

Coarctation of the Aorta

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최은석

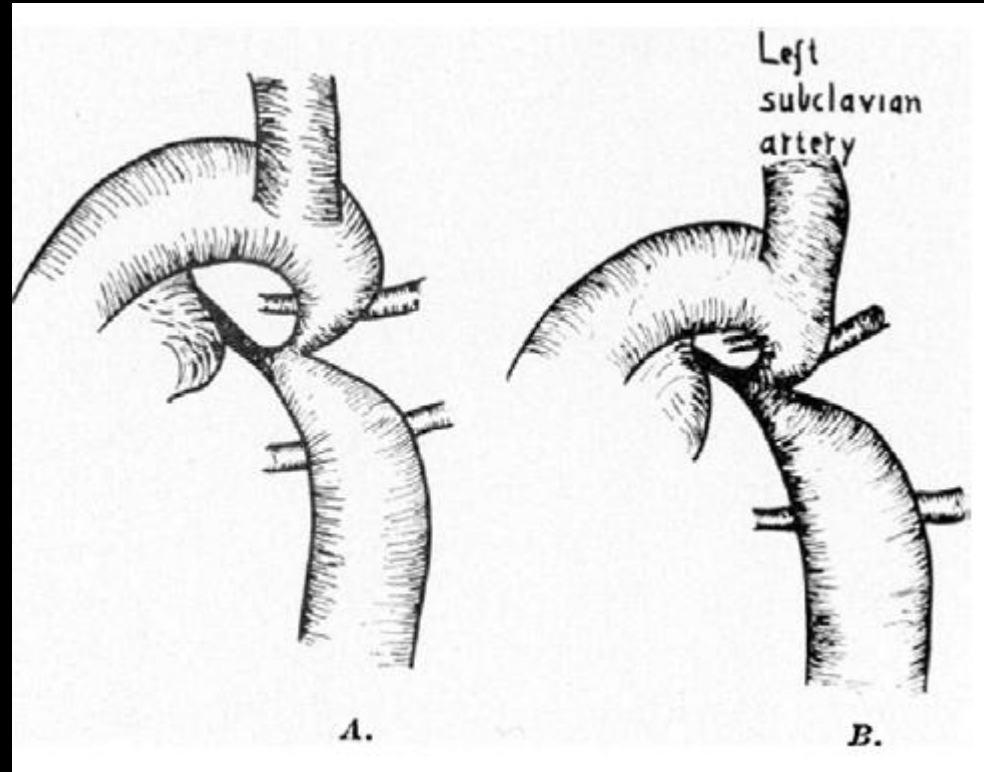


Coarctation of the aorta

- Congenital narrowing of the aorta
 - Usually just distal to the LSCA
- 0.2~0.6 / 1000 live births
 - 5~8% of all CHD (8th most common)



Clarence Crafoord

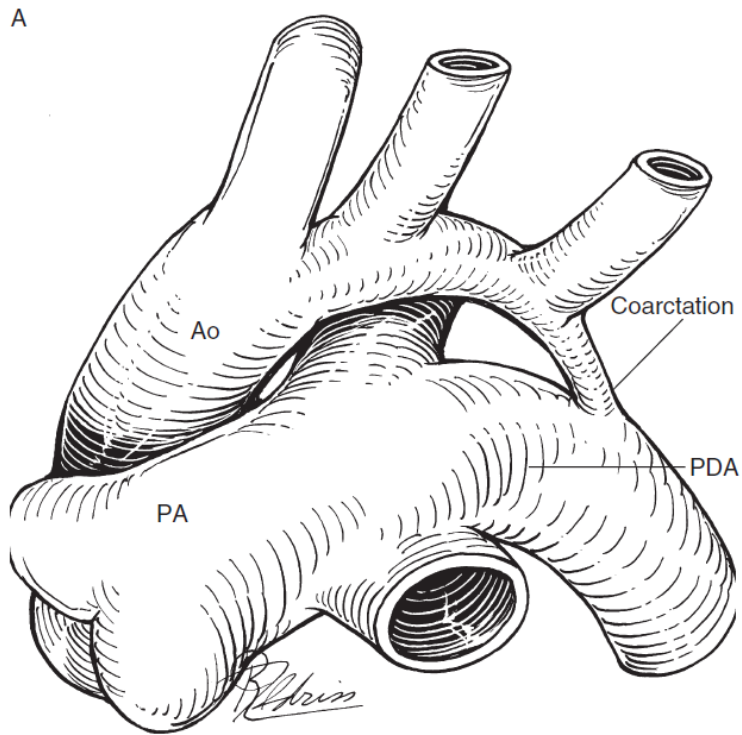


J Thorac Surg 1945;14:347-61

1949, in Stockholm

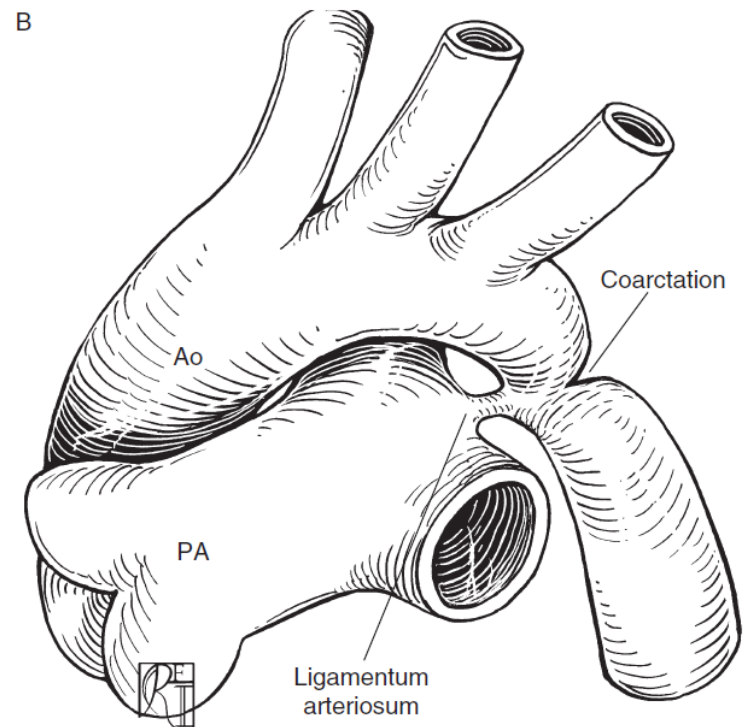
Ann Thorac Surg 2009;87:3432-6

Infantile (Preductal)



Symptomatic

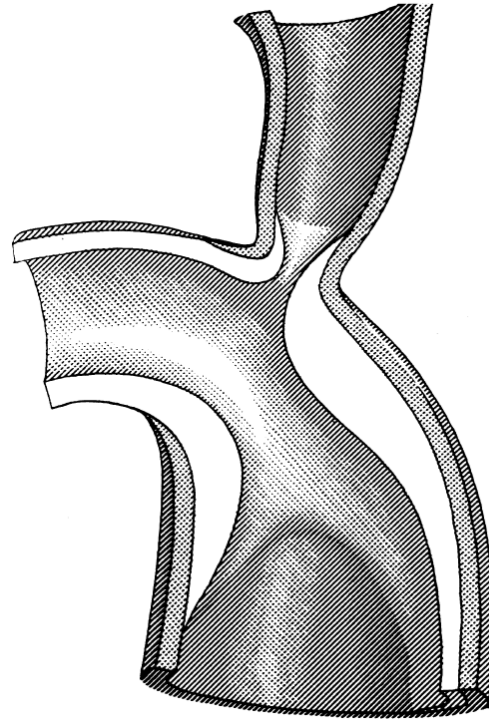
Adult (Postductal)



Asymptomatic

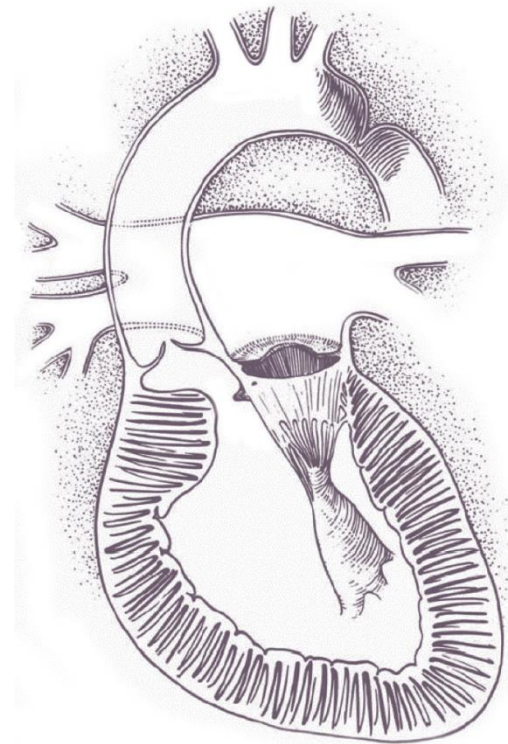
Embryology

- Flow theory
- Ductal sling theory



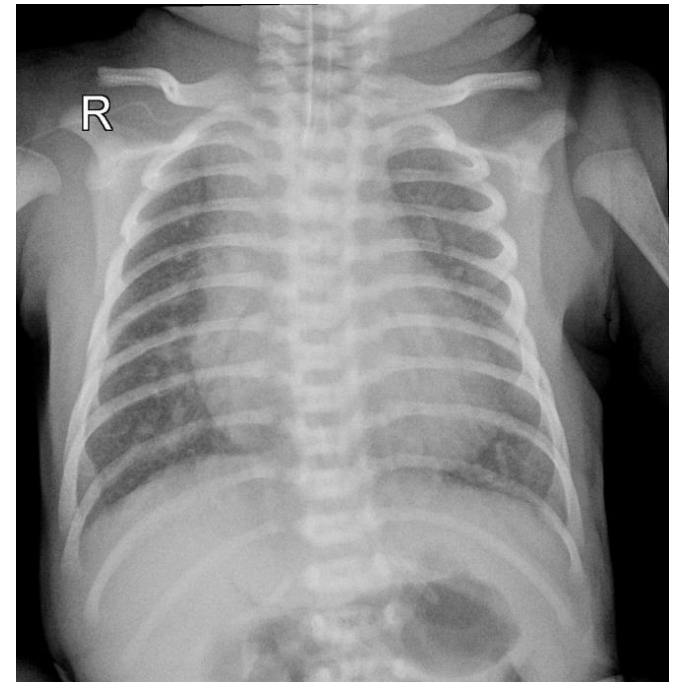
Associated anomalies

- 75%
- VSD
 - post. malalignment
- Bicuspid aortic valve
- Mitral valve anomalies
 - Shone's syndrome



Symptoms and Signs

- Bimodal
 - Symptomatic (infants)
 - Circulatory collapse after ductal closure
 - Congestive heart failure
 - Marked cardiomegaly
 - Asymptomatic
 - HTN

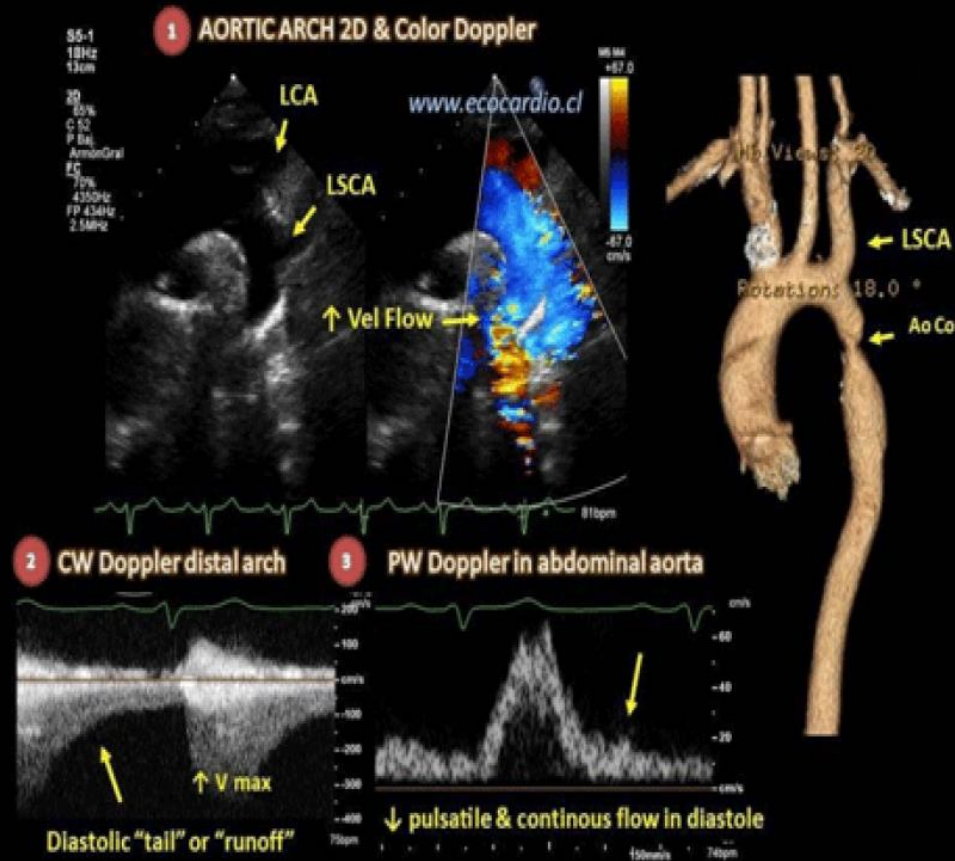


Diagnosis

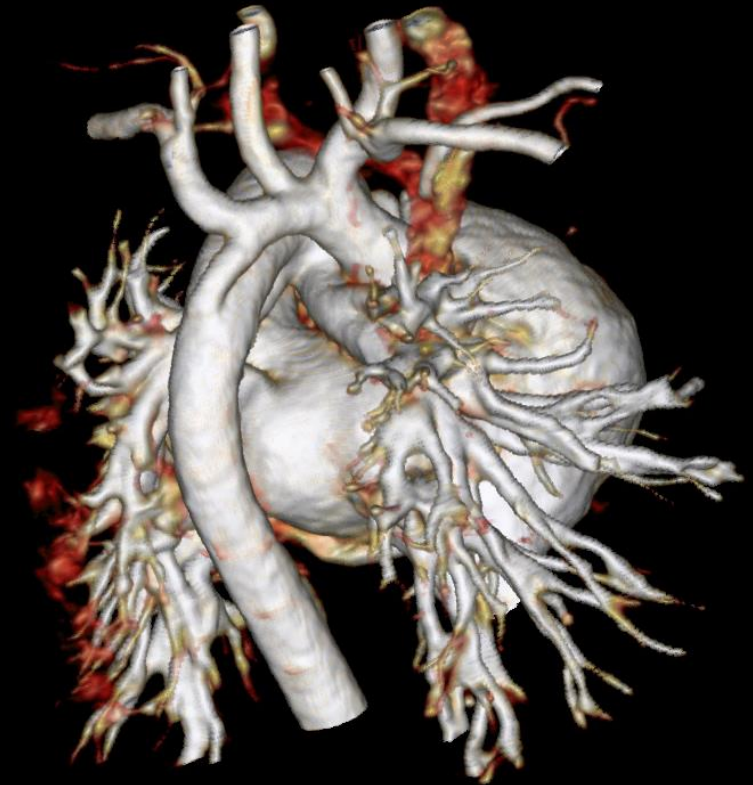
- Echocardiography
 - Anatomy: posterior shelf
 - CoA pressure gradient
 - Diastolic tail in DTAo
 - Tricky if large PDA (+)
- CT angiography



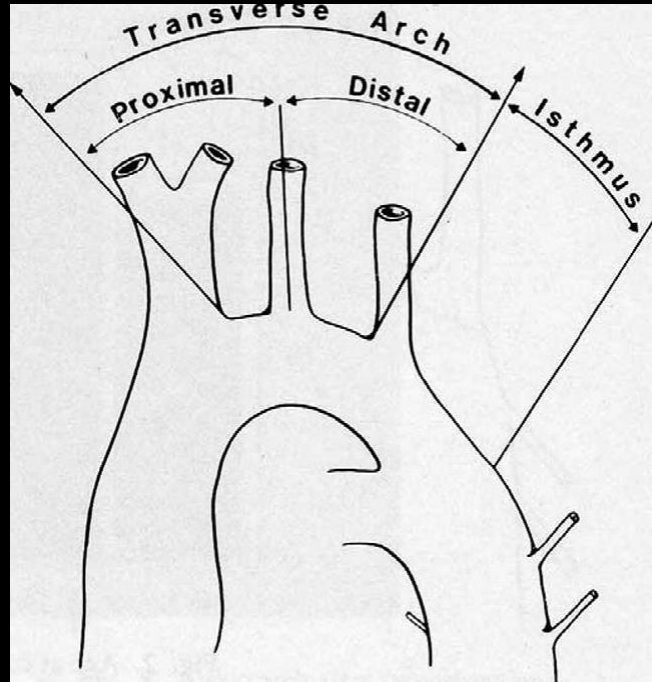
Echocardiography



CT angiography

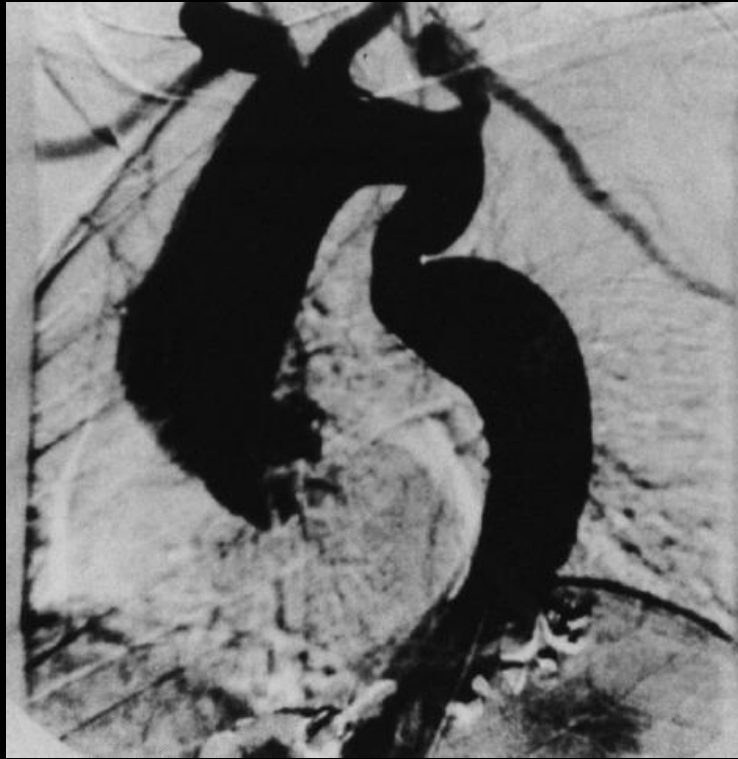


Hypoplastic aortic arch



- Proximal / Distal / Isthmus : < 60 / 50 / 40 % of Ascending Aorta
- Transverse arch < weight + 1 mm

Pseudocoarctation



- Elongation of the aortic arch - kinking
- No actual obstruction

Medical management

- Prostaglandin E1 (PGE1)
 - Alprostadiol, Eglanin®
 - Maintaining PDA



Balloon angioplasty

- For native coarctation
 - Controversial
 - Concern
 - Rupture of the aorta, femoral vessel injury
 - Aneurysmal formation, re-coarctation



Surgical approach

Thoracotomy

Sternotomy

- Arch hypoplasia
- Associated cardiac defects
- One stage vs. staged

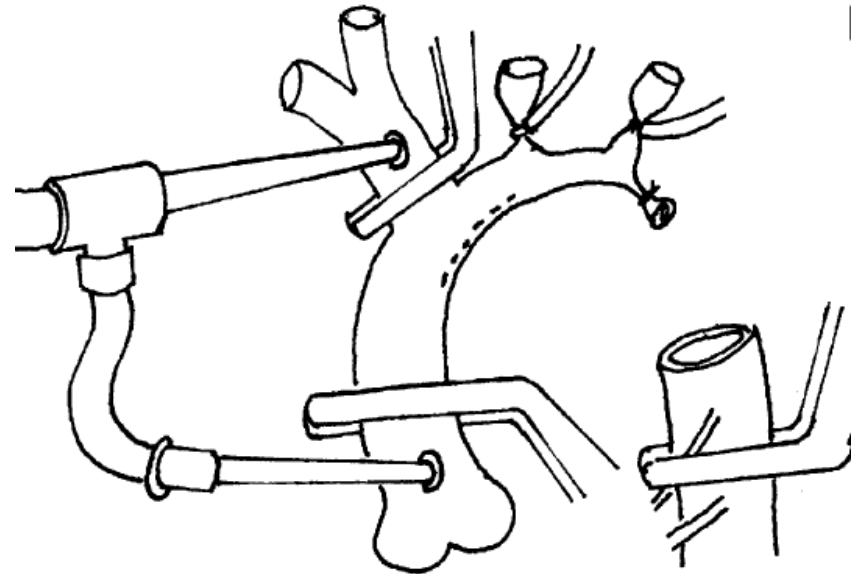
CPB strategy

No CPB or
Partial CPB

Deep hypothermic
circulatory arrest (DHCA)

Selective cerebral
perfusion

Selective cerebral and
myocardial perfusion



Surgical techniques

Excision of ductal tissue
+ direct anastomosis

End-to-end
Extended E to E
End to side

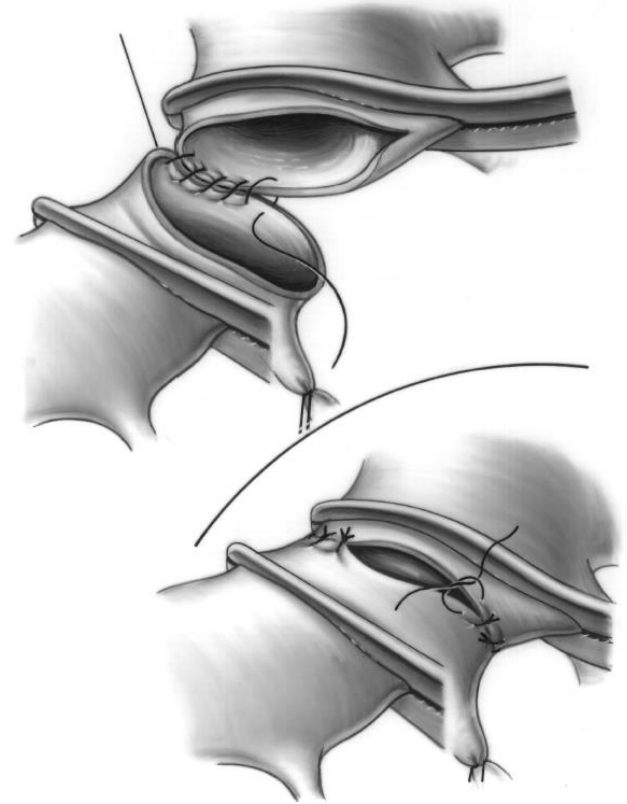
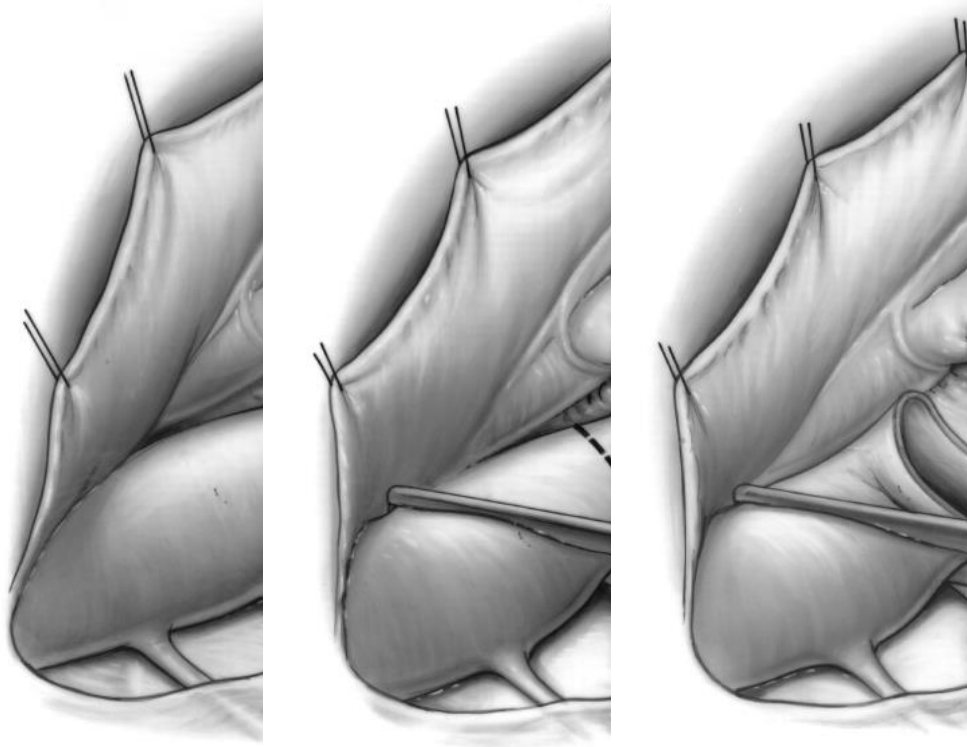
Subclavian flap

Patch aortoplasty

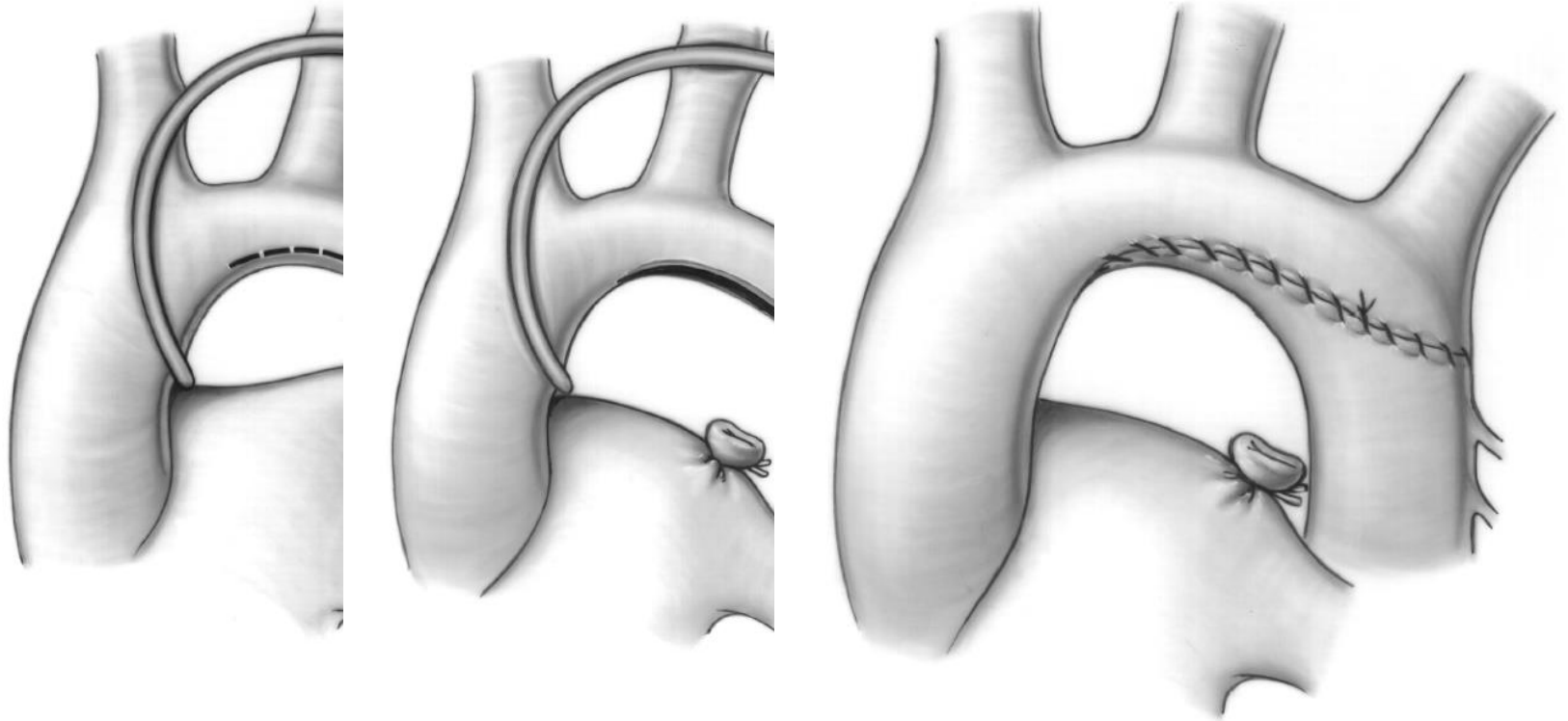
Graft interposition

Anatomic
Extra-anatomic

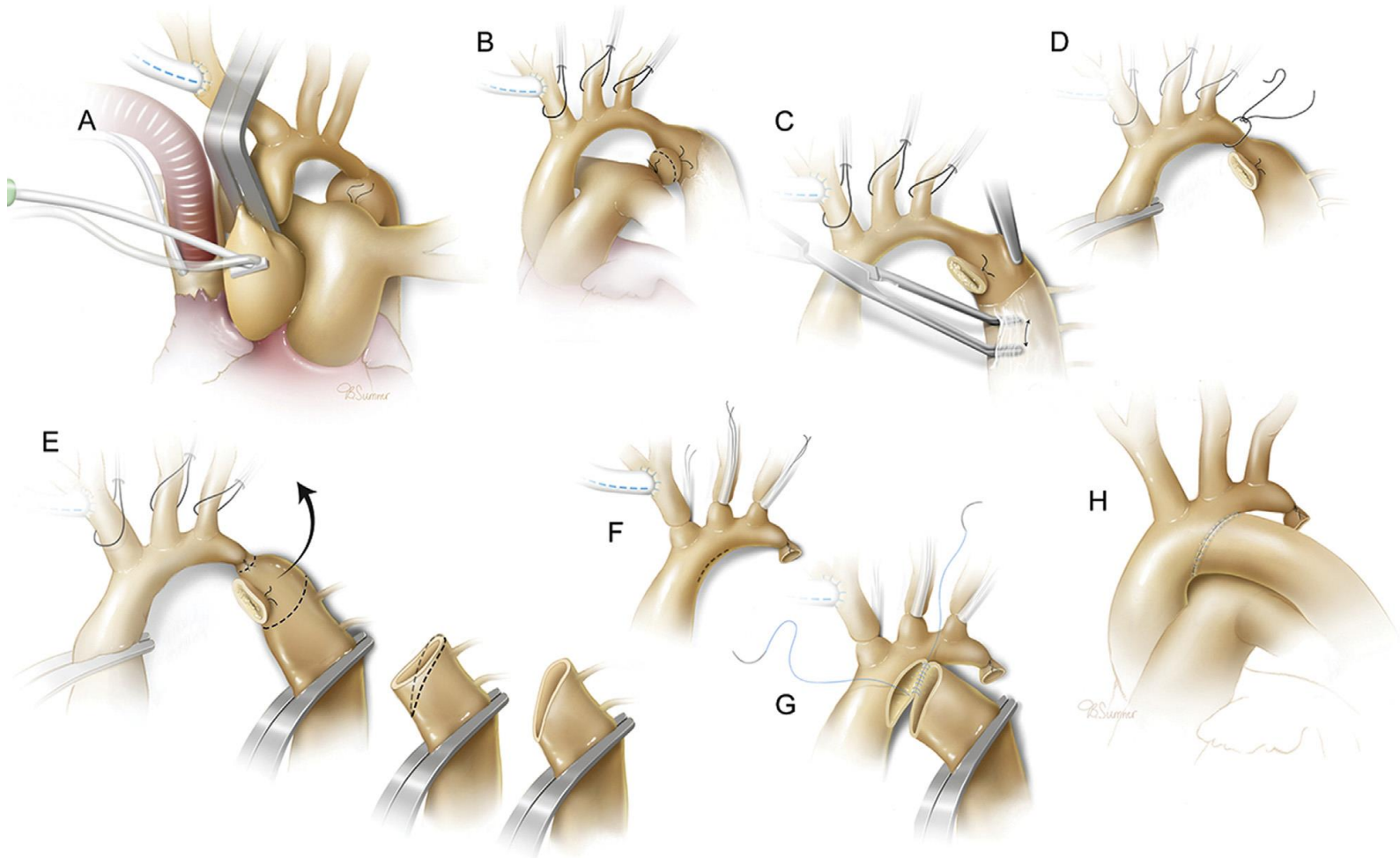
Resection and end-to-end anastomosis



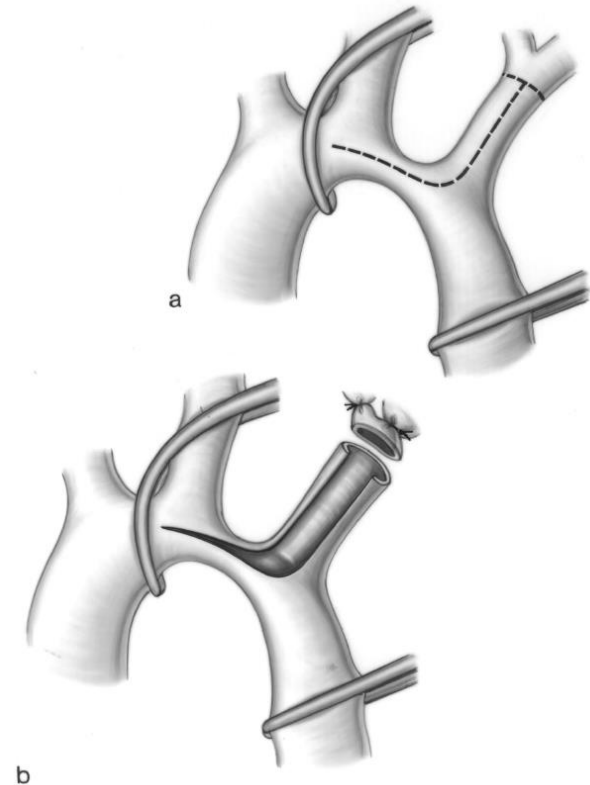
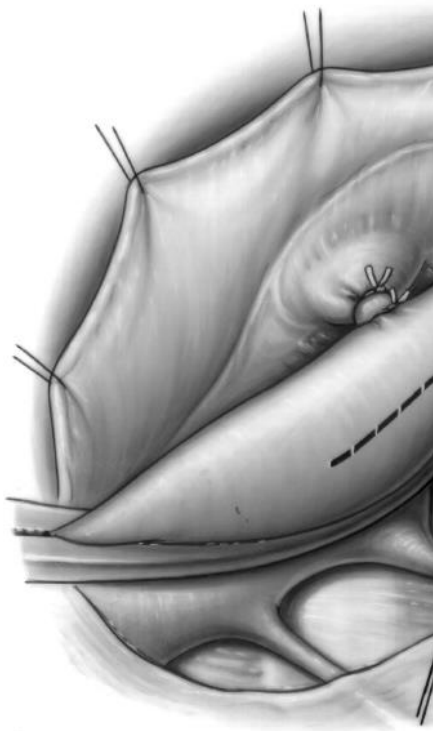
Extended end-to-end anastomosis



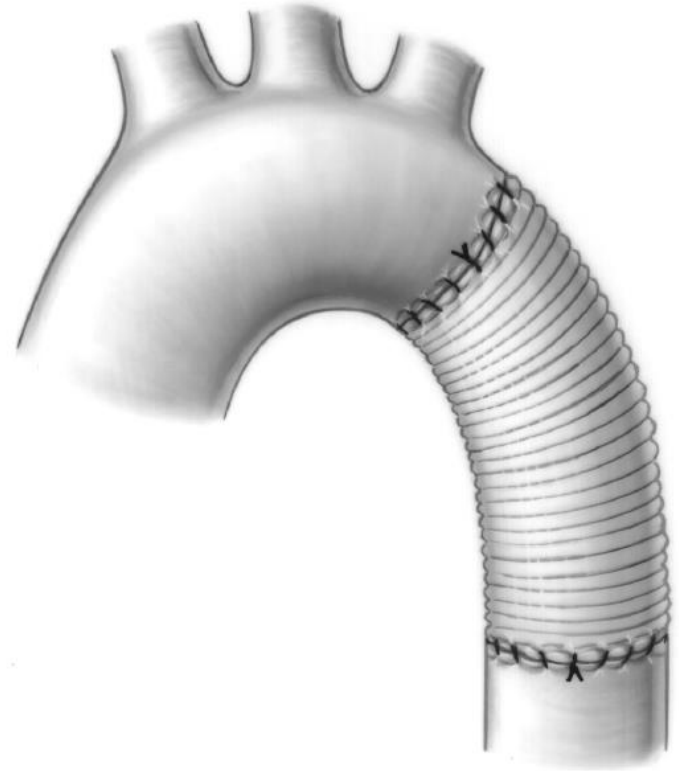
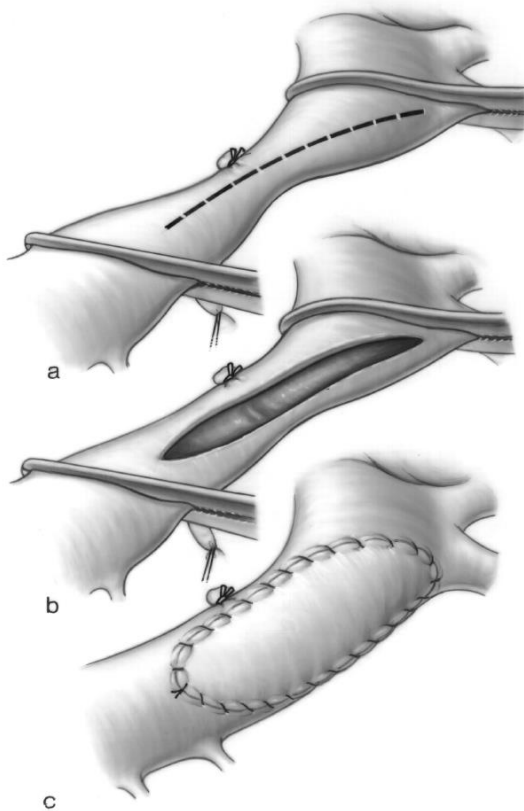
End-to-side anastomosis



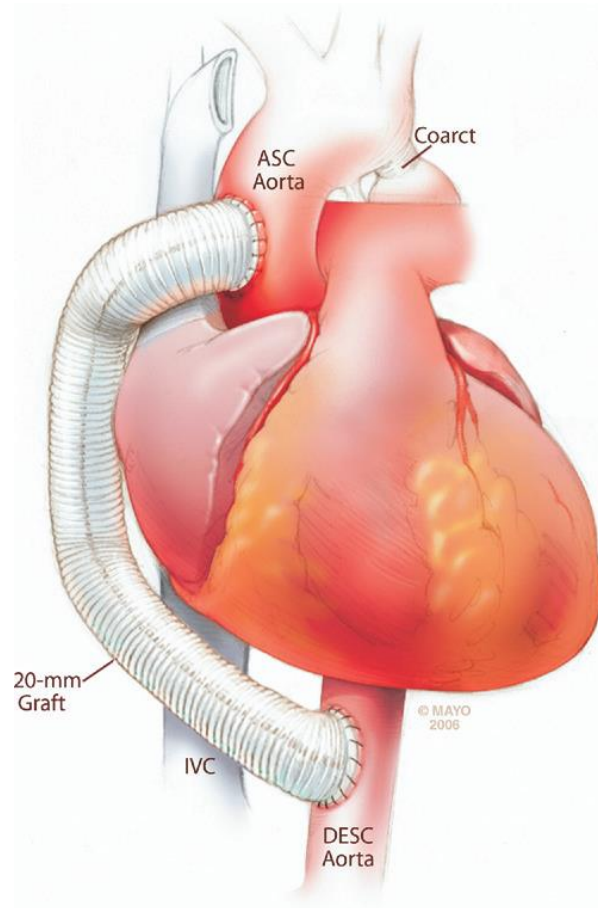
Subclavian flap technique



Patch or Graft



Extra-anatomic bypass



Early complications

- Renal failure
- Paraplegia

- Vocal cord paralysis
- Chylothorax

- Paradoxical HTN
- Abdominal pain

Outcomes

Mortality

Associated lesions

Re-coarctation

Hypertension

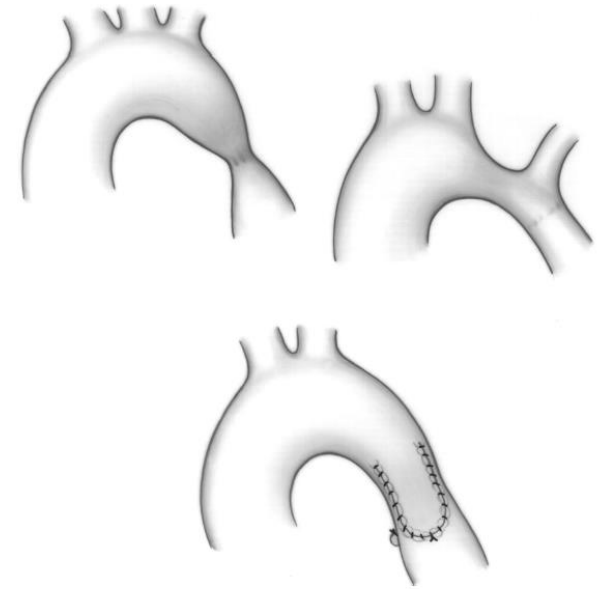
Age at repair
Endothelial response

Aneurysm

Patch

Re-coarctation

- Causes
 - Technically inadequate repair
 - Ductal tissue
 - Circumferential suture line
 - Hypoplasia of the arch
 - Tension on the anastomosis



Re-coarctation

- Indication for intervention
 - Significant narrowing on imaging
 - Pressure gradient of 20-30 mmHg
- Treatment
 - Balloon dilatation
 - Surgery



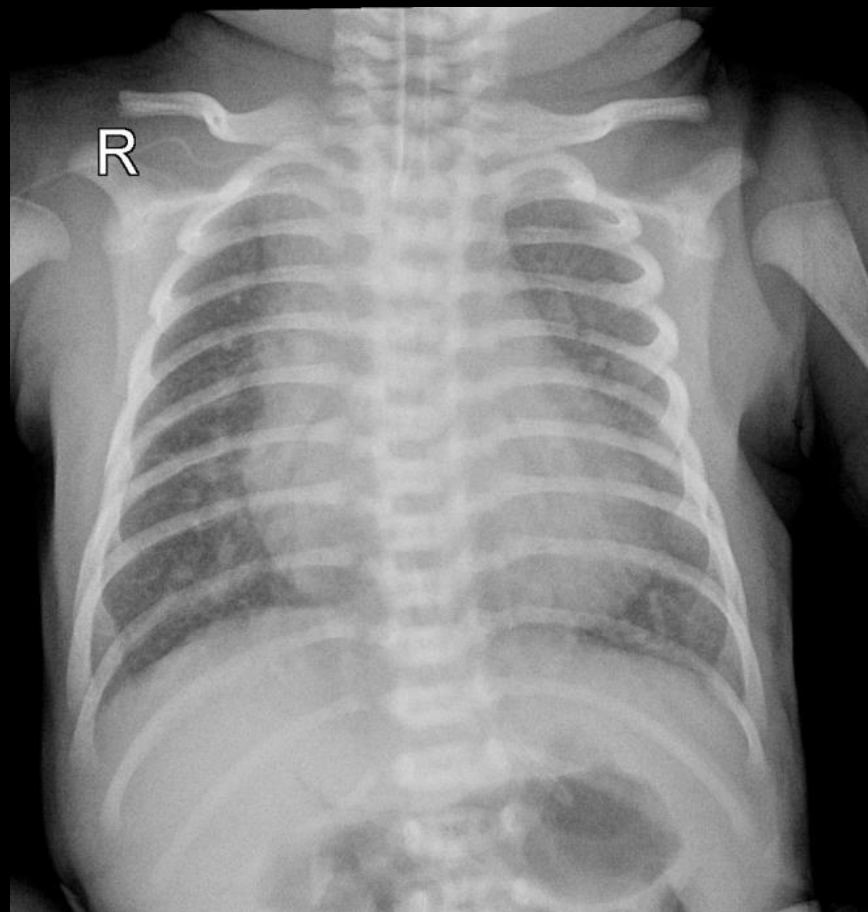
CASE

Brief Hx

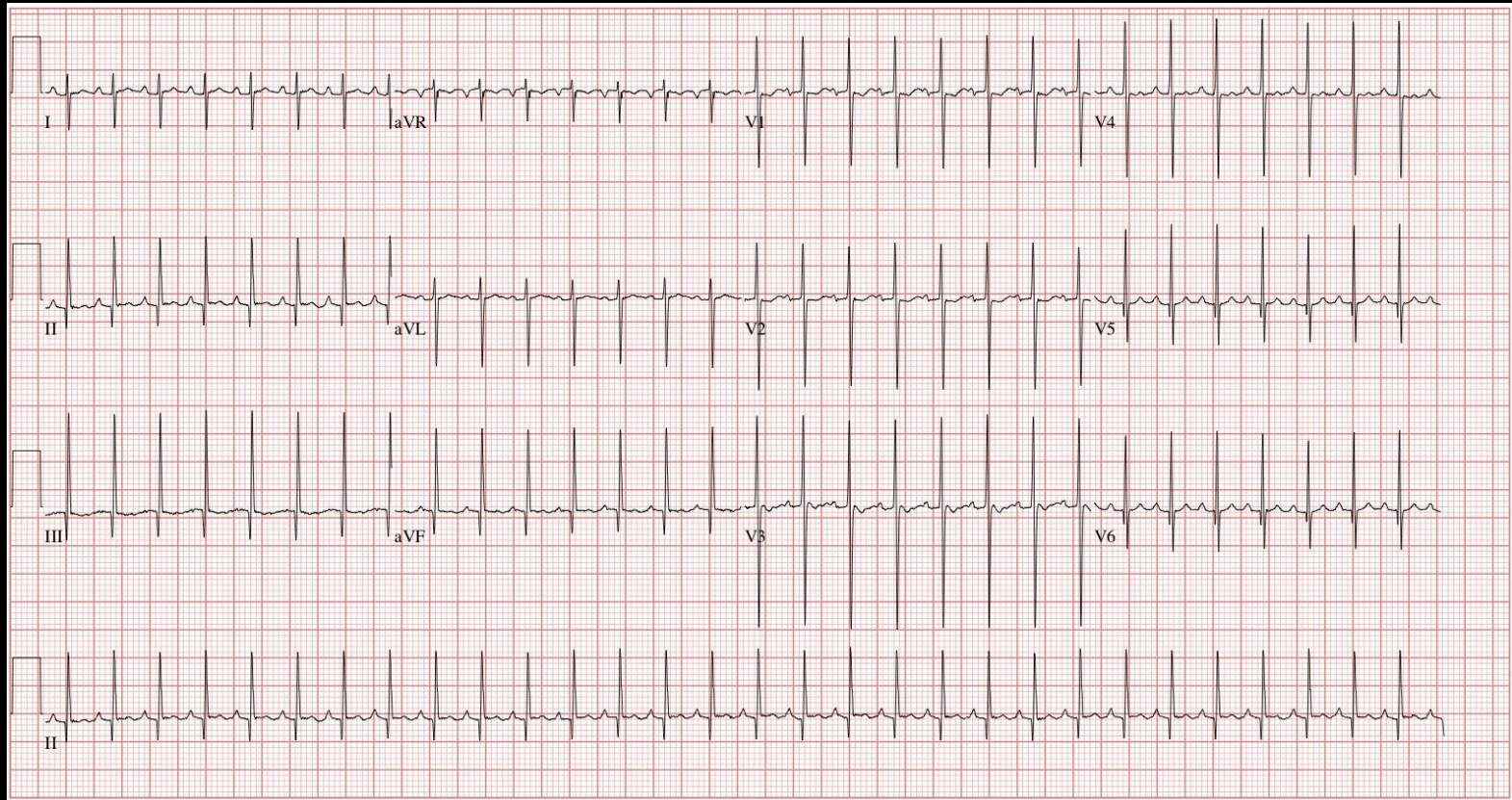
- Fetal diagnosis: COA with VSD
- GA 38+1 wks
- 3030 gm, male
- PGE1 infusion in NICU
- Intubation at 6 days



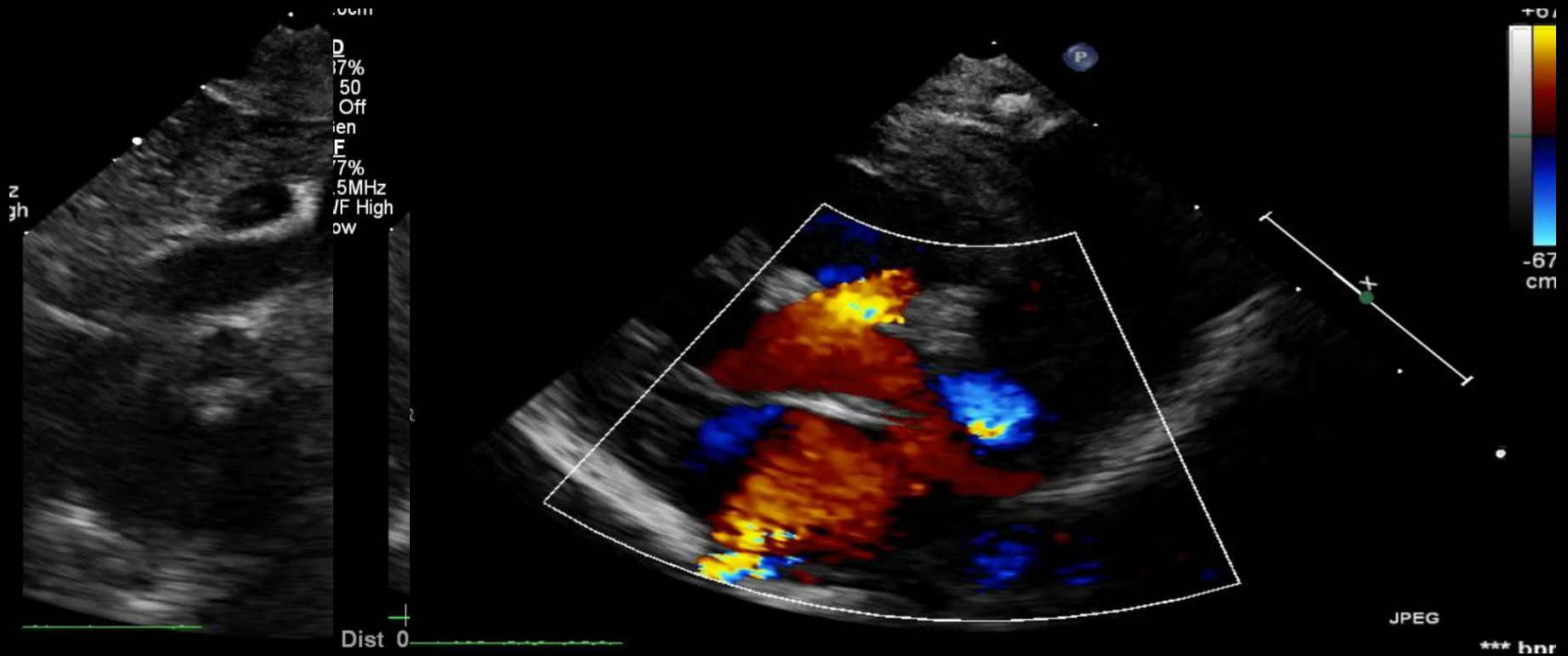
Preop. CXR



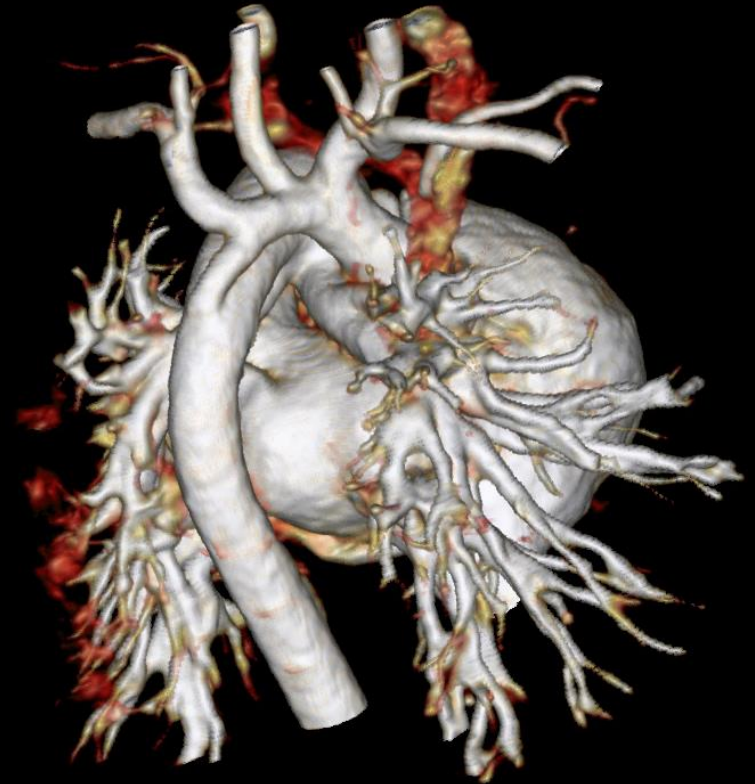
Preop. ECG



Preop. EchoCG



Preop. CT angio



Operation

- M/9d, 3.1kg
- Op name
 - COA repair (end-to-side)
 - VSD patch closure
 - ASD closure, PDA division
- CPB/ACC/SCMP time: 132/48/29 min



Postop. course

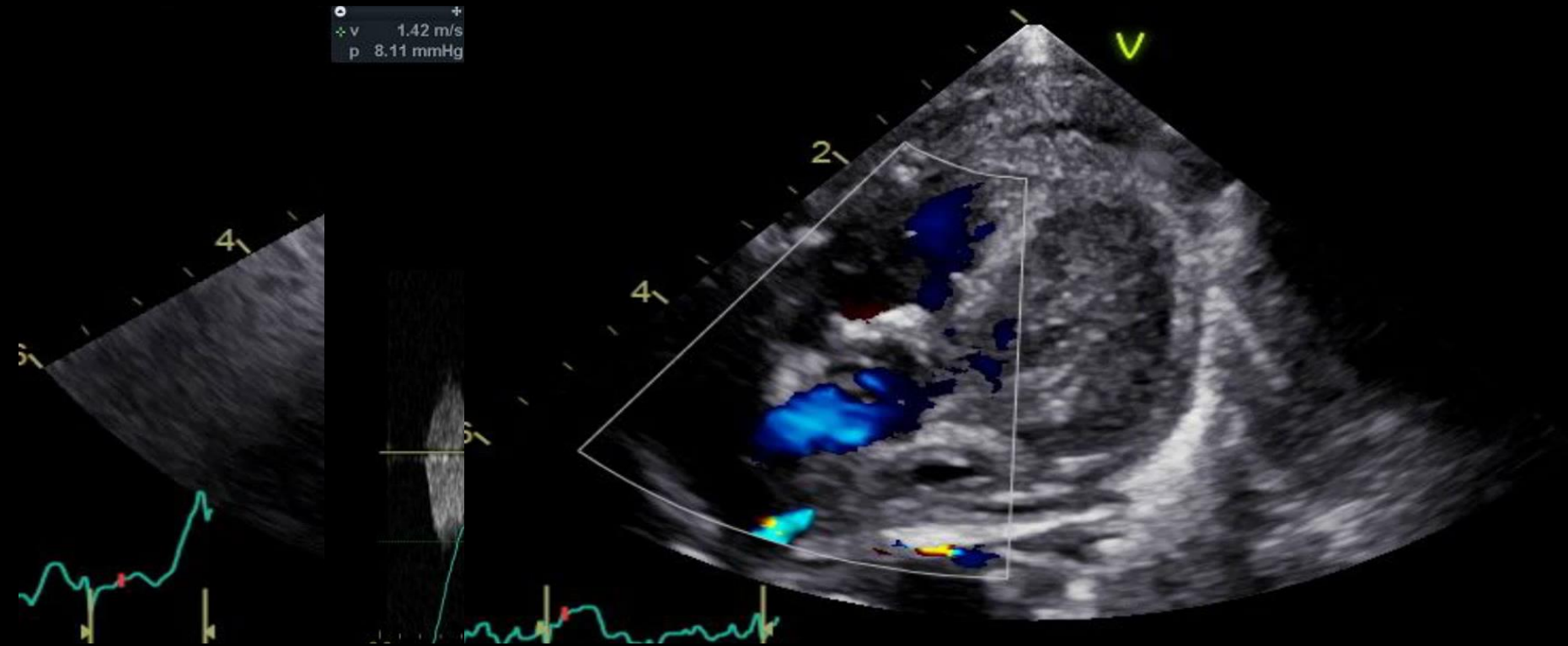
- POD #5 extubation
- POD #6 Transfer to general ward
- POD #10 discharge



POD #10 CXR



Postop. EchoCG



Reference

- Stark JF. (2007). *Surgery for Congenital Heart Defects* (3rd ed.)
- Mavroudis C, Backer CL. (2013). *Pediatric Cardiac Surgery* (4th ed.)

