How I do It: Complex Reoperation in the Hostile Chest

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Disclosures

- Edwards Lifesciences – Consultant
- WL Gore – Consultant, research support
- Artivion – Research support and Steering committee Proact-Xa
- Terumo Aortic – Consultant, research support
- Abbott – Consultant
- Medtronic – Consultant, research support

Reoperations – preparation is key

- There are emergencies, and there are reoperations.
- There are NO emergency reoperations
- Bruce Lytle, MD

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In Press, Corrected Proof What's this?

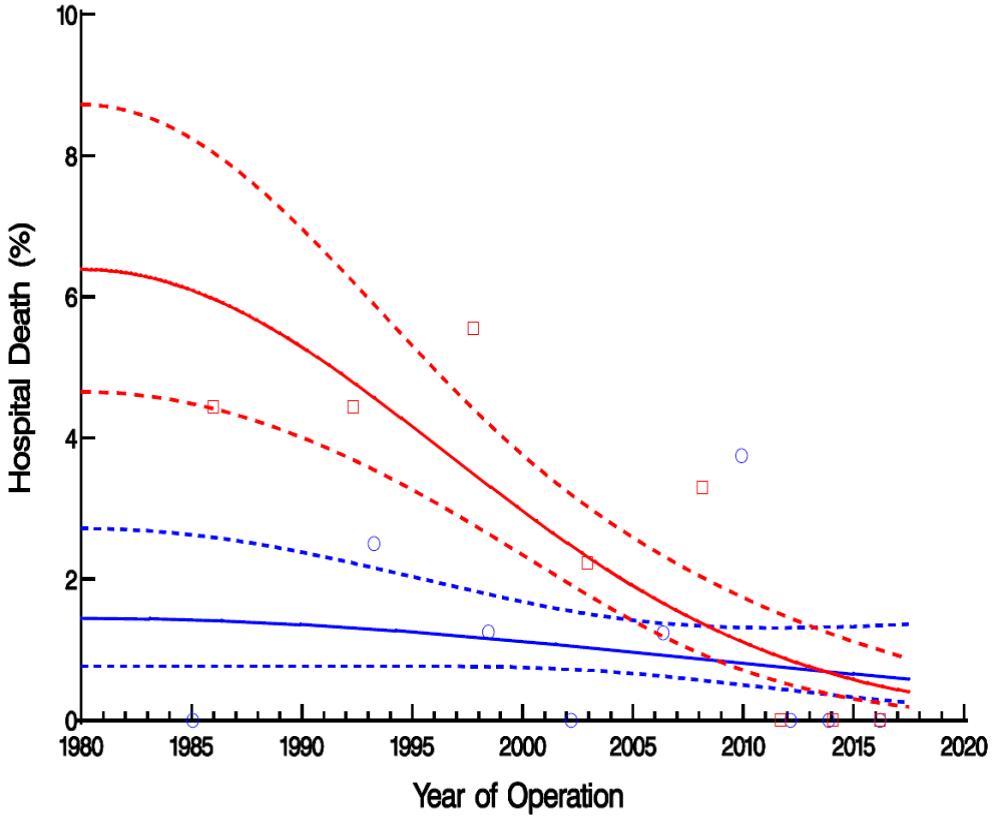
Adult

The decreasing risk of reoperative aortic valve replacement: Implications for valve choice and transcatheter therapy

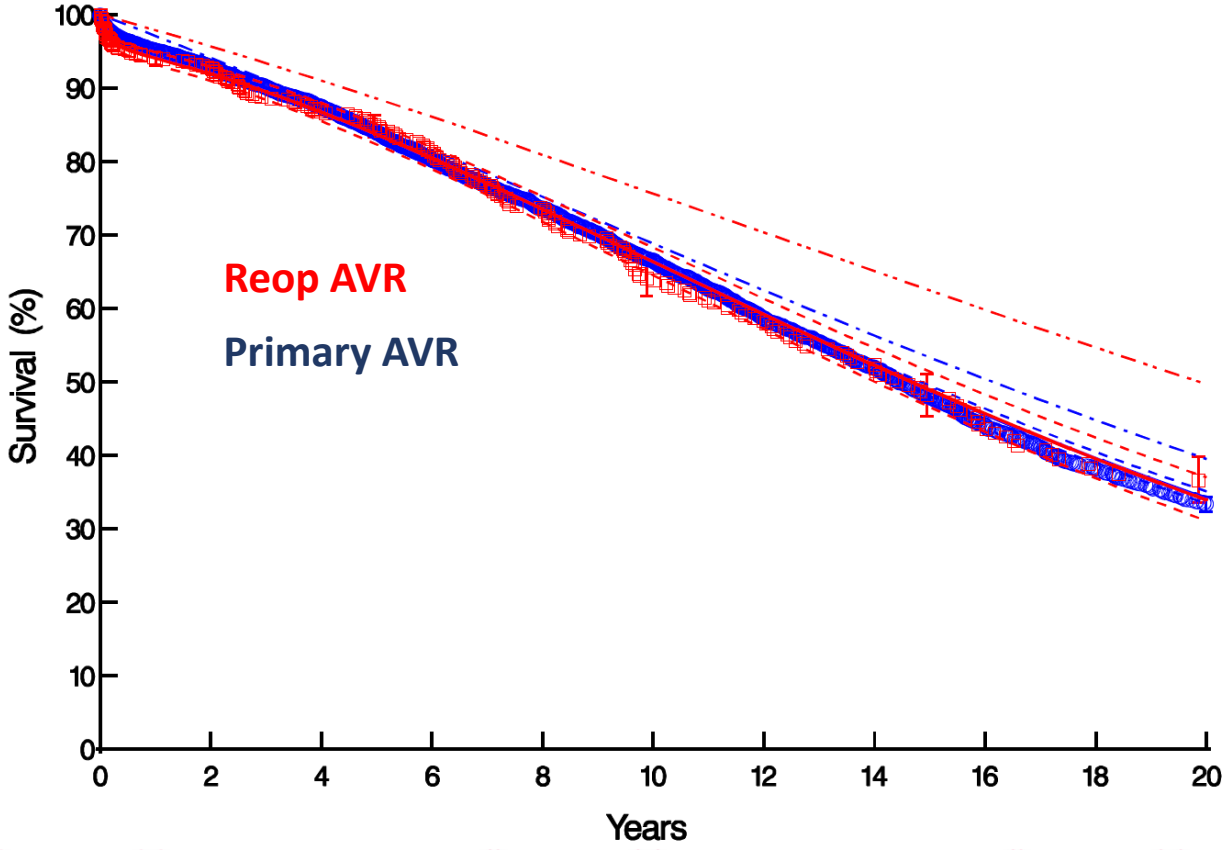
Accepted for the 100th Annual Meeting of The American Association for Thoracic Surgery.

Rashed Mahboubi MD [a], Mona Kakavand MD [a], Edward G. Soltesz MD [a b], Jeevanantham Rajeswaran PhD [c], Eugene H. Blackstone MD [a c], Lars G. Svensson MD, PhD [a b], Douglas R. Johnston MD [a b]

Redo AVR outcomes



Survival is not different



Why are reoperations different?

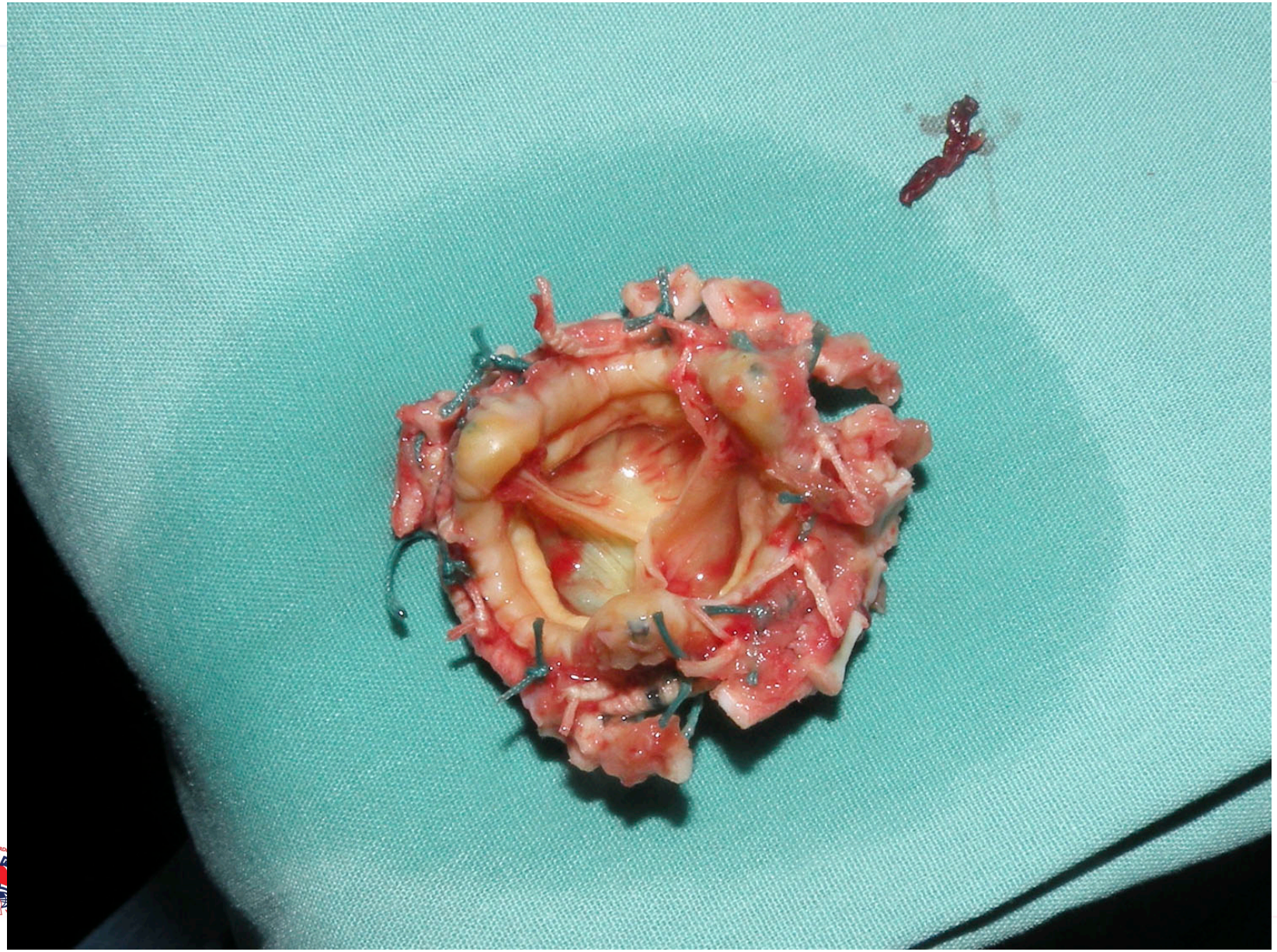
- Limited exposure
- Limited tissue (conduit, anulus, aorta)
- Scar tissue / calcium
- Prosthetic material

Preparation for reoperation begins with:

The first operation

Principles

- Minimize tissue disturbance
  - Mini incisions
  - AVR > Root enlargement > root replacement
- Minimize foreign material
  - Plegets / felt
  - Glue
- Graft placement



Reoperations

- Pre-operative imaging
- Safe re-entry
- Safe dissection
- Canulation and protection

Thought process

- Chest wall
- Lungs and pleura
- Pericardium
- Aorta
- Coronary arteries
- Valves
- Myocardium

Decision for surgery

What is fixable?

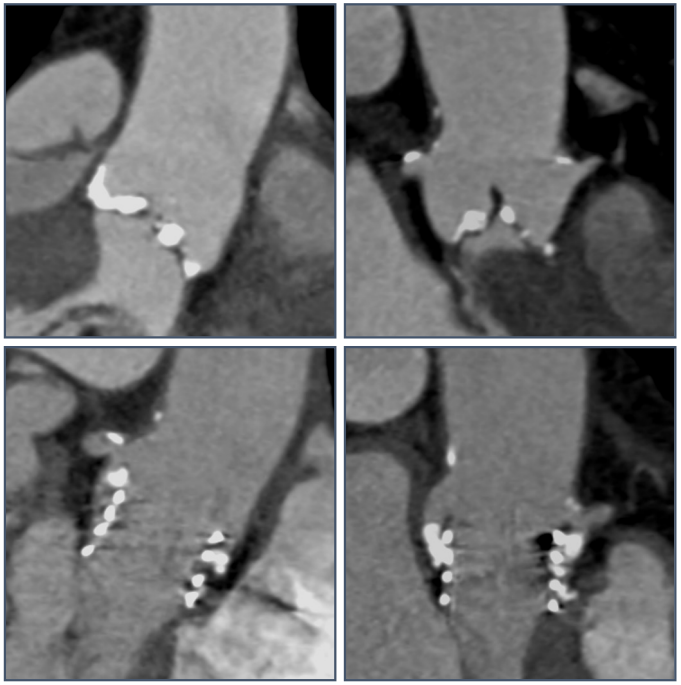
- Valves
- Coronaries
- Aorta
- Pericardium +/-

What is not?

- Pulmonary Fibrosis
- Chest wall restriction
- Myocardial Restriction
  - The most difficult decision point

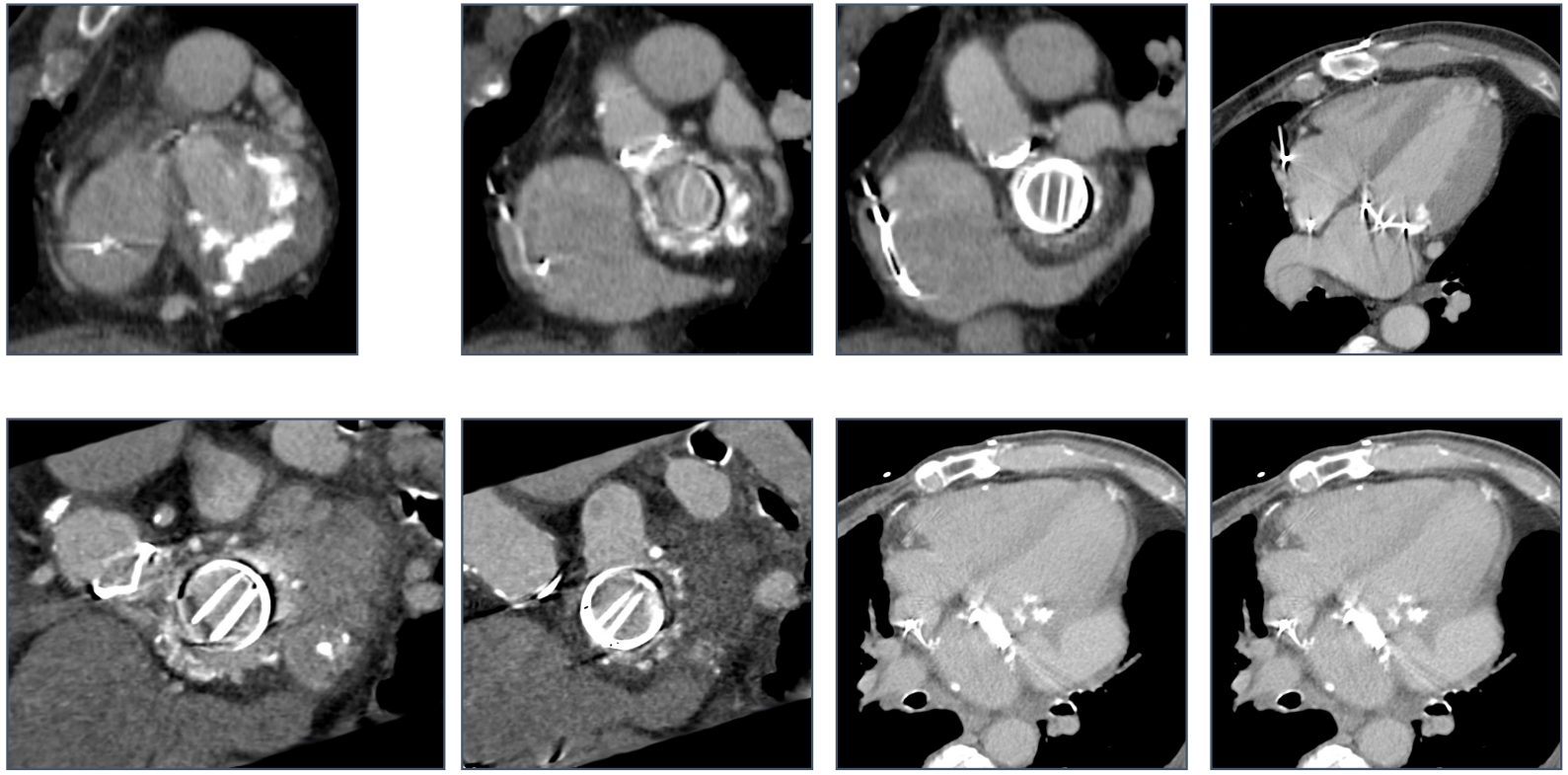
CT

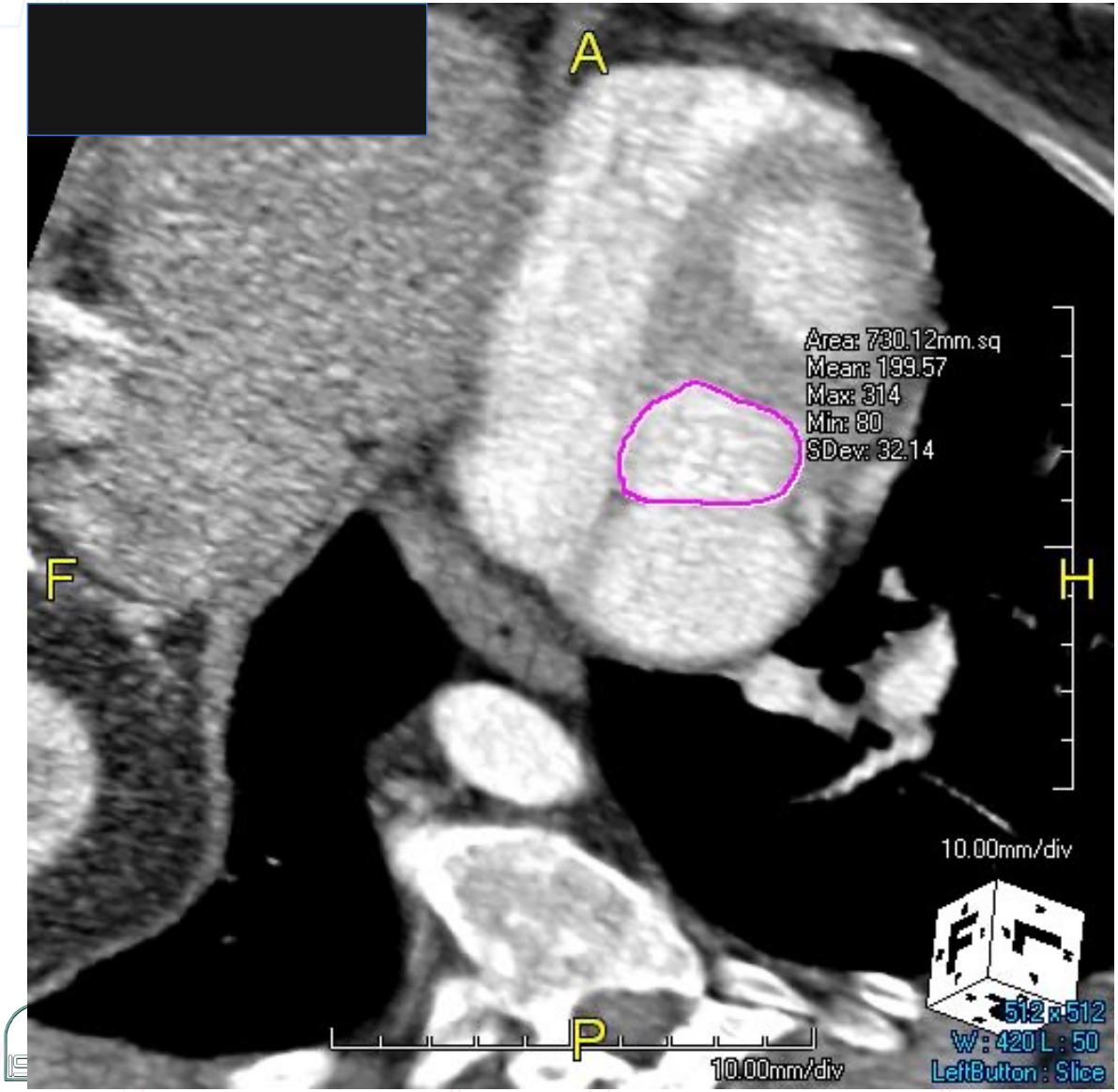
- Root Morphology
- Extent of calcium
- Predicted valve sizing
- Course of bypass grafts
- Location of coronaries



- Safety of sternal re-entry!

3D Reconstruction

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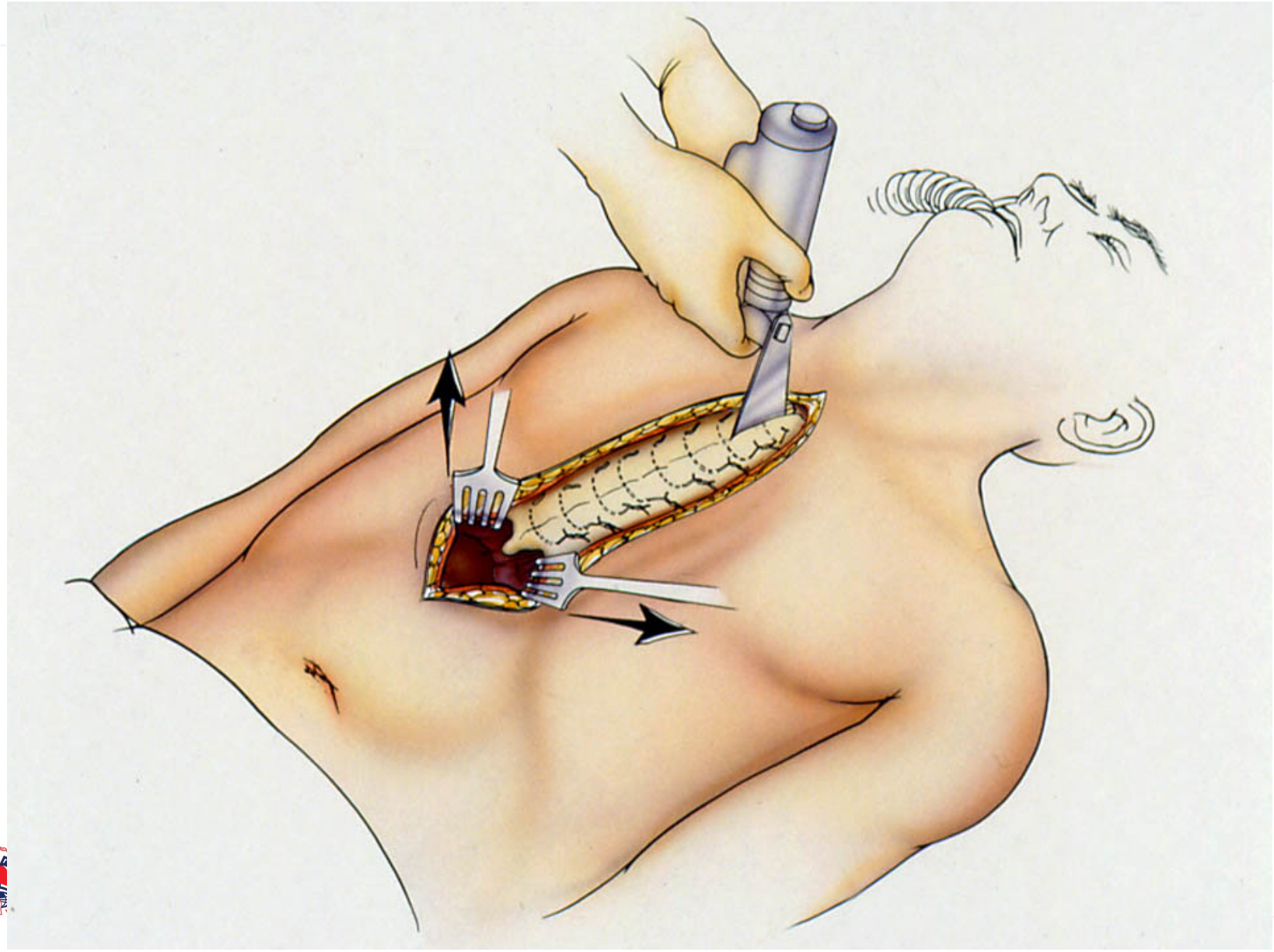

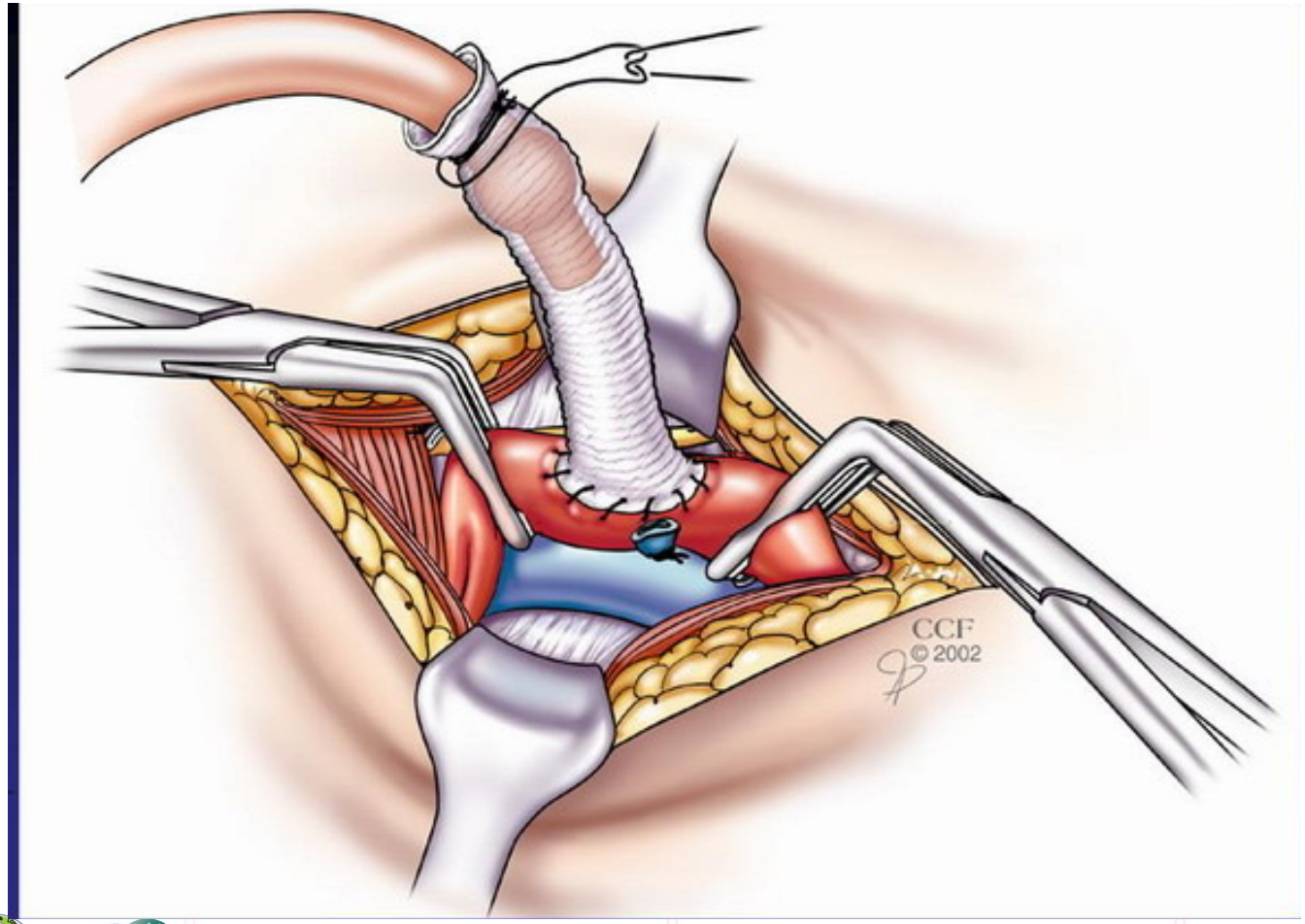
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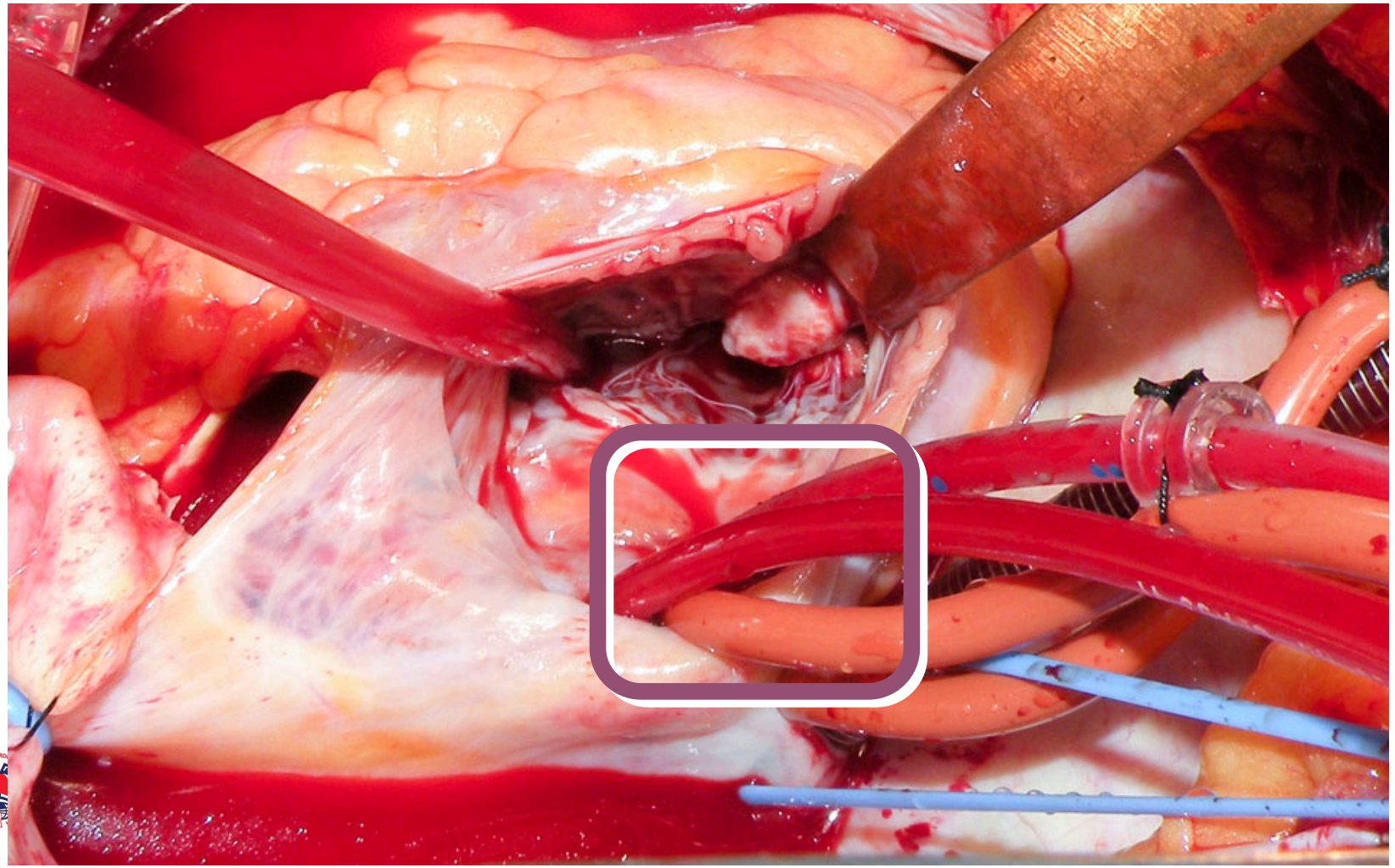
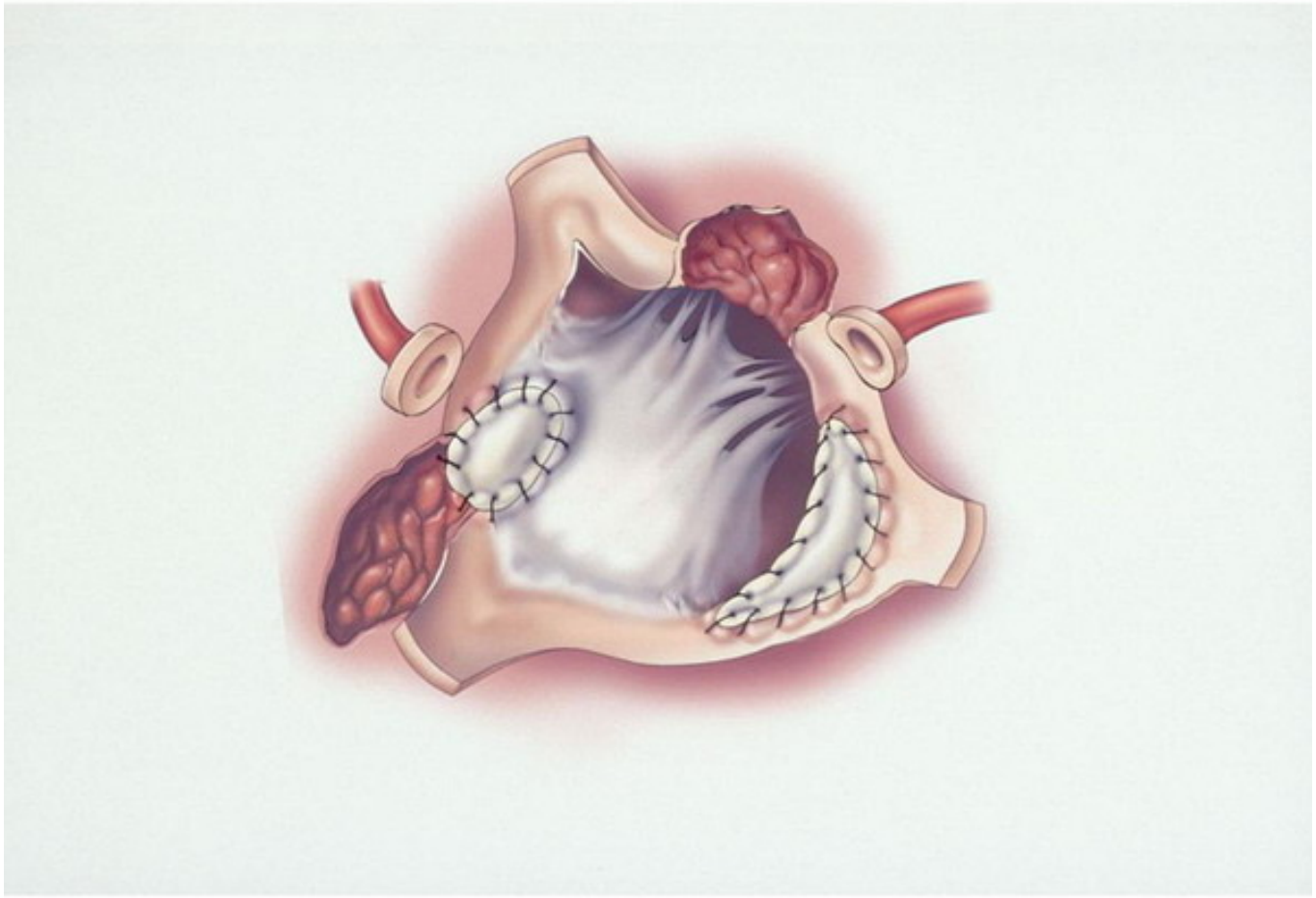


Reconstruction

- Be prepared to:
  - Patch the anulus
  - Patch the aorta
  - Replace the root
  - Bypass the coronaries

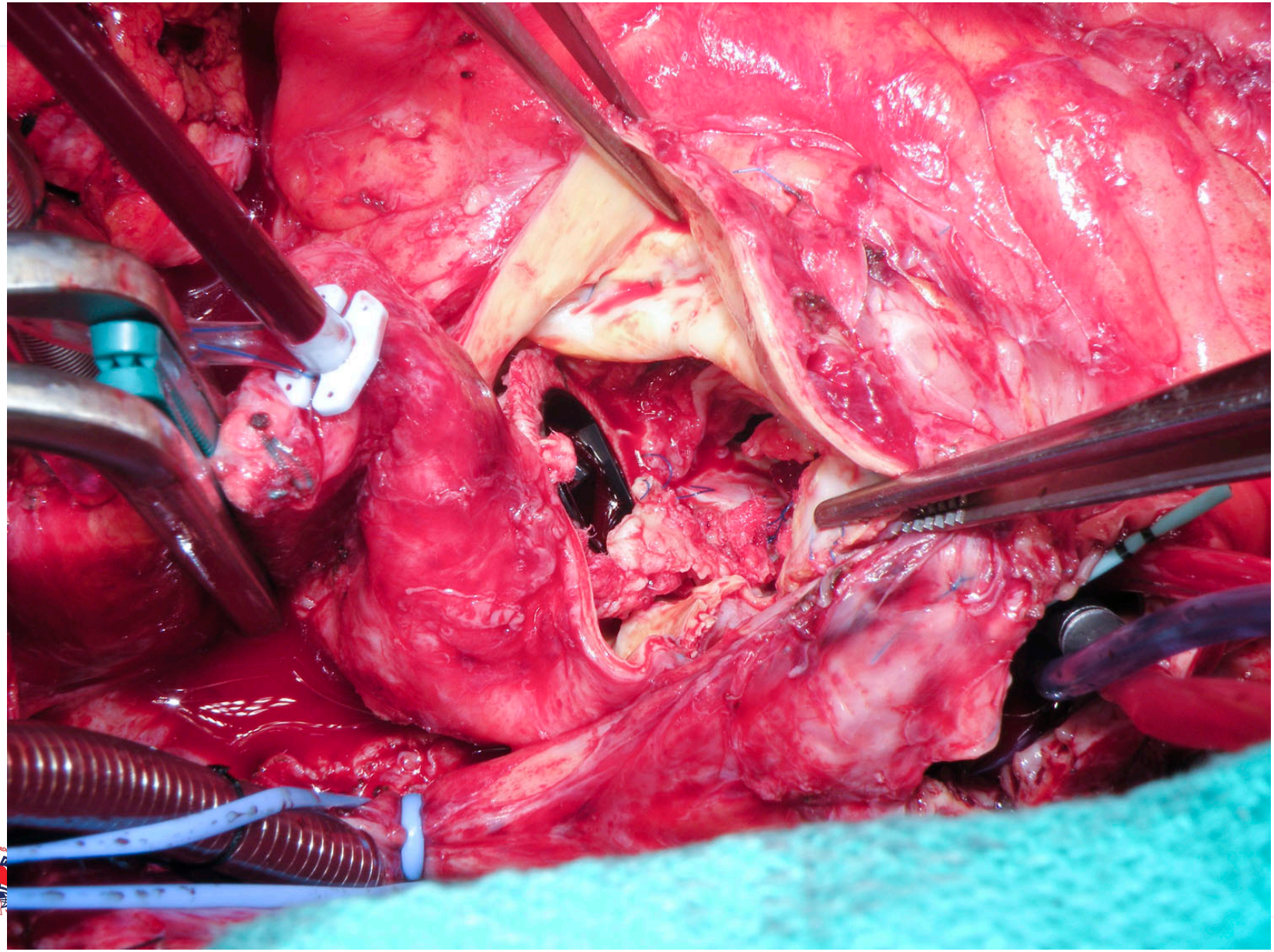
- Pitfalls
  - Calcified aorta
  - Coronary graft (RCA)
  - 2+ MR with restriction



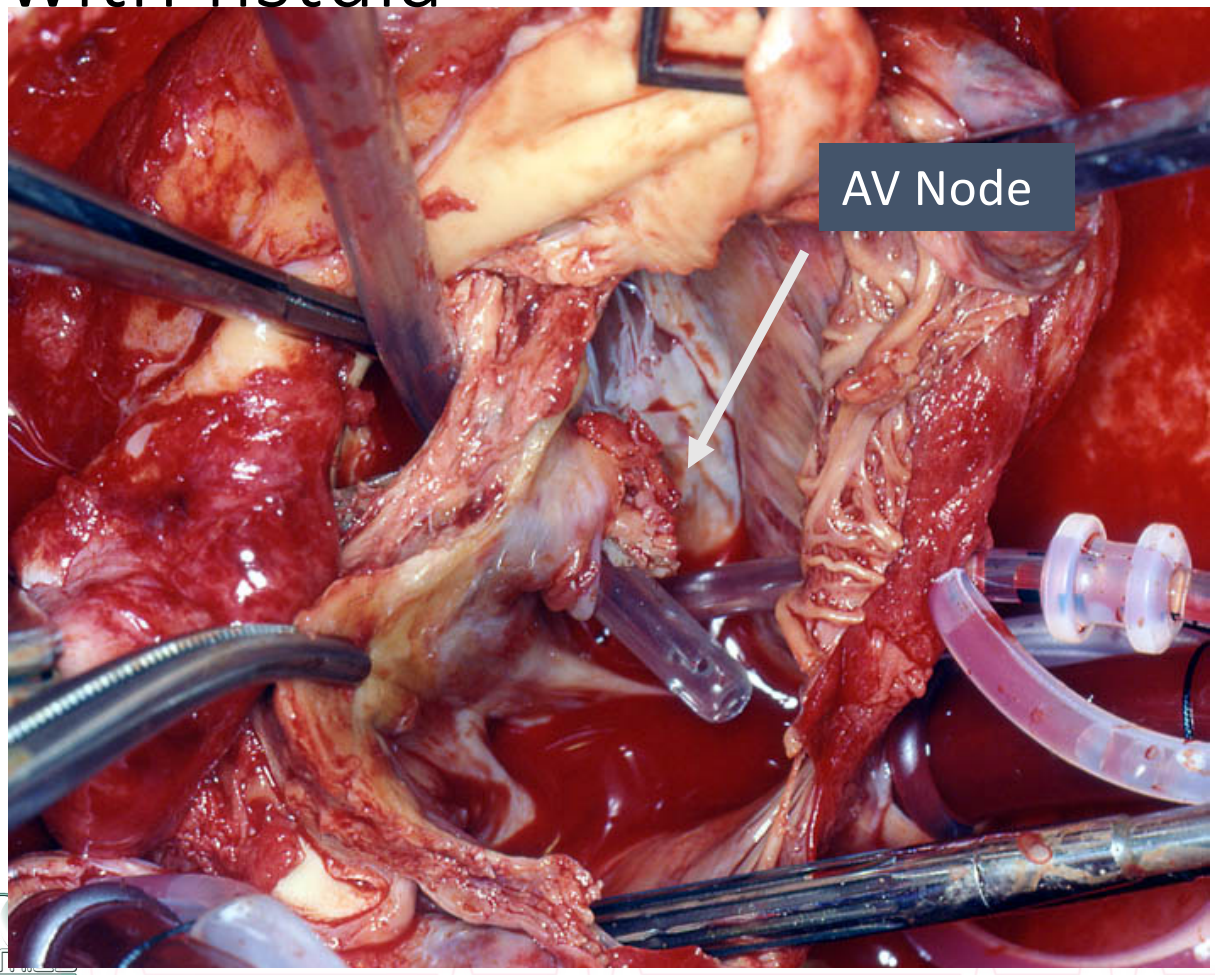
Variations

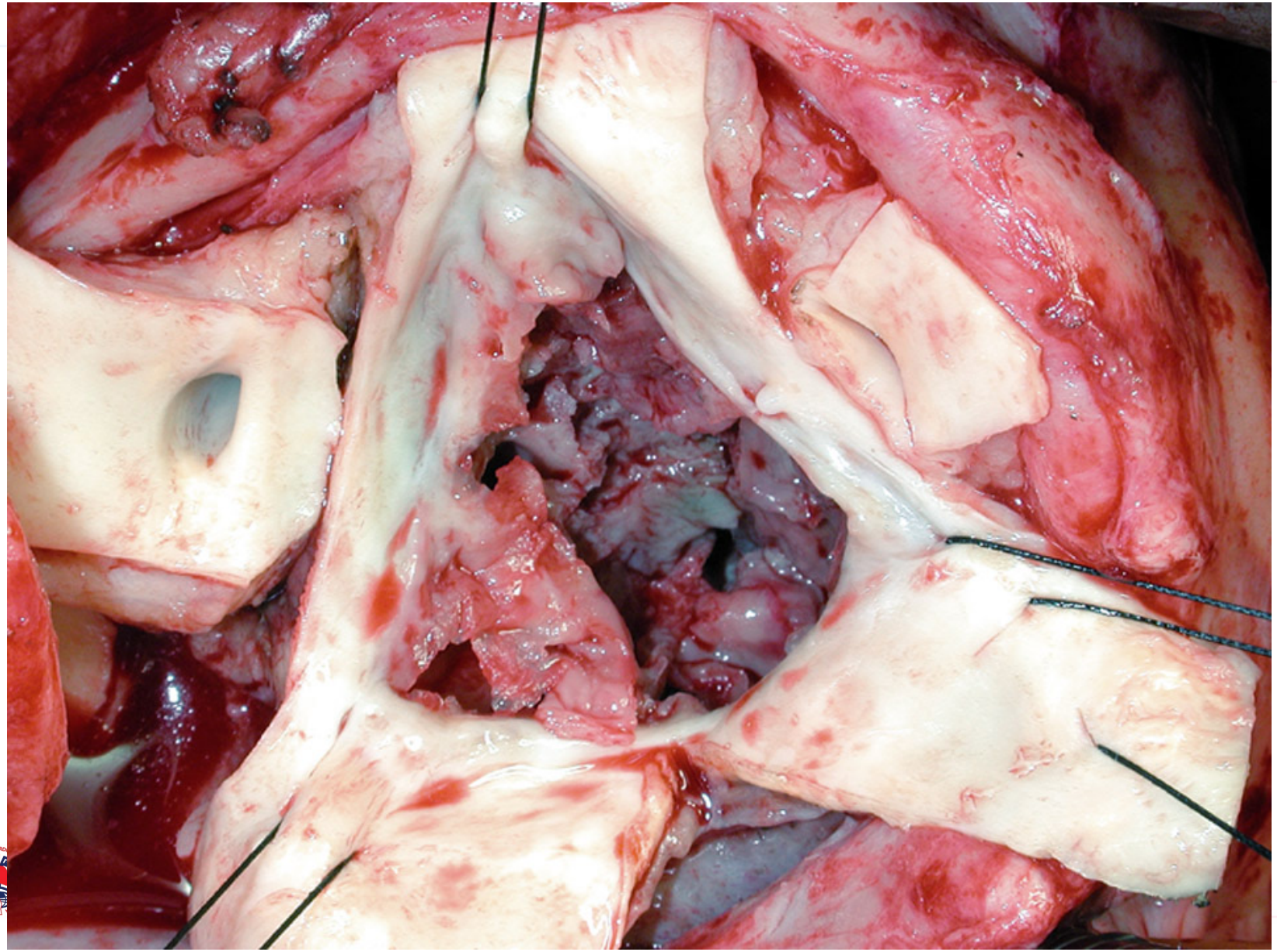
- Prosthesis explant
- Radiation
- Endocarditis
- Intact root
- Double valve disease

- Dealing with AI



Invasion with fistula





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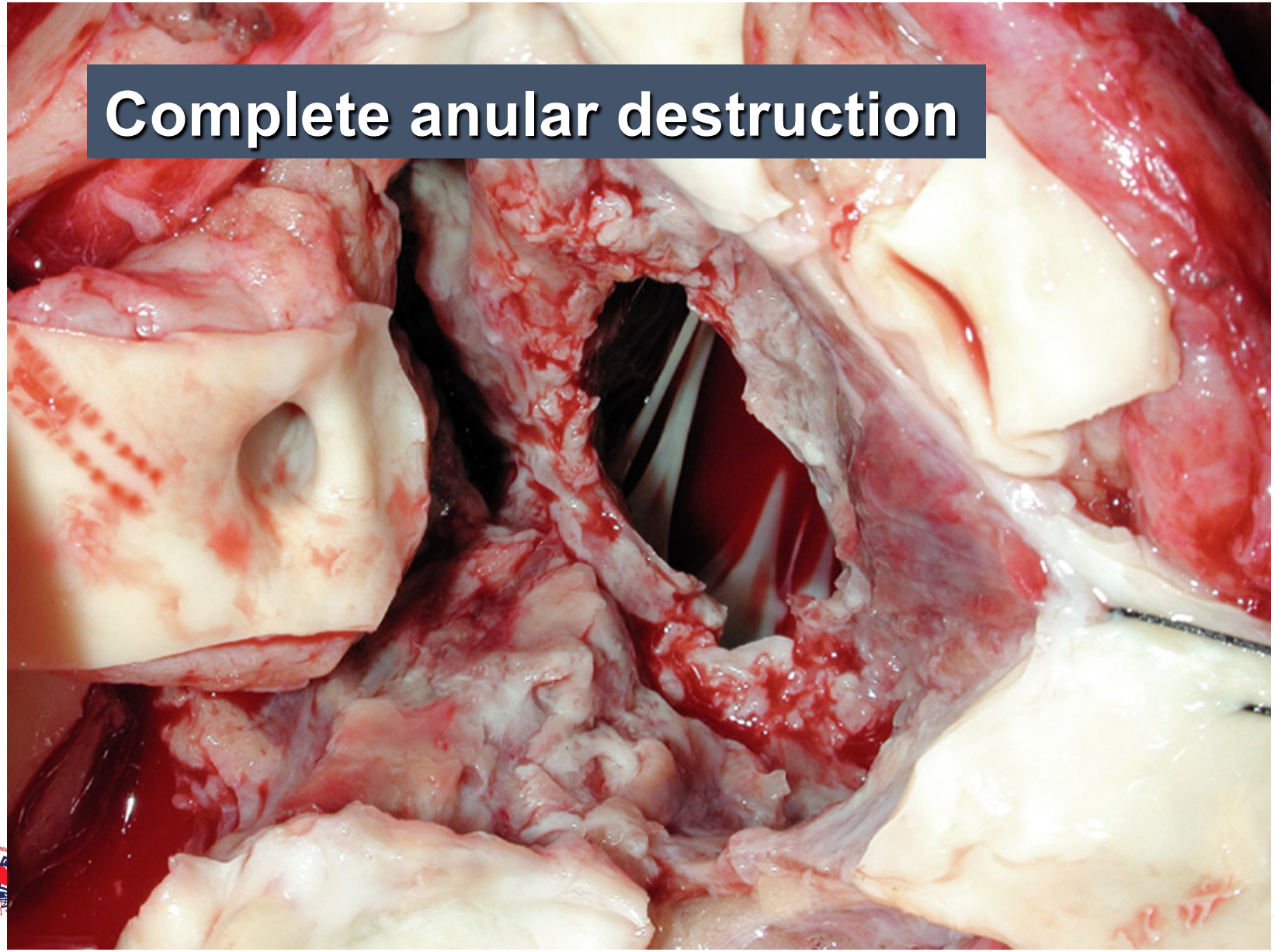
Ho Chi Minh city, Vietnam

Complete anular destruction



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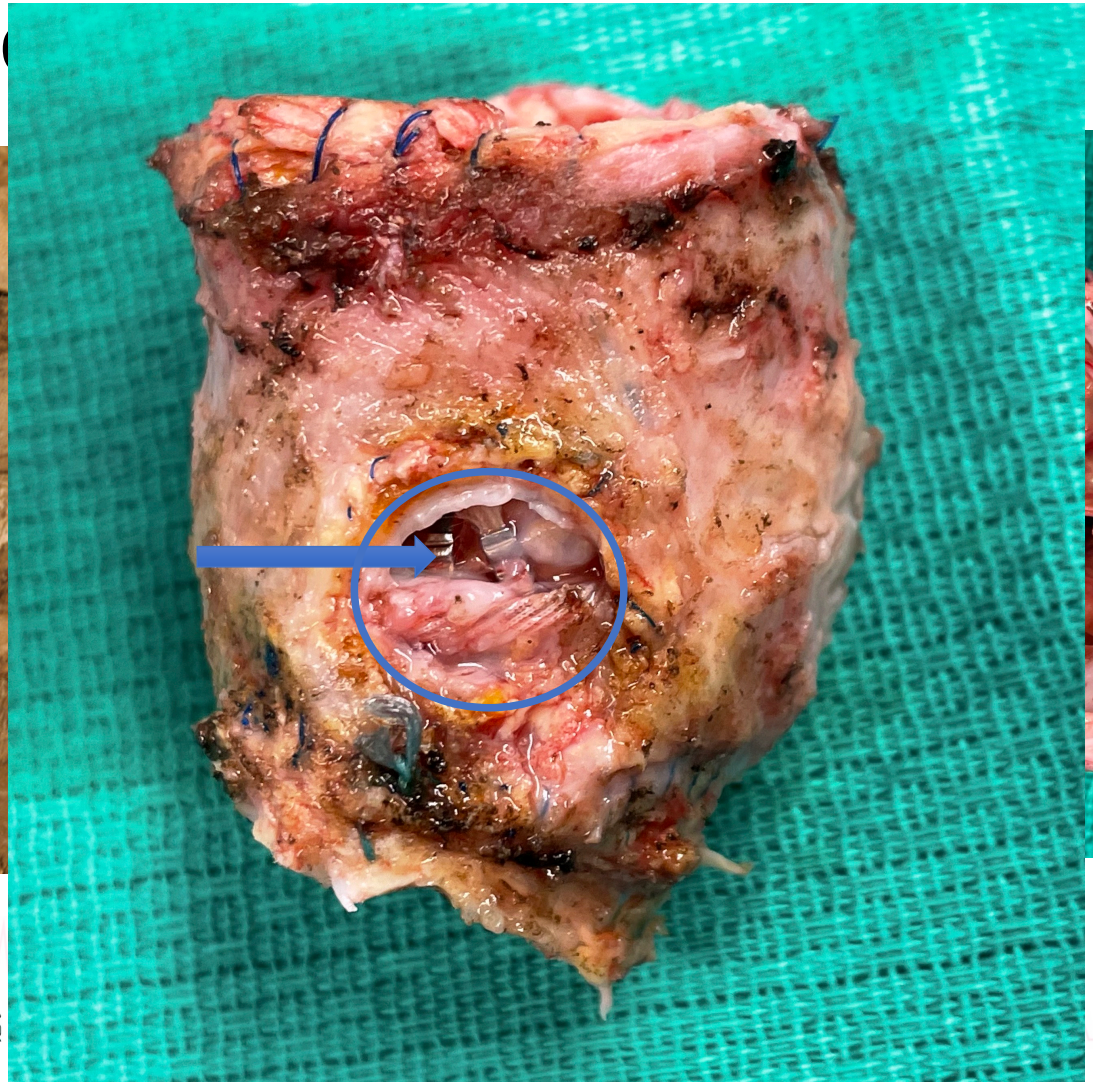
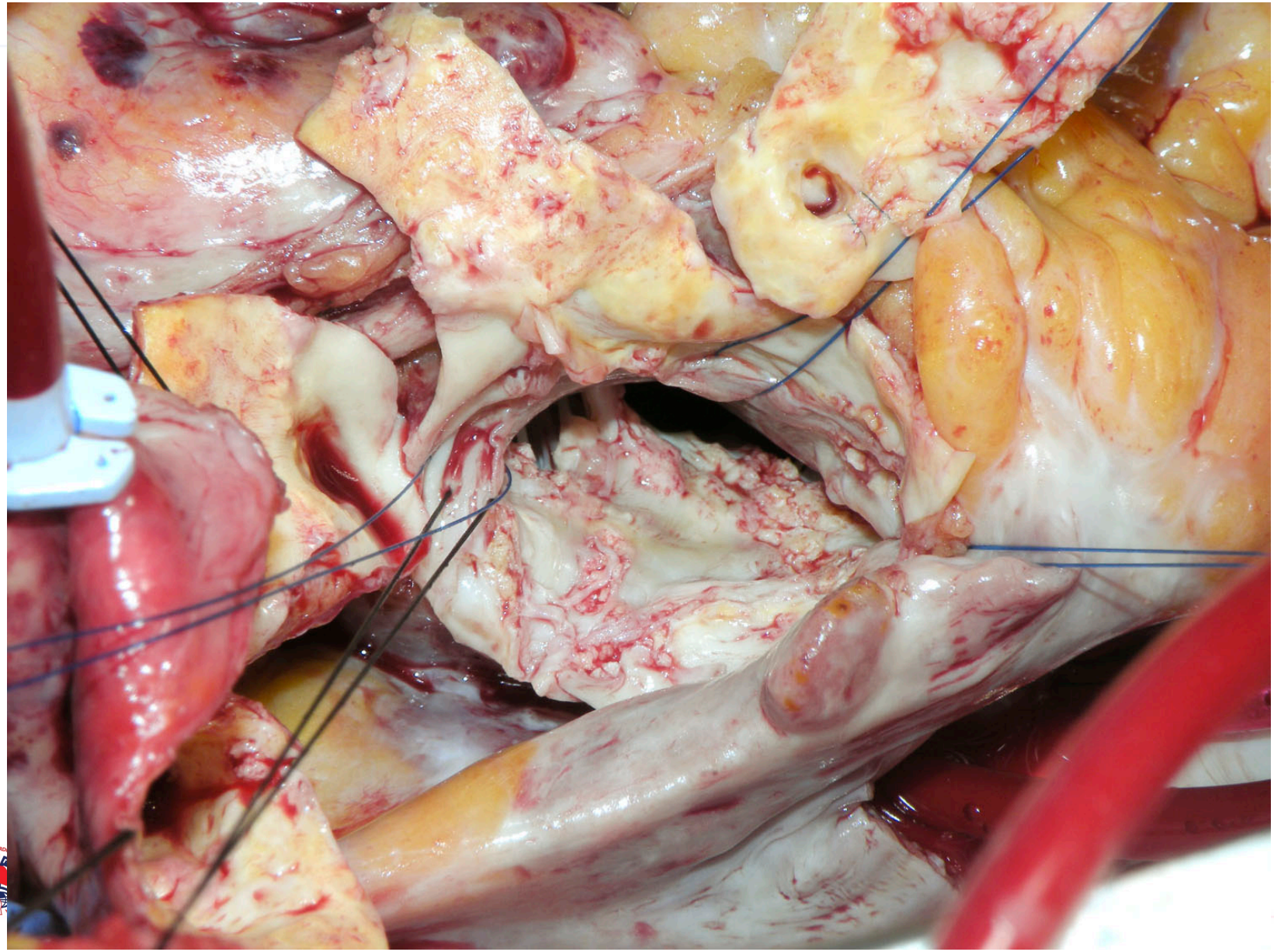
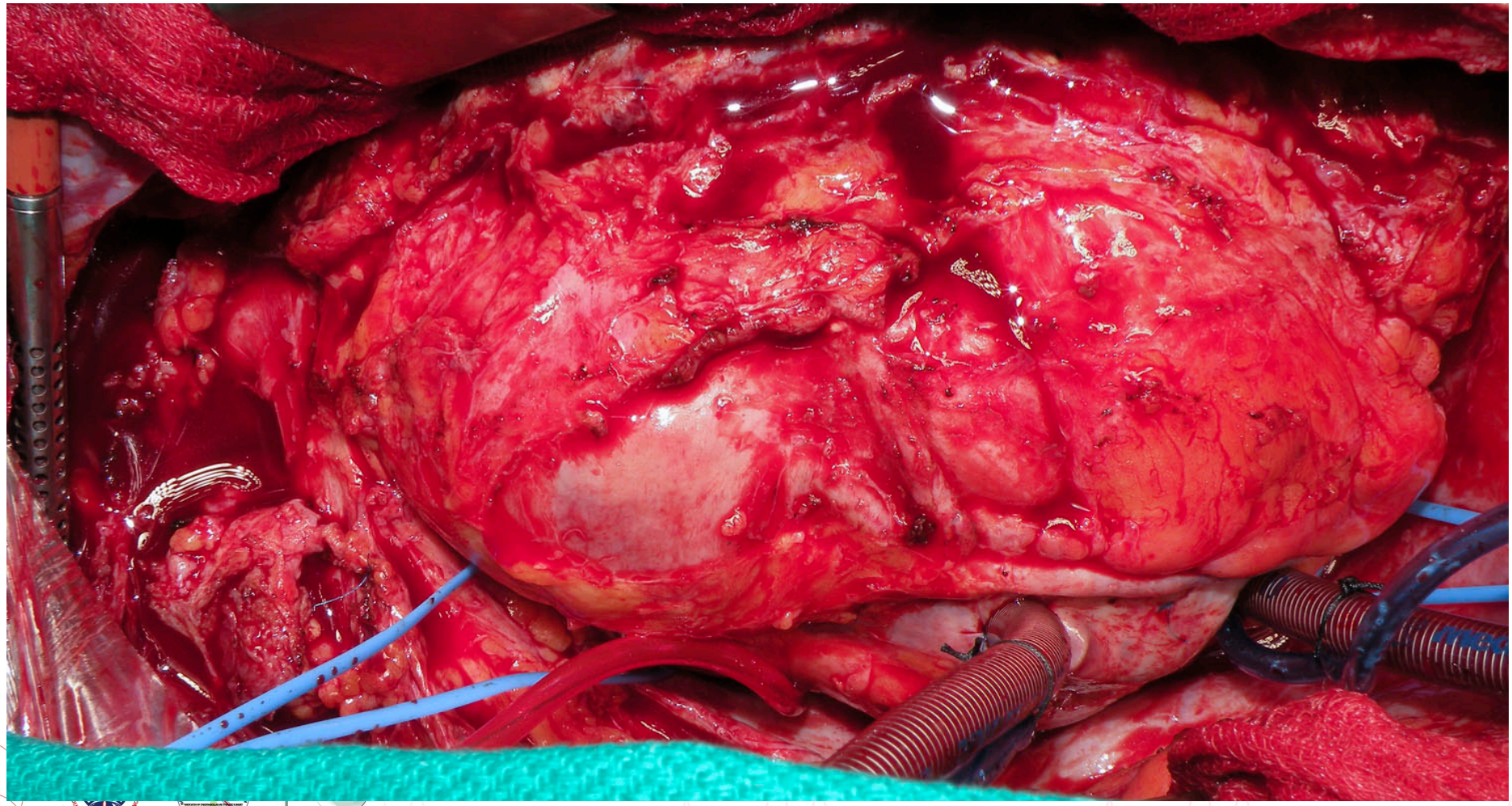
Ho Chi Minh city, Vietnam

Surgical Ar

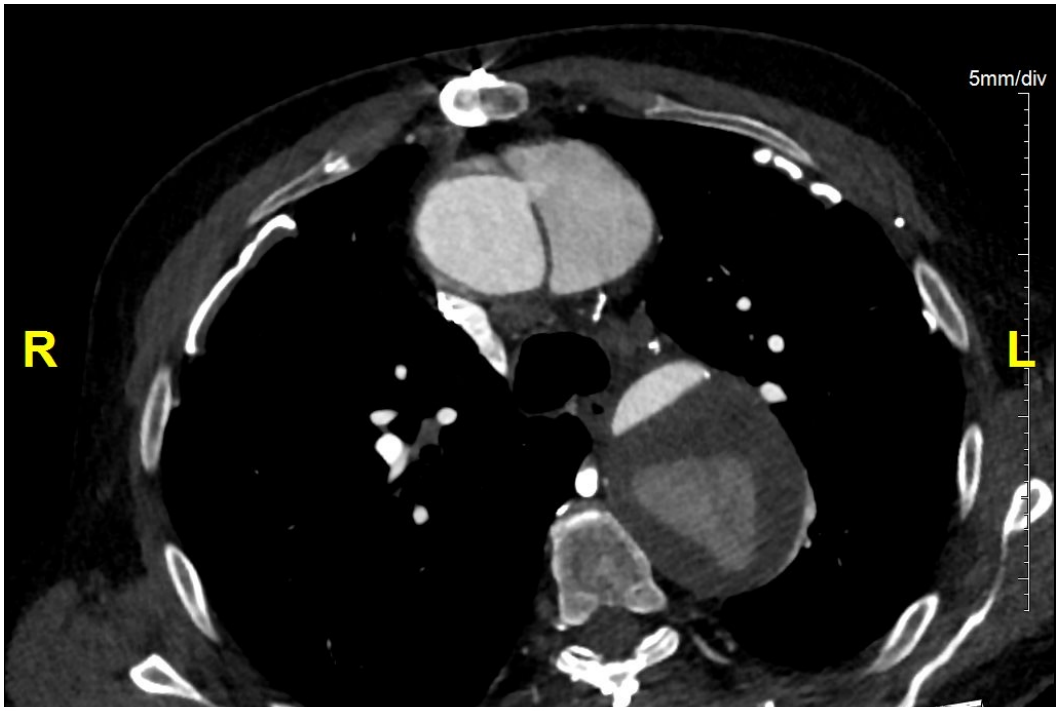




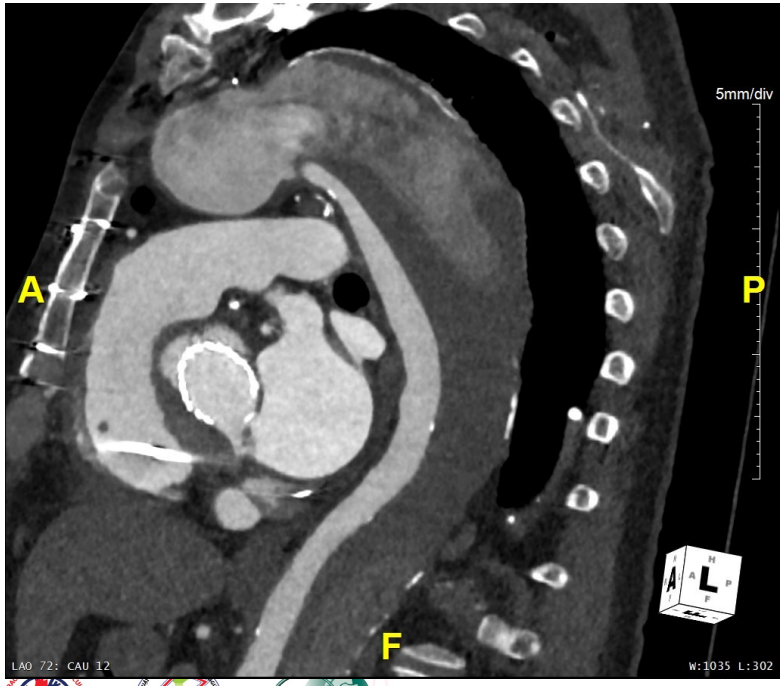
Giant root aneursym

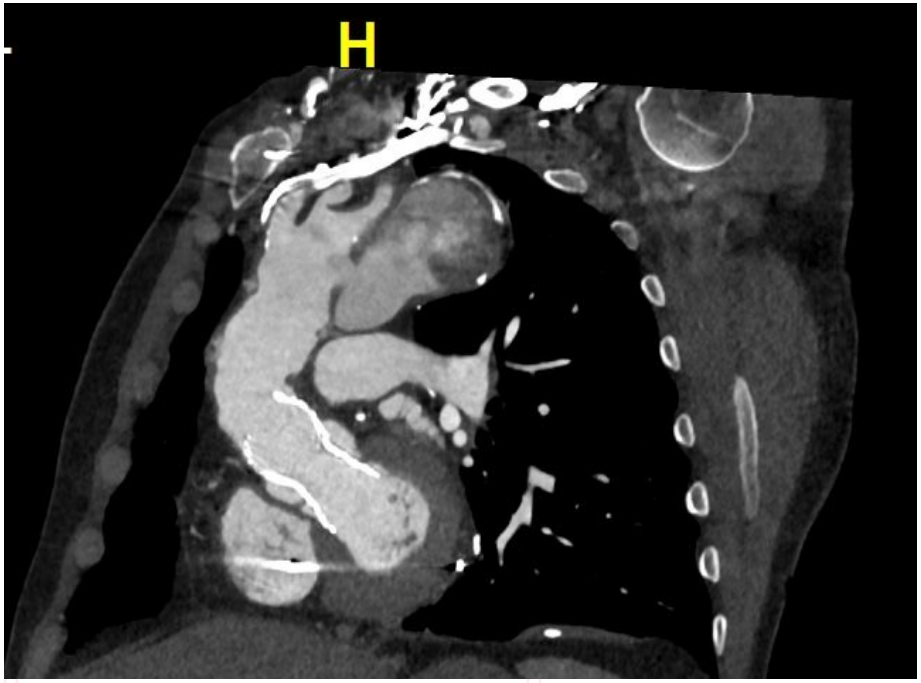


77 yo s/p Hemiarch for Type A with 3+ AI



Pre CT



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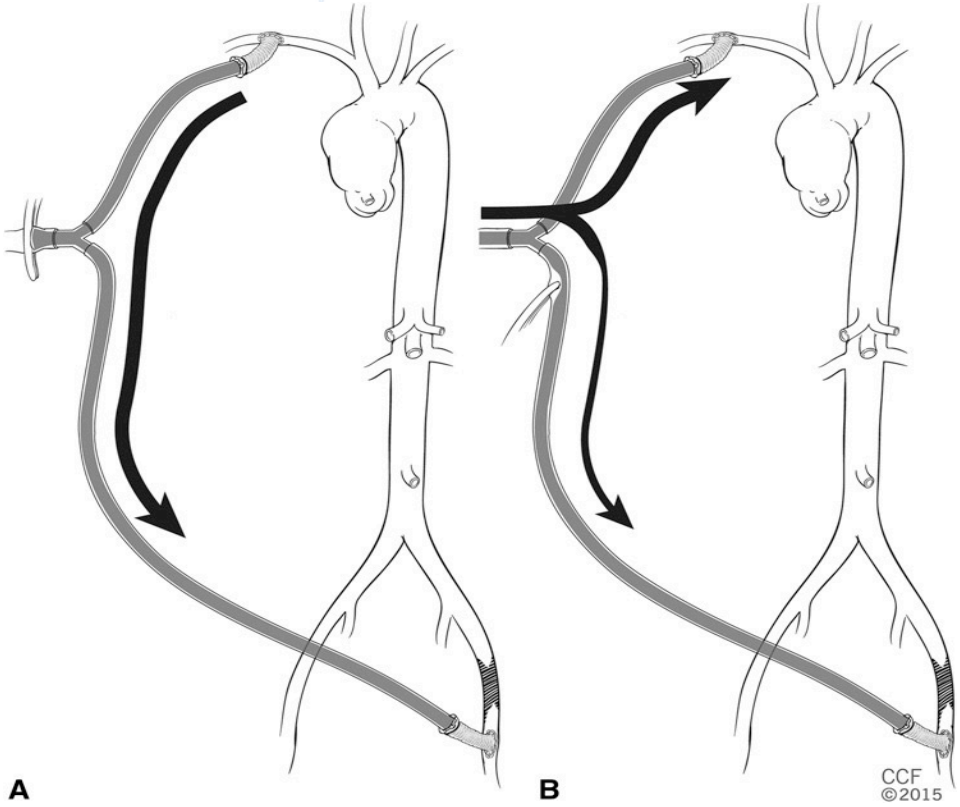
Redo after Type A Hemi-arch

- Sternal Re-entry
- Canulation
- Ease of clamping / protection
- Arch strategy
- Root strategy

Surgical Approach

- Redo axillary canulation with bicaval
  - Direct ostial retrograde
- Total arch vs hemi arch with ACP
- Redo root, CABG

- Safe re-entry?



- Y arterial line
- Atropine / Lidocaine
- Cool
- Open anterior table
- When VF,
  - Turn flow down,
  - open posterior table
  - CODA balloon into arch
- Reperfuse at full flow and complete cooling
- Dissect

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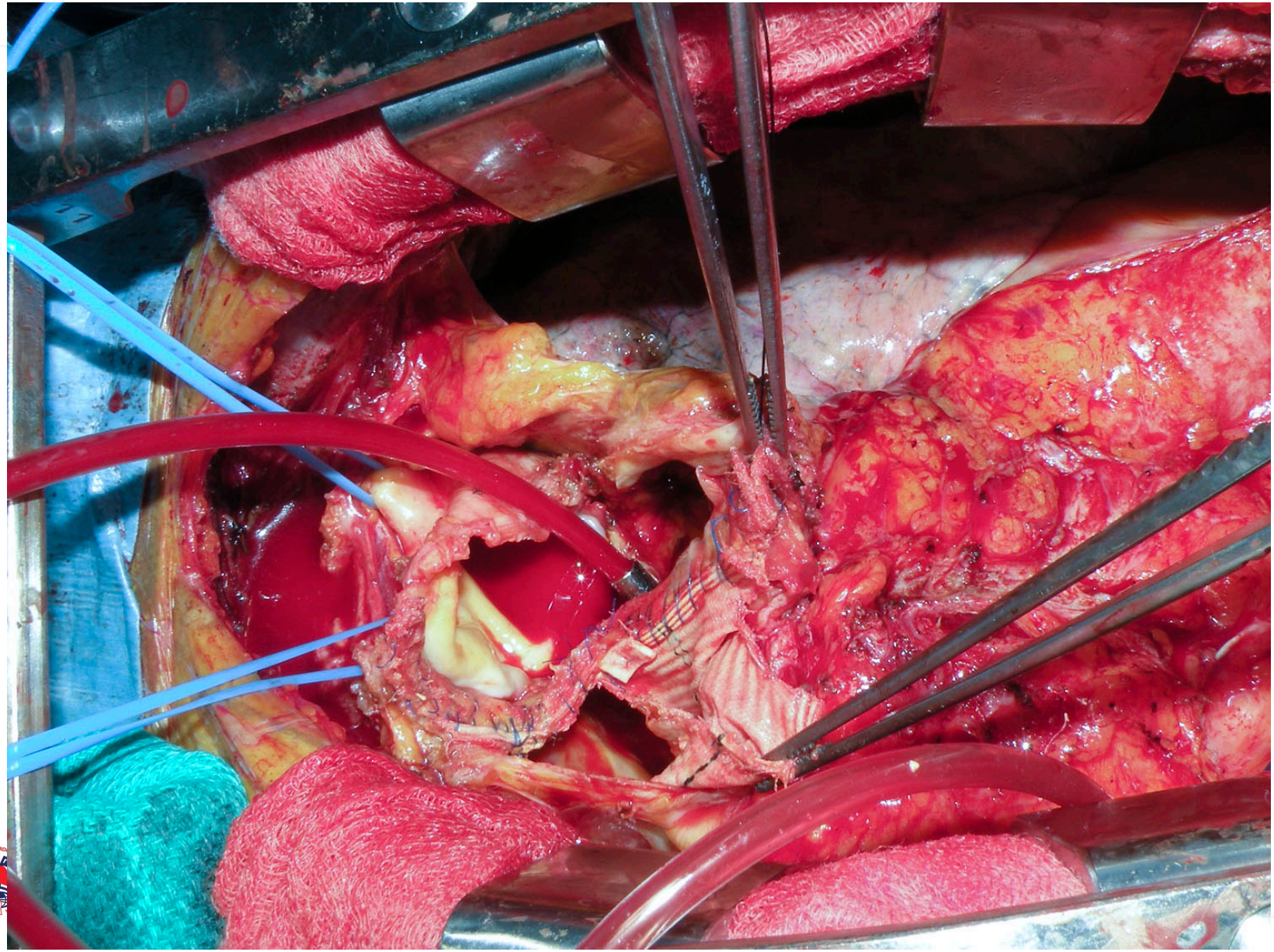

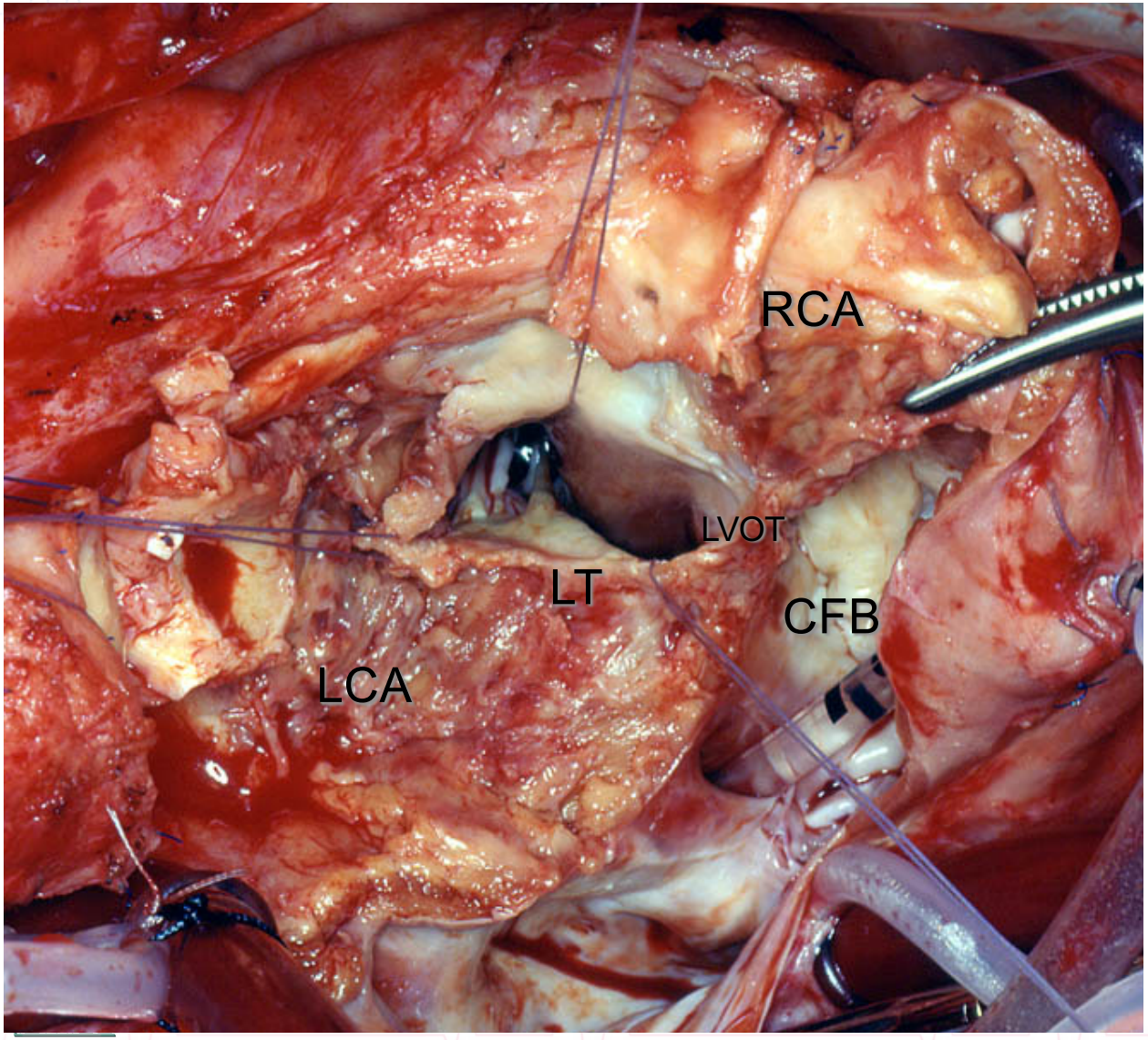
RCA
LVOT
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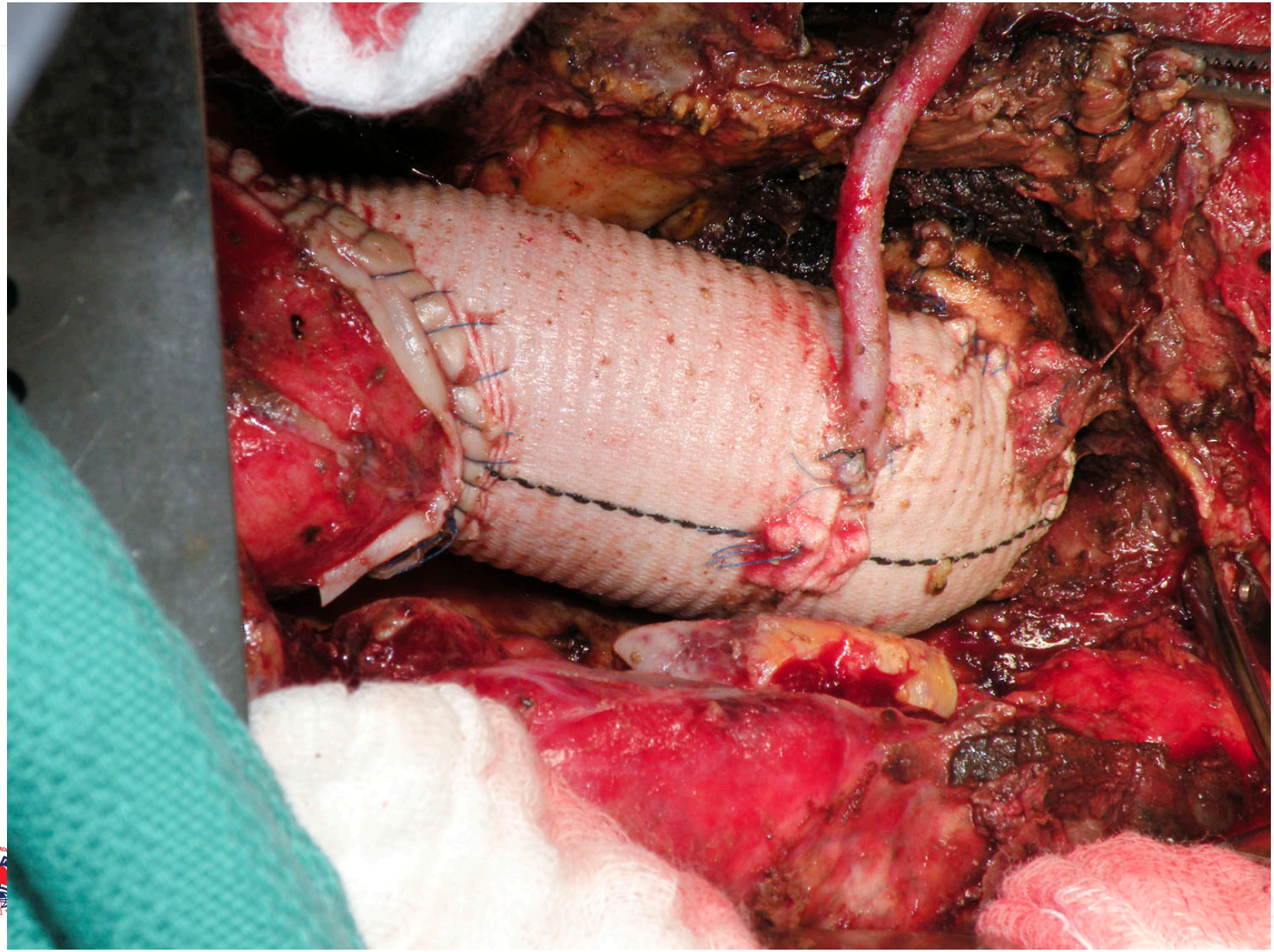
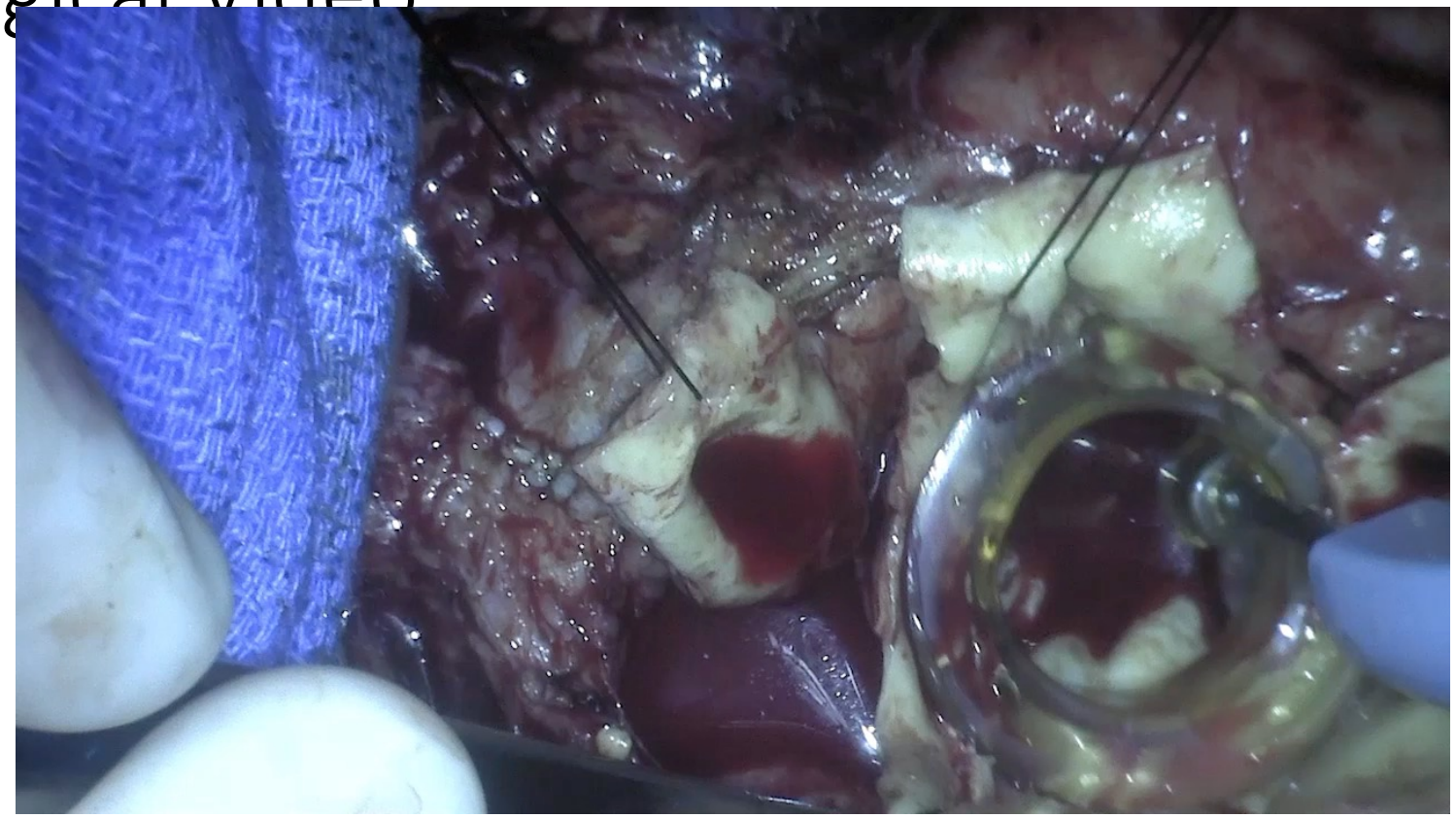
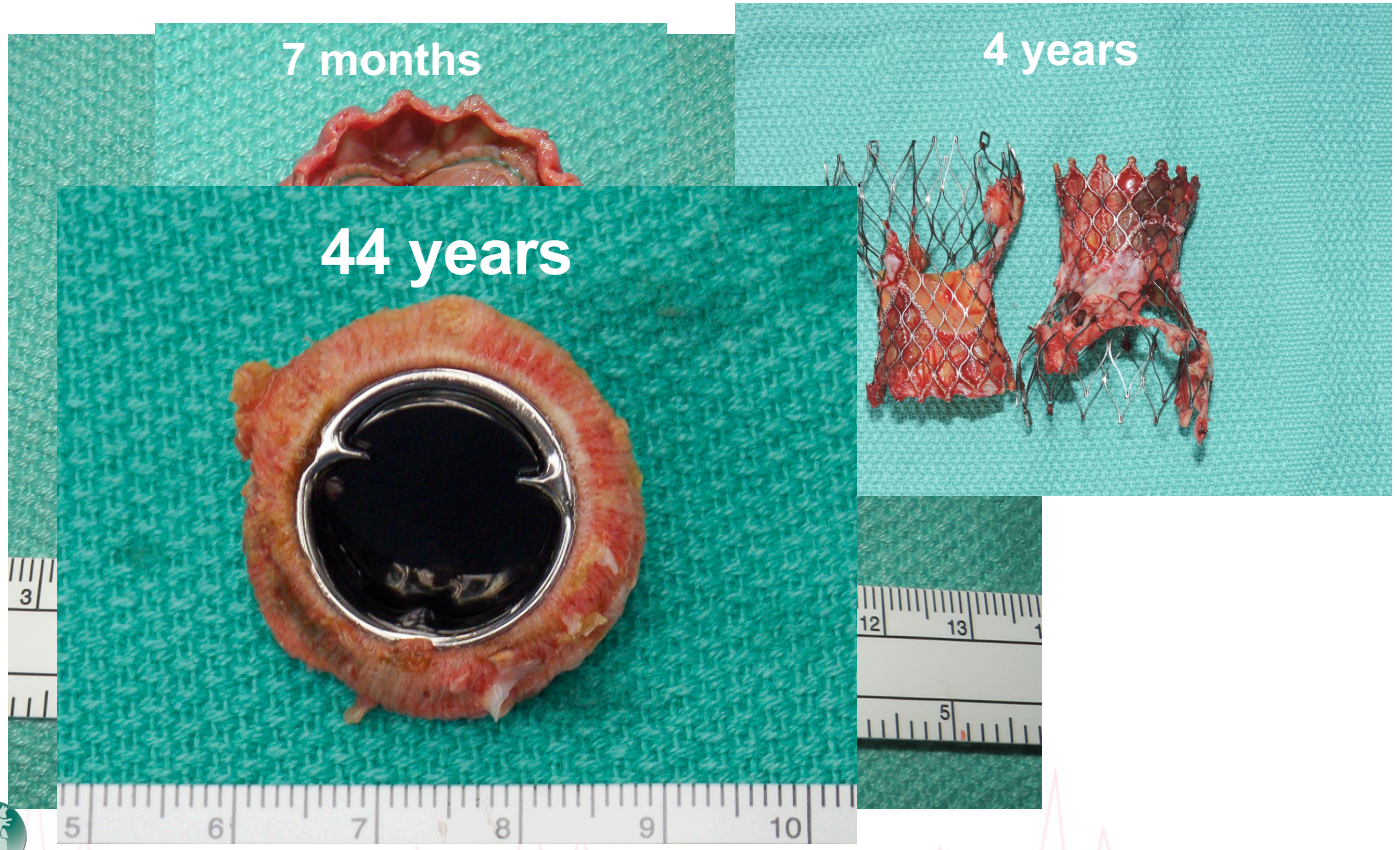
CFB
LCA



Surgical Video



Rogues Gallery



Algorithm for a difficult root

- IF – coronary ostia are preserved, consider root replacement
  - If fixed, far away, or extensively scarred-> Cabrol
- IF – coronary ostia are extensively calcified
  - Avoid root replacement
  - Consider root enlargement, ascending aortic patch
  - Be prepared with vein
- If the anulus is destroyed – sew to the outflow tract
  - Consider homograft

Conclusions

- Reoperations require deliberate planning
- Pre-op imaging is key
- Give thought to canulation, clamping, and protection
- Be prepared to patch holes and replace all or part of the root

- Reoperative AVR can be as safe as primary operation!

Thank you