

Distal Arch and Descending Aorta: What Is the Optimal Therapy in 2017?

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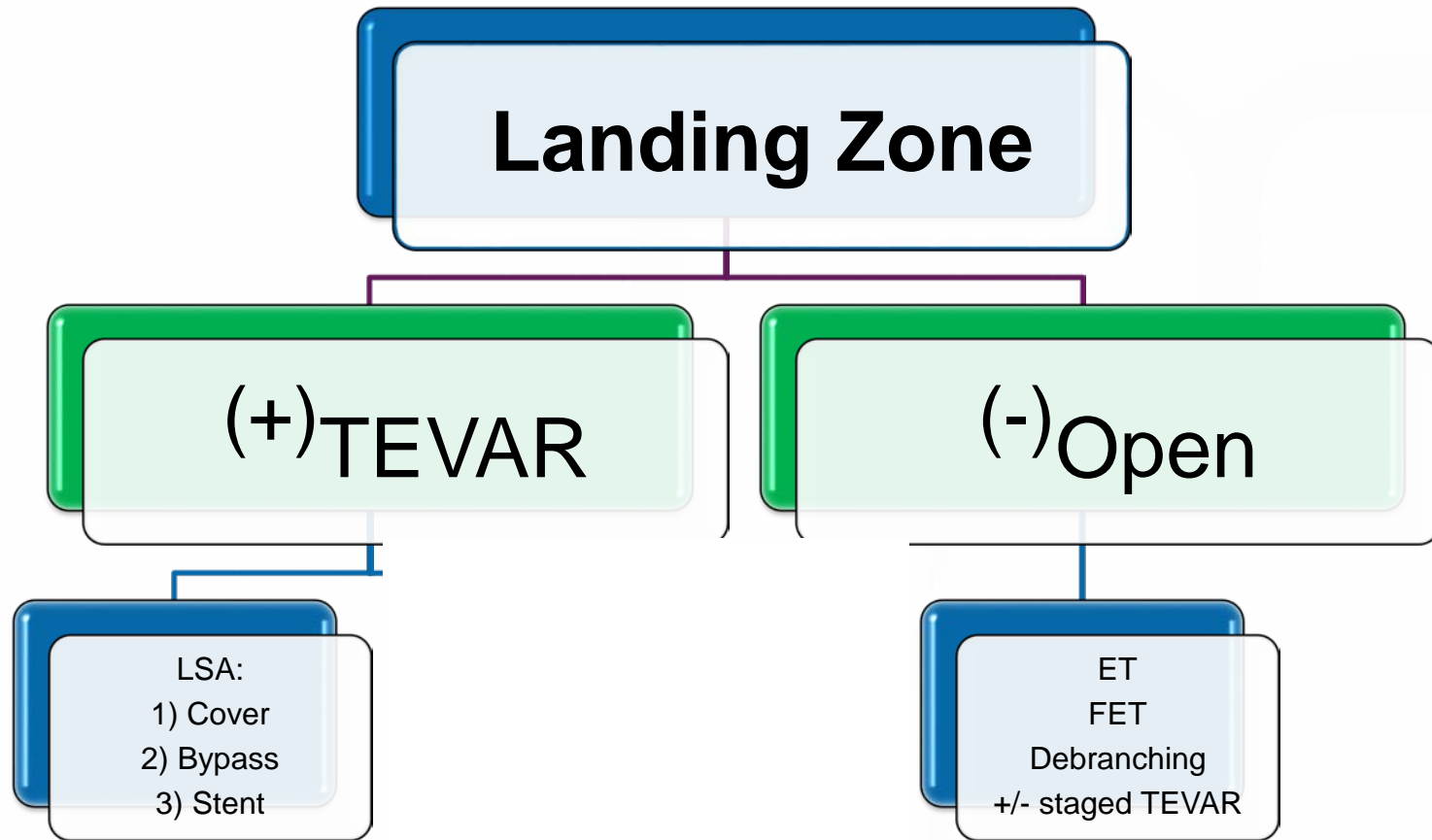
Heart and Vascular Institute, Cleveland Clinic



Disclosures

Bolton	Consultant, Investigator
Cook	Speaker, Investigator
Cryolife	Consultant
Edwards	Consultant, Investigator
Gore	Consultant, Investigator
LivaNova	Speaker, Investigator
Medtronic	Consultant, Investigator
St Jude	Speaker, Investigator
Vascutek	Speaker, Investigator

Options for Zone 2



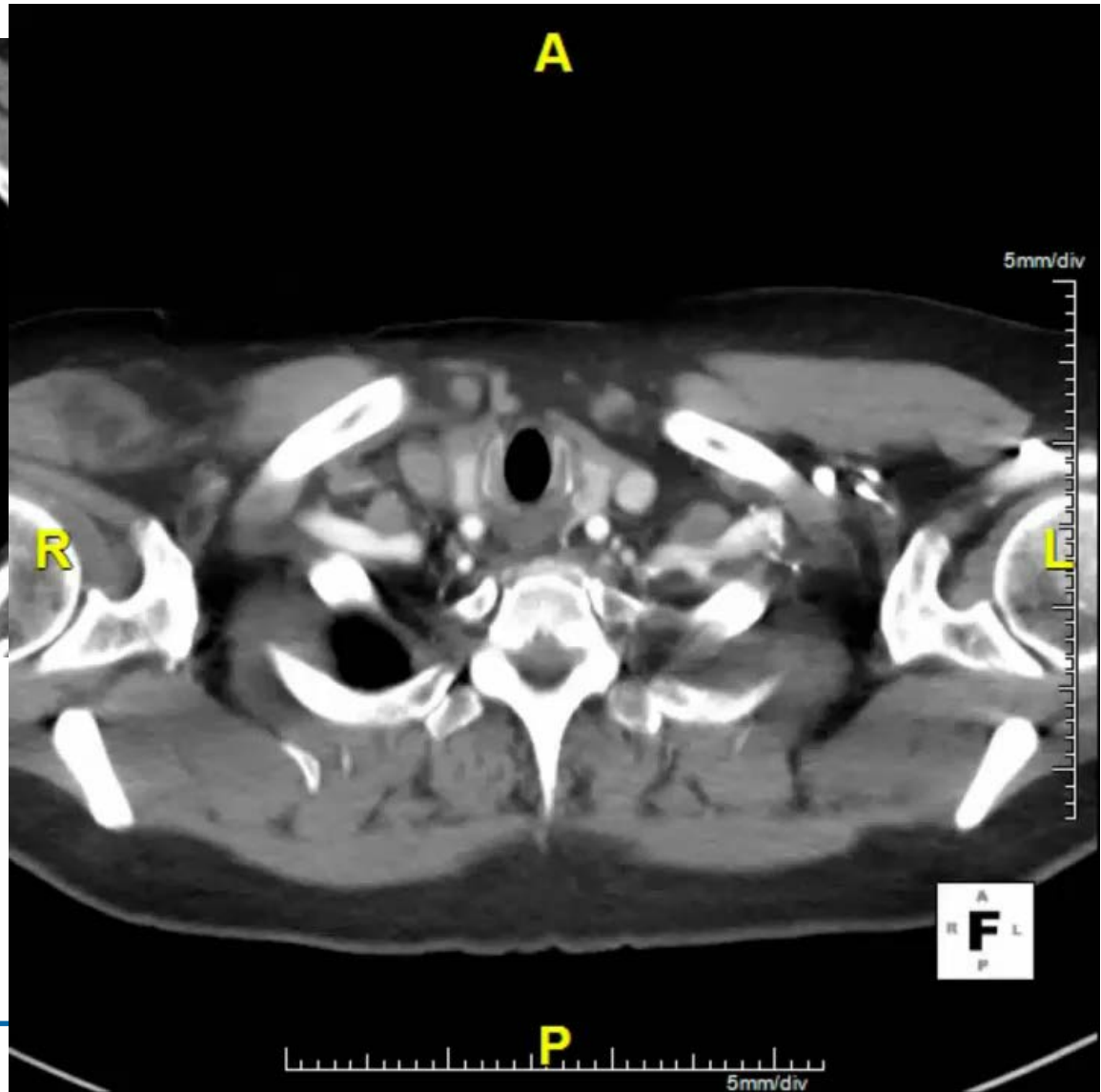
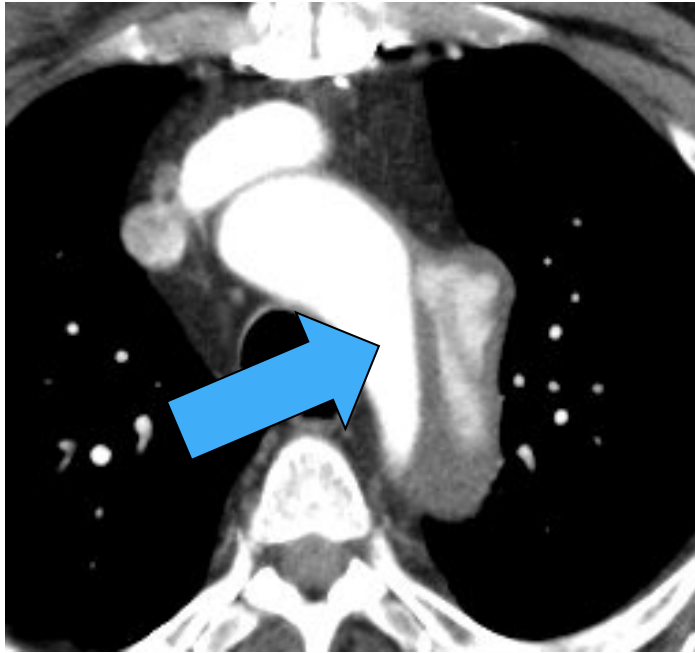
Open Options for the Distal Arch

- Conventional
 - Elephant Trunk
 - "Platform"
- Hybrid (open plus stentgraft)
 - Frozen Elephant Trunk
 - Hybrid Debranching

70 y/o Male s/p Type A Dissection

- 2007 Emergency ascending and hemiarach
- Sternal infection on chronic suppressive abx
- Malignant lymphoplasmacytic lymphoma
- Obesity (BMI 37), Ventral hernia, Sleep Apnea, Barrett's esophagus, Hyperlipidemia, Glaucoma, h/o retinal detachment, restless leg syndrome, depression

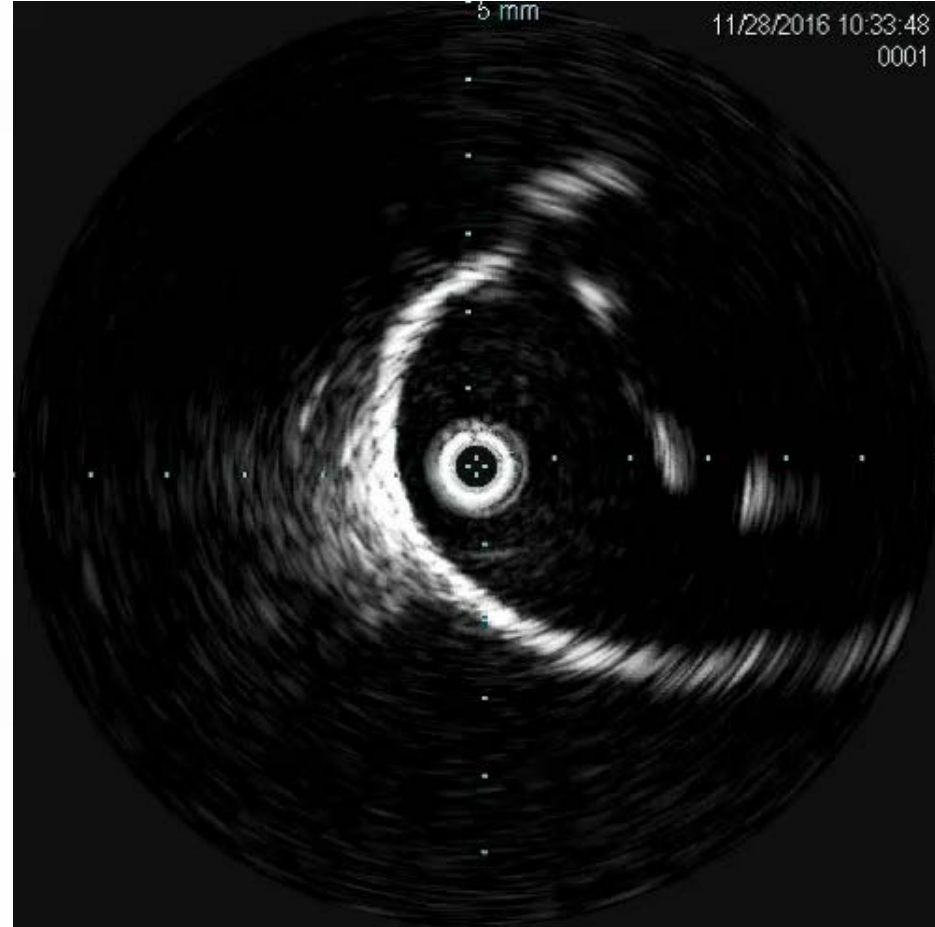
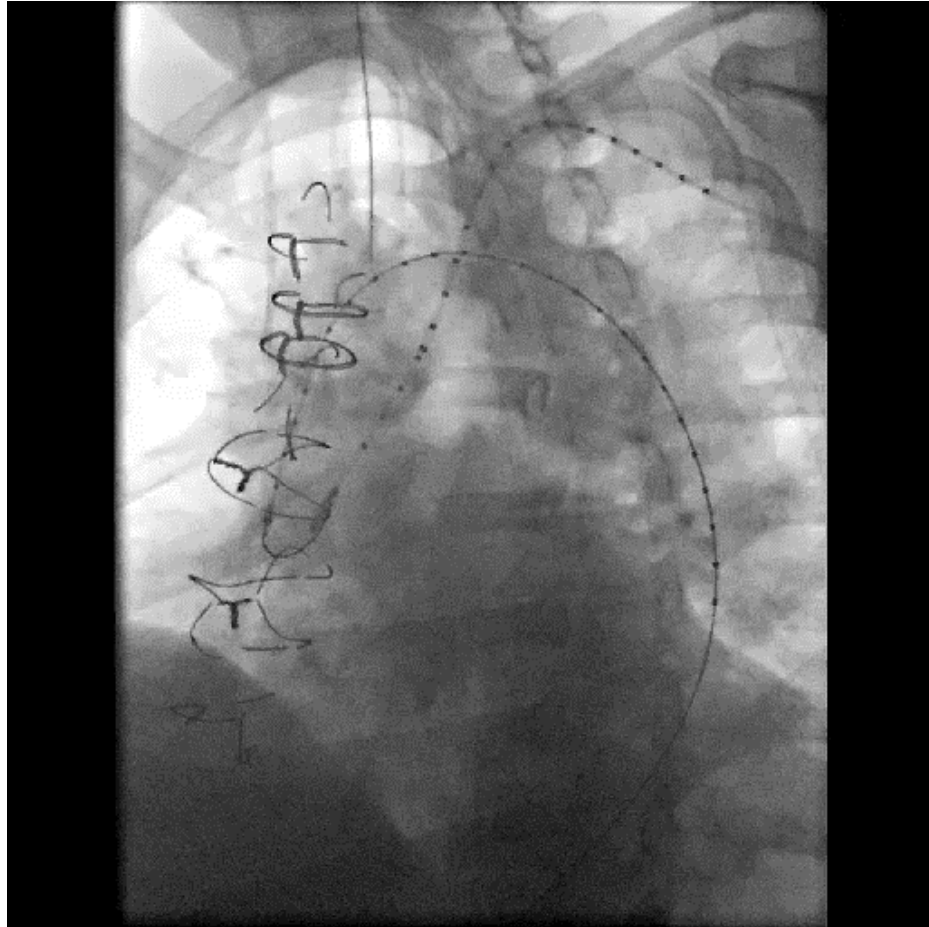
Recent Growth Distal Arch FL



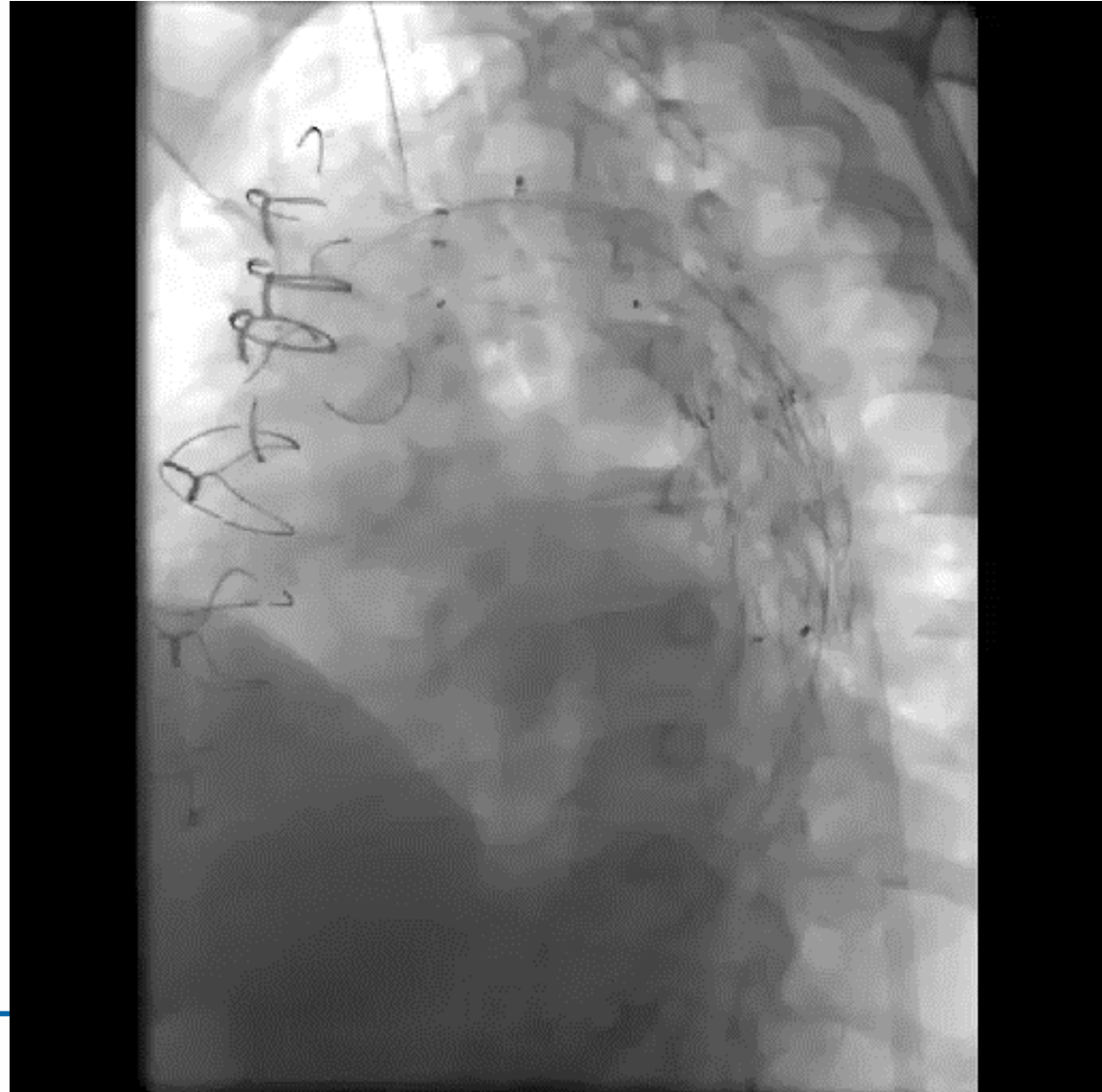
Plan for TEVAR

- Spinal drain, Cover to Celiac
- Size between LCC and LSA, minimal oversizing (3D CT)
- Always use IVUS
- U/S guidance for brachial access
- U/S guidance for Perclose also helpful
- Beware dissected LSA

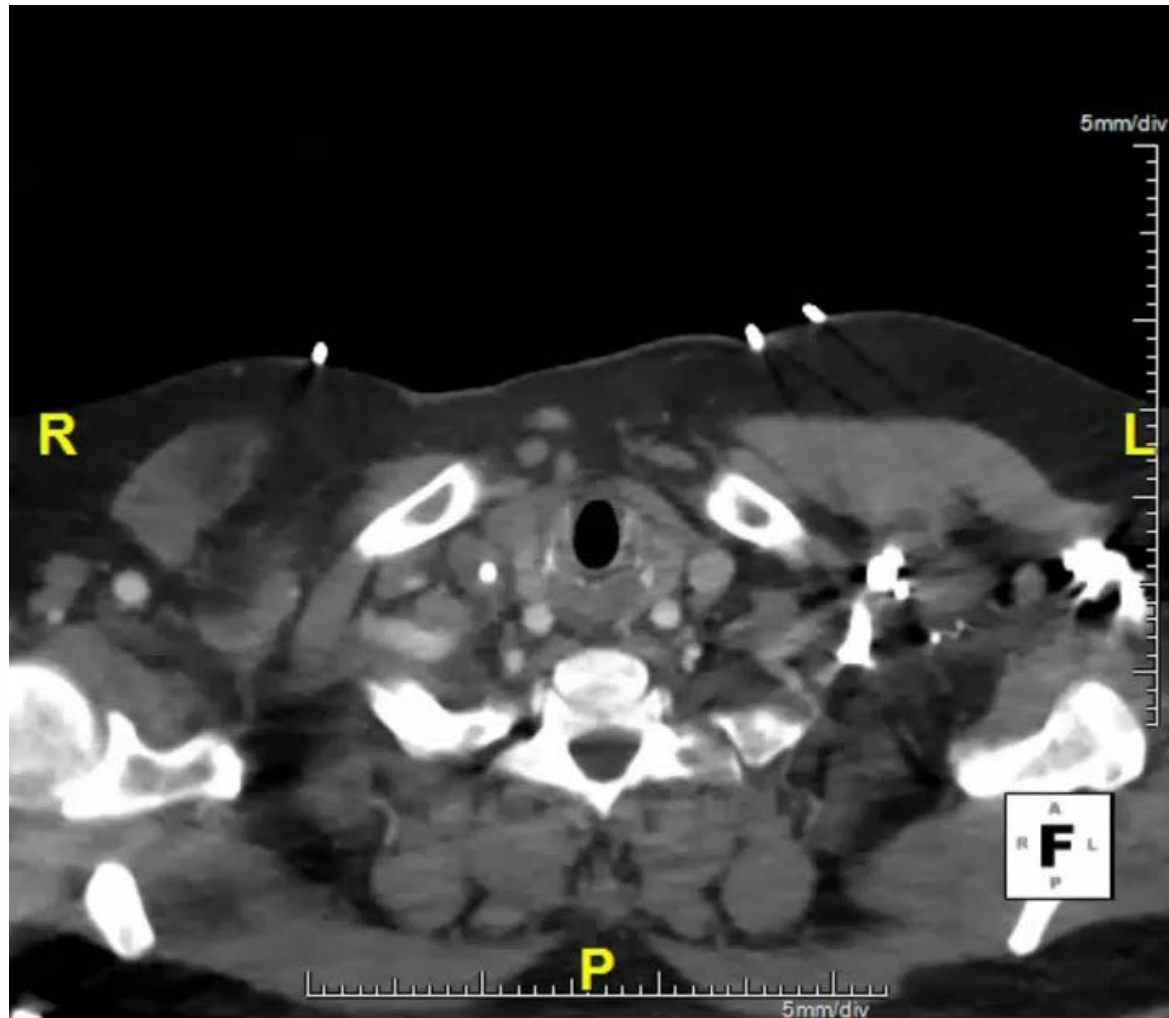
IVUS



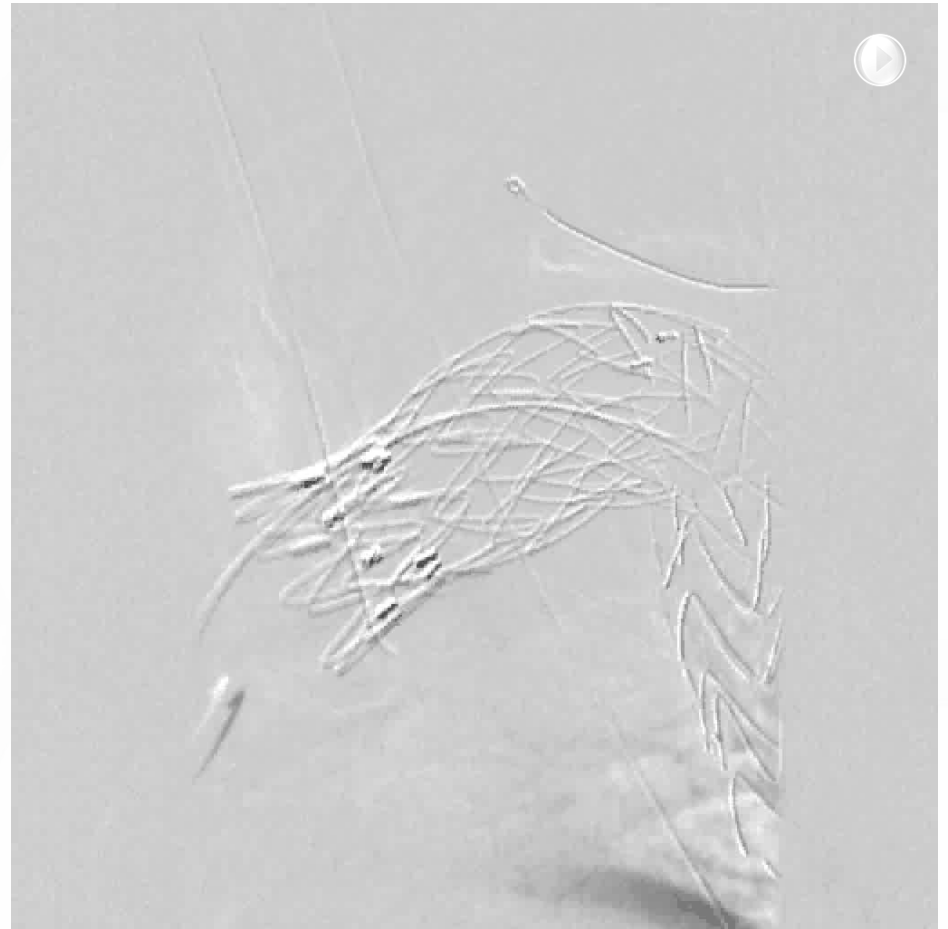
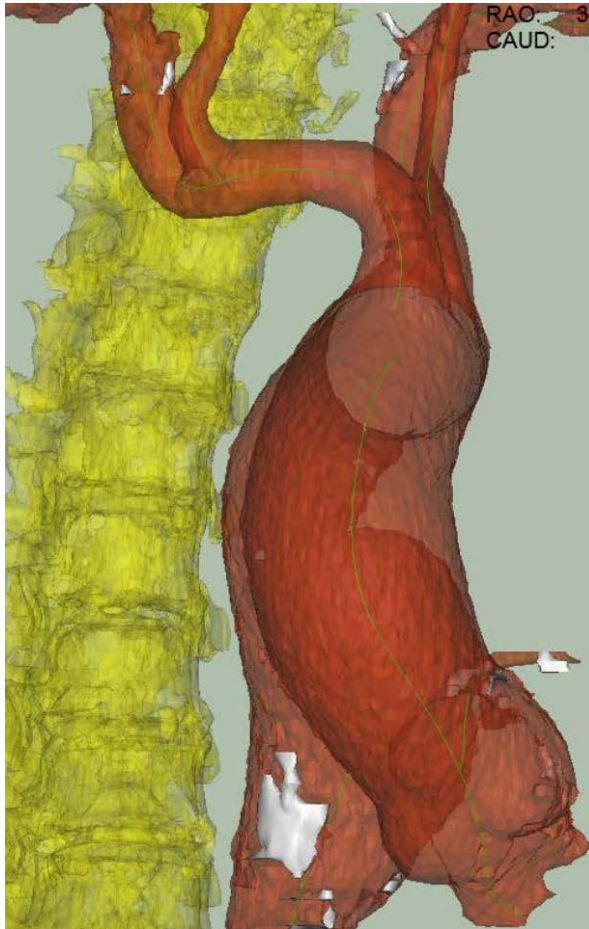
Laser Fenestration and LSA Stenting



Completion CT

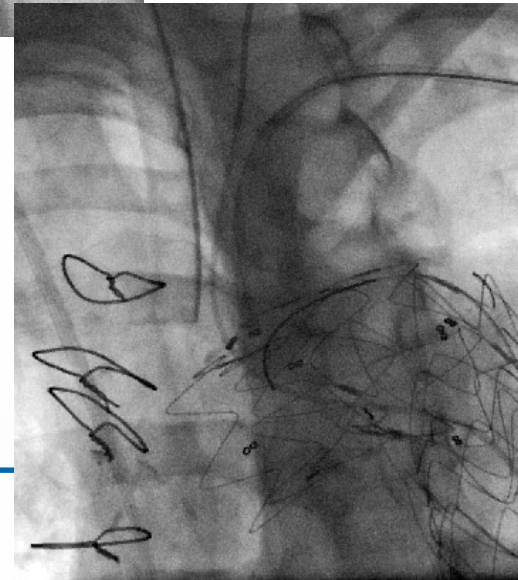
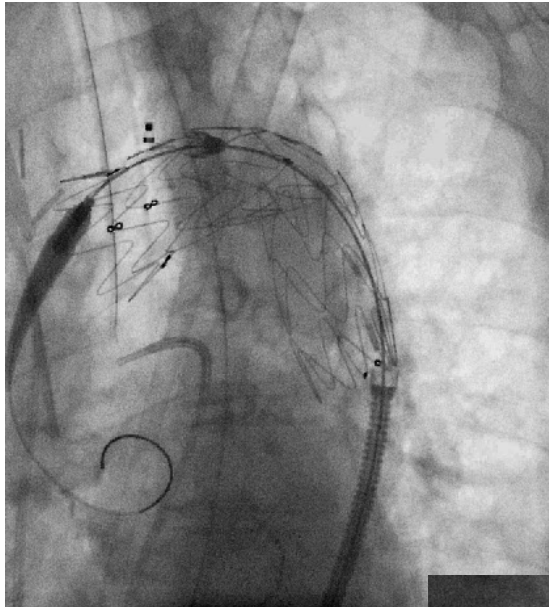


Malalignment an Issue

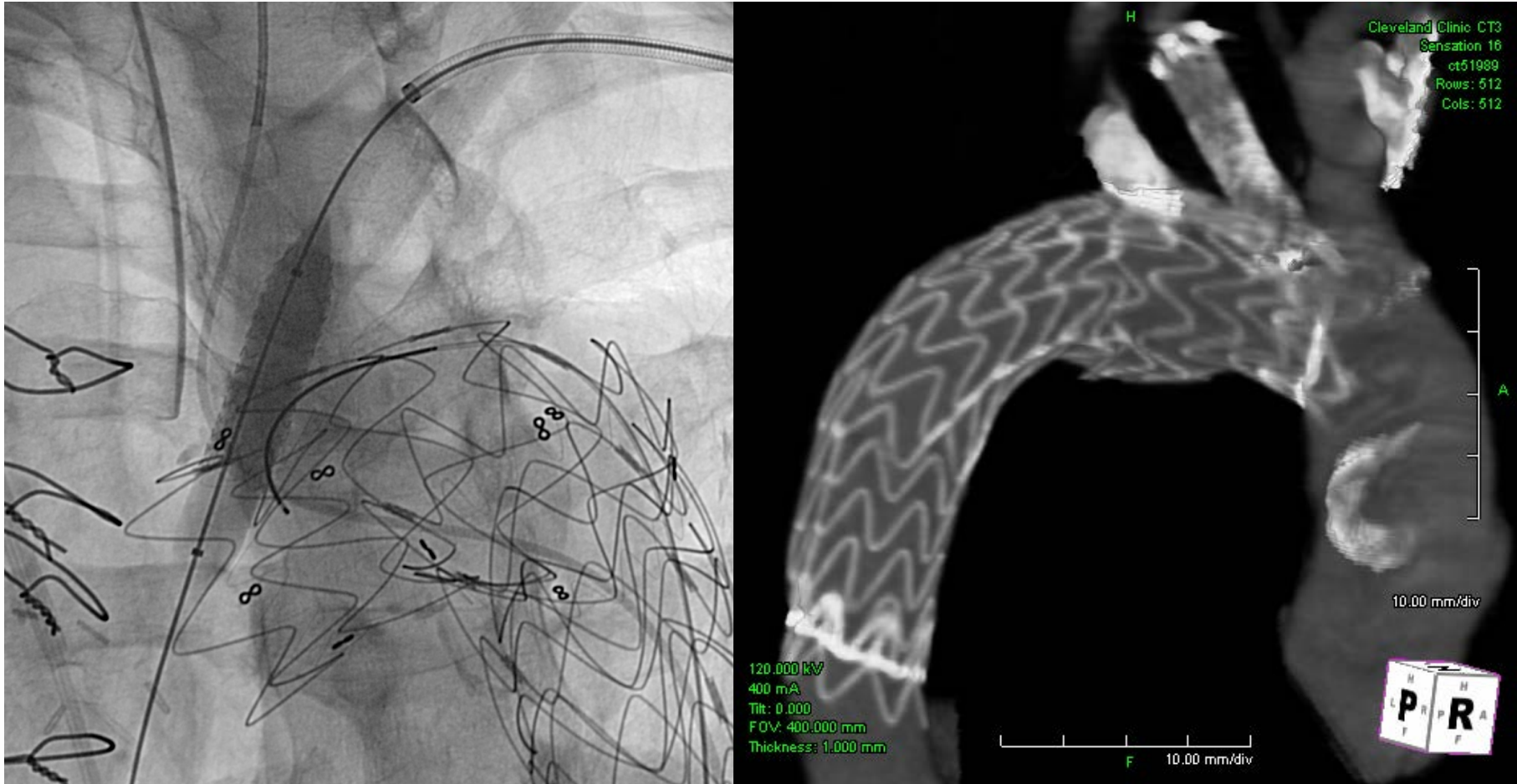


Key Points for Laser Fen + Stenting

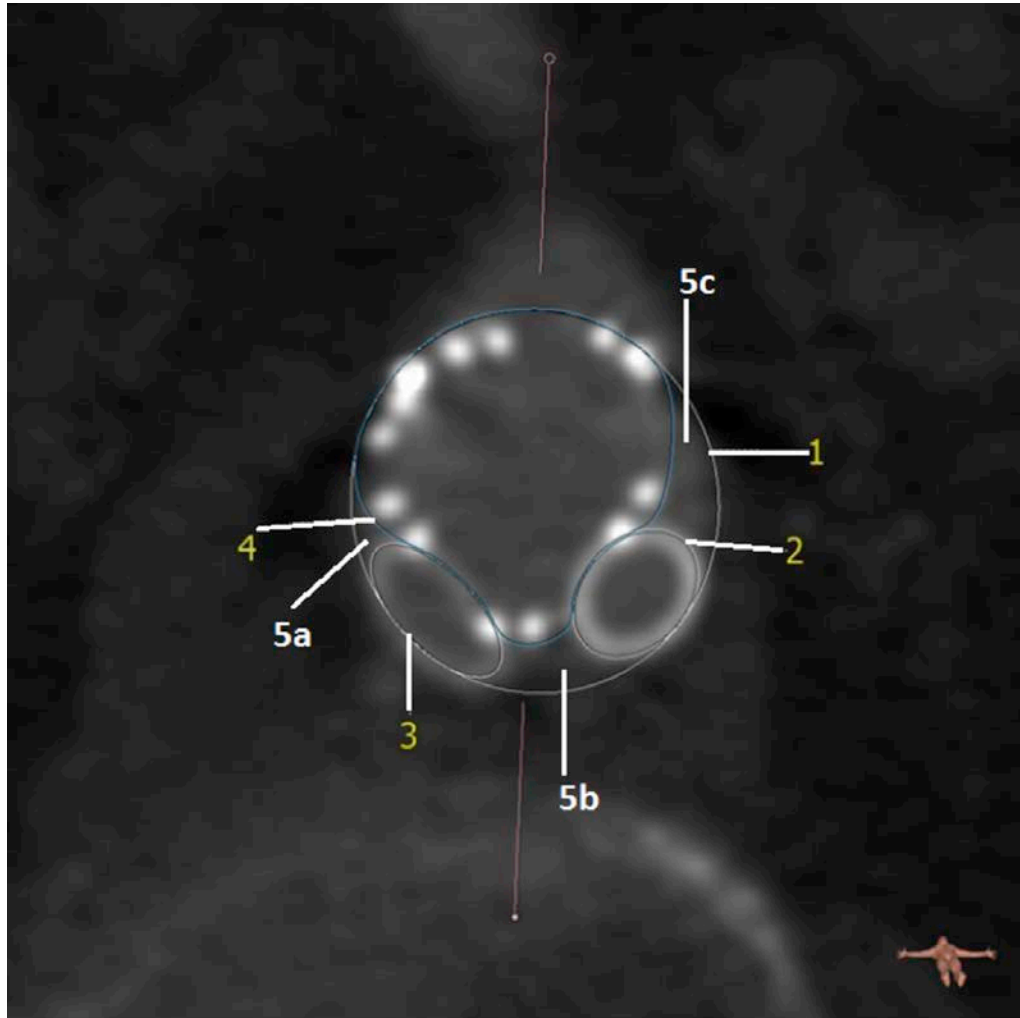
- Understand the Anatomy
- Visualization
 - LAO, RAO, Cr/Cau
- Thru and thru wire
- Balloon “waist”
confirmation
- LSA angio guidance
from above



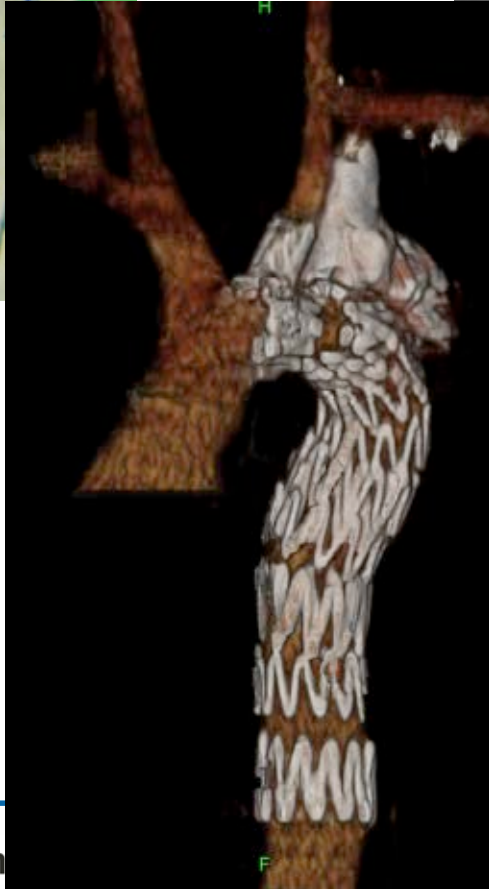
Chimneys, Periscopes, Snorkels (ChimPS) Alternative



Branch Challenge: Endoleaks, Patency ?

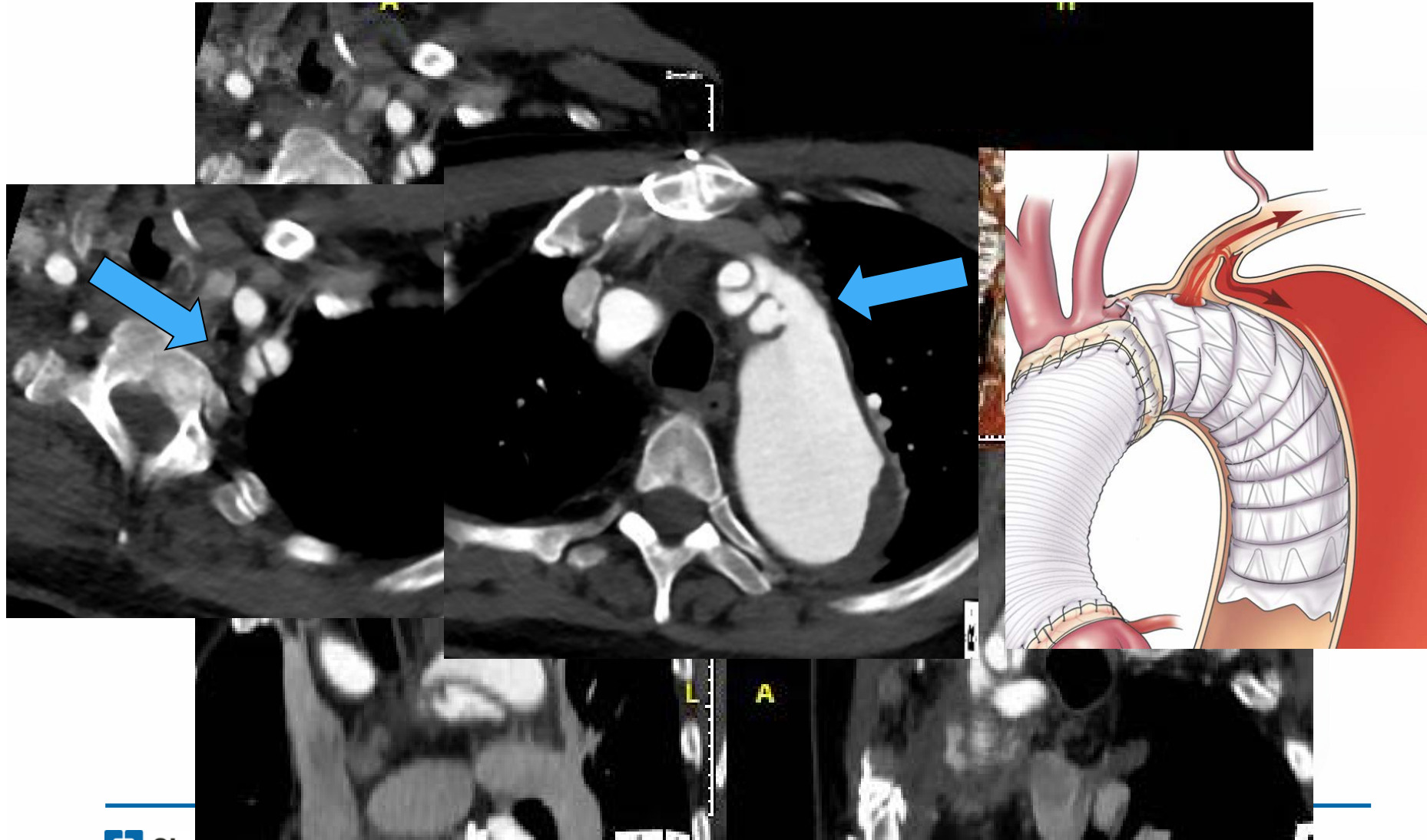


Fenestrated Devices



Yokoi Y, et al. Tokyo, Japan
Presented at 2012 AATS Aortic Symposium
Azuma T, et al. EJCTS, 2013

Beware the Dissected LSA



Arch Single Branch Devices

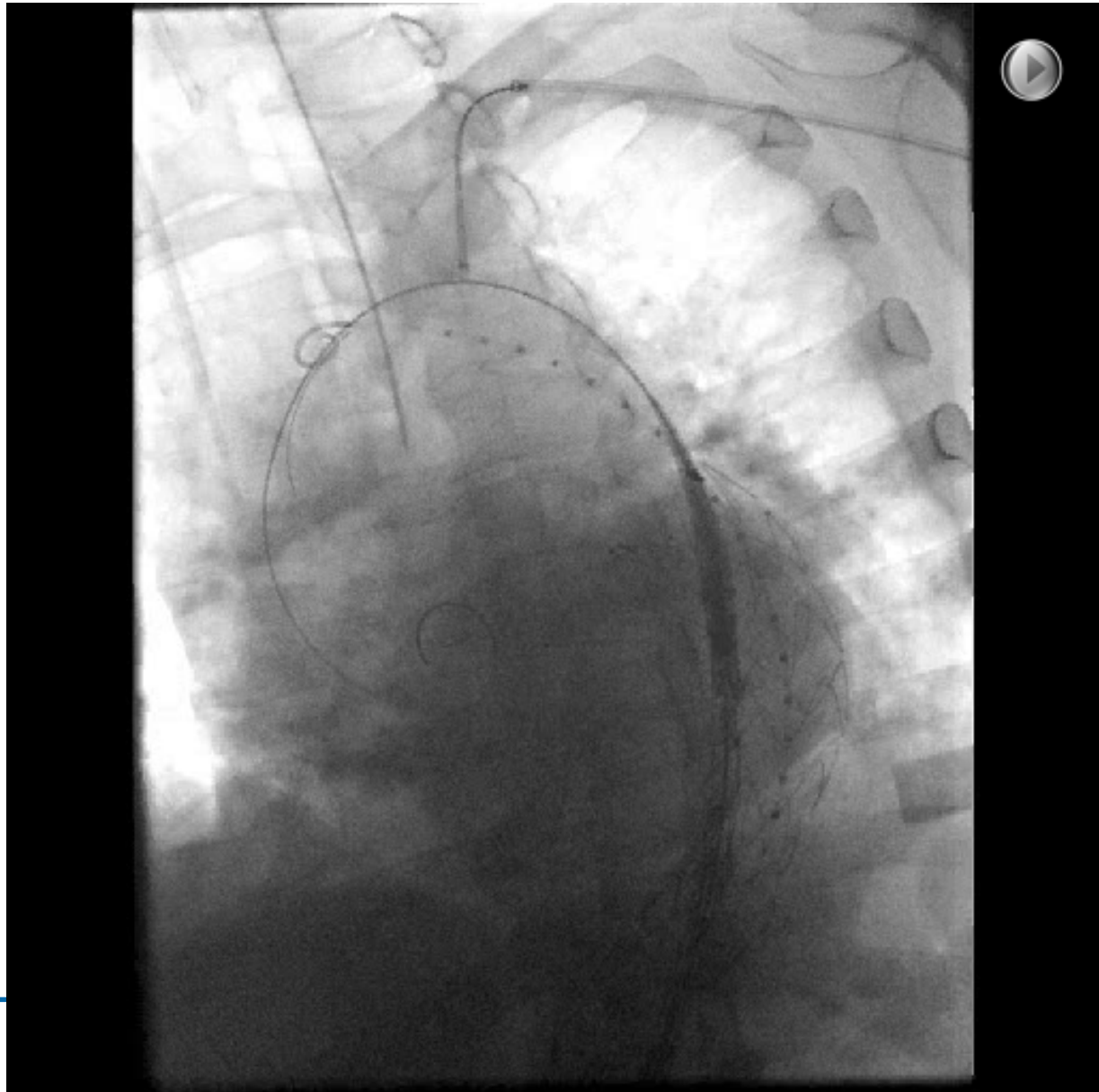
MonaLSA



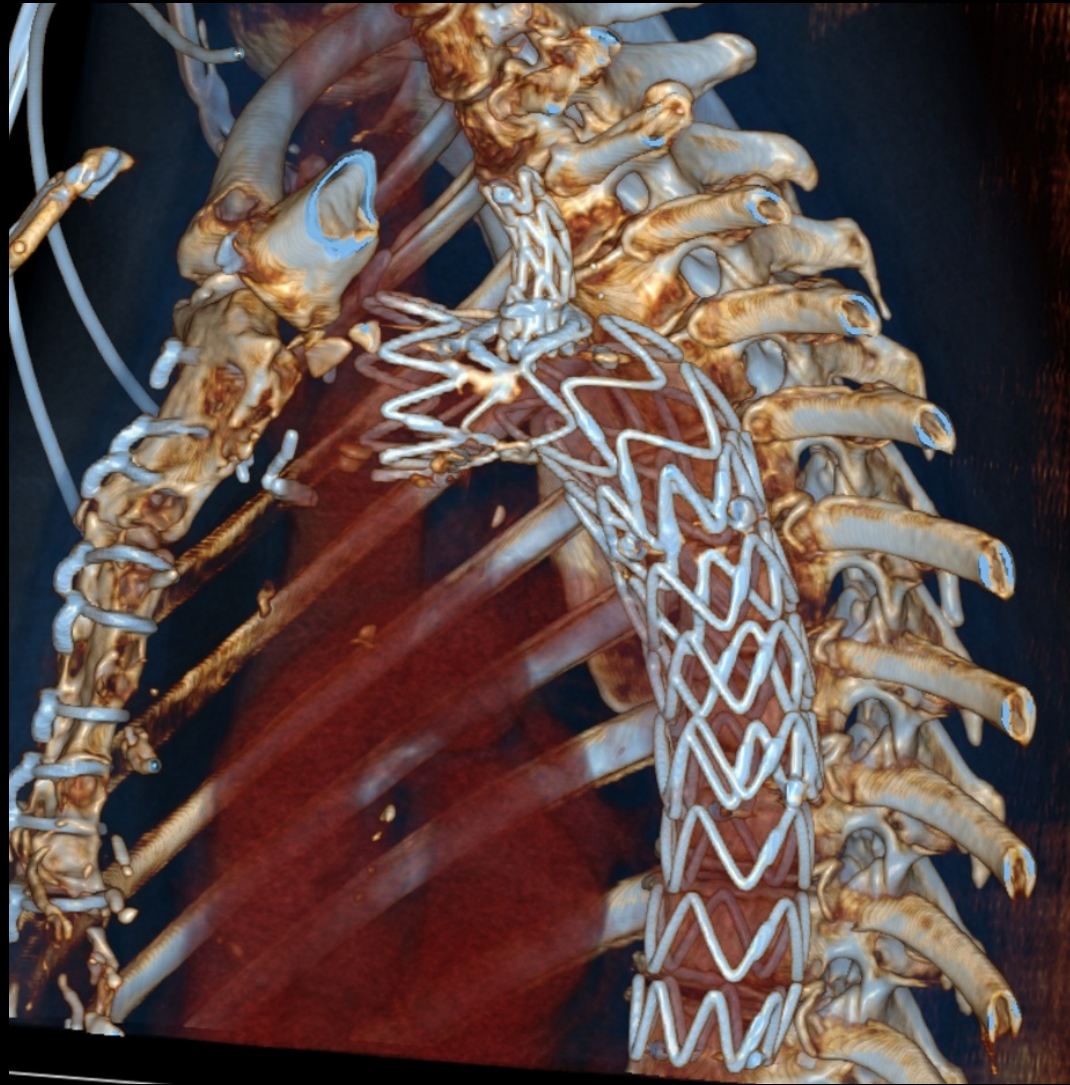
TBE



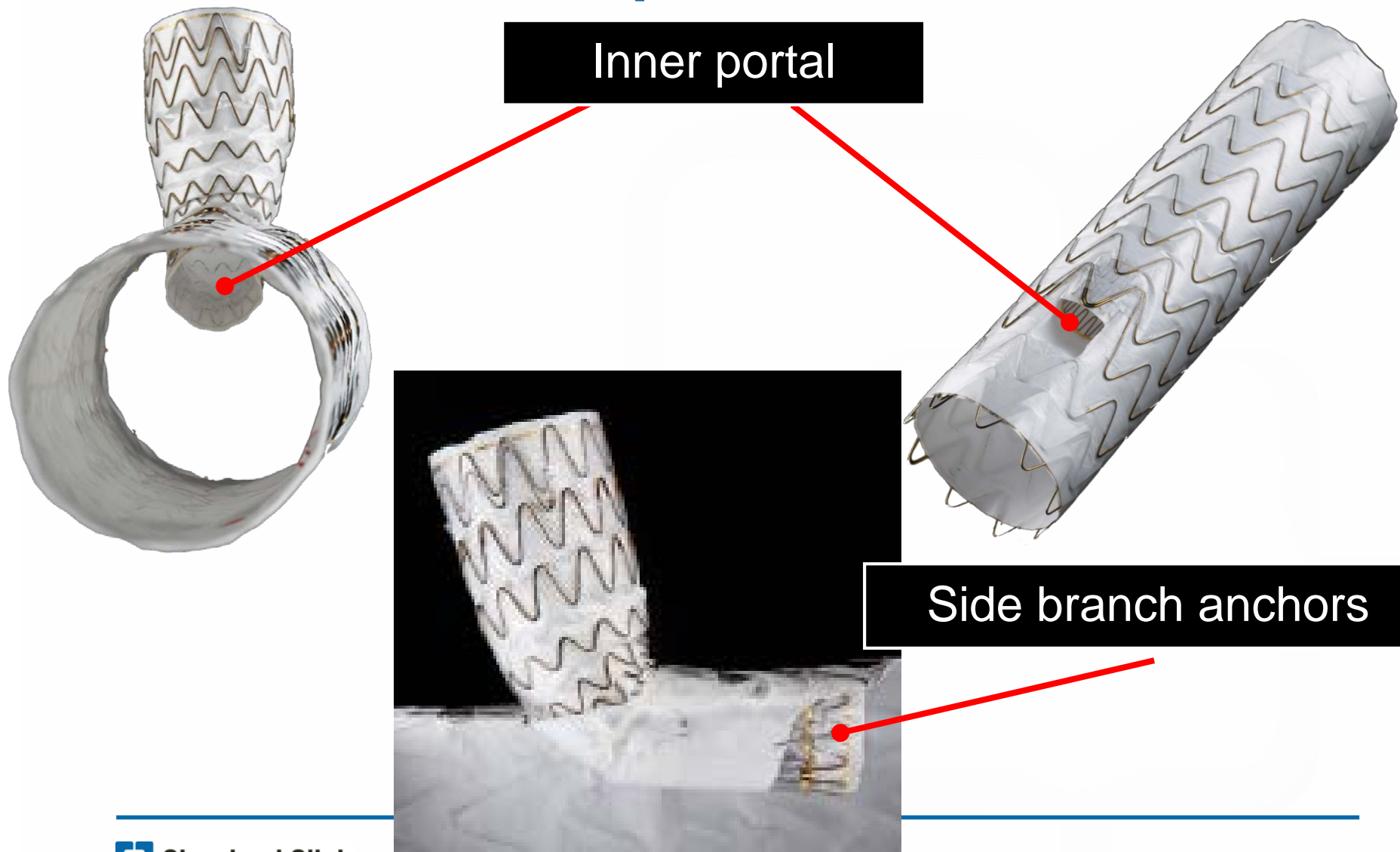
Procedure



Post-Op CTA Image

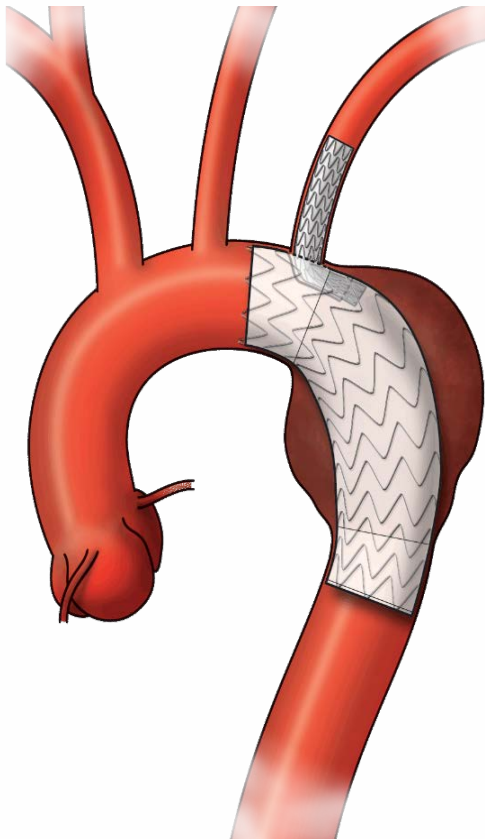


GORE® TAG® Thoracic Branch Endoprosthesis

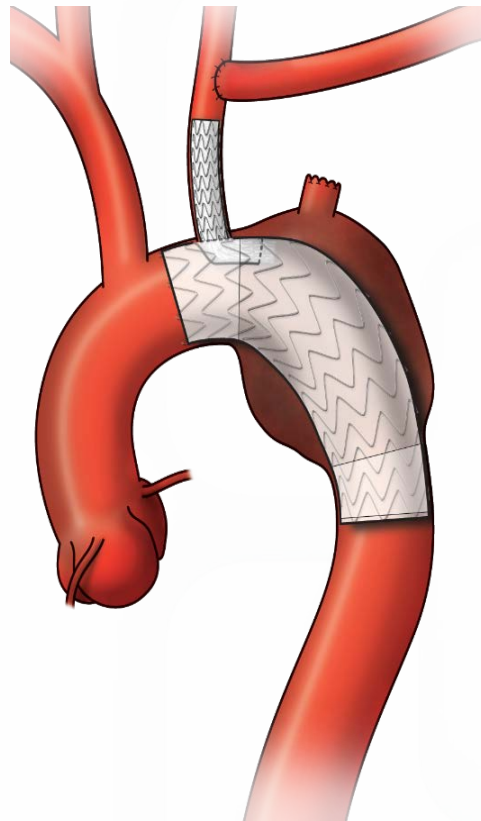


Potential Use of Single Branch Device

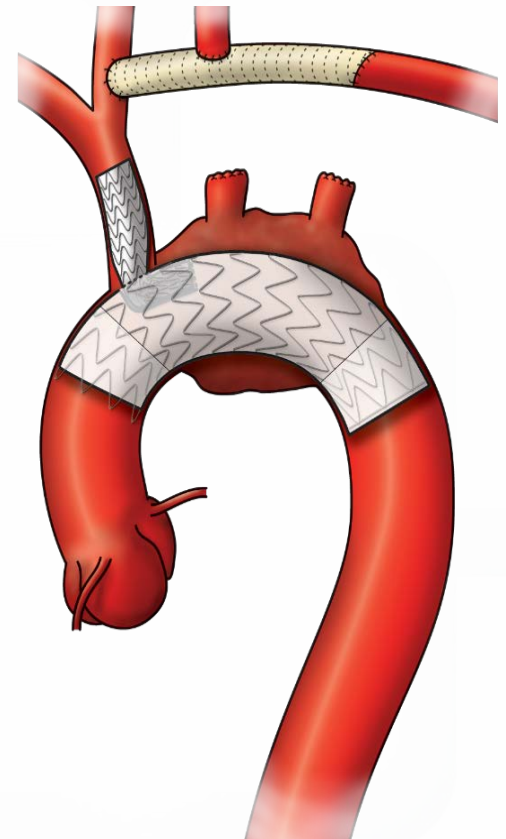
Zone 2



Zone 1



Zone 0



LSA Branched Graft Commonalities

- Double Wire Access
- Through and through wire optimizes alignment
- Avoid wire wrap
 - RAO visualization
 - Over the wire snaring
- Minimize manipulation within the arch
 - Wire Snaring in distal aorta when possible
- Know the LSA and limitations of devices

Hybrid Arch Classification

Type I

Beating Heart

On or Off Pump

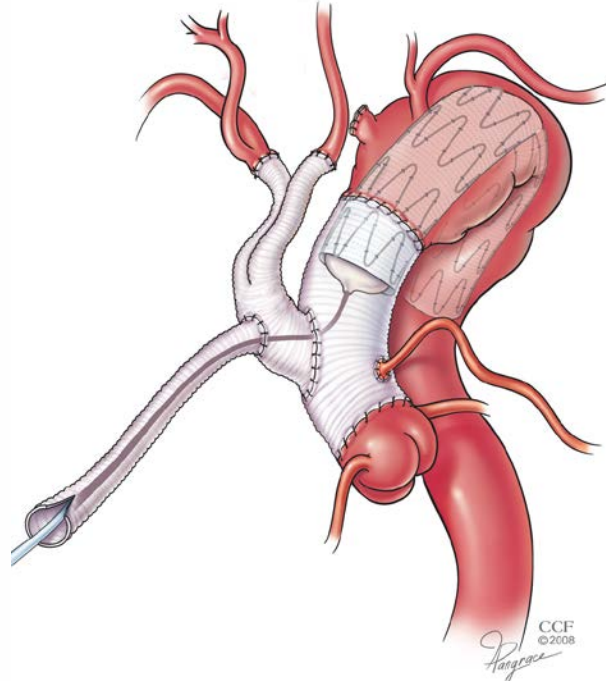
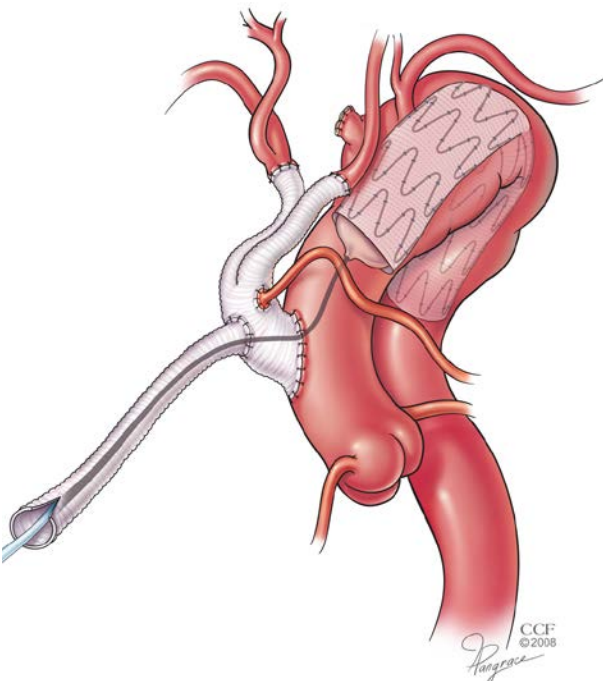
Type II

Cardiac Arrest Only

Type III

Circulatory Arrest

(incl FrozenET and EEC)

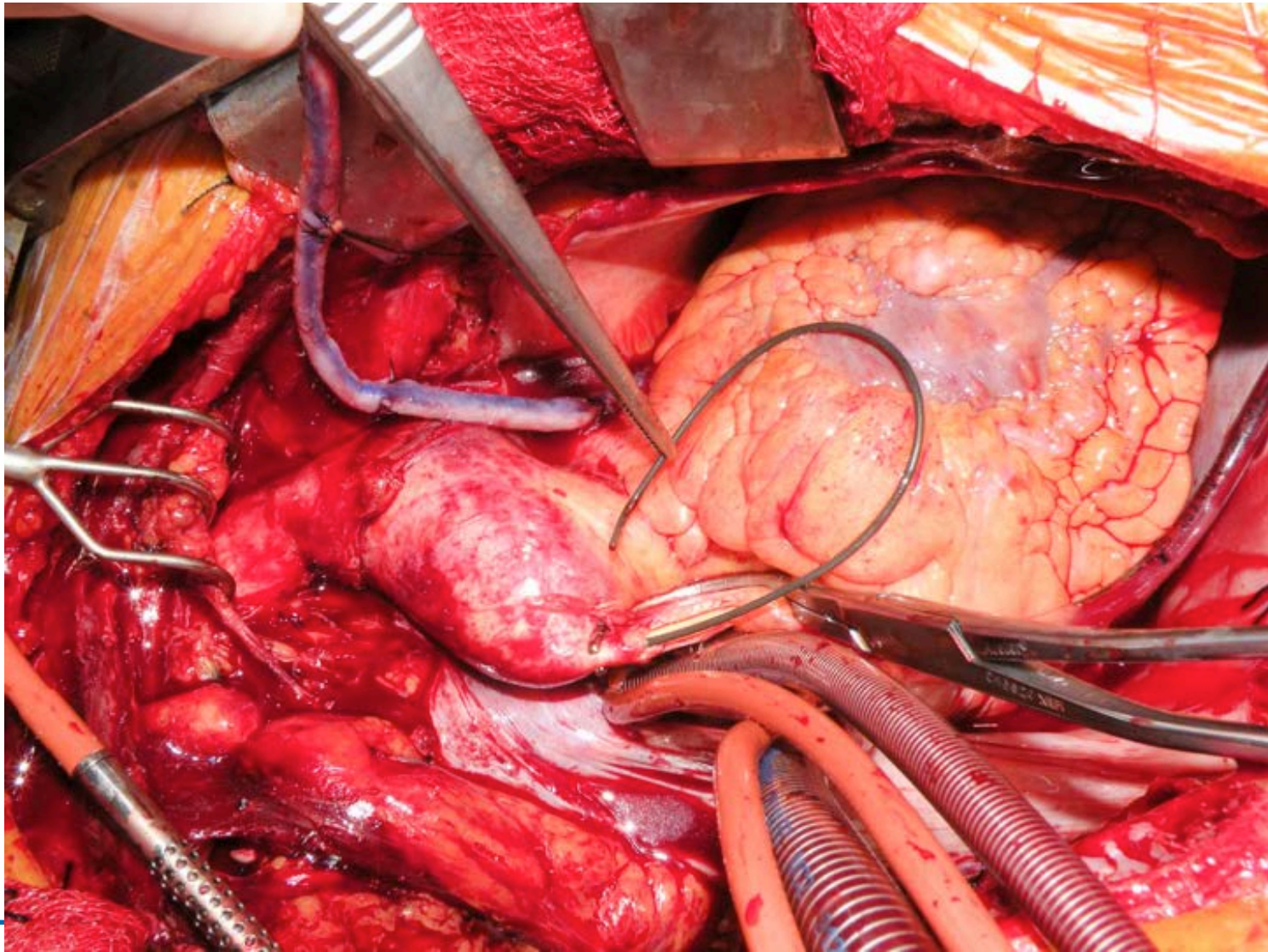


Single (s) or Two (d) stage

81y/o acute hoarseness, CP → CAD + Ruptured Arch Aneurysm

- Inferior wall ischemia
- Cath → 70% PLCx and RCA
- CT → Large arch aneurysm, Leak
- s/p PPM, *Jehovah's Witness*
- Hybrid Arch Type 1s
 - Beating heart debranching, Antegrade TEVAR

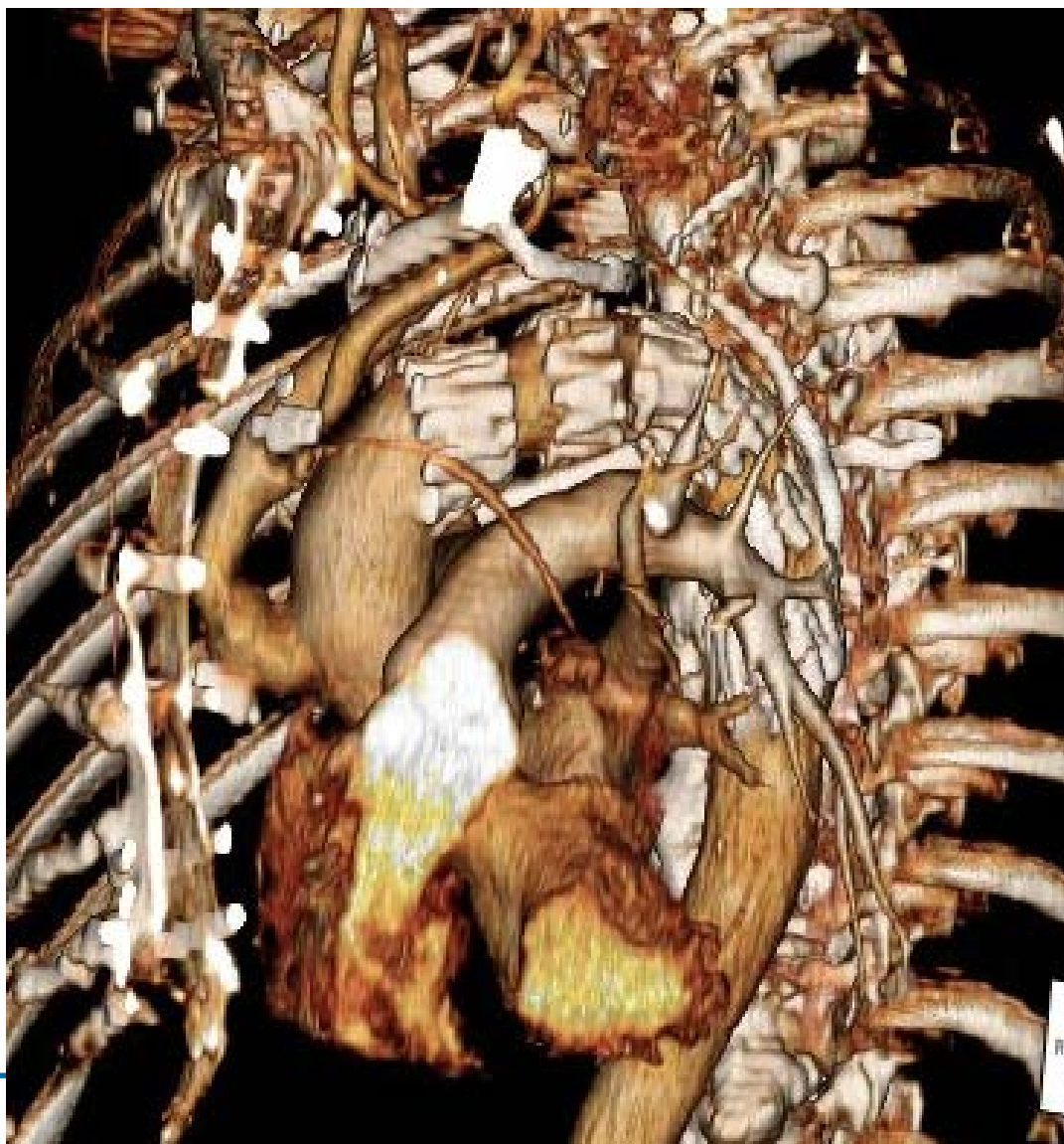
CABG and Debranching 1st



Antegrade Delivery 2nd



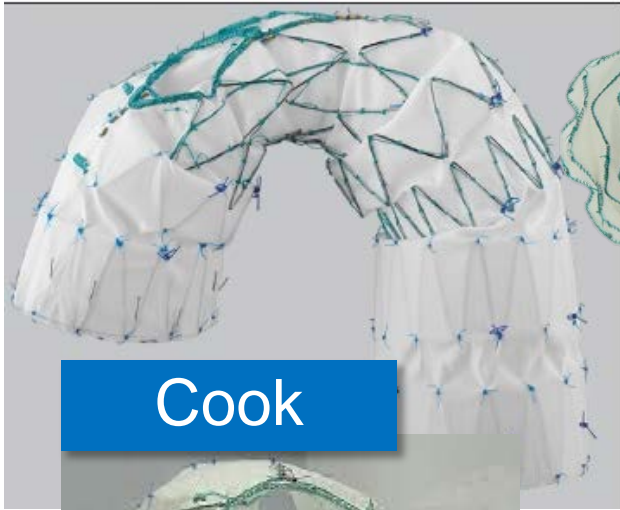
Completion CT



Hybrid Arch Type 1 Issues

- Side-biting clamp on diseased ascending
- Ascending diameter disparity - often large
- Landing zone less reliable, relatively short
- Partial/full sternotomy
- ~~• Extra anatomic bypass patency~~
- ~~• Limited options for multi component procedure~~

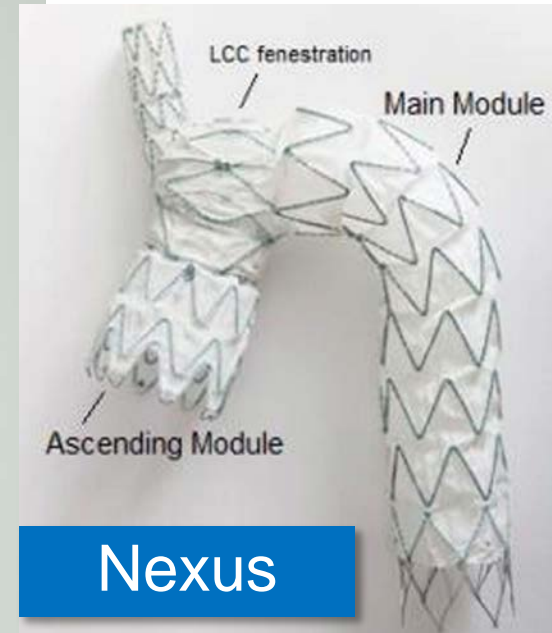
Arch Double Branch Devices



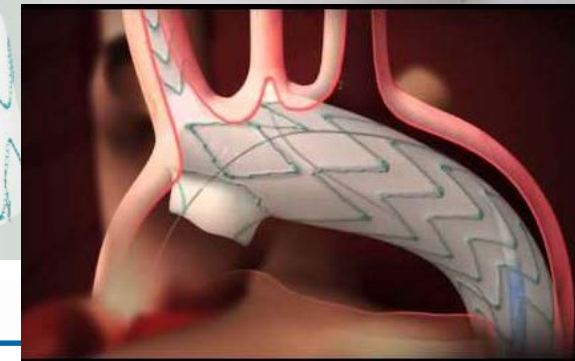
Cook



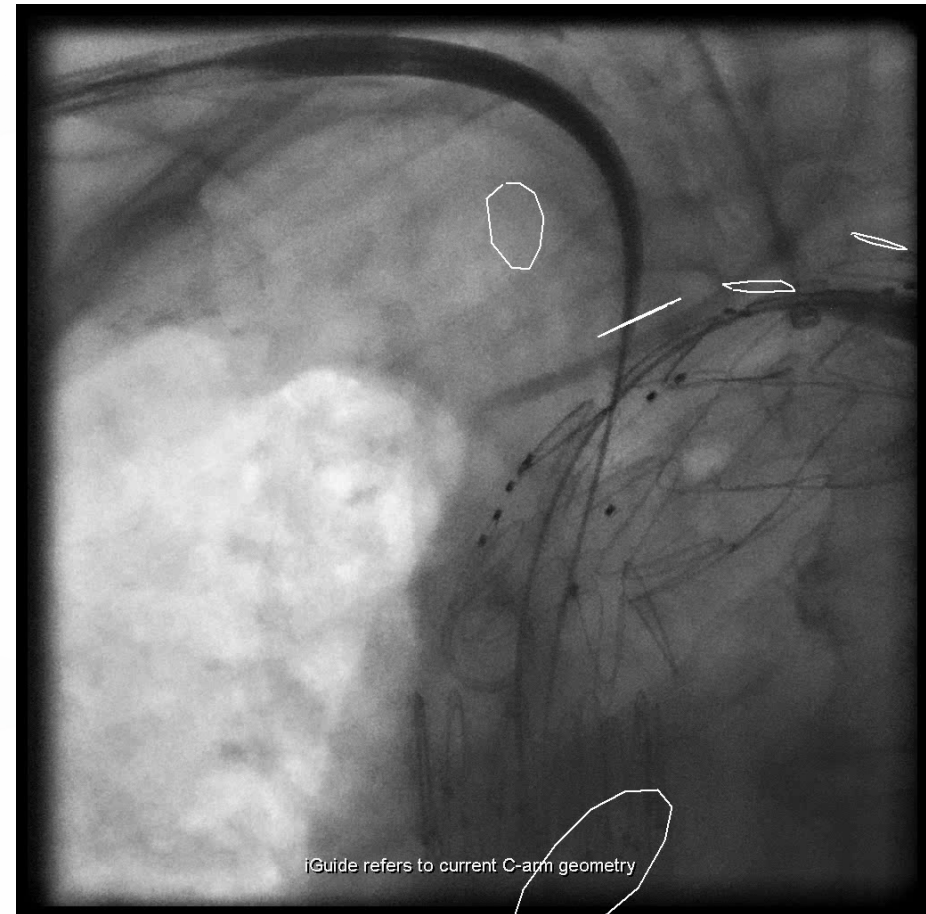
Bolton

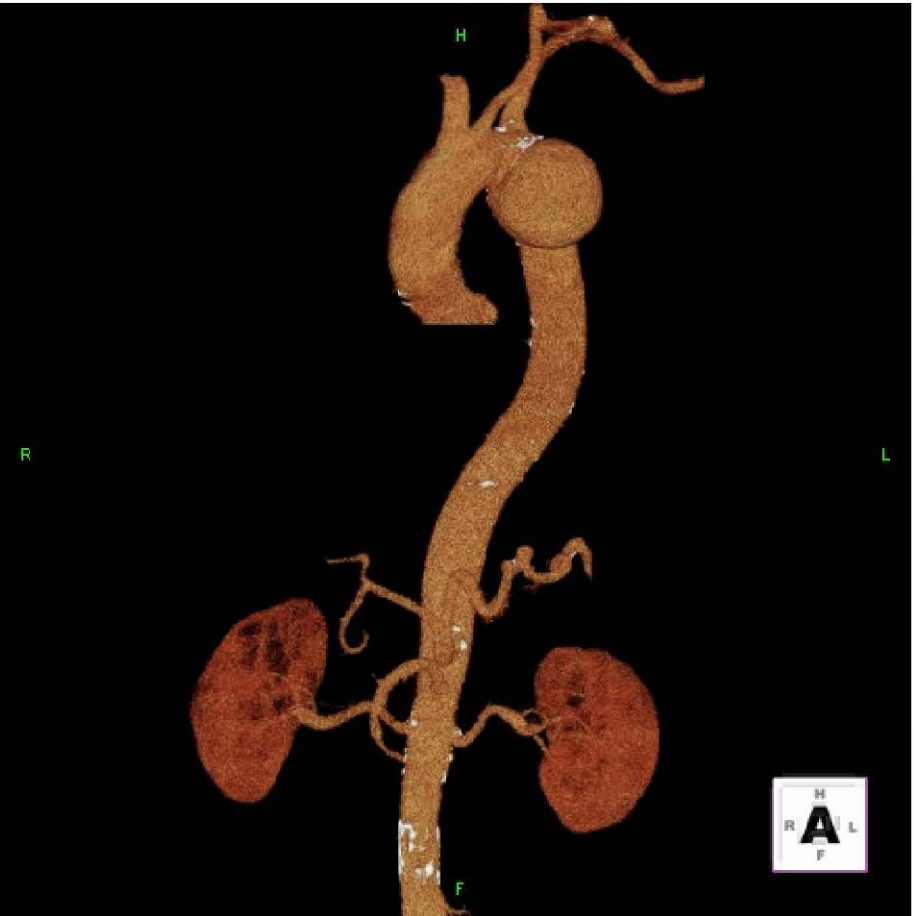


Nexus



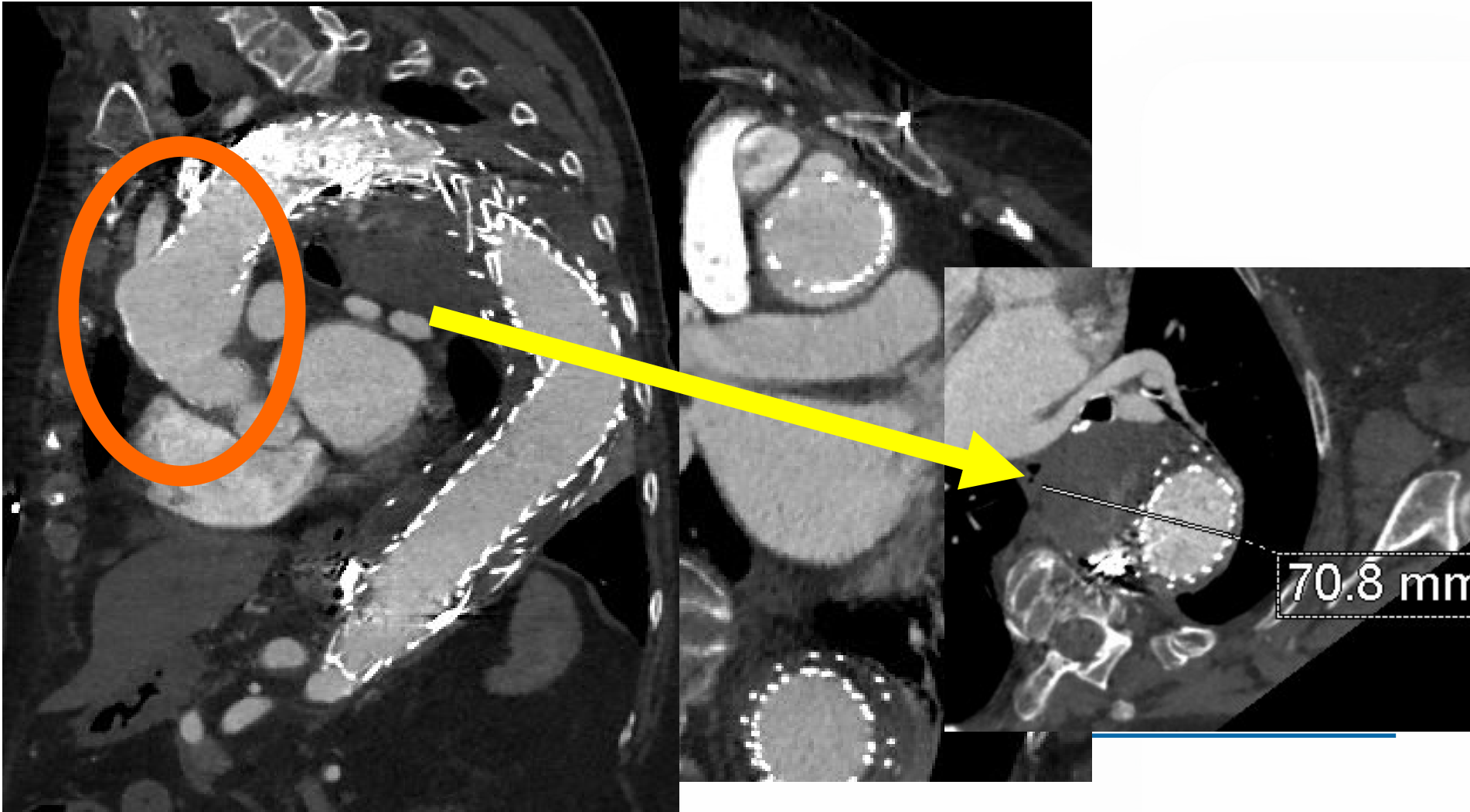
Arch Branches Improving





Ascending Often Dilated / ing

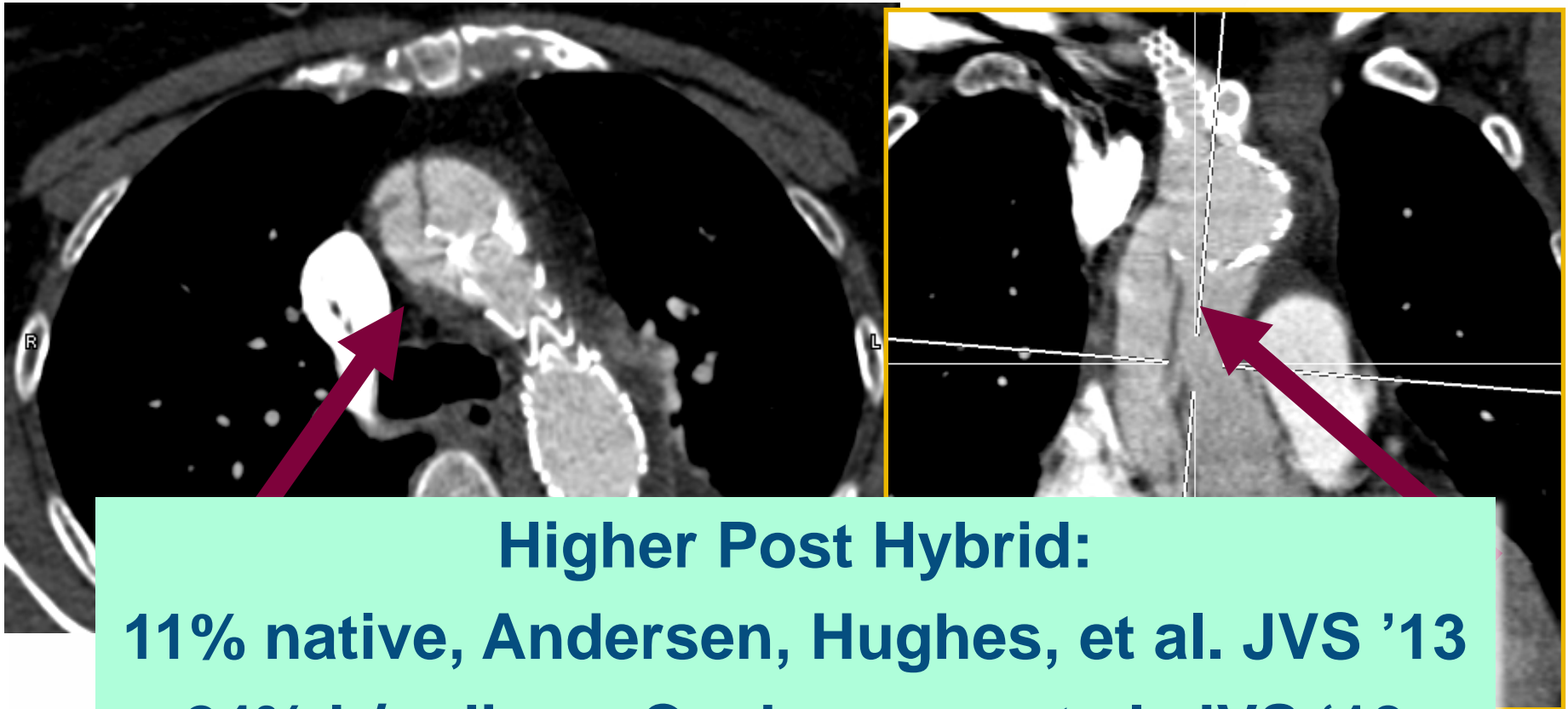
- Type 1 Endoleak ~ 10% (up to 19%)



Proximal / Retrograde Dissection

- Post TEVAR ~ 1-8%

especially dissection and CTD



Higher Post Hybrid:

11% native, Andersen, Hughes, et al. JVS '13

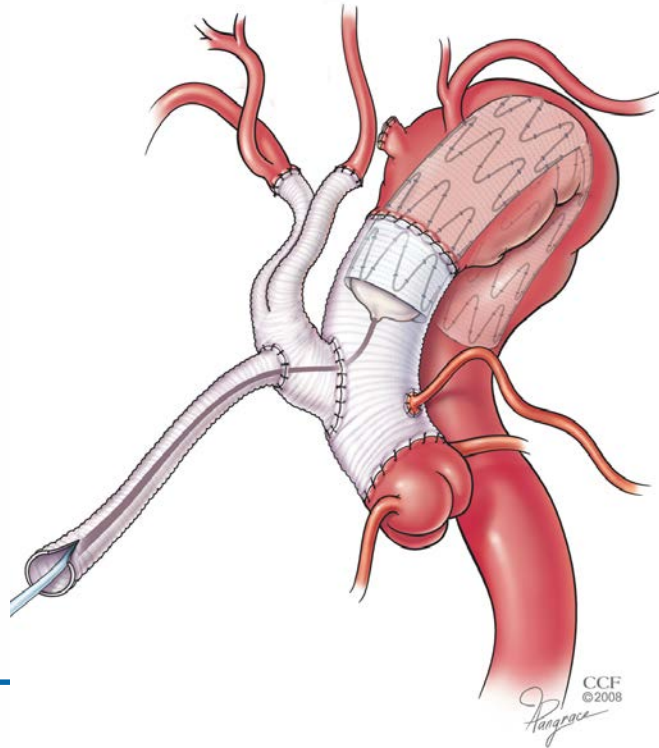
24% h/o dissx, Cochenec, et al. JVS '13

Type A after previous Type B



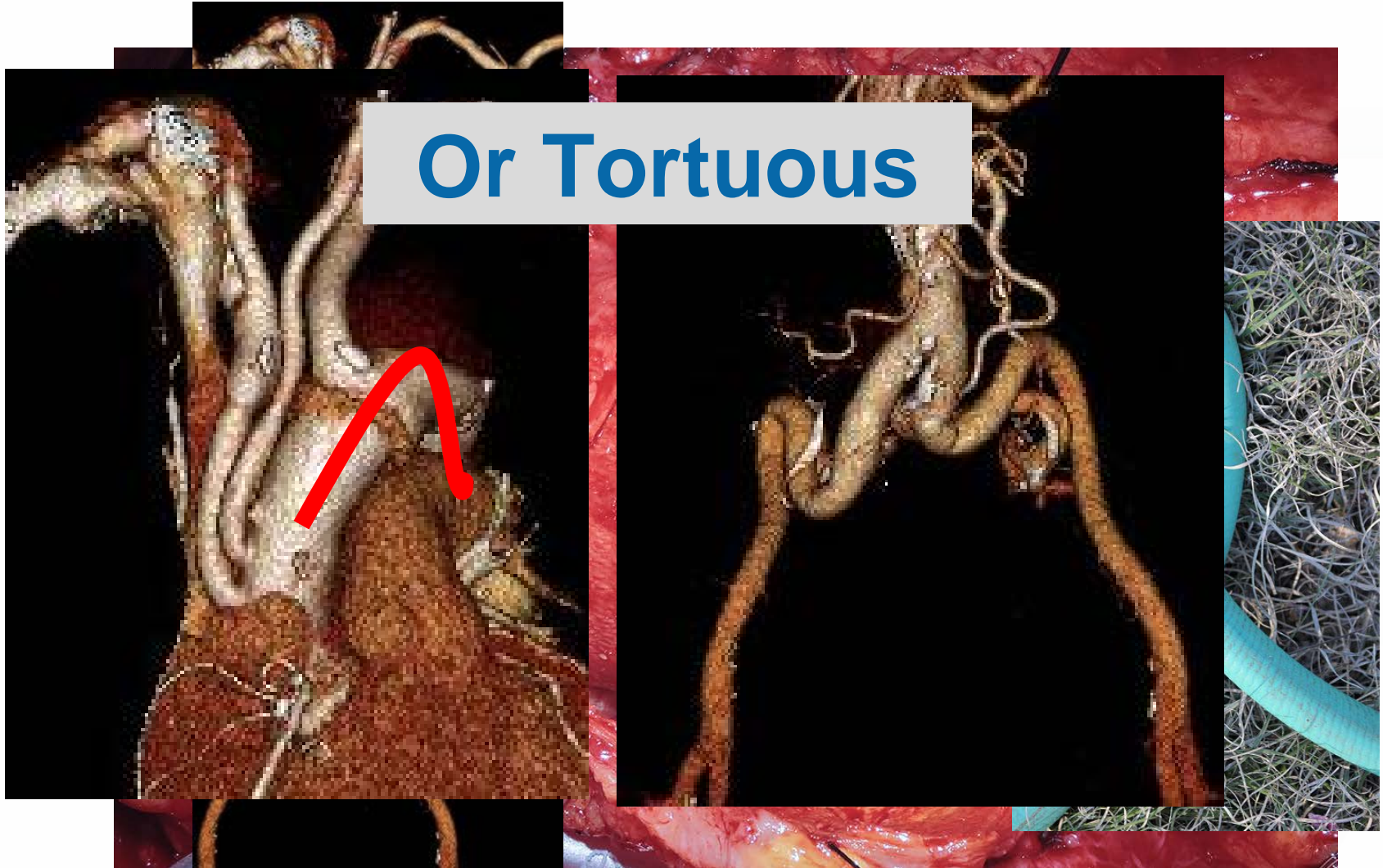
**Retrograde Dissection or
Disease Progression ?**

Should we limit hybrid debranching to those with an ascending graft?



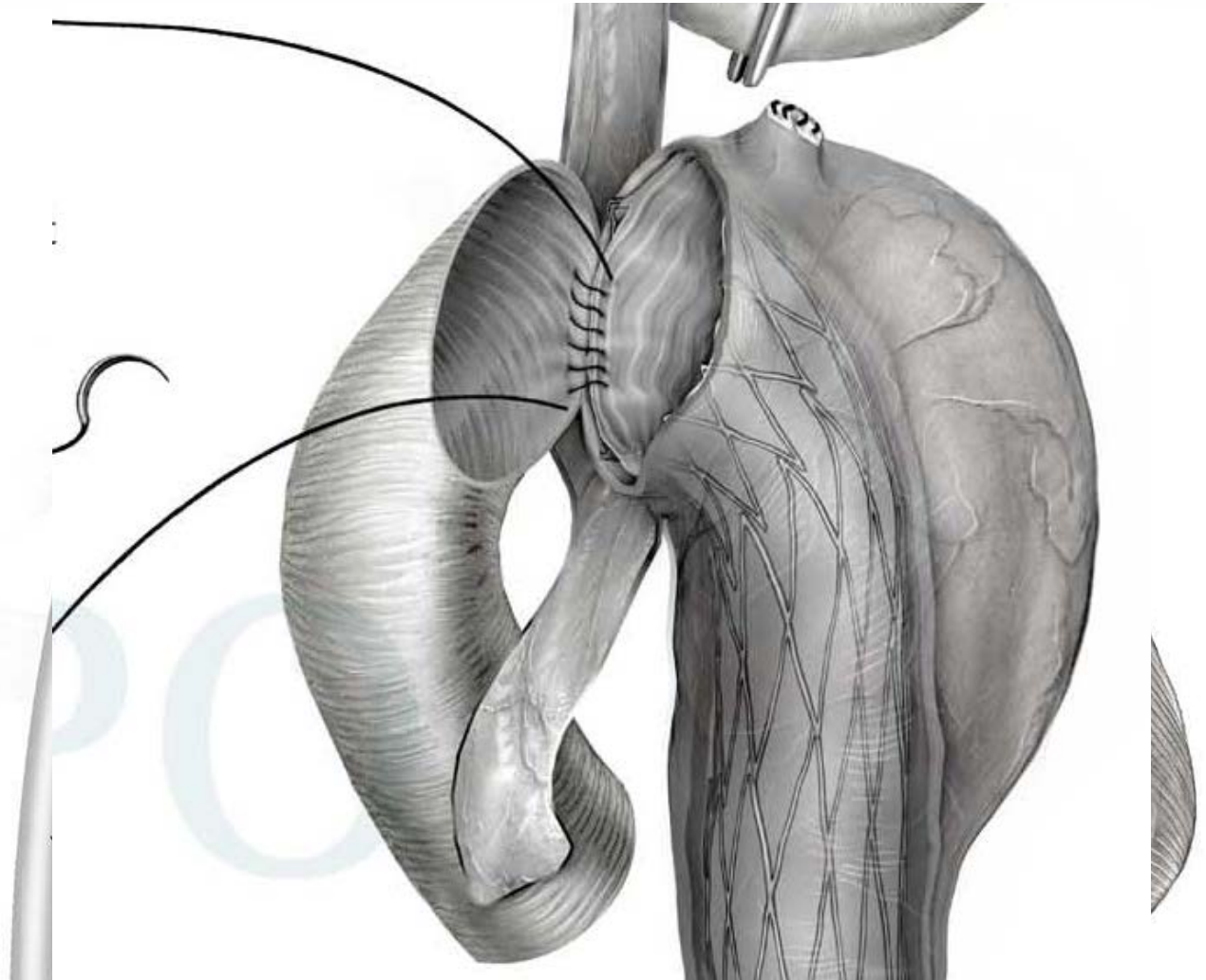
Grafts Often Short

Or Tortuous

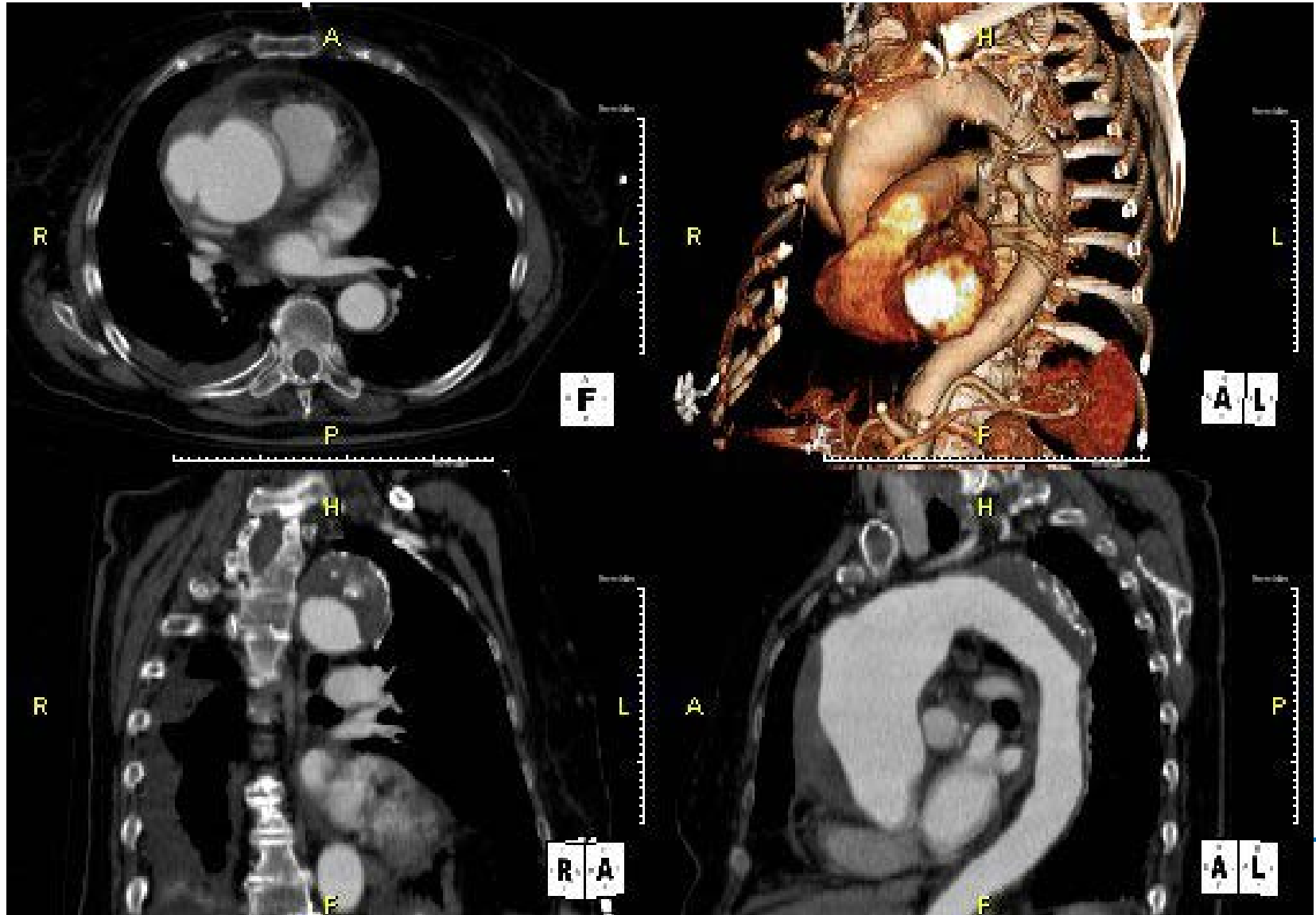


Frozen Elephant Trunk

- Sternotomy
- Circ Arrest
- +SABP



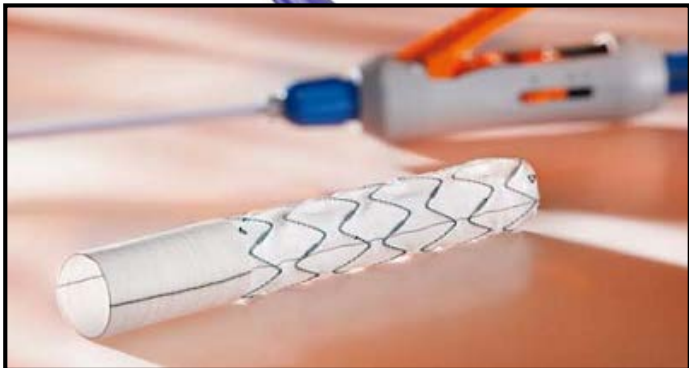
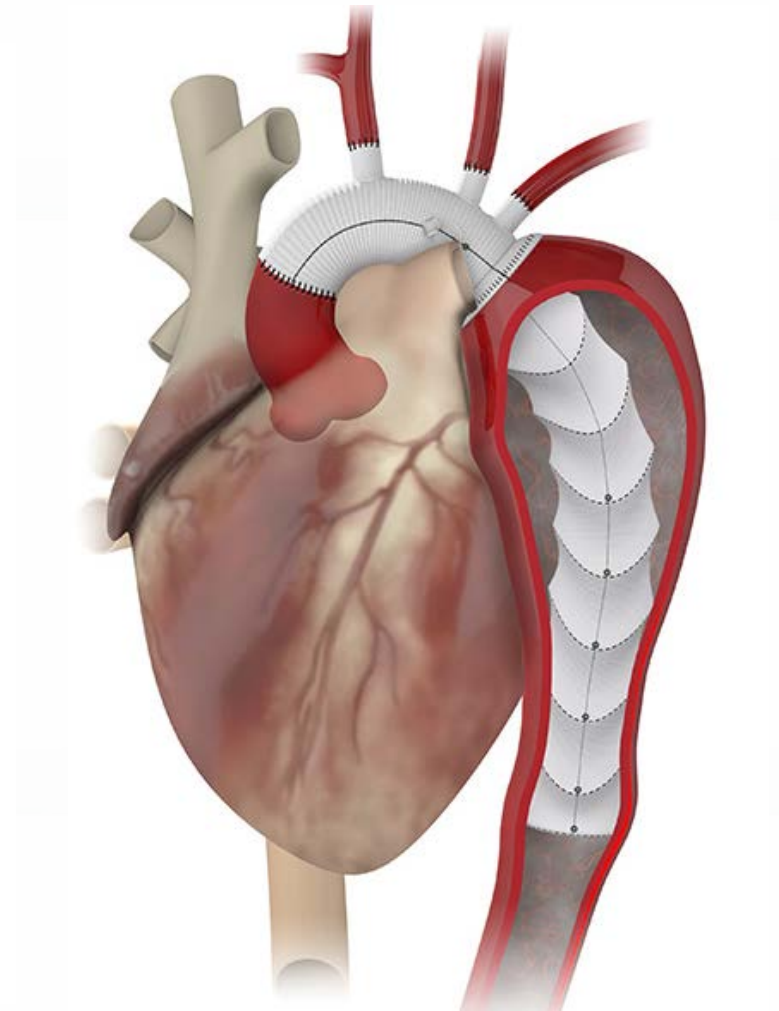
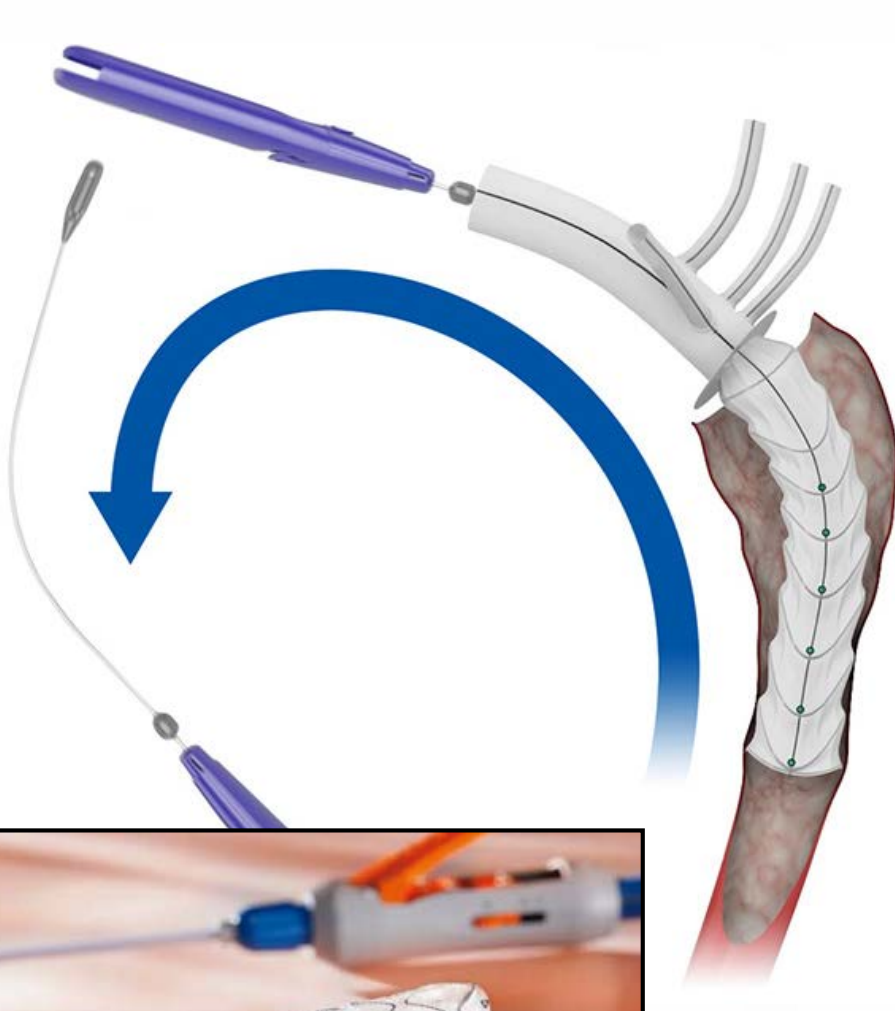
86y/o asc an, chronic dissx



Completion CT

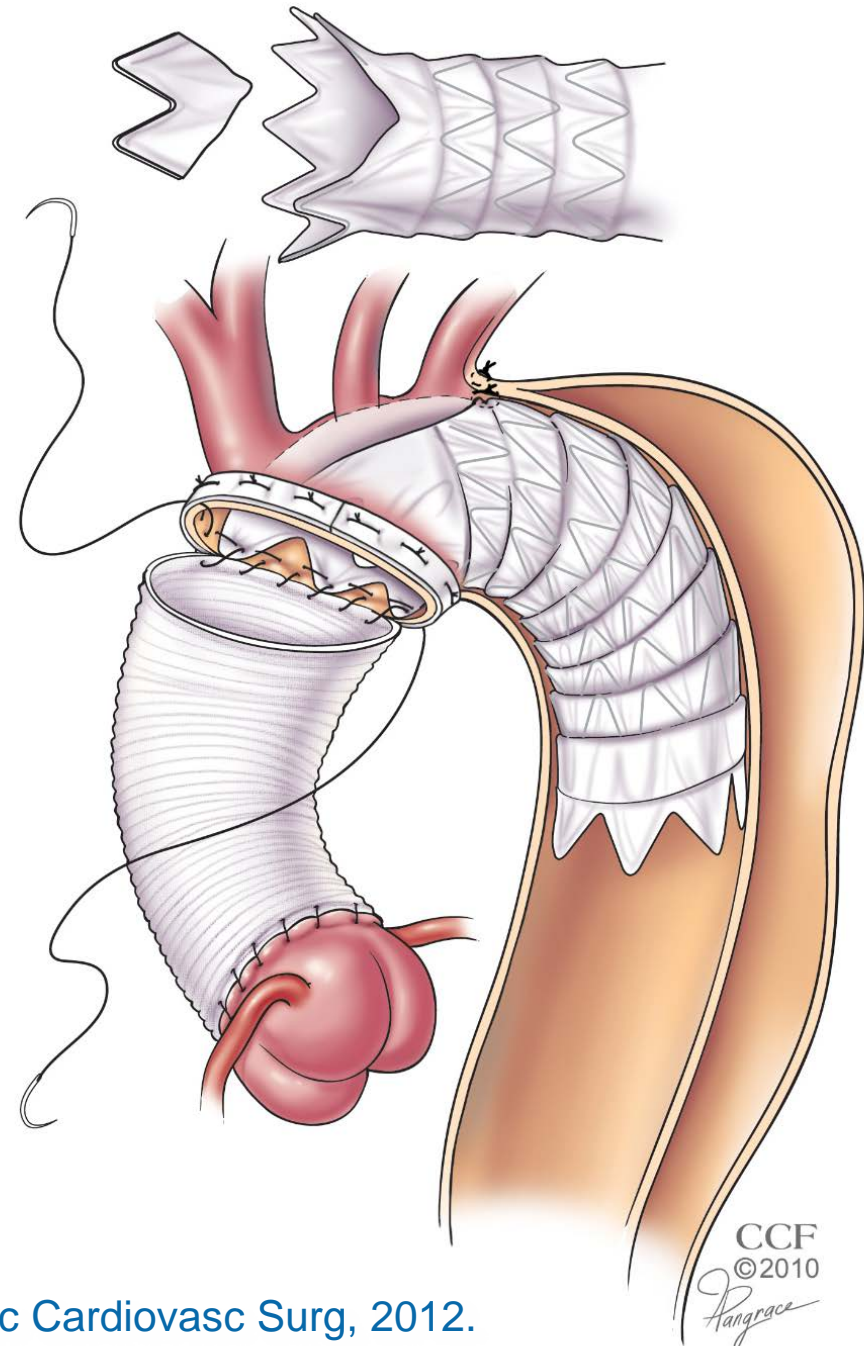


Newer Devices

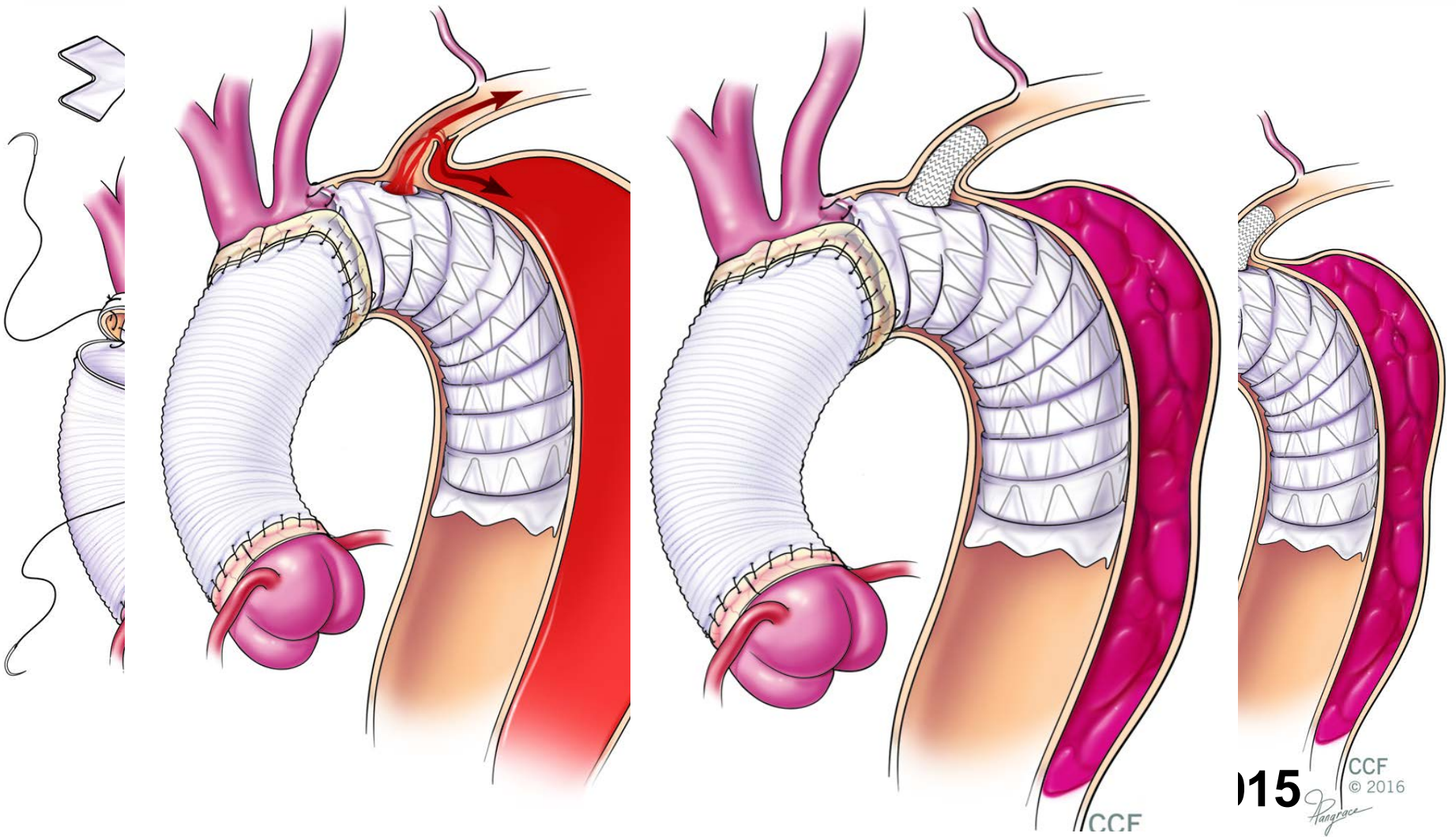


S.A.F.E.R. Technique

Single Anastomosis
Frozen Elephant
trunk Repair

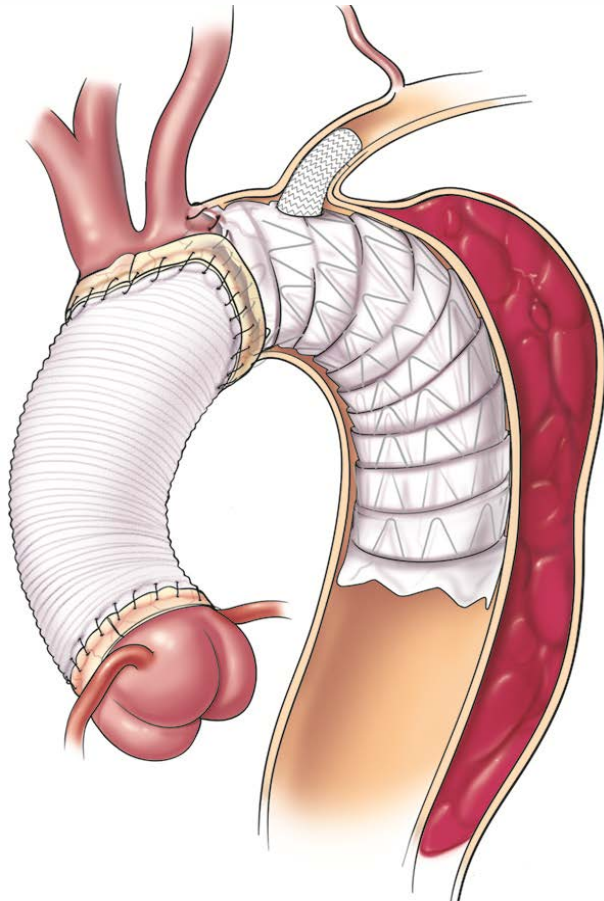


Evolving Procedure: B-SAFER

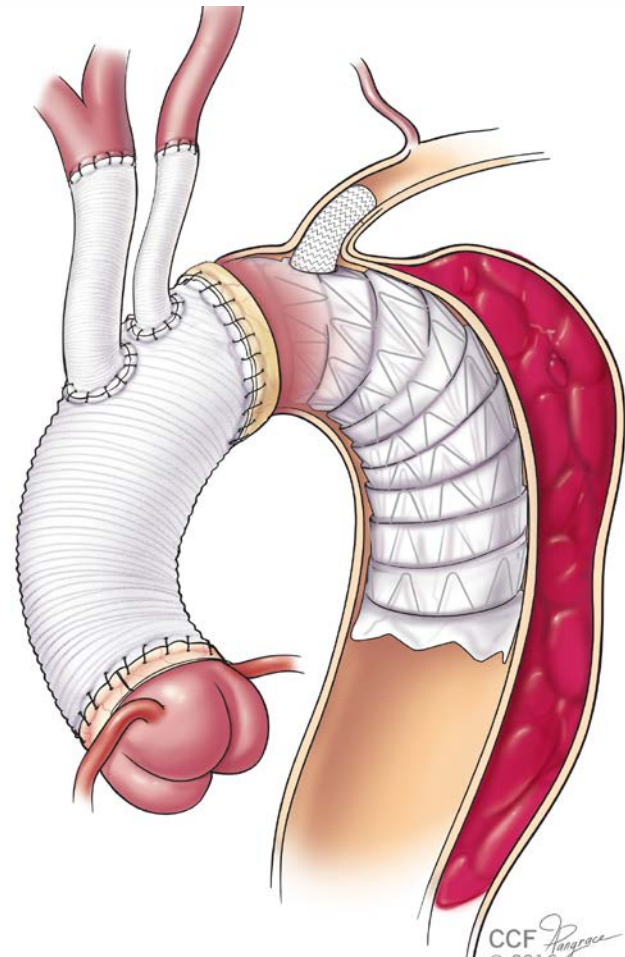


Branched Frozen Elephant Trunk

- Acute: B-SAFER



- Chronic: Modified



Roselli EE, et al. STS 2017 poster

Advantages and Limitations

- Open



- Widely applicable
- Durable
- Safe with SAnteBP



- Invasive
- Long, complex op
- Too much for some

- Hybrid

- Less Mech Circ Support
- Commercial devices

- Still big operation
- Device complications
 - Stroke, Endoleaks, retro dissx

- Endo

- Least invasive

- Unknown Durability
- Device availability
- Proximal seal ?

Which will win out ?

Tailored Therapy for Each Patient