23° Ετήσιο Σεμινάριο Συνεχιζόμενης Ιατρικής Εκπαίδευσης Νοσοκομείου «Ο Ευαγγελισμός»

Αθήνα, 26 Φεβρουαρίου – 2 Μαρτίου 2018

Διαχωρισμός τύπου Α

Ιωάννης Κοκοτσάκης ,MD, PhD, FETCS
Καρδιοχειρουργός Διευθυντής
Καρδιοχειρουργικής Κλινικής
ΓΝΑ «Ο Ευαγγελισμός»

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Δεν υπάρχει σύγκρουση συμφερόντων
με τις παρακάτω χορηγούς εταιρείες:

NOVARTIS, JANSSEN ONCOLOGY, ABBVIE, BRISTOL-MYERS SQUIBB, MEDTRONIC, TAKEDA, GENESIS, MSD, PFIZER, AMGEN, ASTELLAS, GILEAD, AENORASIS, BAXTER, BIANEΞ, WINMEDICA, ABBOTT, BIOΣΕΡ, SANOFI, ANGELINI, DEMO, ELPEN, EDWARDS, ROCHE, RONTIS, SPECIFAR, UCB, ΥΓΕΙΟΔΥΝΑΜΙΚΗ, MAVROGENIS

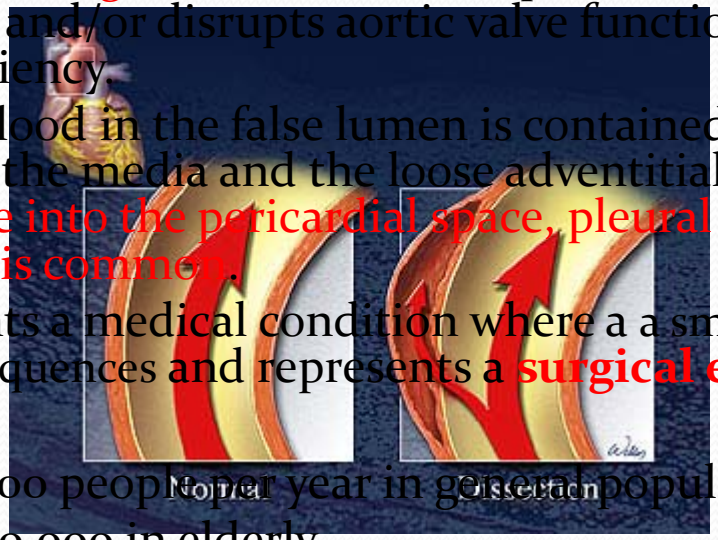
Acute Aortic Dissection (AAD)

AAD usually results from a tear in the aortic intima, which allows a pressurized hematoma to form within the media between the inner two-thirds and outer one-third of the aorta.

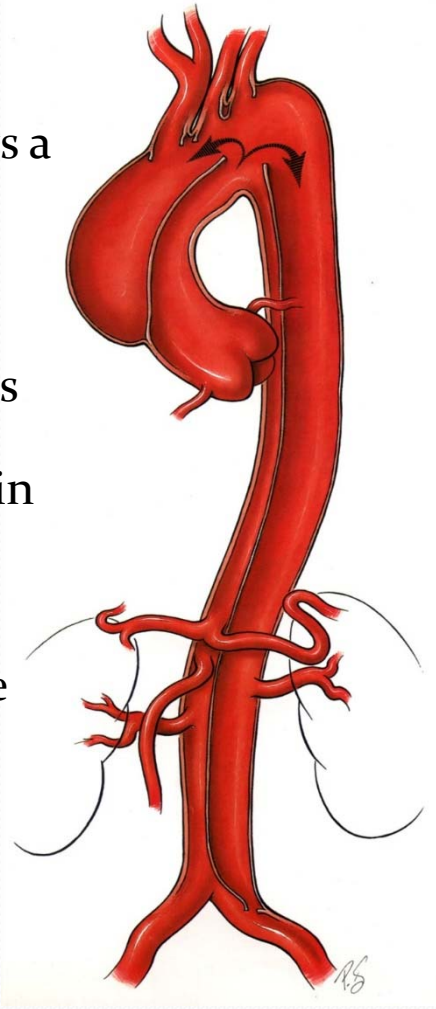
The blood typically propagates rapidly along the length of the aorta, ante or retrograde and often compromises branch vessels along its path and/or disrupts aortic valve function, which causes aortic insufficiency.

Because the blood in the false lumen is contained by only the thin outer third of the media and the loose adventitial connective tissue, rupture into the pericardial space, pleural space, or mediastinum is common.

AAD represents a medical condition where a a small tear can have dreadful consequences and represents a **surgical emergency**.

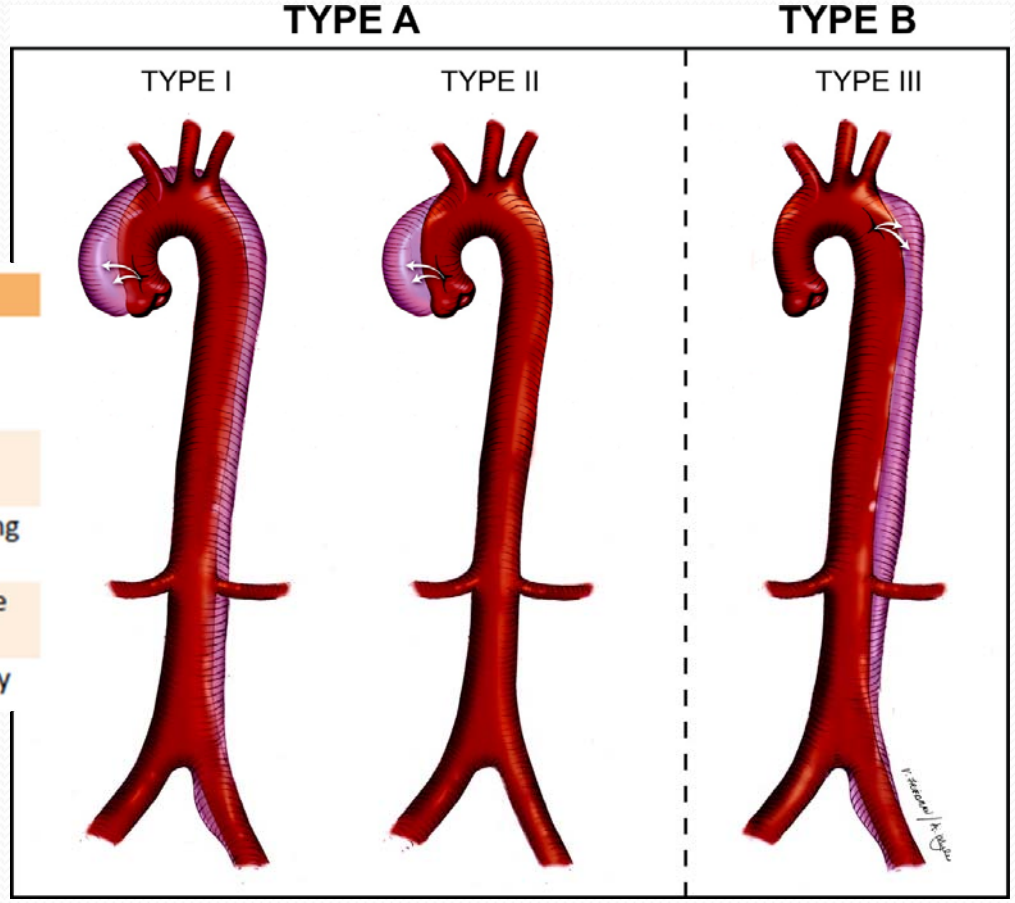


- 3,5-6/100.000 people per year in general population
- Up to 10/100.000 in elderly



Acute Aortic Dissection (AAD) Classification

	Type	Characteristic
DeBakey[4] (1965)	I	Originates in the ascending aorta, but extends distally and involves the descending aorta
	II	Originates in and is confined to the ascending aorta
	III	Originates in and involves the descending aorta
Stanford[8] (1970)	A	Involves the ascending aorta irrespective of the site of origin
	B	Involves the descending aorta exclusively



Acute Type A Dissection

SPONTANEOUS MORTALITY

48 hours : 50%

7 days : 60%

30 days: 90%

Anagnostopoulos CE : Acute Aortic Dissection. 1975; Baltimore : University Park Press.

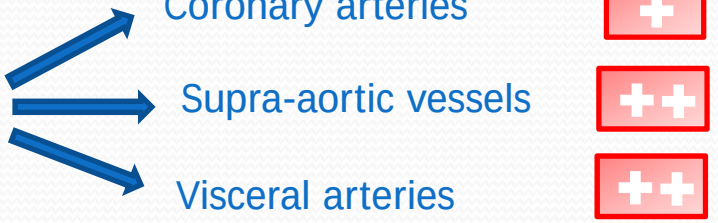
« ...acute type A dissection is an inherently lethal condition.
Our first job is to produce a live patient. »
John Elefteriades. J. Thorac. Cardiovasc. Surg. 2002, 123; 201-3

Acute Type A Dissection

THE PRE-OPERATIVE PATIENT'S KILLERS:

- TAMPONADE

- MAJOR MALPERFUSION

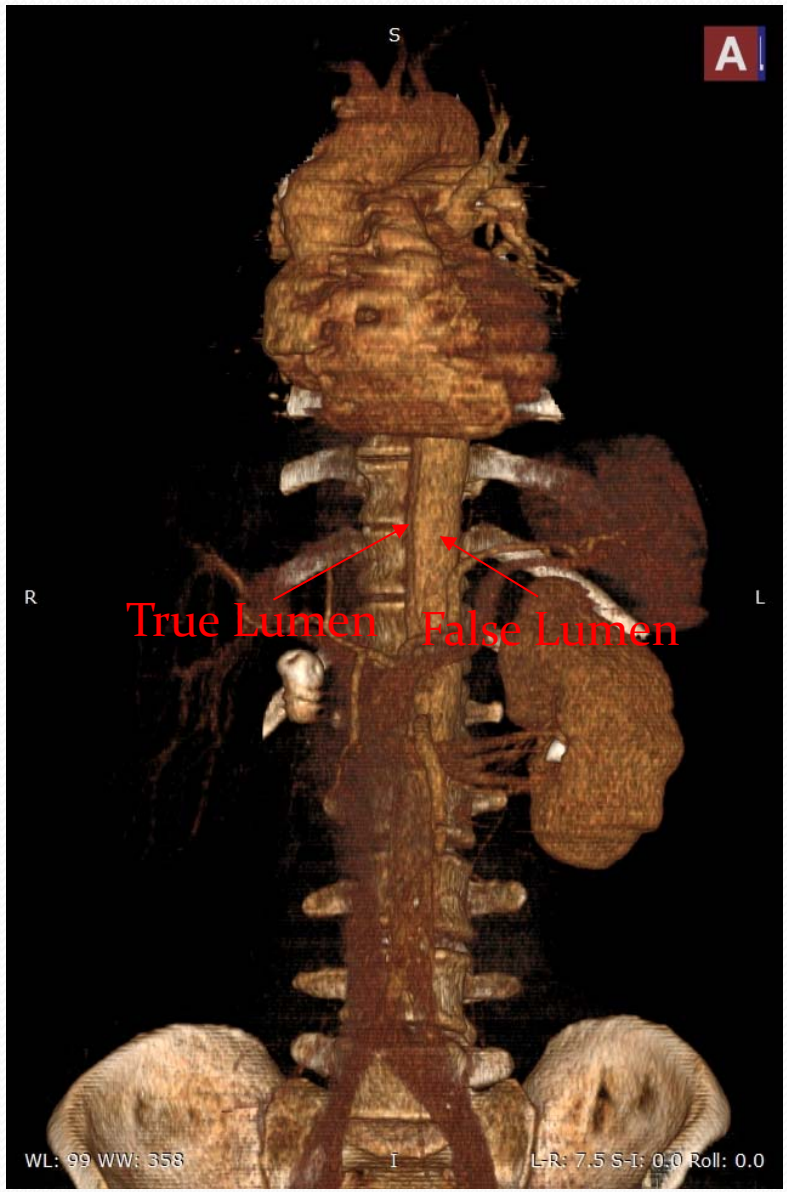


- ACUTE AORTIC REGURGITATION

Case A

50 year old male admitted with Acute type A dissection via emergency Air-transfer

- Symptoms
  - Chest & Back pain
- Risk Factors
  - Hypertension
  - Smoking
- Physical examination
  - Absent Lt. radial & Lt. femoral pulses
- Paraclinical data:
  - EKG→ LV hypertrophy
  - Echocardiogram
    - AV normal tricuspid – no regurgitation
    - LV EF 60%
  - CTA
    - Dissection extending from Asc. Aorta to iliac arteries
    - Tear in the Aortic Arch
    - Severe compression of the true lumen in DTA
    - CTA, SMA & Lt. renal artery dissected and perfused mainly from false lumen
    - Rt. renal artery arising from true lumen with delayed perfusion
  - Blood Tests
    - Pre-op lactate 4,6mmol/L

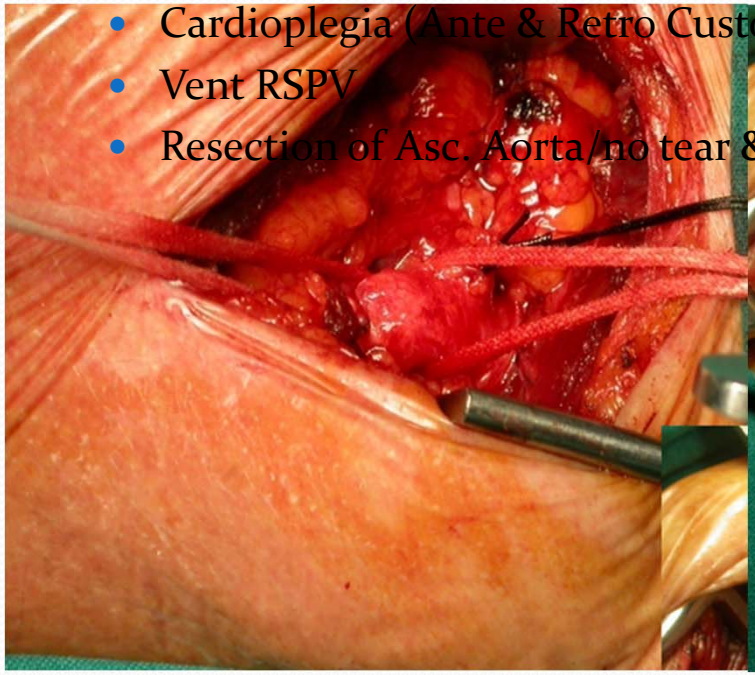


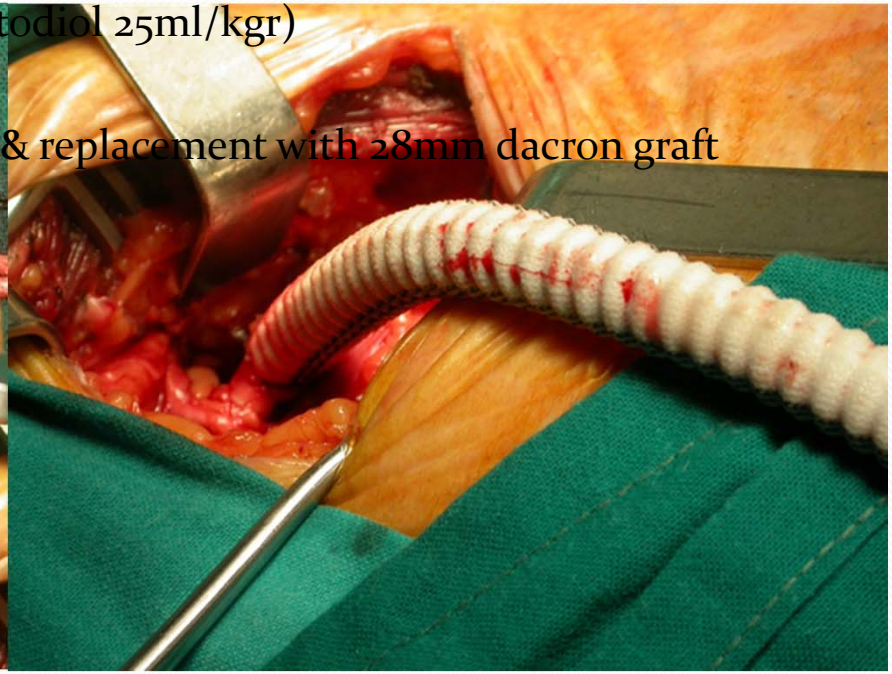
Case A

Case A

Procedural Steps

- Rt. infraclavicular incision & rt. axillary artery cannulation through 8mm dacron graft
- Median sternotomy
- CPB (rt. axillary artery / rt. atrium)
- Cardioplegia (Ante & Retro Custodiol 25ml/kgr)
- Vent RSPV
- Resection of Asc. Aorta/no tear & replacement with 28mm dacron graft

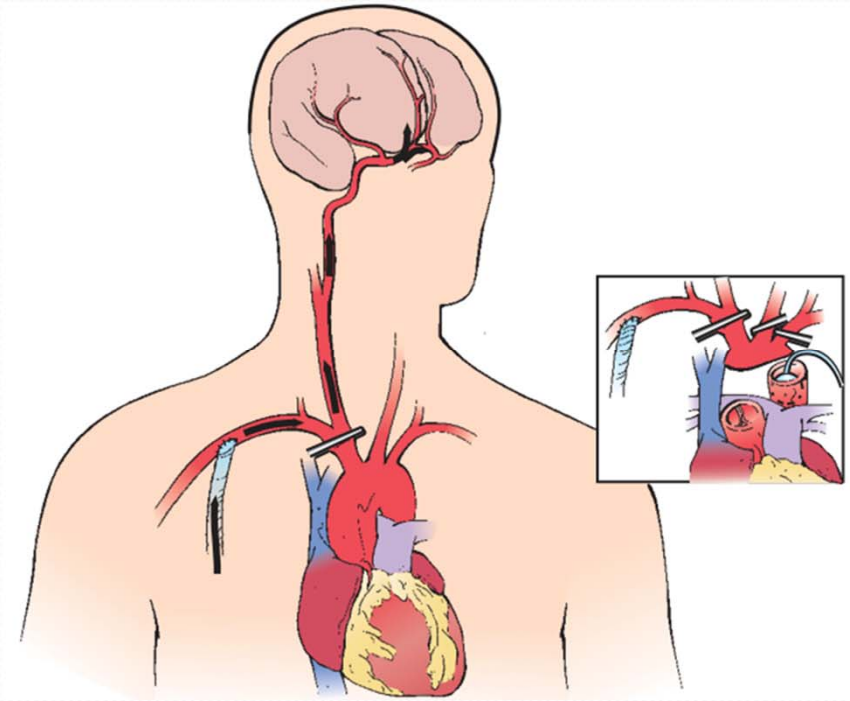


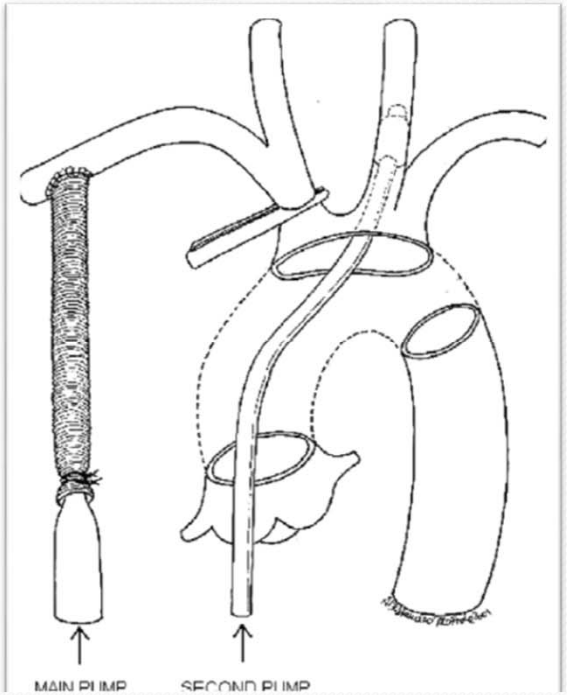


Case A

Procedural Steps

- HCA & SACP with clamping of IA & separate perfusion of LCCA @22°C

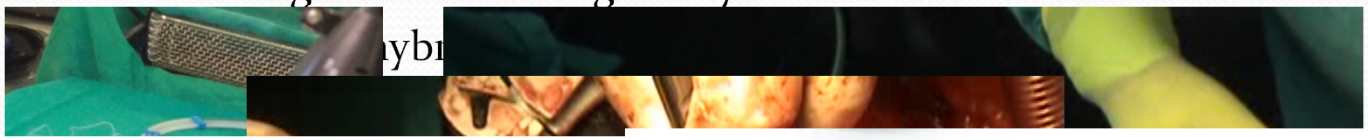




Case A

Procedural Steps

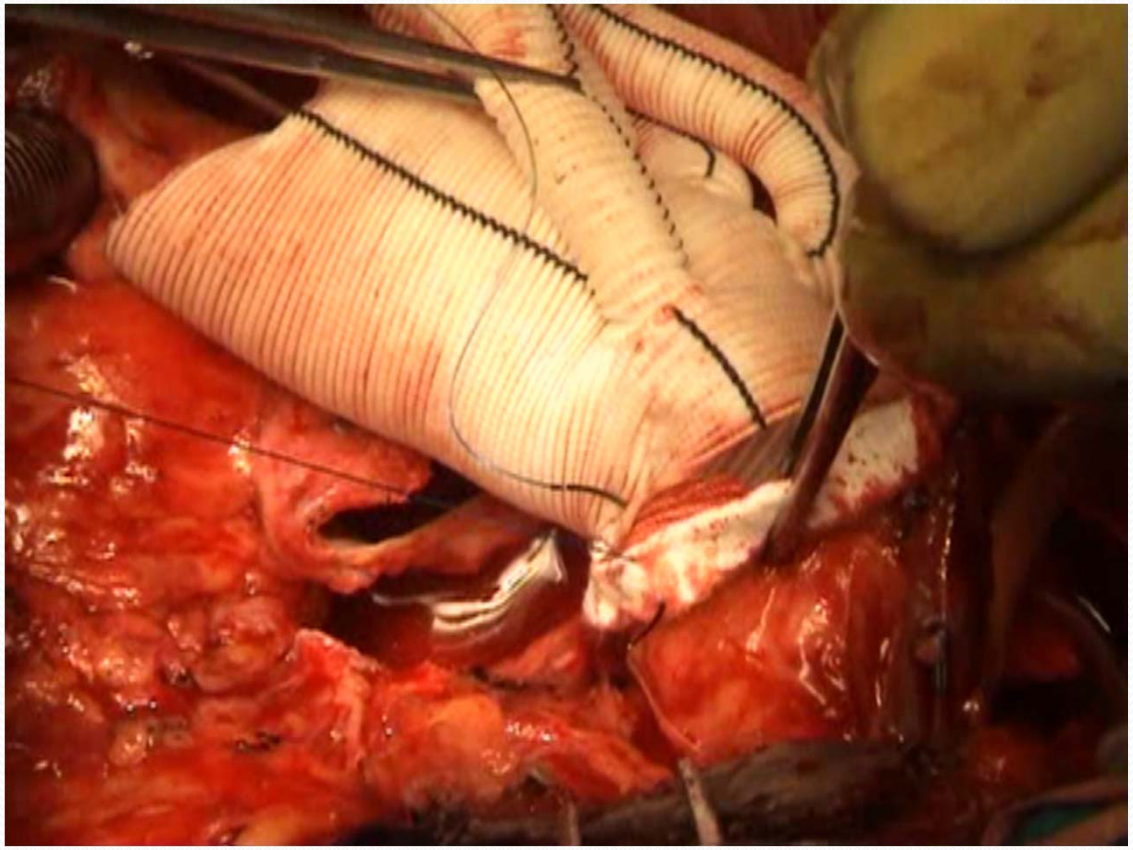
- Tear in the arch opposite to the LSA ostium
- Resection of the arch up to LSA ostium & reconstruction of the distal aortic stump with inside-outside Teflon strips (sandwich technique)
- Preparation of E-vita Open plus hybrid prosthesis (30 x 160mm)
- Insertion of guide wire through foley catheter in the true lumen of DTA



Case A

Procedural Steps

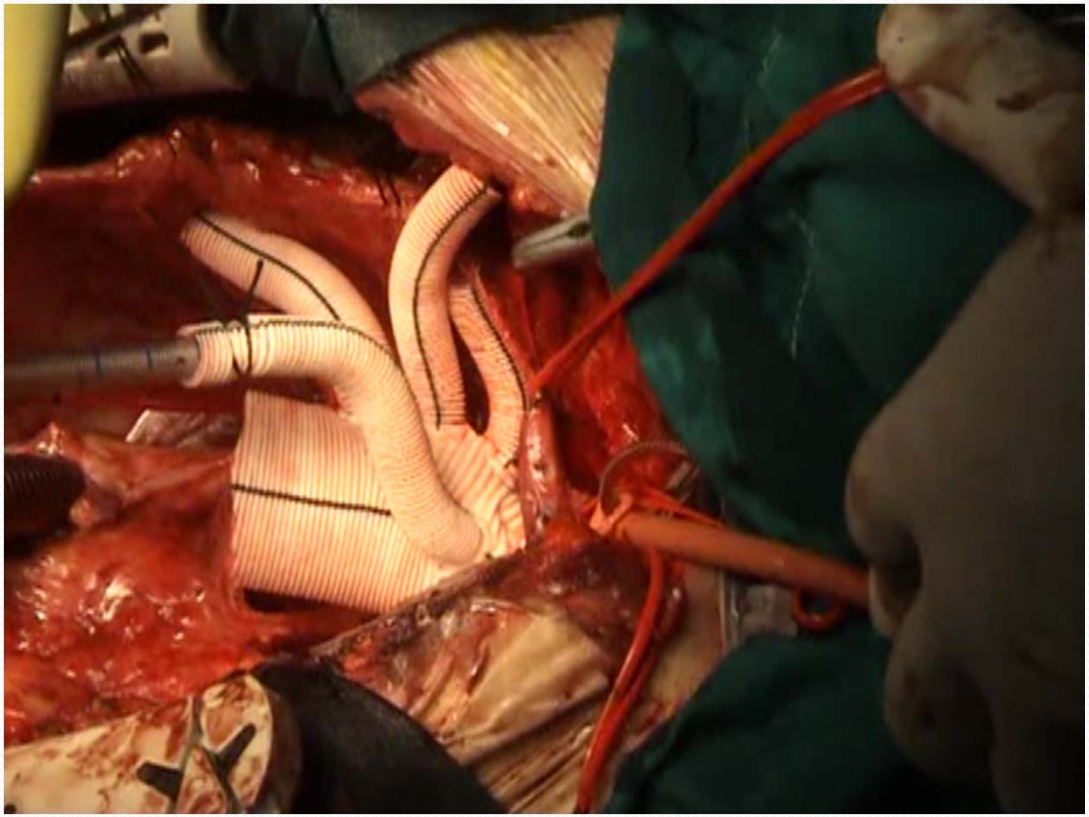
- Anastomosis of the hybrid prosthesis cuff & branched graft to the distal aortic stump



Case A

Procedural Steps

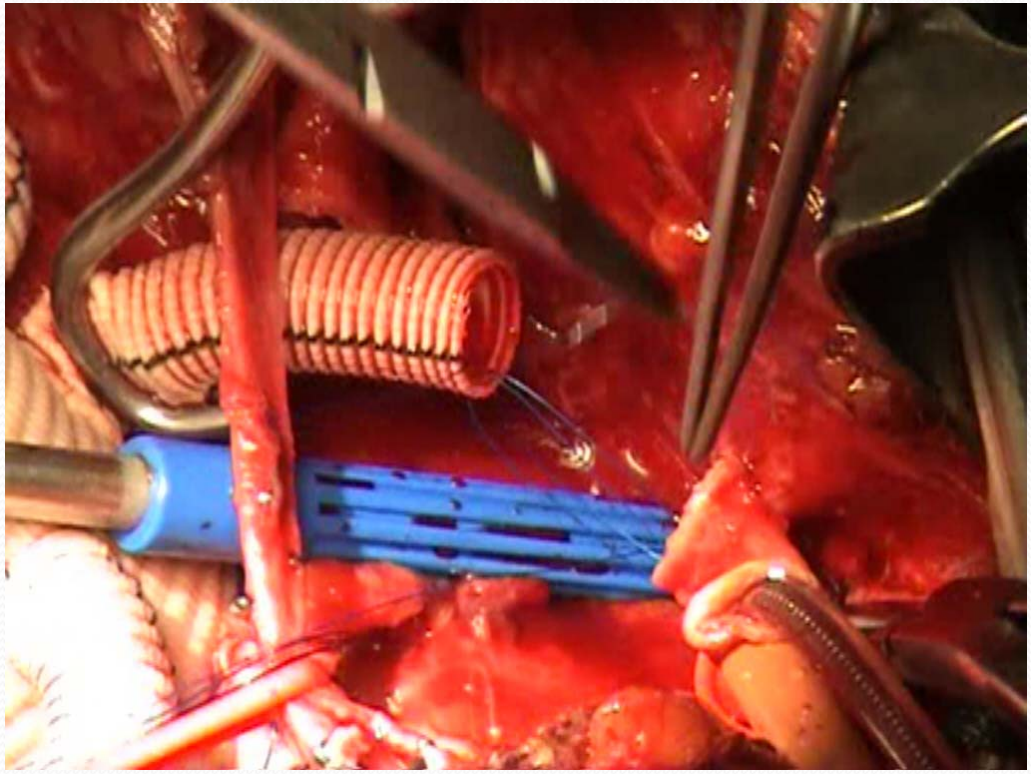
- Reperfusion of the lower body through the side branch of the graft & rewarming



Case A

Procedural Steps

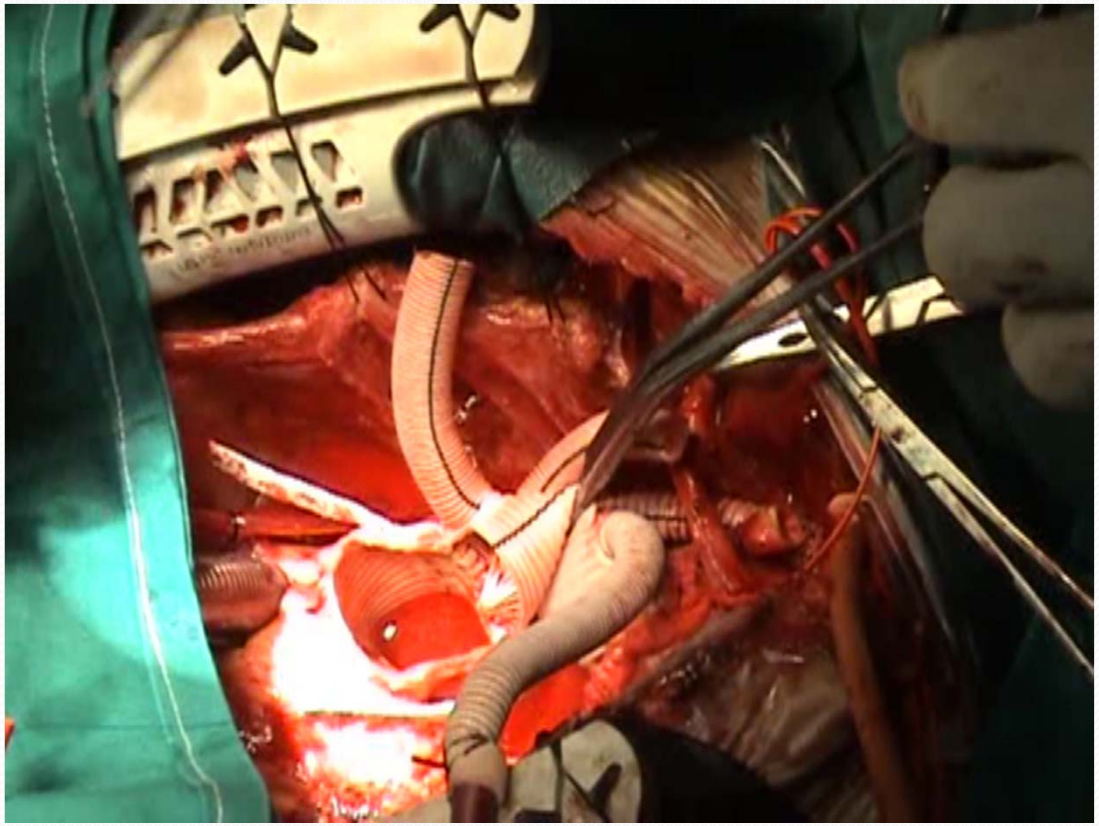
- Anastomosis of the 3rd branch to the LSA



Case A

Procedural Steps

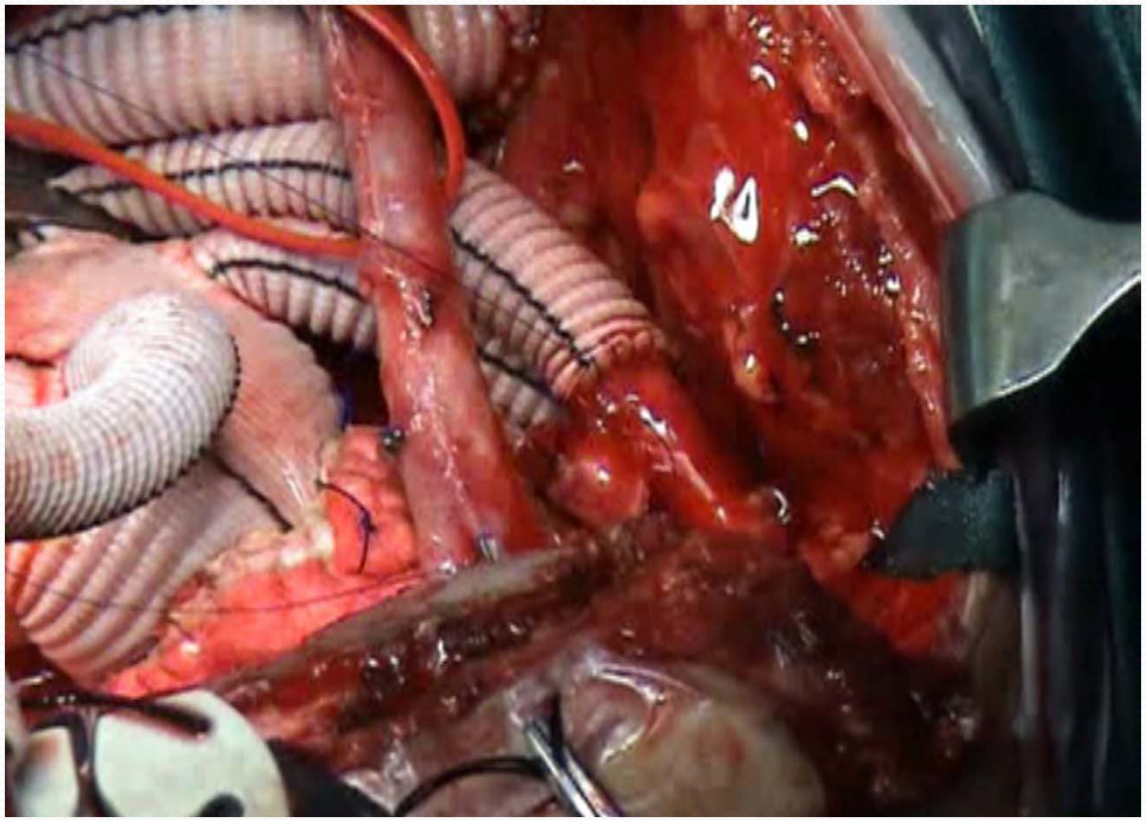
- Proximal anastomosis of the branched graft to ascending aorta graft & cardiac reperfusion



Case A

Procedural Steps

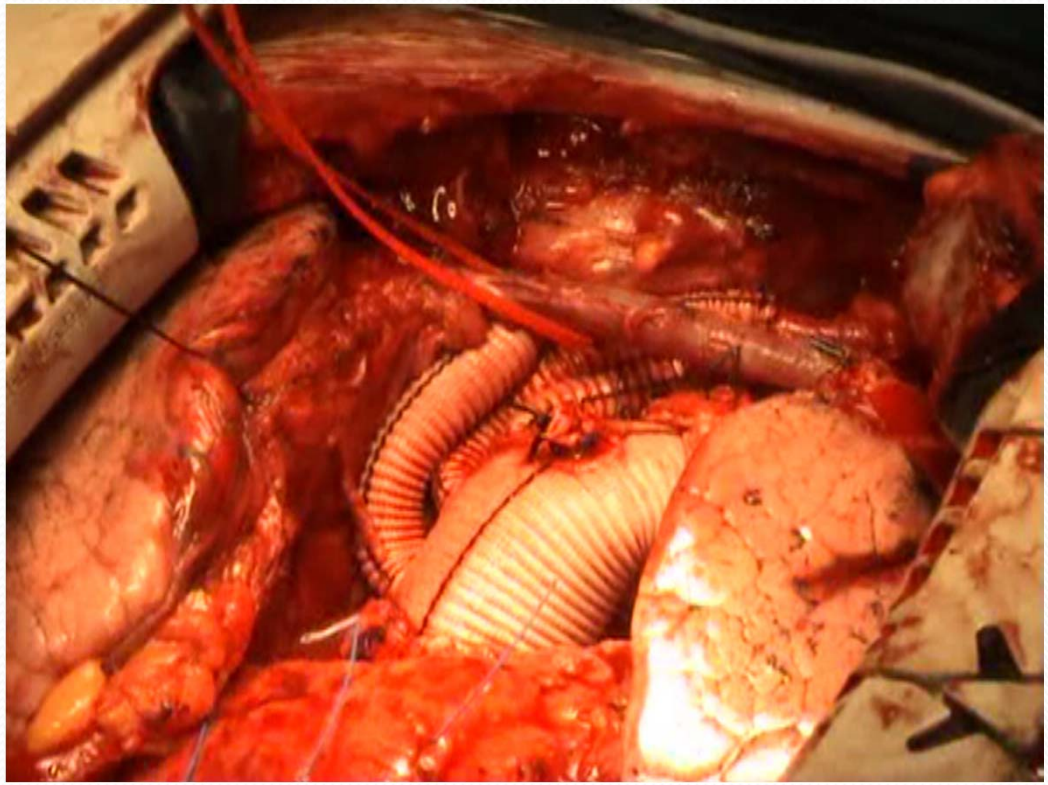
- Anastomosis of the 2nd branch to LCCA
- Anastomosis of the 1st branch to IA



Case A

Procedural Steps

- Termination of CPB with minimal inotropic support
- Haemostasis & sternal closure
- Transfer to the ICU



Case A

- Post-operative course
  - Uneventful

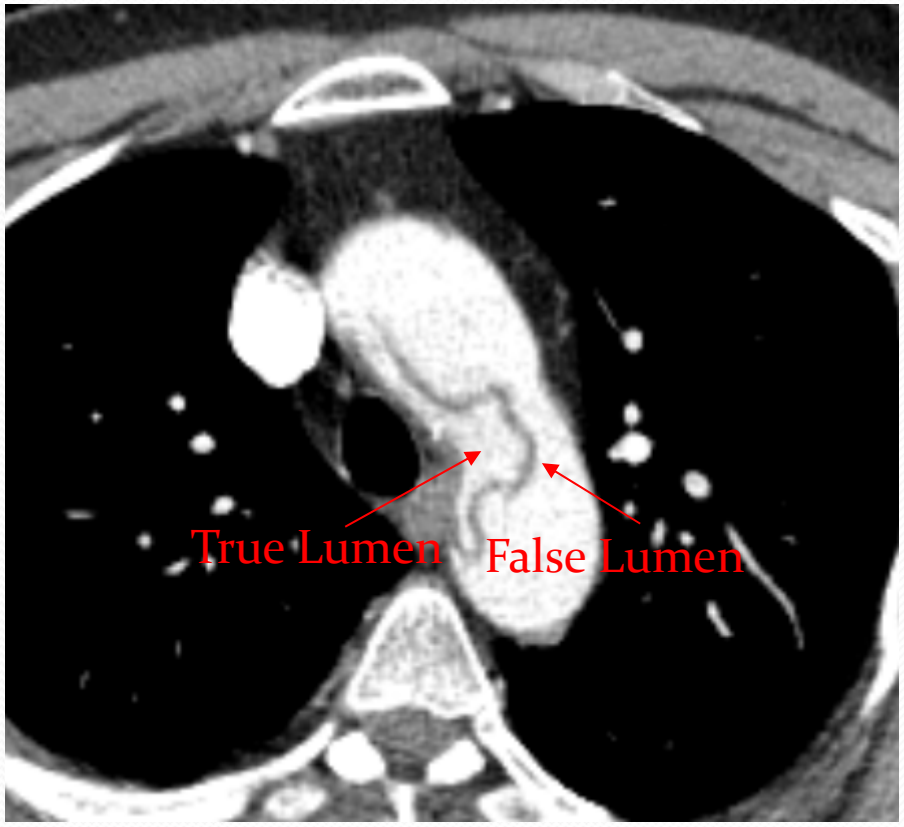
- Hospital discharge on 10th post-op day

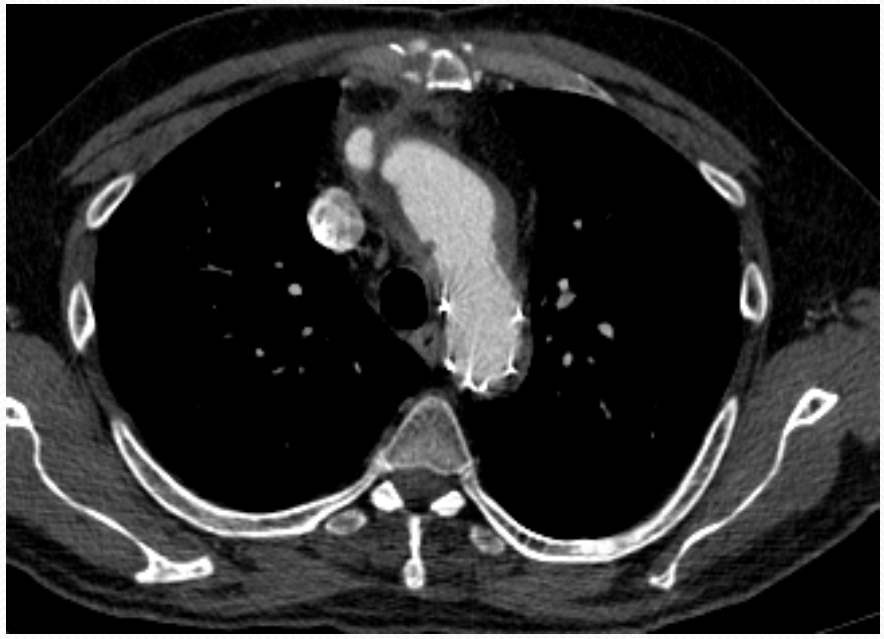
Case A

CT @ 1 month demonstrating

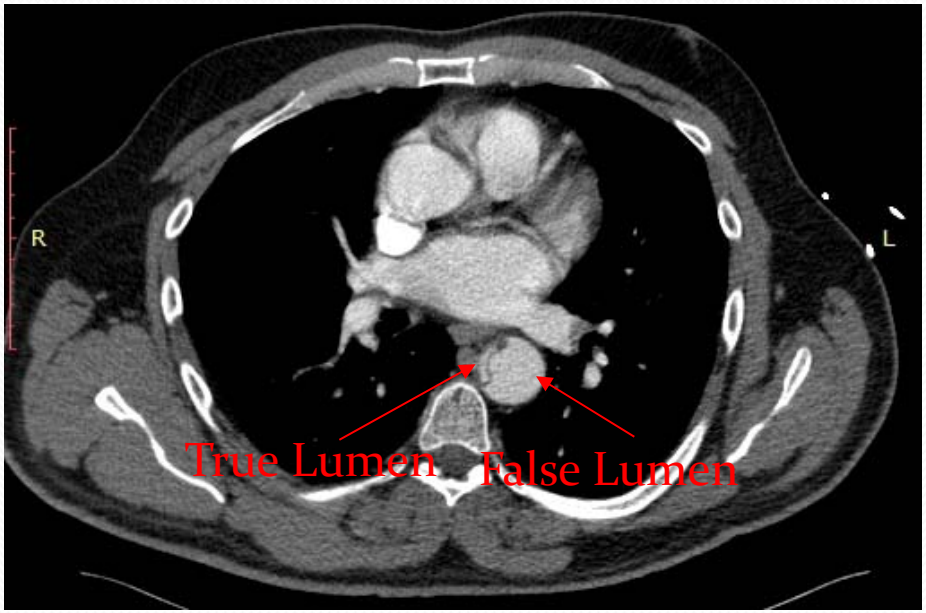
complete remodelling of the thoracic aorta

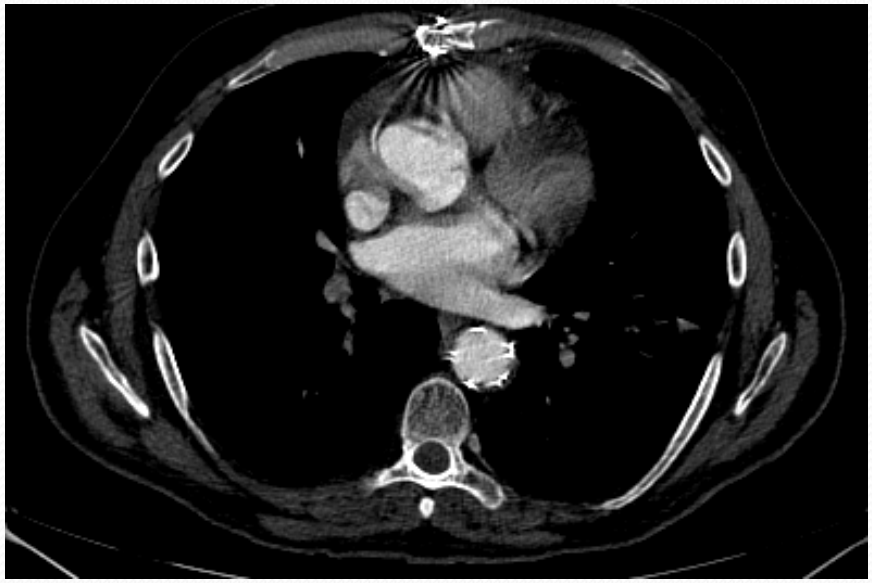
Frozen Elephant Trunk in Acute Type A Dissection



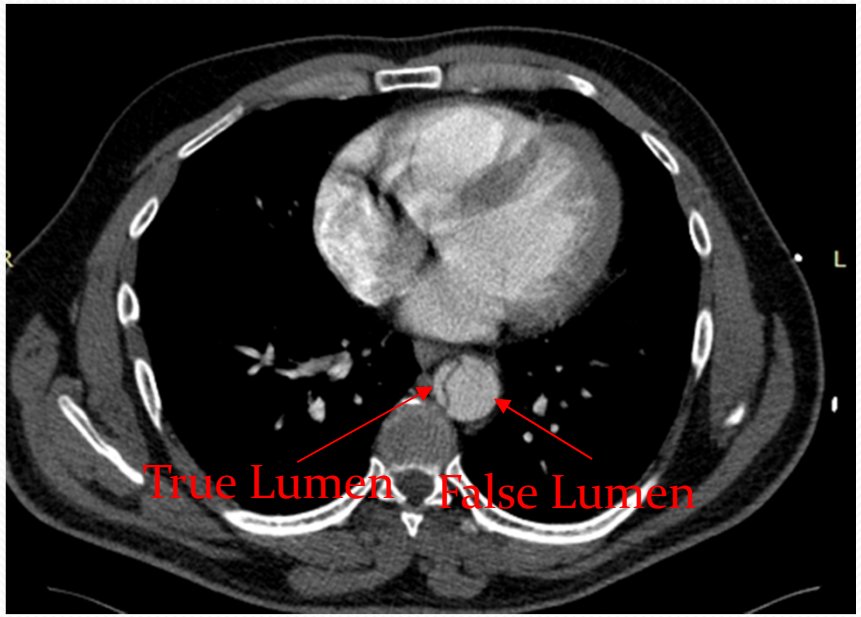


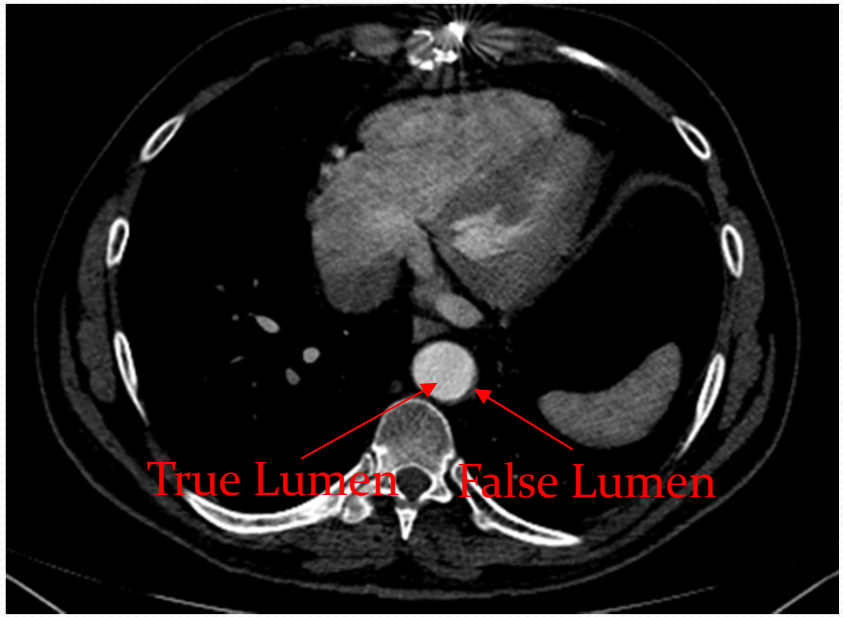
Frozen Elephant Trunk in Acute Type A Dissection



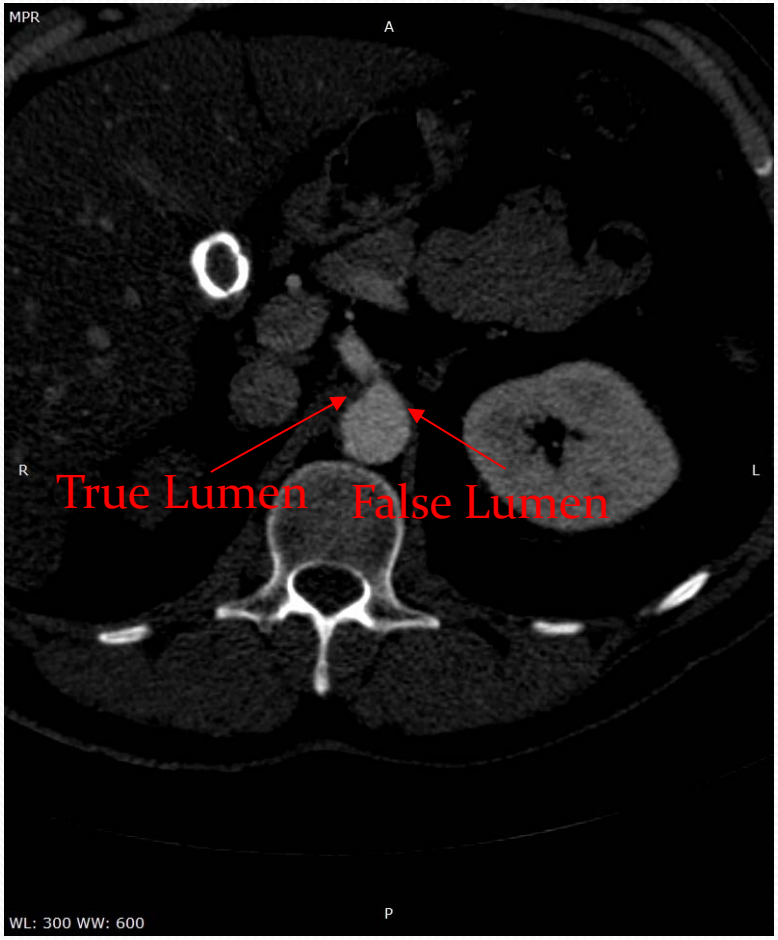


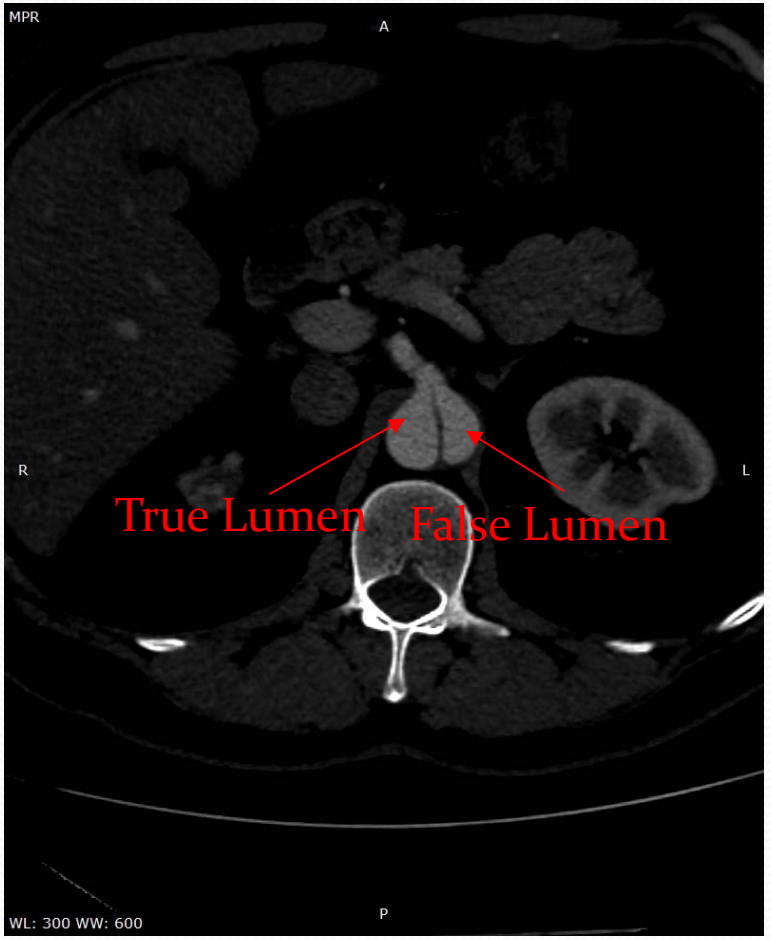
Frozen Elephant Trunk in Acute Type A Dissection



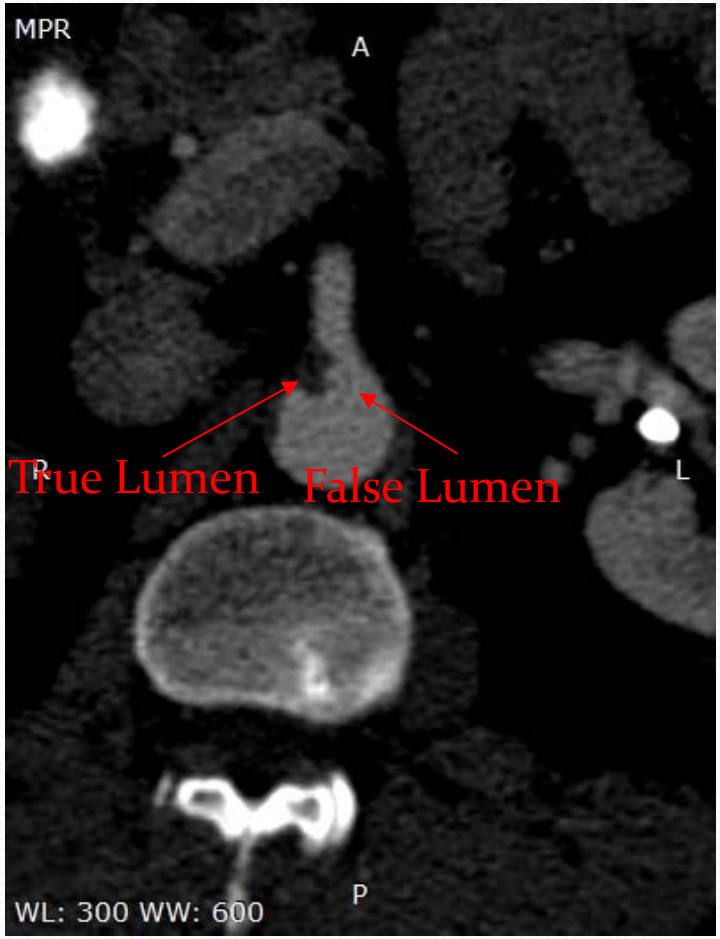


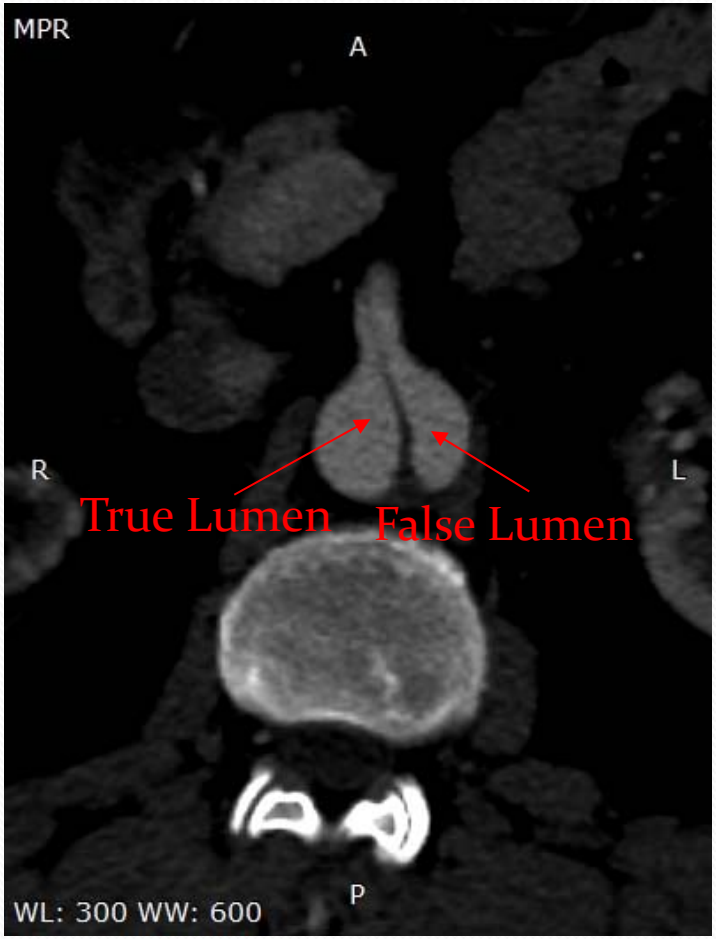
Frozen Elephant Trunk in Acute Type A Dissection



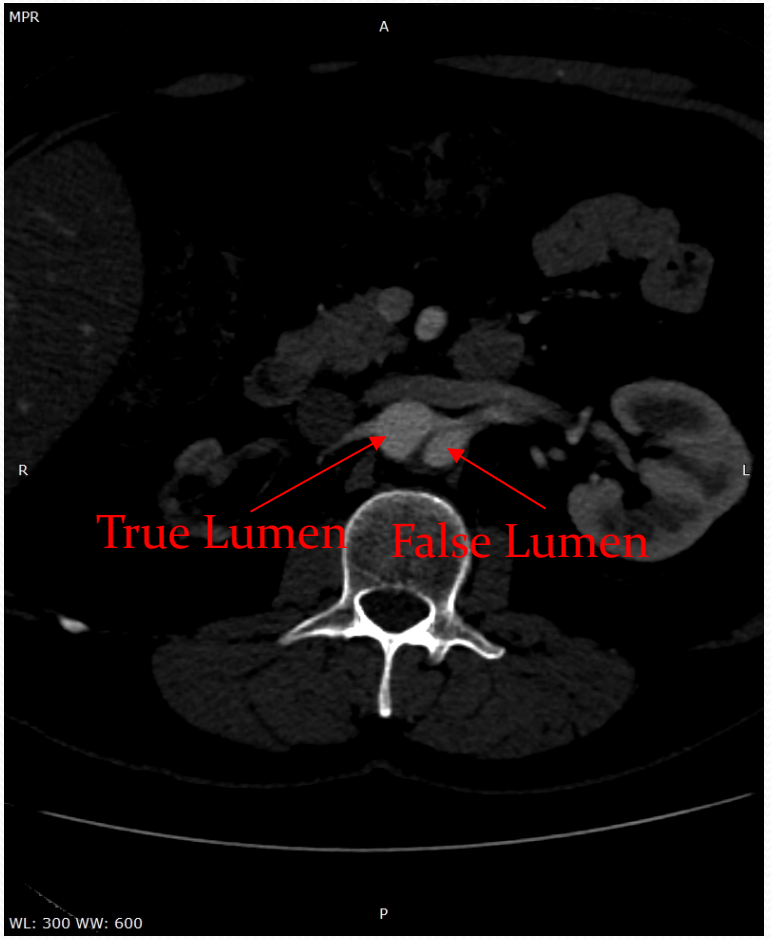


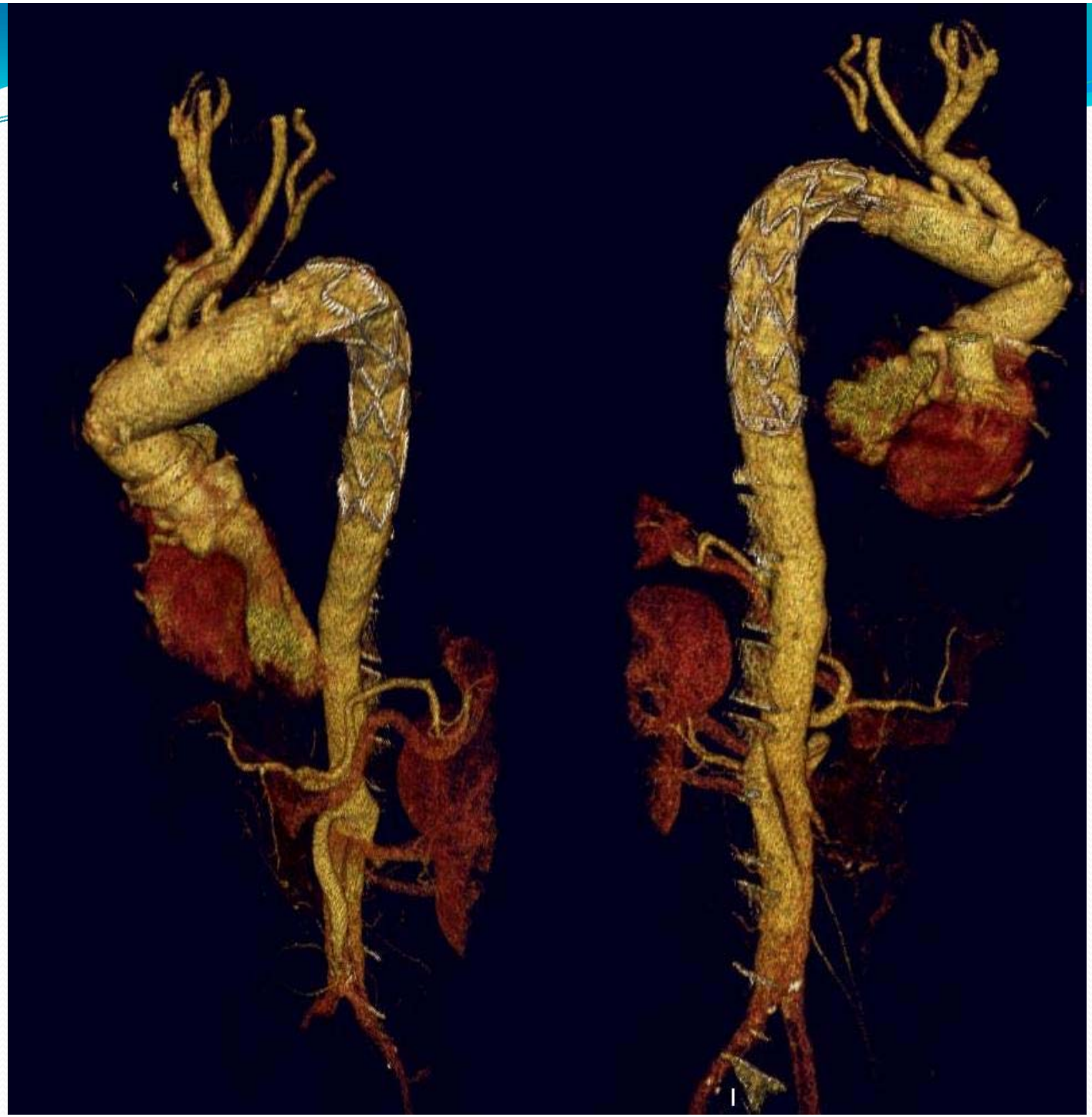
Frozen Elephant Trunk in Acute Type A Dissection



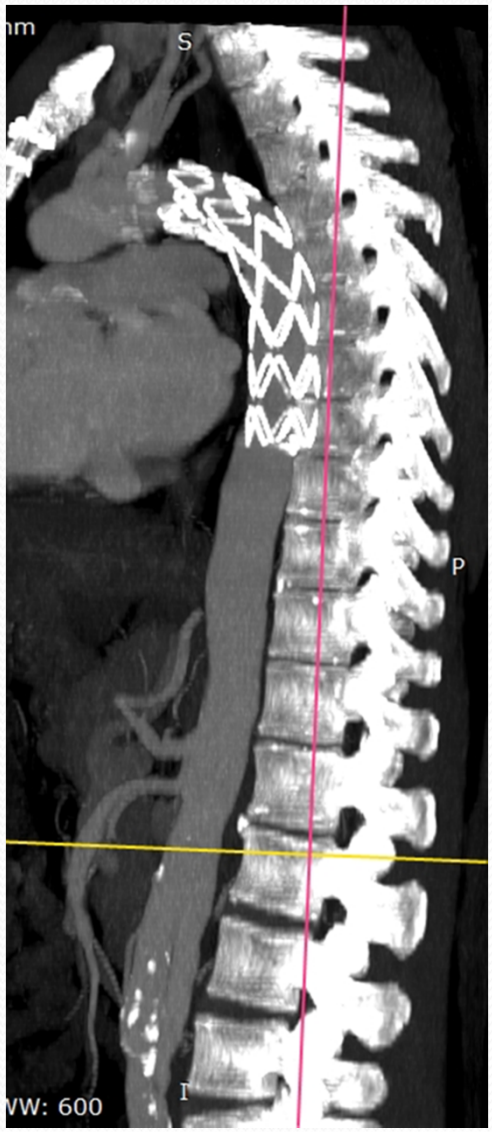


Frozen Elephant Trunk in Acute Type A Dissection





Case A



F-up @
1, 2,3 & 6 years
with
stable findings

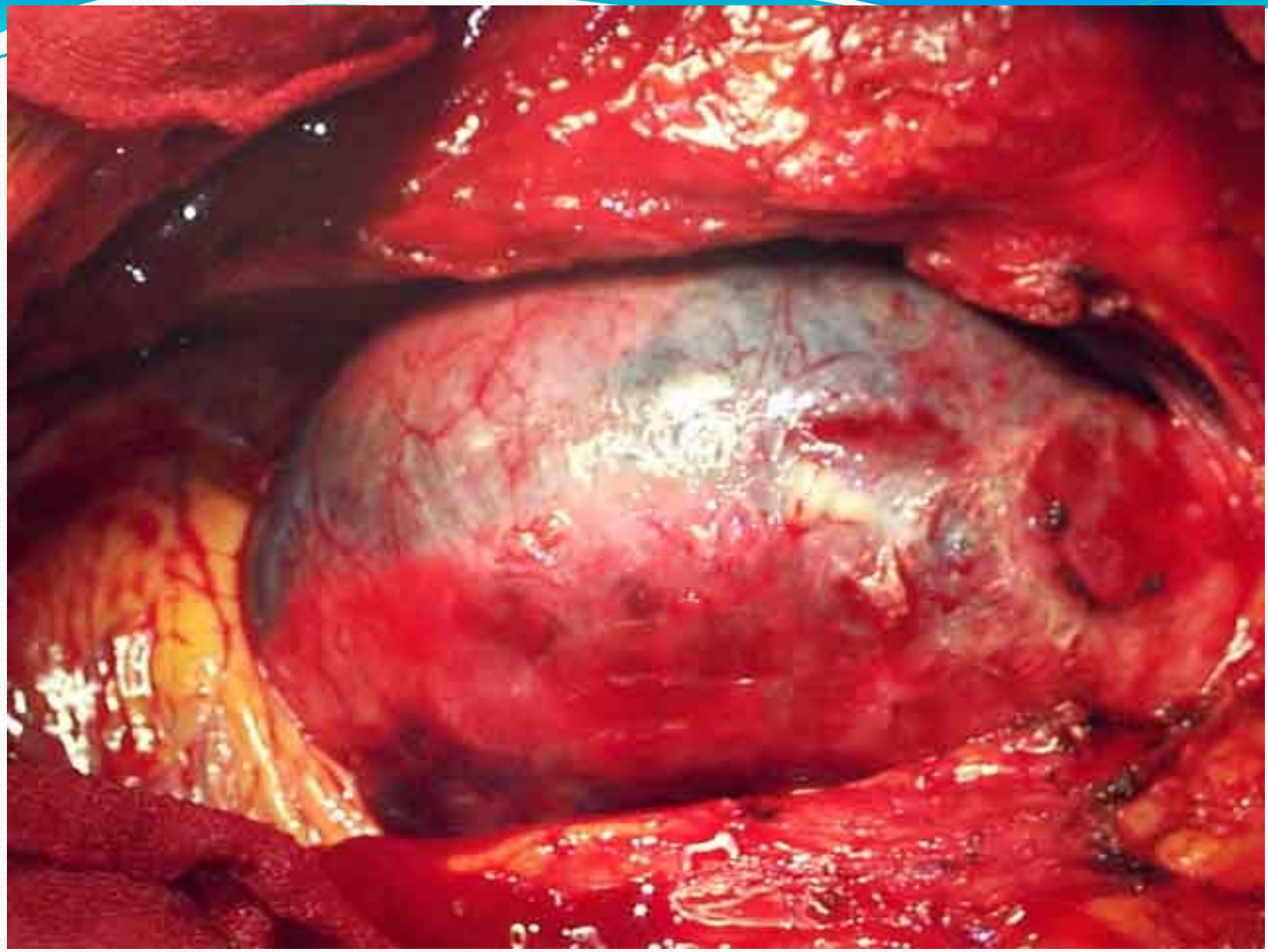
PRINCIPLES OF SURGERY in AAAD's

- Excision of intimal tear (entry point)
- Restoration of aortic valve competence
- Obliteration FL
- Reconstitution of aorta with interposition graft +/- coronary reimplantations

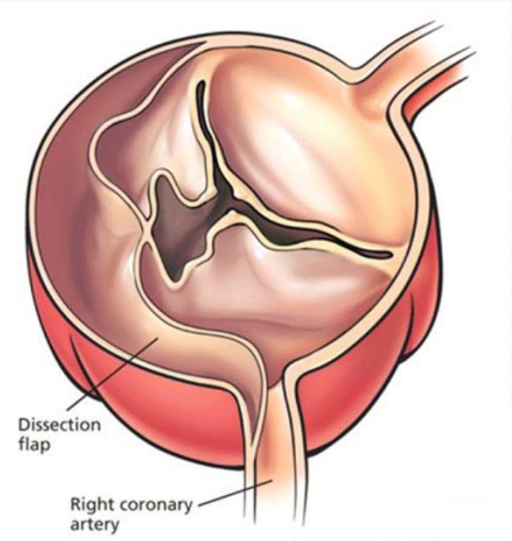
Unfortunately this objective is rarely achieved except for DeBakey type II dissection (involving only the ascending aorta)

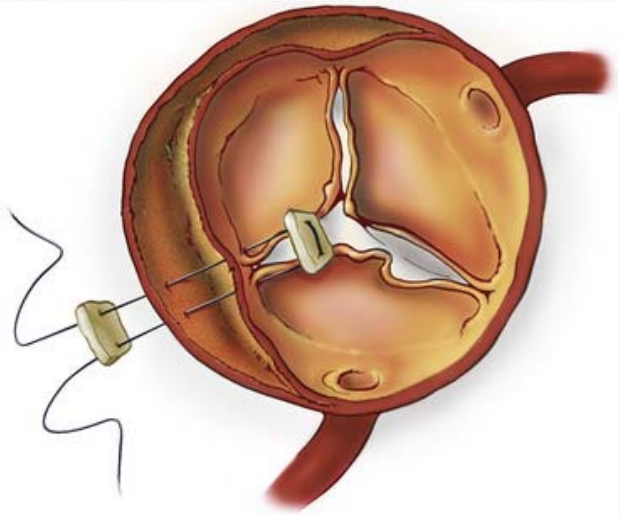
Complexity of surgical management

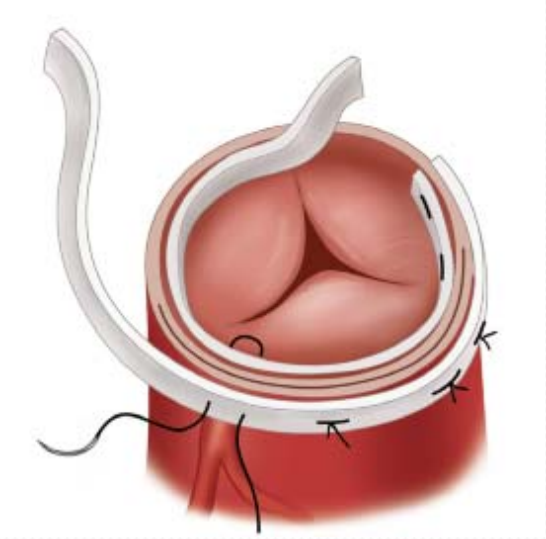
- Surgical approach
- Myocardial protection
- Management of the aortic valve
- Brain & Spinal Cord protection
- Peripheral organ (liver, kidneys) protection



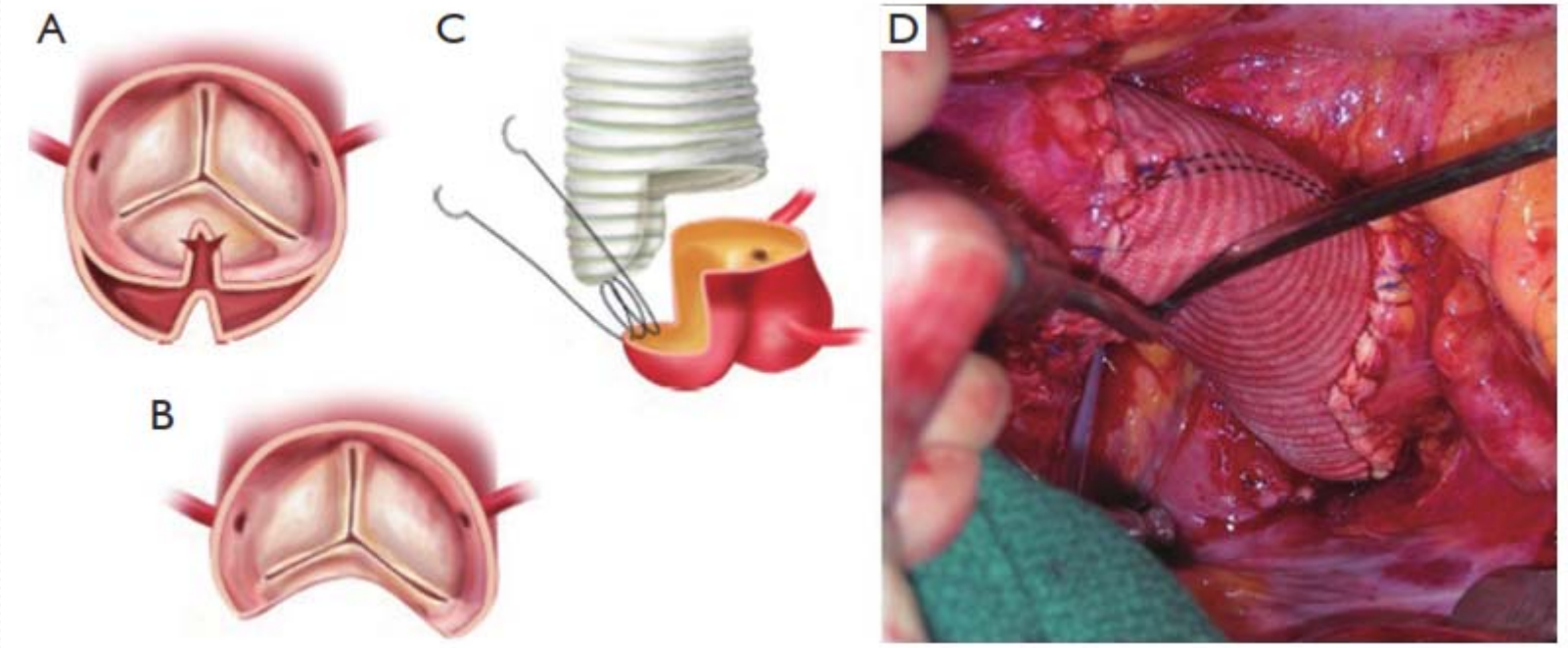
Resuspension of AV & Reconstitution of STJ



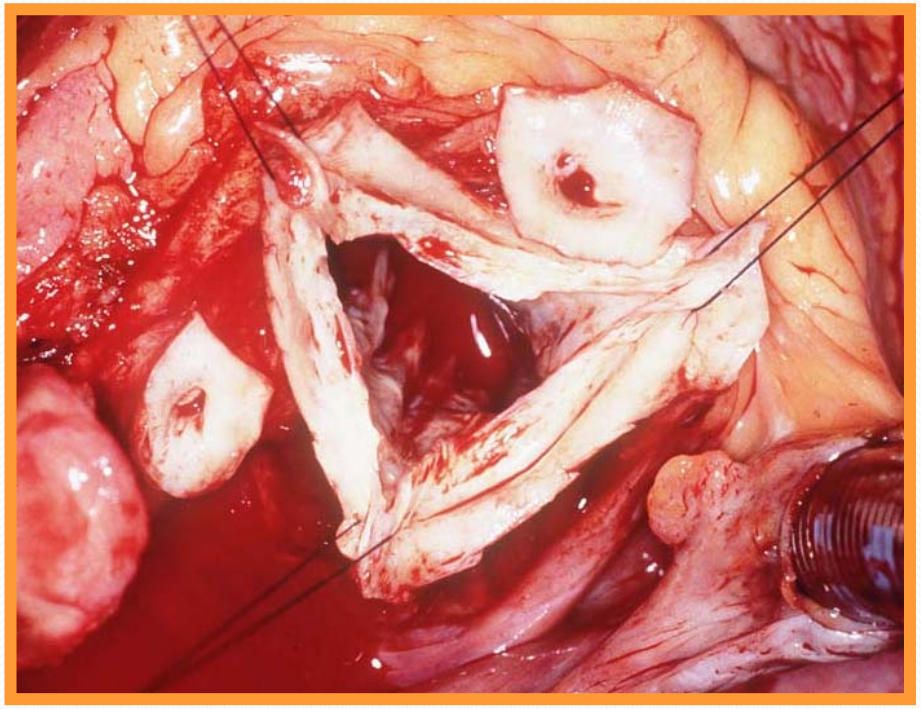


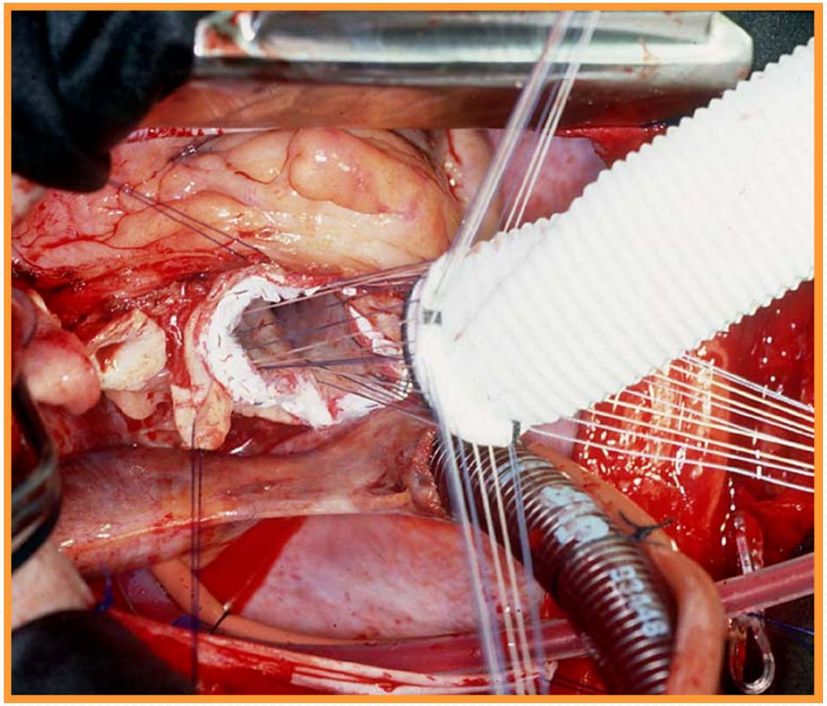


Aortic Root Remodelling (uni-Yacoub)

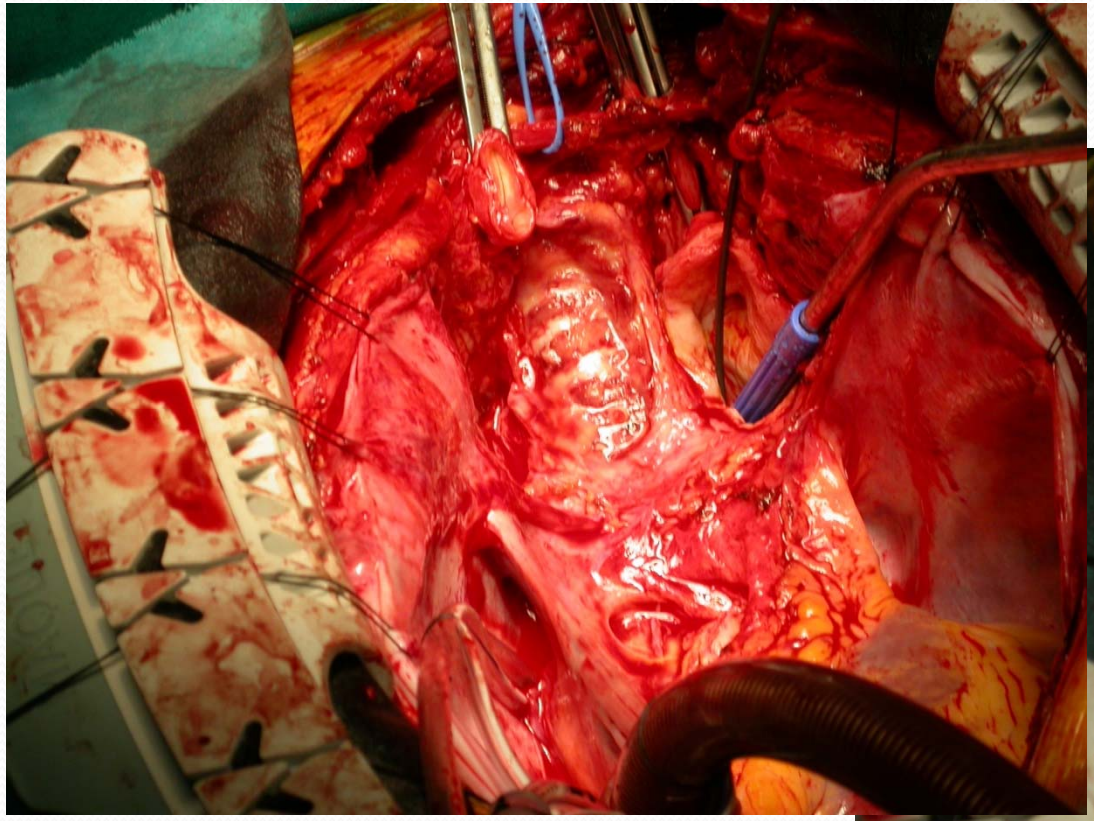


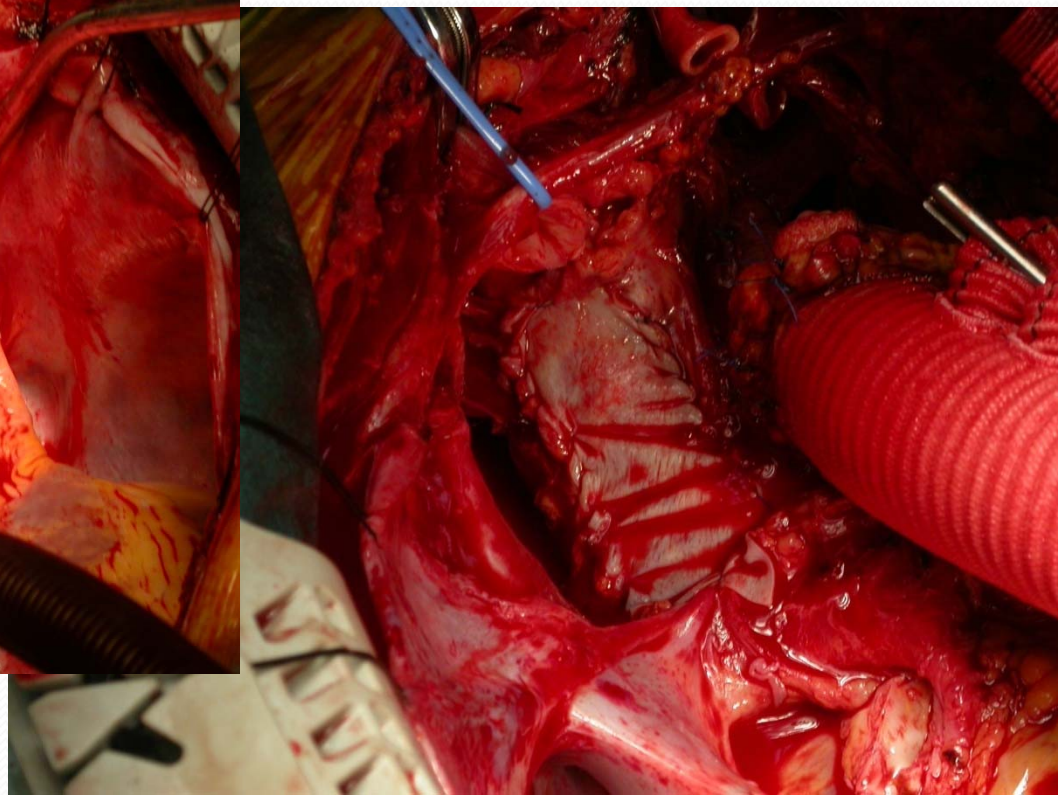
Button-Bentall Technique





Bentall & Frozen elephant trunk reconstruction for chronic Type A dissecting aneurysm ruptured in the trachea





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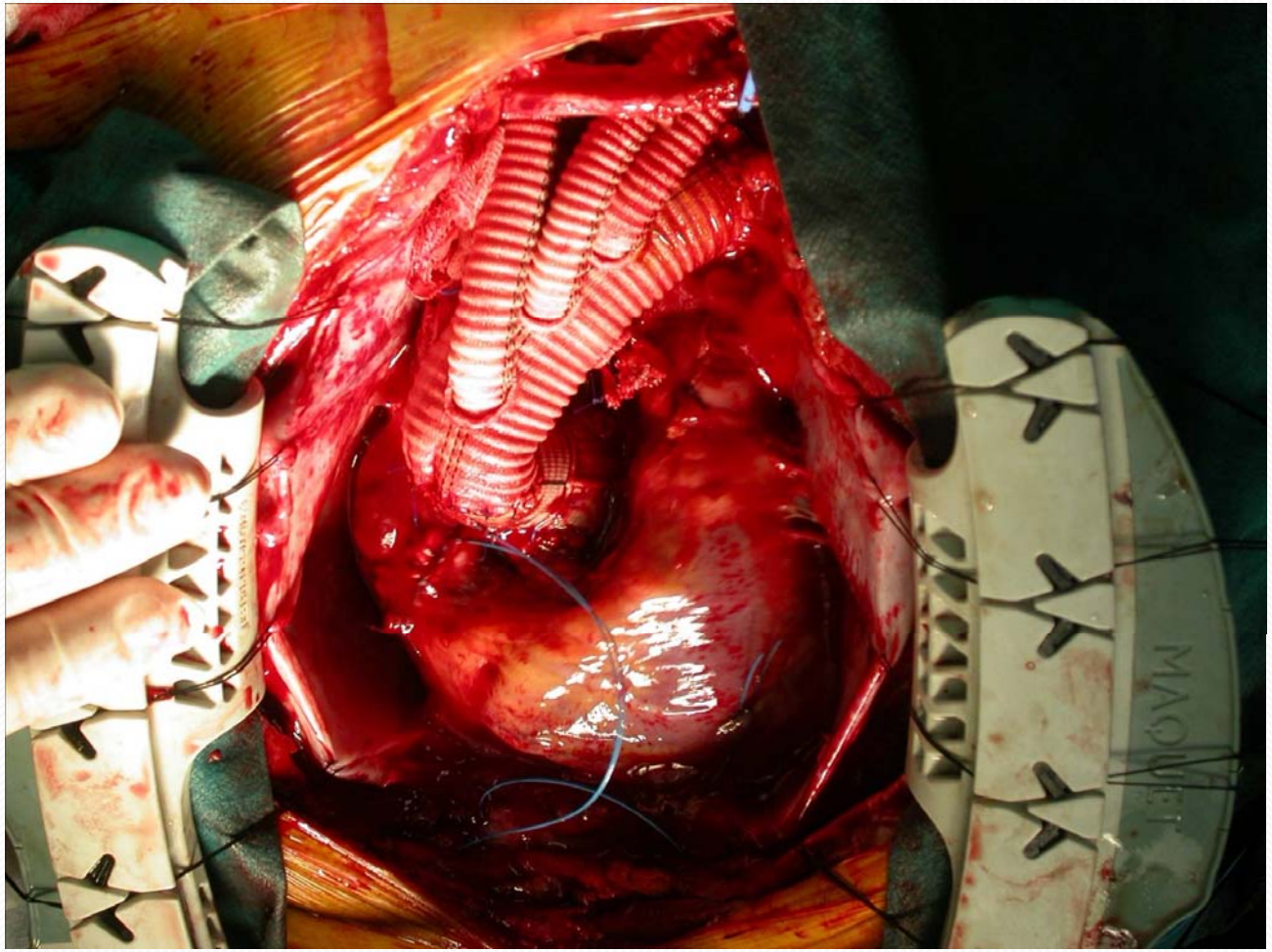


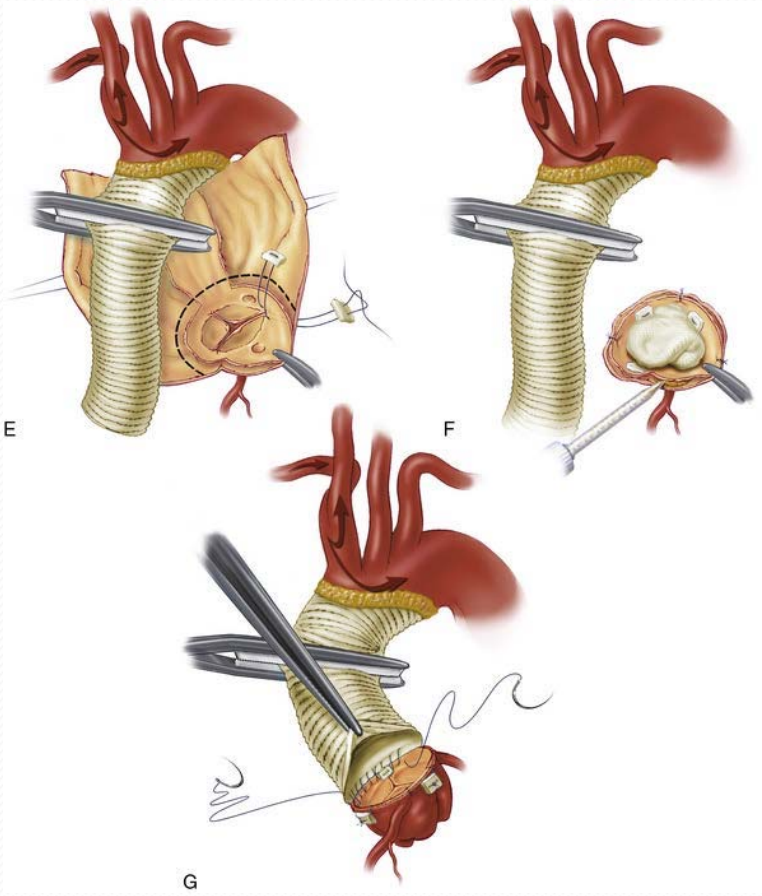
THE DISTAL REPAIR

IS THERE AN IDEAL TECHNIQUE ?

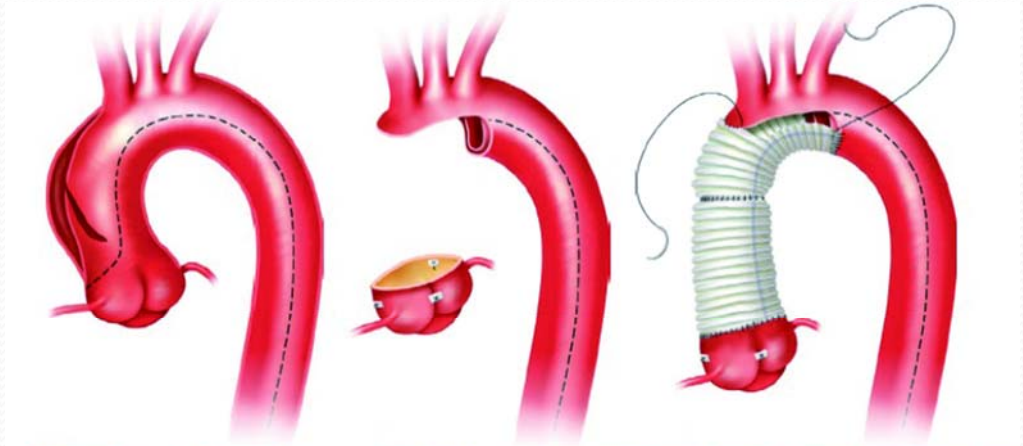
The Open Distal Anastomosis…

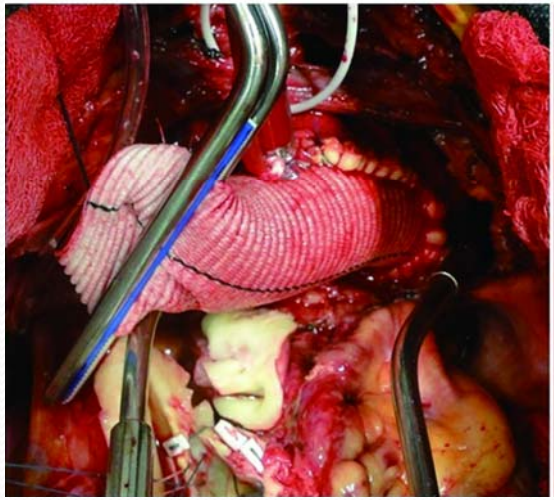
- Allows checking the aortic arch
- Prevents from cross-clamp injuries
- Requires circulatory arrest and brain Protection

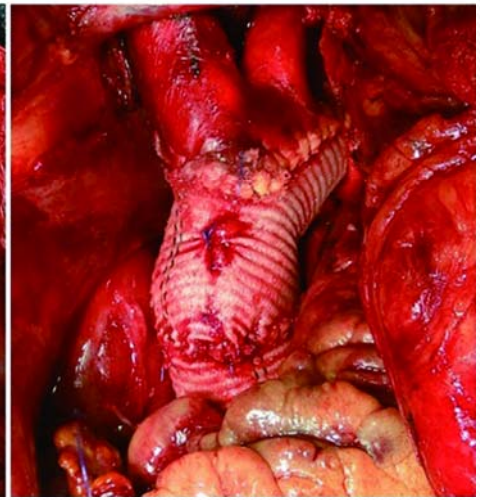
Distal aortic anastomosis: how to deal with the arch?



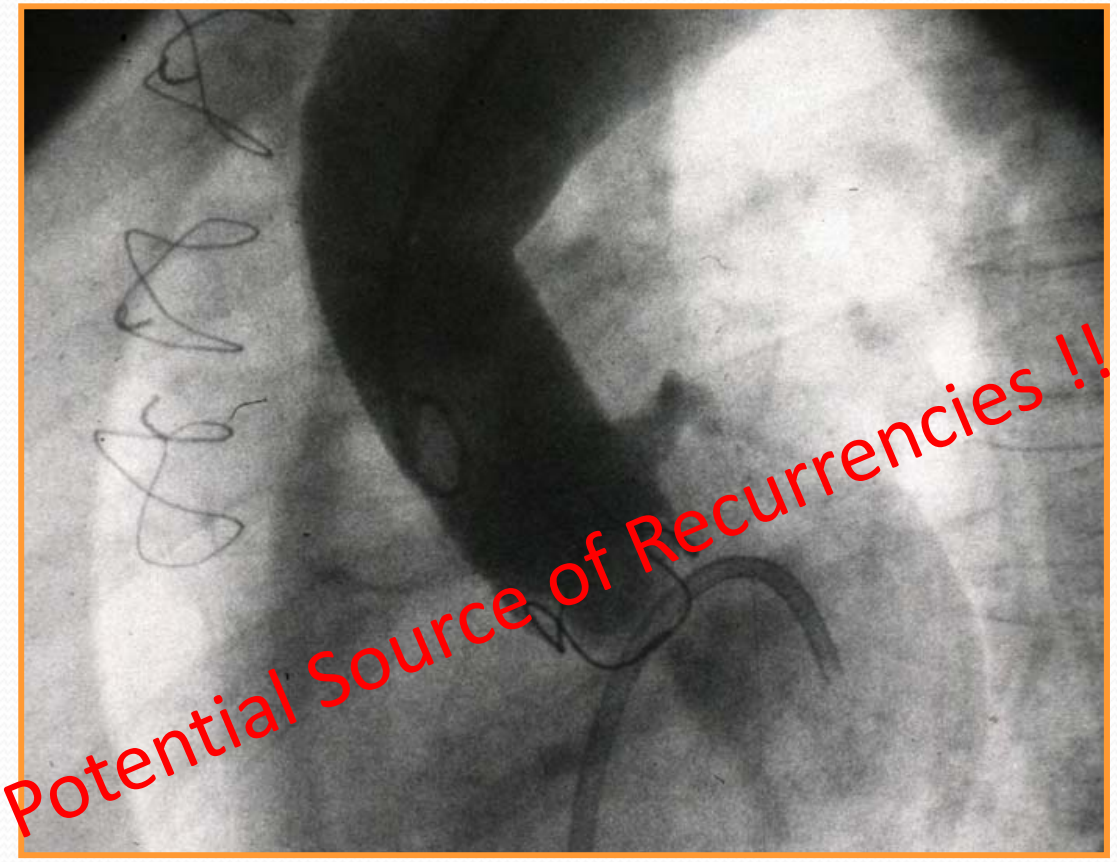
Peninsula-style transverse arch repair





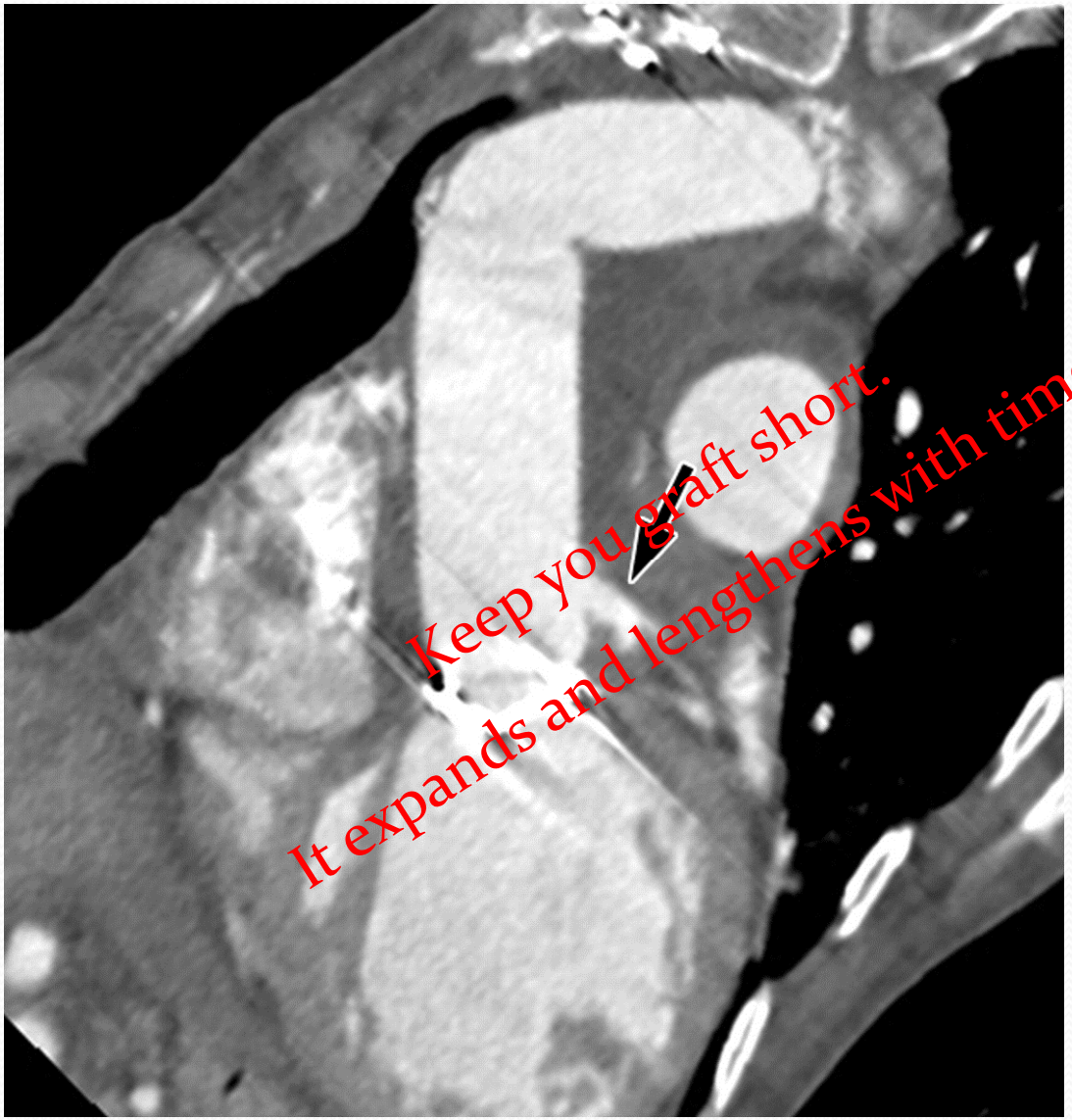


Distal Anastomosis in Asc.A (instead in Arch)



- Due to this risk , a more aggressive approach with hemi-arch or complete arch replacement has been proposed

Graft length



THE DISTAL REPAIR

HOW MUCH RESECT?

The false lumen (DeBakey 1) in the arch and descending aorta remains untreated.

- Aneurysmal (thoraco-abdominal) formation 10-30%
- Rupture 10%
- Malperfusion 10-30%
- Redo-surgery ?%

Fresh or Frozen ?

Possible solution? → *elephant trunk*

Advantages:

- Replacement of the aortic arch
- Preparing future replacement of descending aorta providing a landing zone for a stent graft

Frozen Elephant Trunk in Acute Type A Dissection

- An ideal technique in treating complications due to malperfusion
- Helps to prevent future events (mainly aneurysm formation in the chronically dissected descending aorta)
- Complete remodelling of the dissected aorta

Indications for FET in AAADs

Disease-related

- Complex primary and re-entry intimal tears, involving distal arch and/or proximal DTA
- Distal arch/DTA false-lumen impending rupture
- Distal aortic malperfusion due to DTA true lumen compression or collapse
- Aneurysmal arch and proximal DTA (≥45 mm)
- Severely damaged aortic arch or poor aortic tissue quality (whereby distal aortic arch anastomosis could not be safely performed)

Indications for FET in AAADs

Patient-related

- Patient with adequate performance status, able to withstand TAR (as deemed by the operating surgeon)

Institution- or surgeon-related

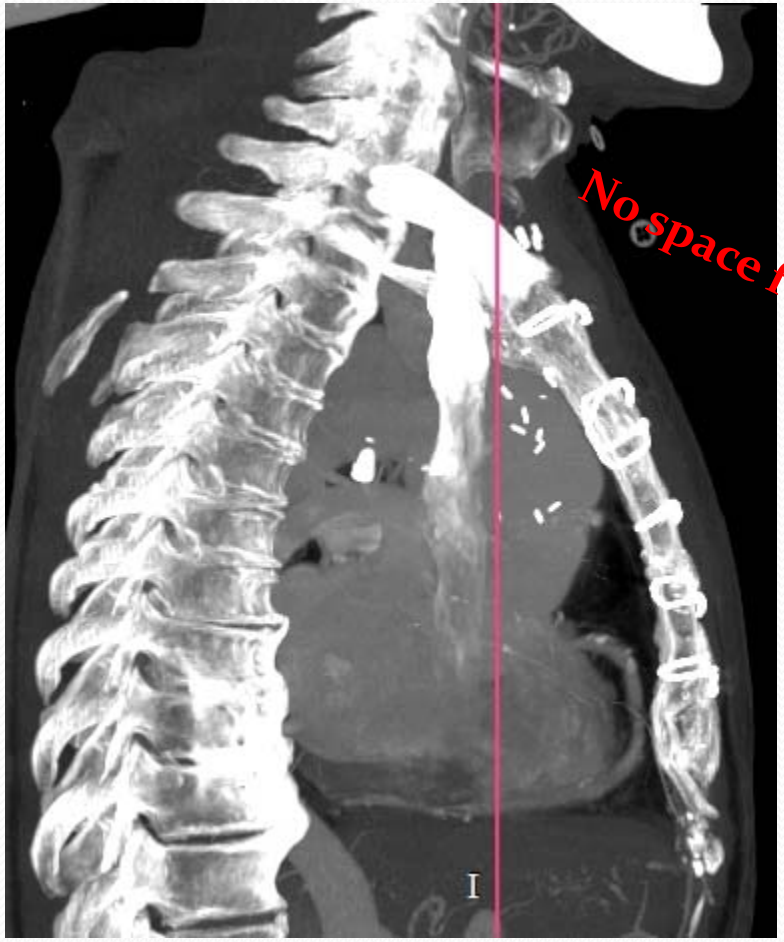
- Adequate equipment and surgical/endovascular expertise

Case B

71 year old male admitted with Chronic type A dissecting aneurysm 6,7cm found on f-up CTA

- Clinical data
  - Acute Type A aortic dissection repair with 3cm graft in Asc. Aorta (Sept. 2014)
  - Prostatectomy for prostate cancer
  - Present state asymptomatic
- Paraclinical data:
  - Echocardiogram
    - AI + /++++
    - LV EF 60%
  - Coronary angio
    - Normal
  - CTA
    - Dissection from the distal anastomosis of Asc. Aorta graft extending to lt. iliac artery involving supra aortic vessels & lt. renal artery
    - Asc. Aortic aneurysm & arch (6,7cm) abutting sternum & sternal wires
    - Rt. coronary artery coursing close to the lower part of the sternum with adhesions

Rt. Coronary & distal Asc Aorta abutting sternum



No space for conventional sternotomy !!

Complexity of surgical management

When the going gets tough, the tough go colder!

Leonard N. Girardi, MD

From the Department of Cardiothoracic Surgery, Weill Cornell Medicine, New York, NY.
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Address for reprints: Leonard N. Girardi, MD, Department of Cardiothoracic Surgery, Weill Cornell Medicine, 525 E 68th St, M404, New York, NY 10065 (E-mail: lngirard@med.cornell.edu).
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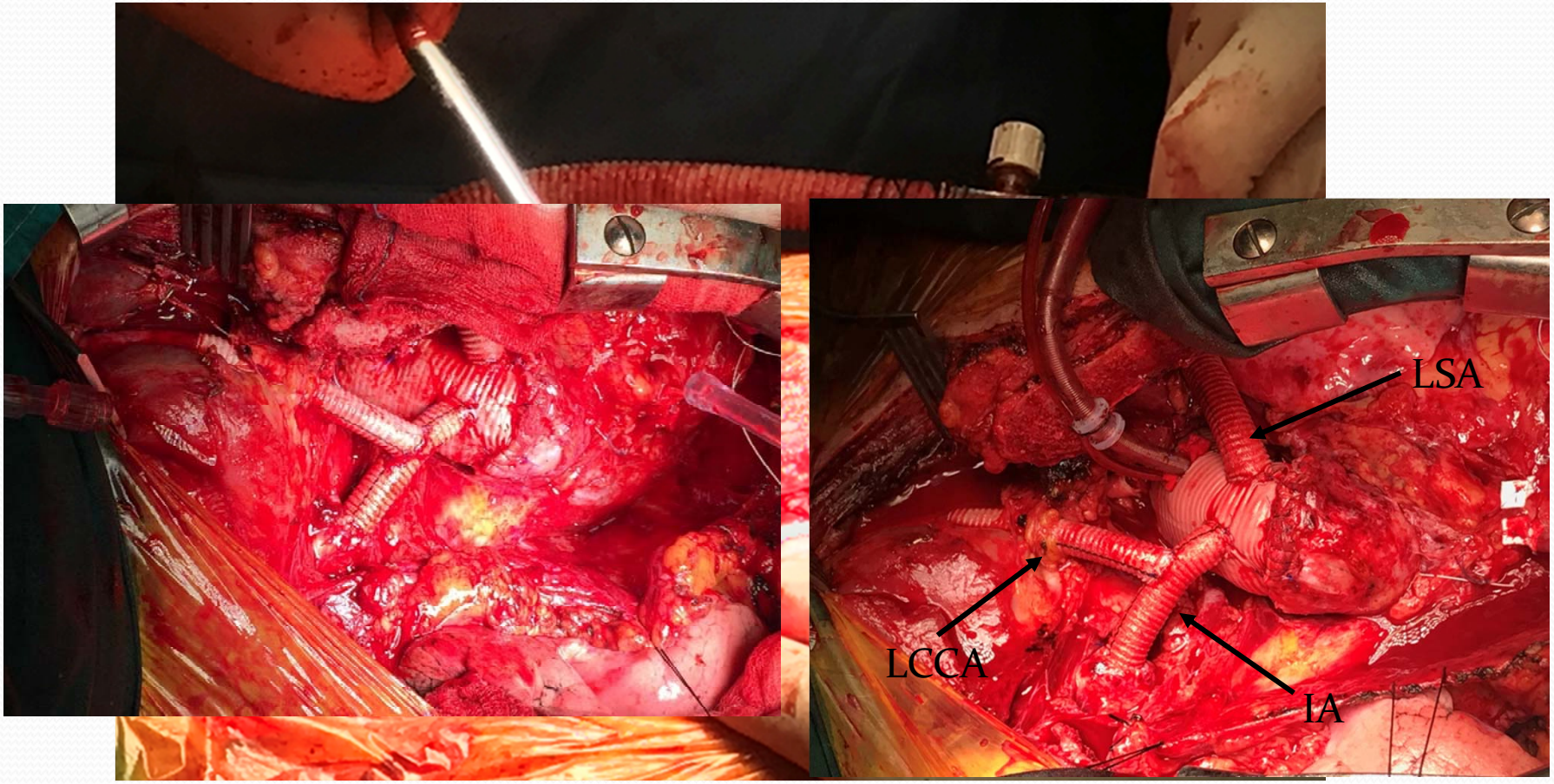
Central Message

Moderate hypothermia is safe across a range of temperatures, particularly for uncomplicated arch reconstruction. Complex total arch surgeries do similarly well at lower temperatures.

Rt. Coronary & distal Asc Aorta abutting sternum



Type A Acute Aortic Syndromes

Sep.2000- Jan.2018

Patients	N=118
Male	94
Female	24
Age (median, range)	62 (34-85)
AV repair & Asc Aorta & Hemiarch	58
AVR & Asc Aorta & Hemiarch	4
Bentall & Hemiarch	35
Asc Aorta & Total arch	17
Bentall & Total arch	3
AV repair & Asc Aorta & Hemiarch & Antegrade TEVAR	1
Total arch replacement & frozen elephant trunk (FET)	**11**
Concurrent CABG	9
Operative Mortality	9 (7,63%)
Total Mortality	25 (21,19%)

Total arch replacement & Frozen Elephant Trunk (FET)

Nov.2007- Jan.2018

Patients	N=31
Chronic Aortic Pathologies	**20**
Chronic type A aortic dissection (redo's)	3
Asc. & Arch & DTA Aneurysm	17
Acute aortic Syndromes	**11**
Acute type A aortic dissection	4
Acute type A IMH (ruptured in DTA)	1
Chronic type A aortic dissection (ruptured)	3
Pseudoaneurysm of aortic arch (PAU)	3
Total Mortality	6 (19,35%)

FET – Gold Standard in Complex Aortic Surgery ?

- Durable repair
- At low risk in experienced centers
- Shortened period of hypothermic arrest
- Shortened CPB time
- Applicable in elective & emergency cases
- Perfect docking for open & endo reintervention

Conclusions

- AcA-AoD is a surgical emergency associated with very high morbidity and mortality.
- Early outcome of emergency surgical repair has not improved substantially over the last 20 years.
- Repeatedly debates regarding operative extent and optimal conduct of the operation.
- The question remains: are patients suffering from too large an operation or too small?

Conclusions cont...

- Distally, open replacement of most of the transverse arch is best in most patients.
- The need for late aortic re-intervention has not been shown to be affected by more extensive distal operative procedures, but the contemporary enthusiasm for a distal frozen elephant trunk (FET) only seems to build.
- It must be remembered that the first and foremost goal of the operation is to have an operative survivor; additional measures to reduce late morbidity are secondary aspirations.

Conclusions cont...

- With increasing experience, true contraindications to emergency surgical operation have dwindled, but patients with advanced age, multiple comorbidities, and major neurological deficits do not fare well.
- The endovascular revolution, moreover, has spawned innovative options for modern practice, including ascending stent graft techniques.
- Despite the increasingly complex operations and ever expanding therapies, this life-threatening disease remains a stubborn challenge for all cardiovascular surgeons.
- Development of specialized thoracic aortic teams and regionalization of care for patients with AcA-AoD offers the most promise to improve overall results.

Thank you