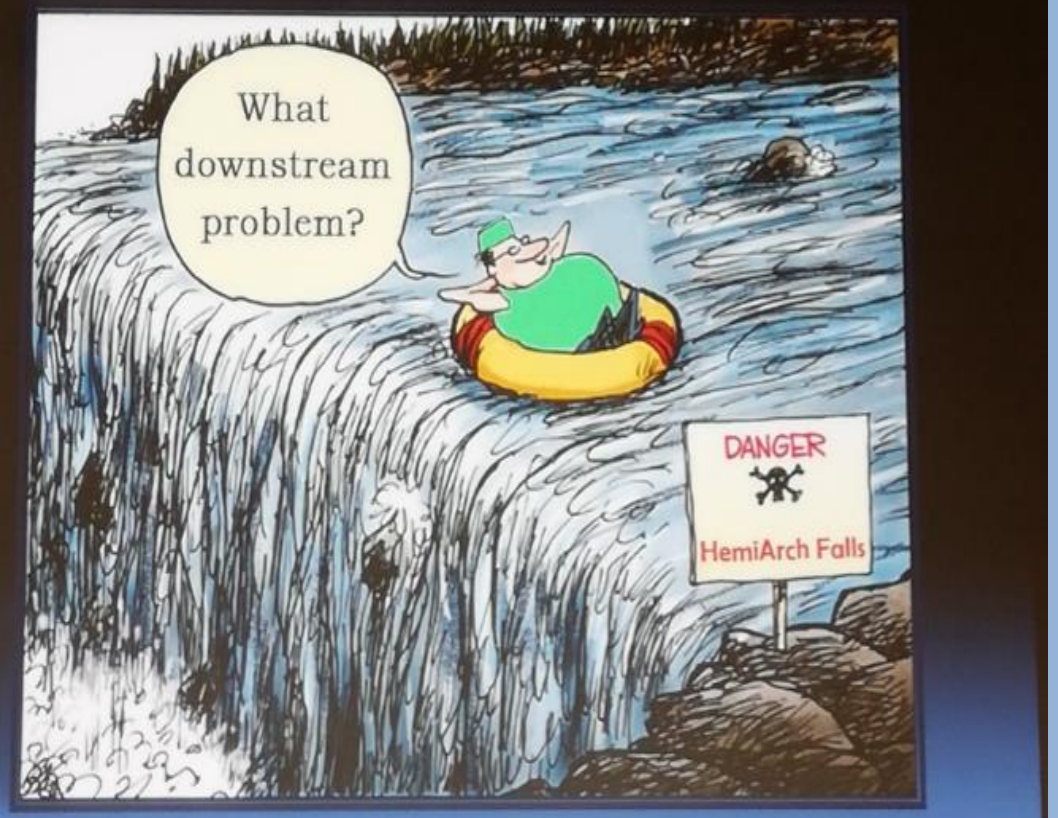
No consensus with regards to the management strategy

- **Differentiation between complete cerebral infarction and ischemia is vitally important**.

- **Intentional delay with aggressive upfront antiedema measures and or decompressive hemicraniectomy**
  Concern that immediate cerebral reperfusion may induce hemorrhagic infarcts and /or brain edema

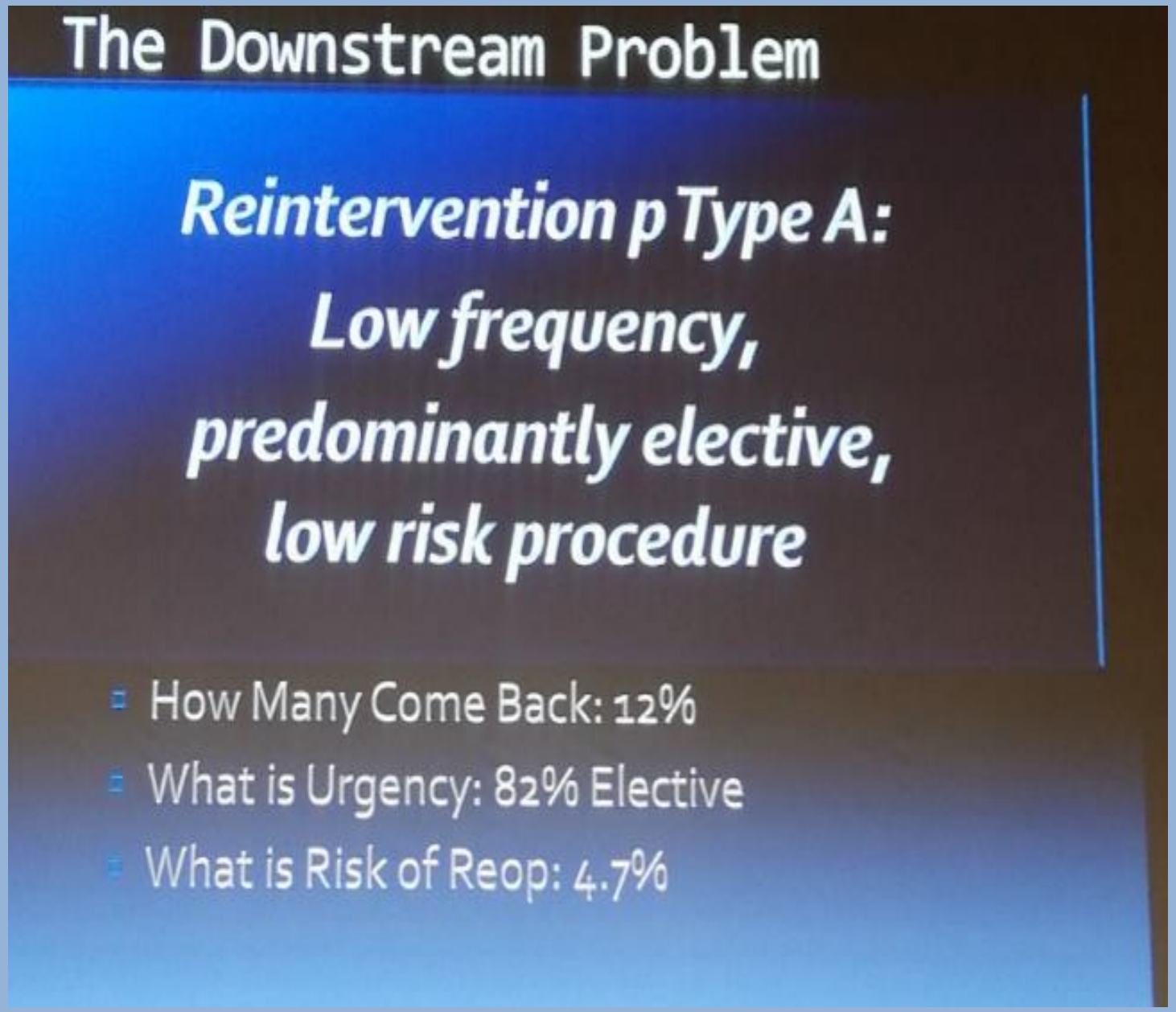
- **Aggressive direct carotid reperfusion before surgical TAAD repair with sunt or carotid stenting**

Downstream Problem



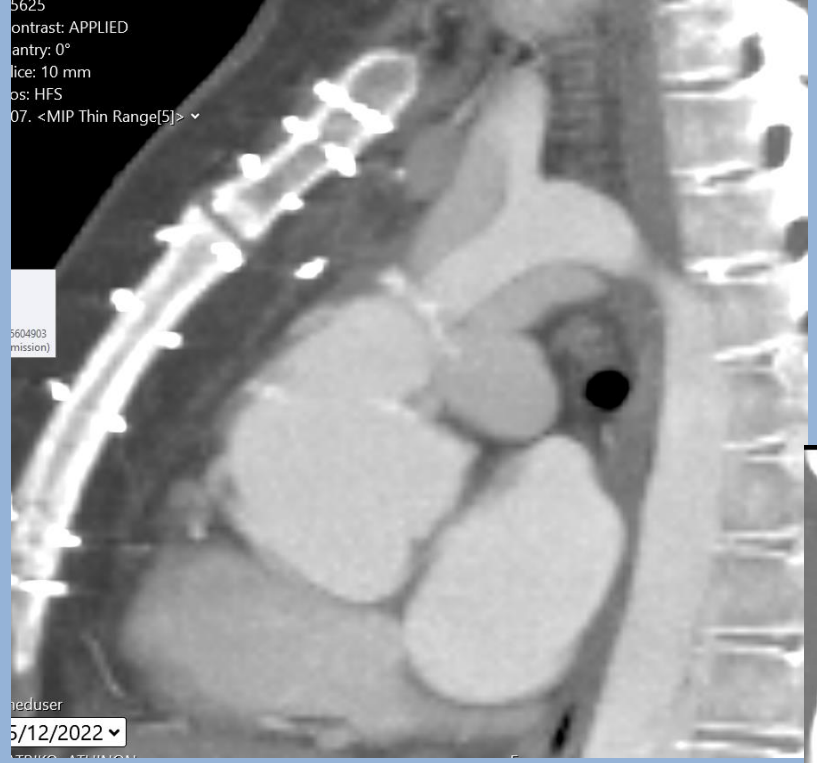
The Downstream Problem:

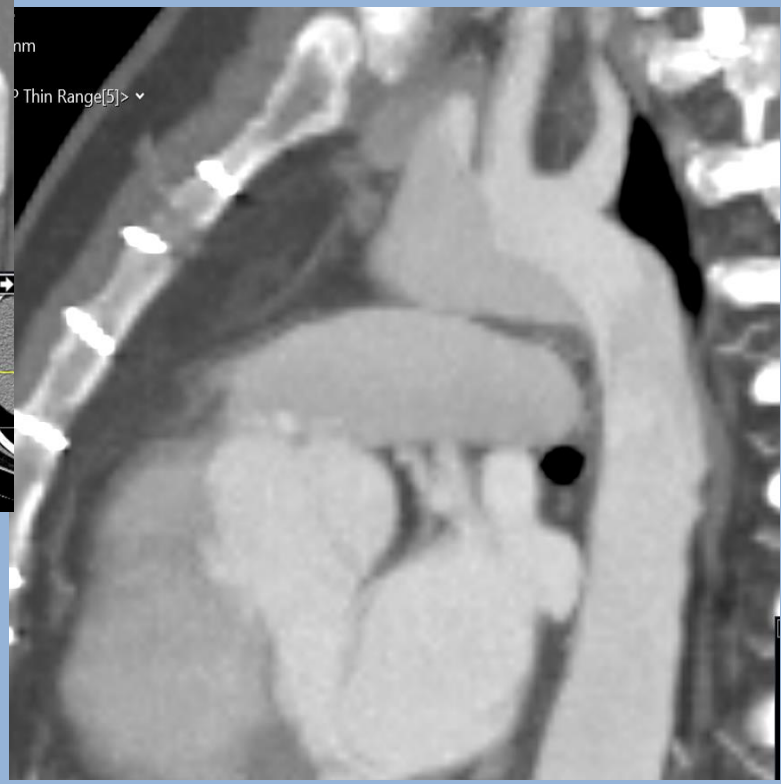
- Substantial late risk due to:
  - High incidence of patent false lumen
  - ↑ Late aortic events
    - High frequency of high risk re-operations
  - ↓ Long term survival

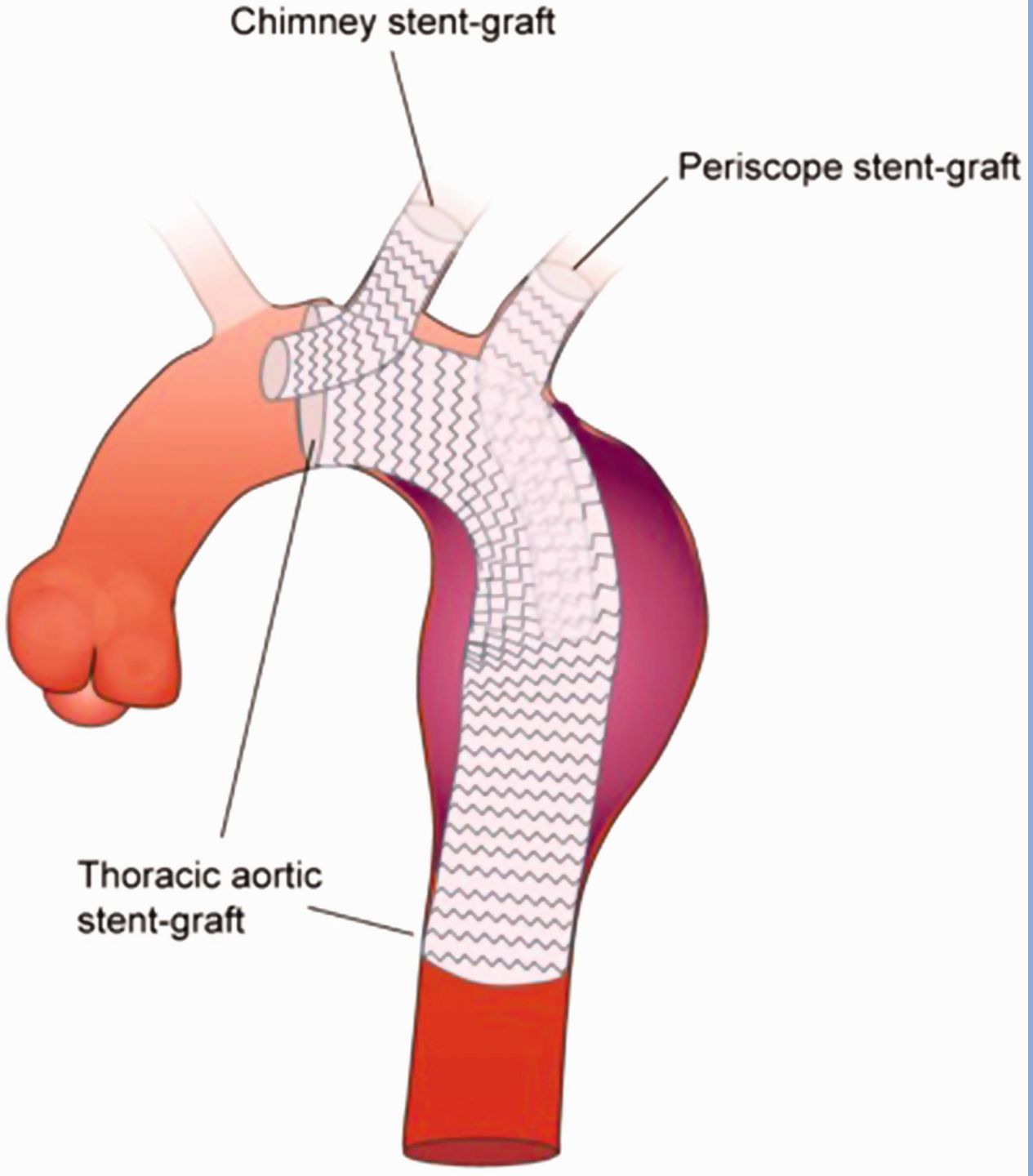


Extended repair for all
puts 100% at risk to treat
10-20% that need late reop.

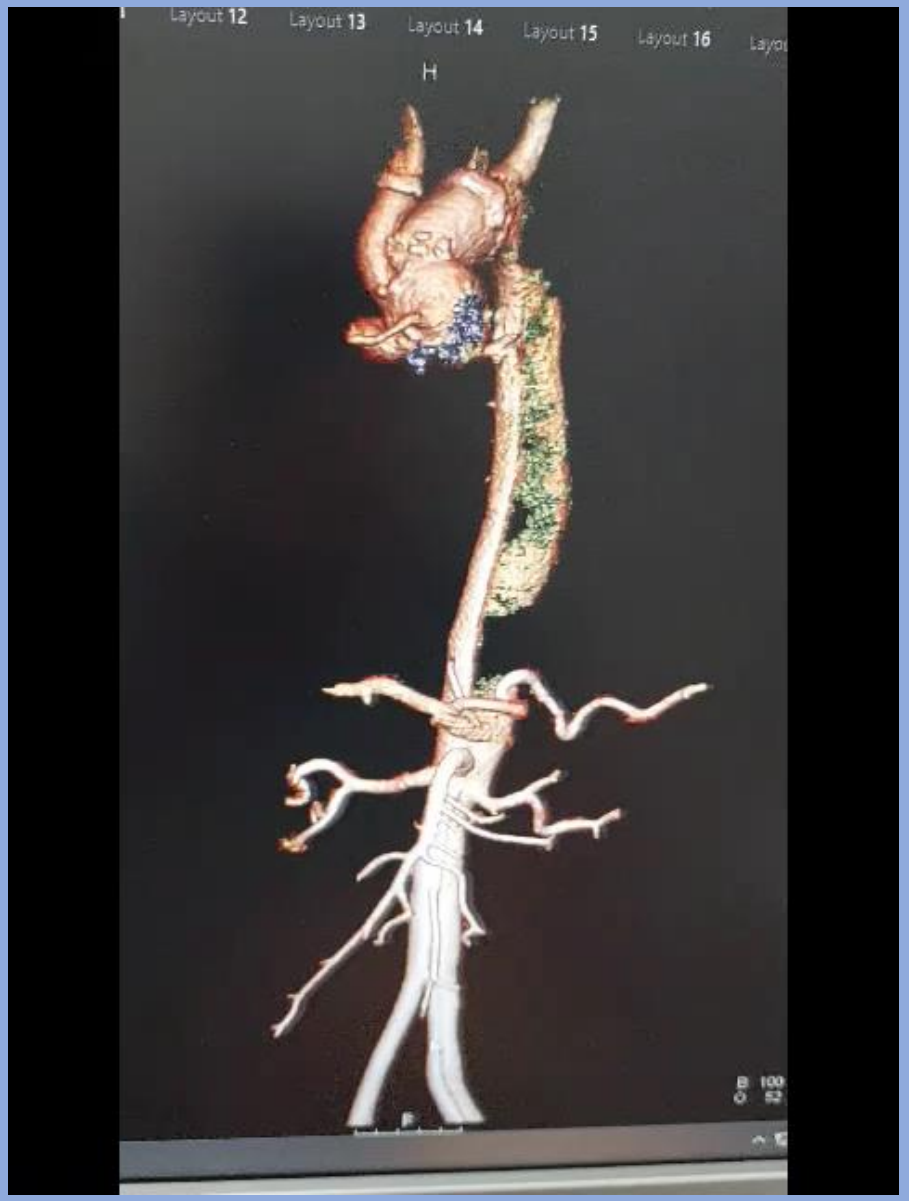
CT- angiography 15 months post-op






Chimney stent-graft
Periscope stent-graft
Thoracic aortic
stent-graft


SAMSUNG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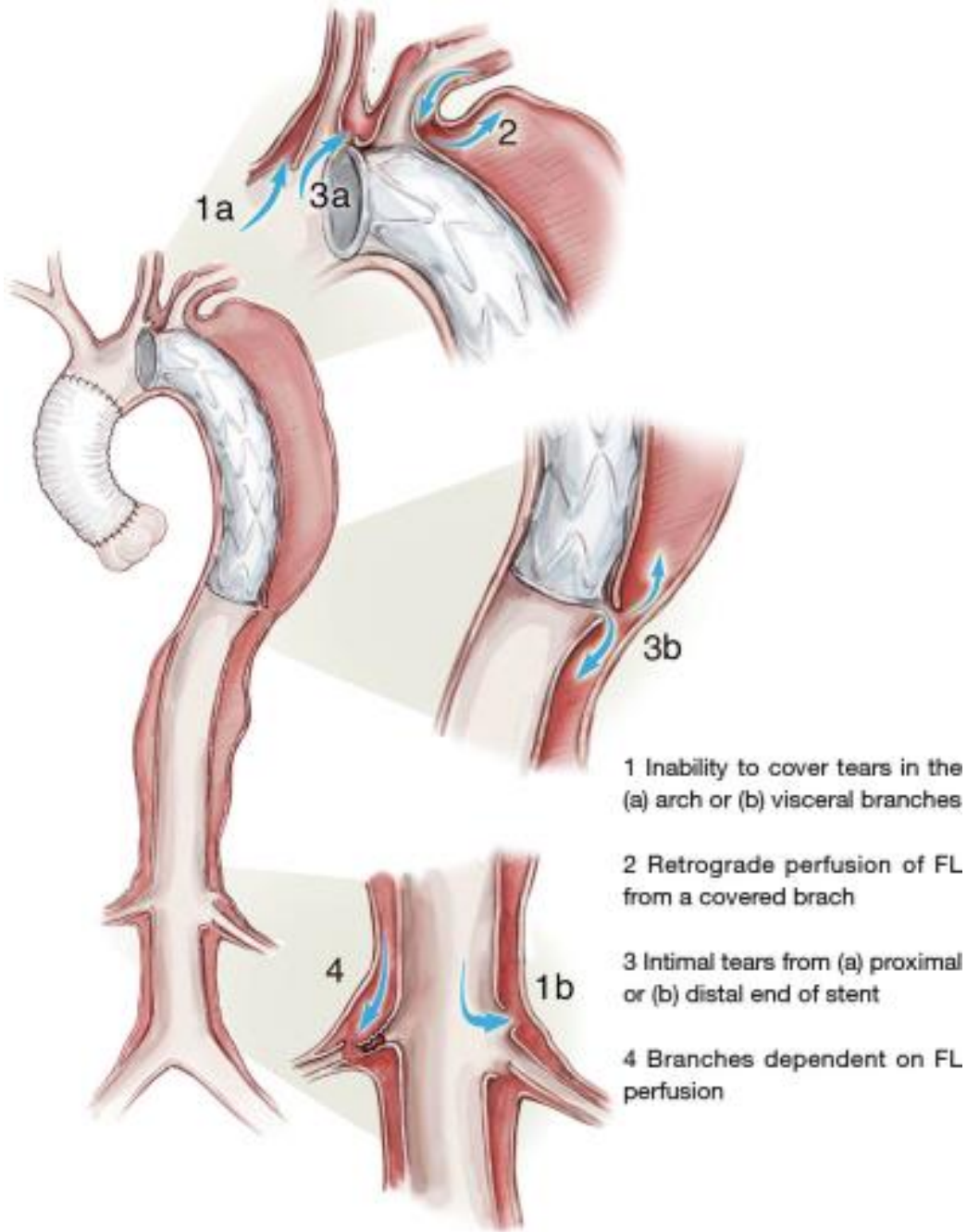


1 Inability to cover tears in the (a) arch or (b) visceral branches

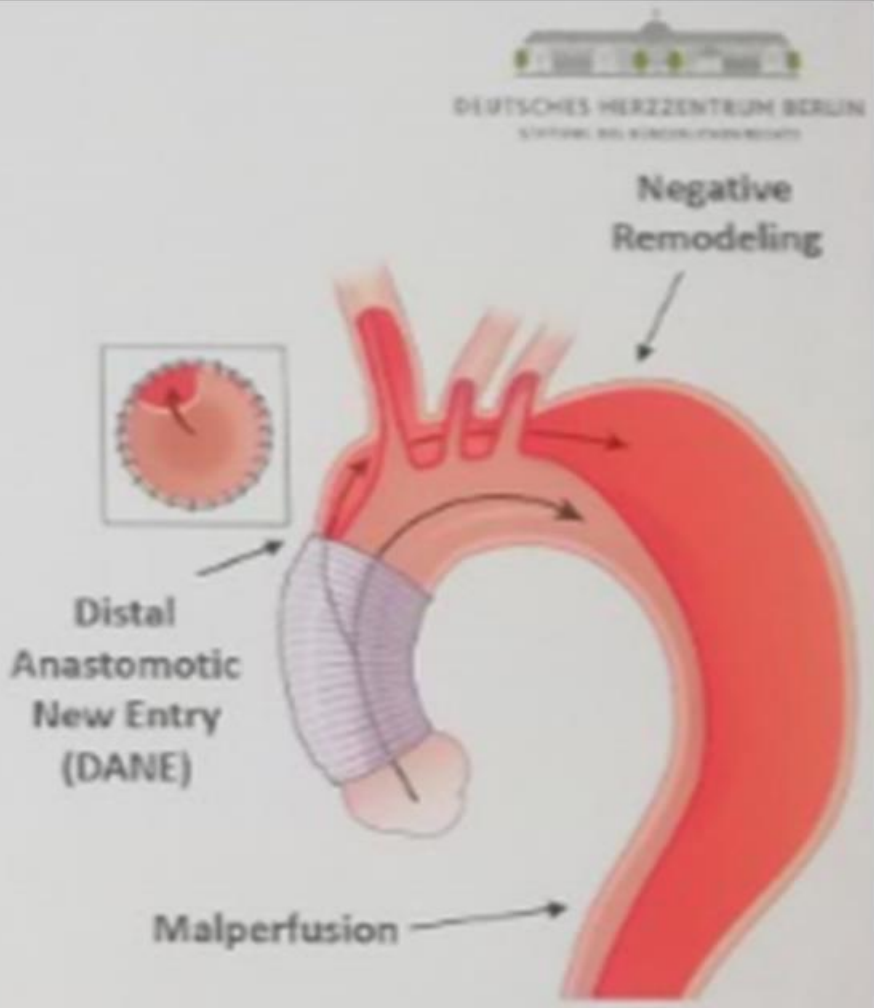
2 Retrograde perfusion of FL from a covered brach

3 Intimal tears from (a) proximal or (b) distal end of stent

4 Branches dependent on FL perfusion

The Pressurized FL

- Pressurization of the FL via the PET (Primary Entry Tear) leads to TL collapse, malperfusion and aortic growth primarily in the region adjacent to the PET.
- Due to the friability of the dissected aorta, between 50-70% of patients following STD hemiarch repair are left with a DANE acting as a PET.



The Downstream Problem

- PROXIMAL REPAIR
  - FL Patency - High
  - Early Mortality – Better
  - Late Mortality – Same
  - Late Ao Events – More
- WHAT IS MAGNITUDE OF PROBLEM
  - How Many Come Back: 12%
  - What is Urgency: 82% Elective
  - What is Risk of Reop: 4.7%

The Downstream Problem

Reintervention p Type A: Low frequency, predominantly elective, low risk procedure

- How Many Come Back: 12%
- What is Urgency: 82% Elective
- What is Risk of Reop: 4.7%