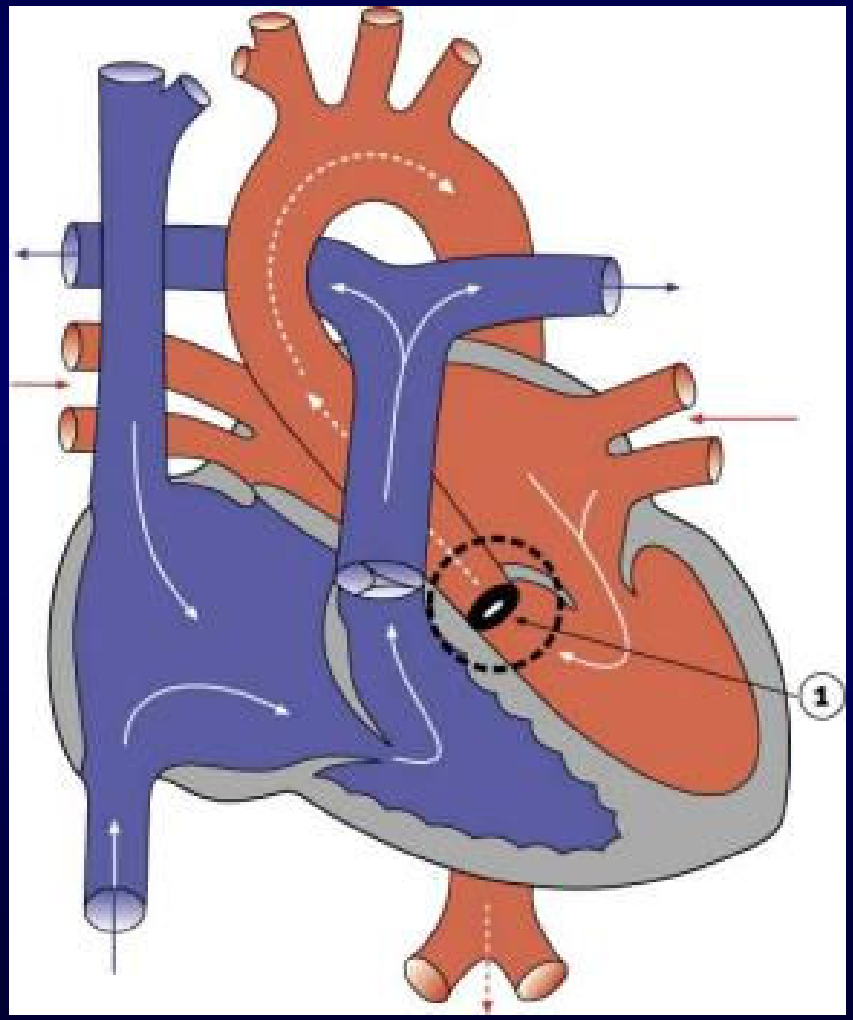
LVOT Reconstructive Surgery

김 응 한

LVOTO

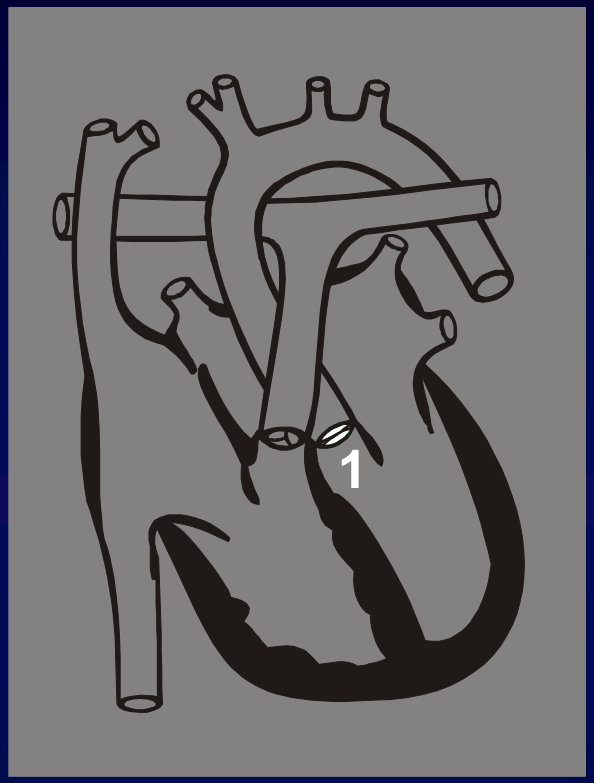


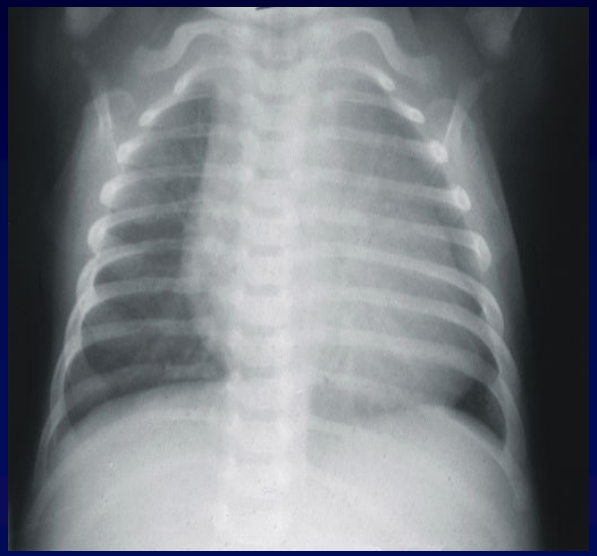
Valvar

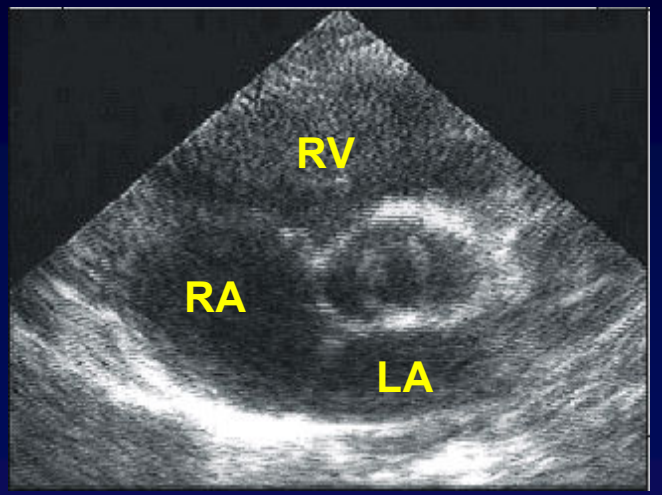
Supravalvar

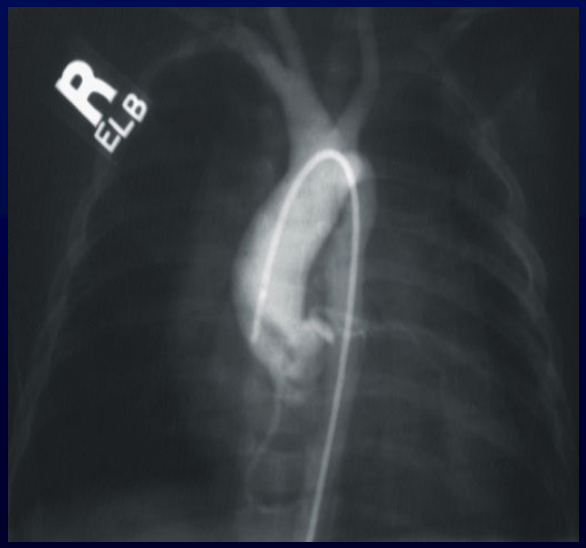
subvalvar

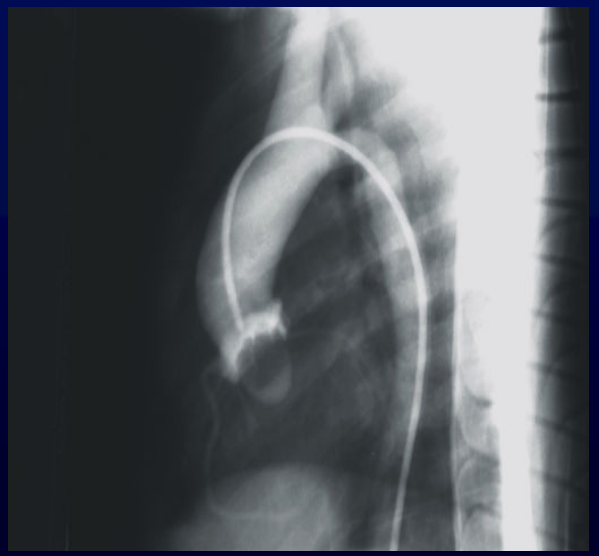
Severe Aortic Stenosis in an infant











1) Valvular Stenosis with a bicuspid aortic valve

Neonate Critical AS

Severe symptom after birth

Congestive heart failure

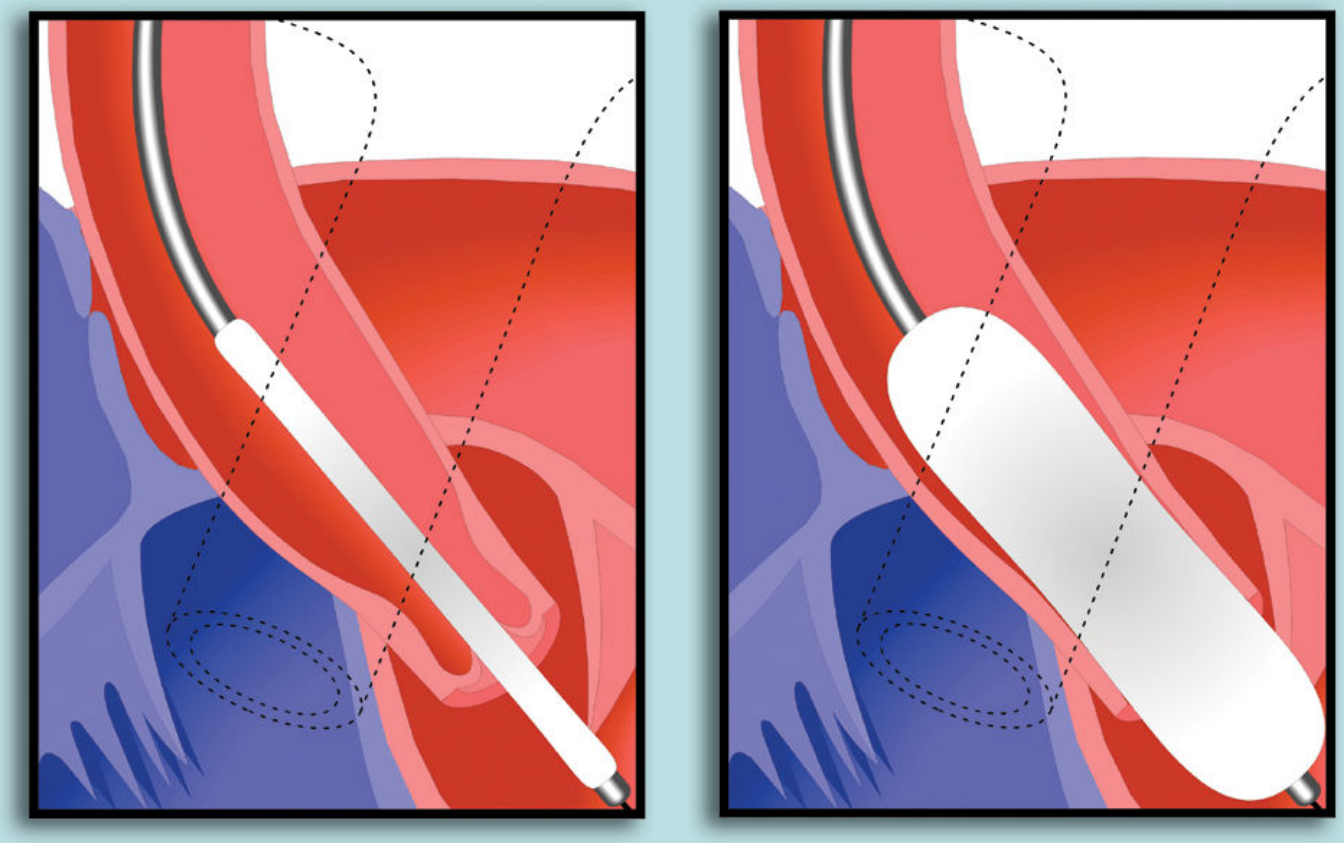
Ductal dependent systemic circulation

Circulating collapse when PDA closing

- Urgent intervention or surgery

Valvuloplasty

Aortic Balloon Valvuloplasty

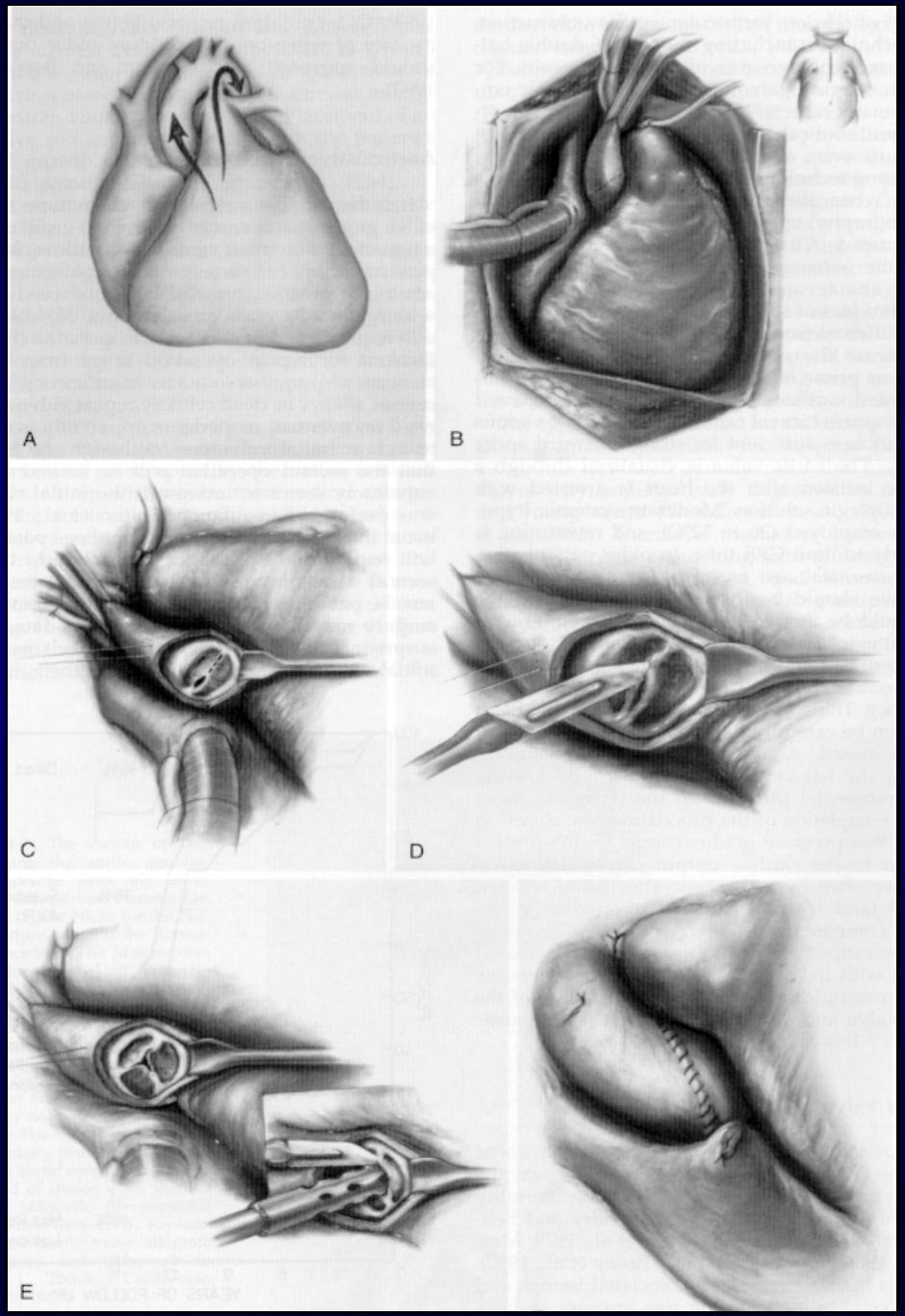


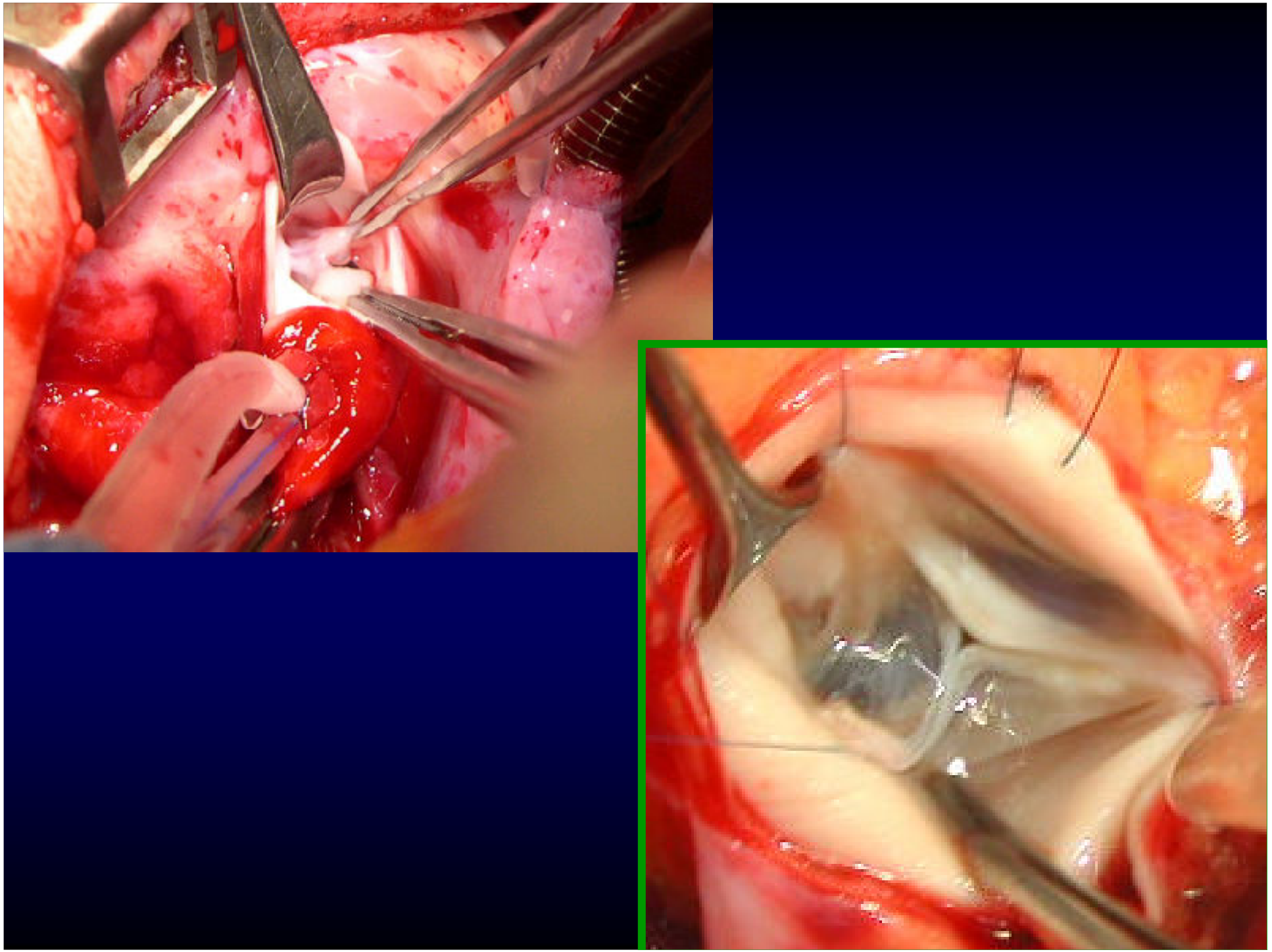
Valvuloplasty balloon passed retrograde across stenotic aortic valve

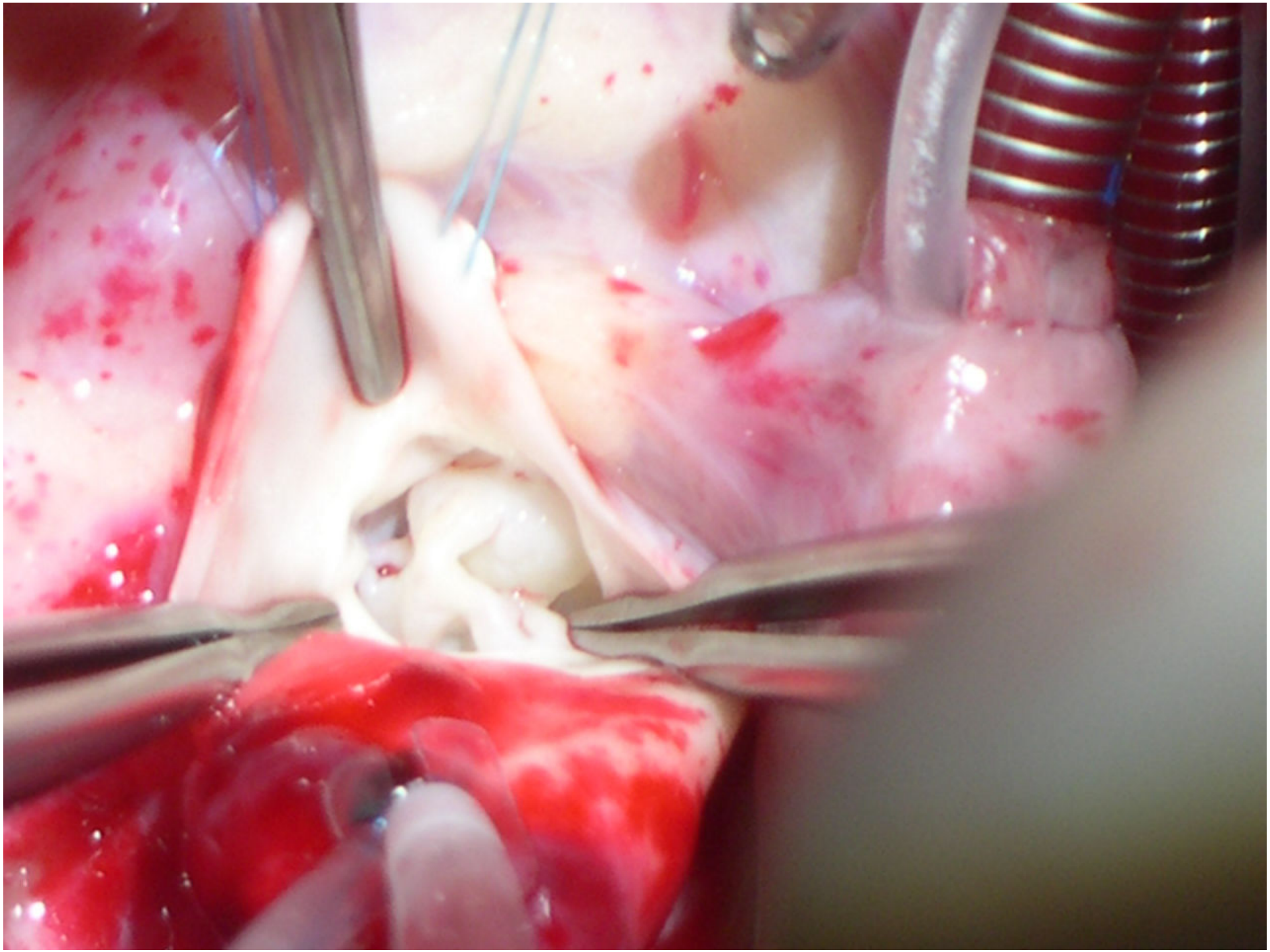
Operation (1)

Valvar stenosis

: valvotomy

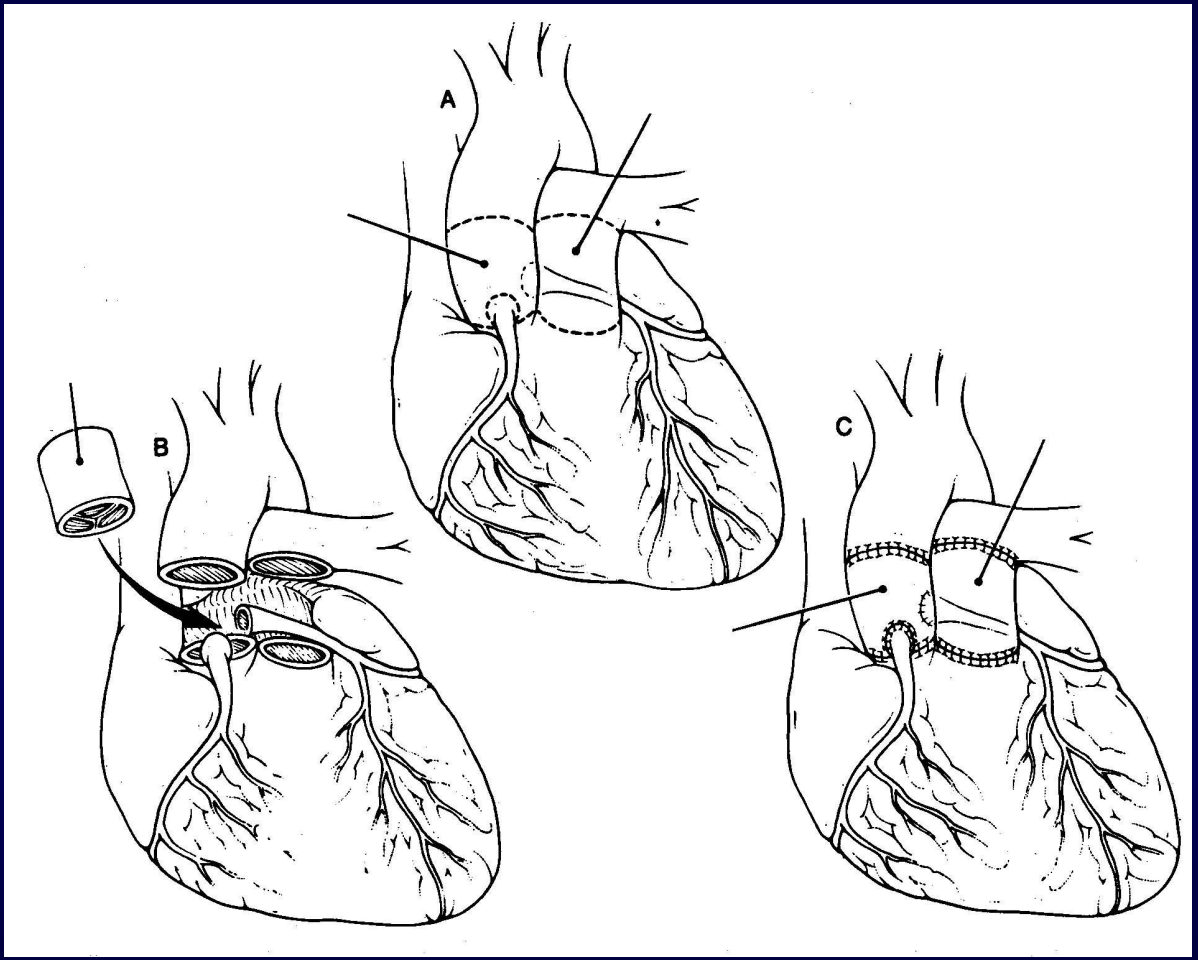






Operation (4)

Severe case



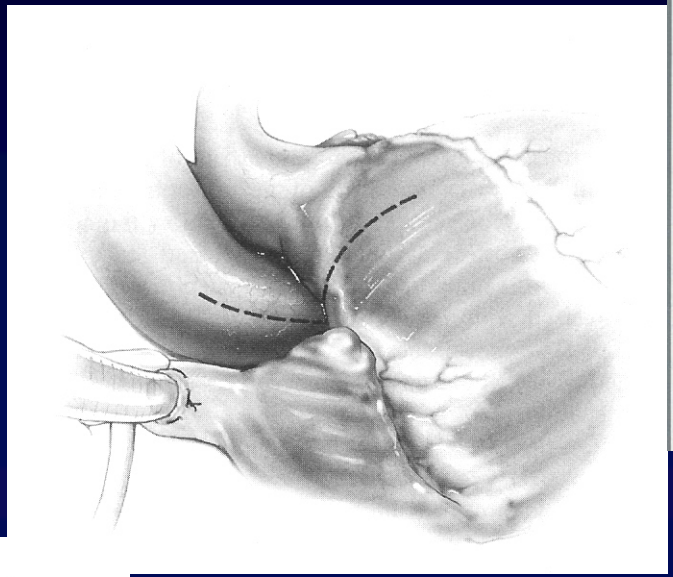
Ross Op.

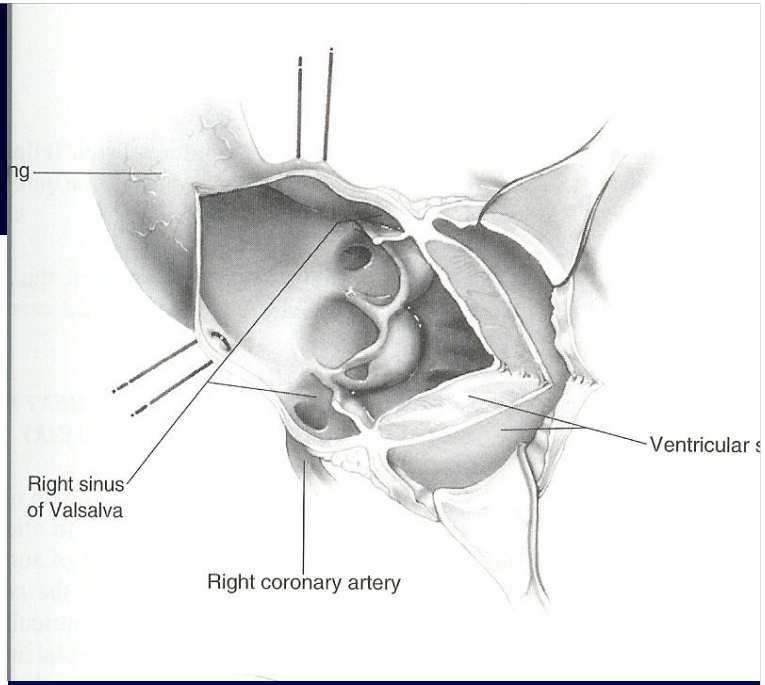
Ross Op.

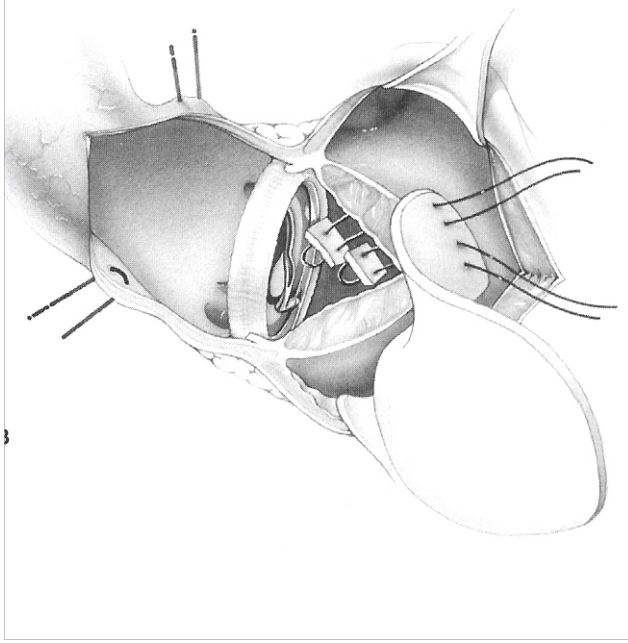
- Experience of SNUH Children's Hosp.
  - 1996 – 2005
  - 14 pts.
    - ✓ Critical AS 2
    - ✓ Congenital AS 10
    - ✓ VSD + AR 1
    - ✓ Endocarditis 1
  - Early mortality 1 7%
  - Late mortality none

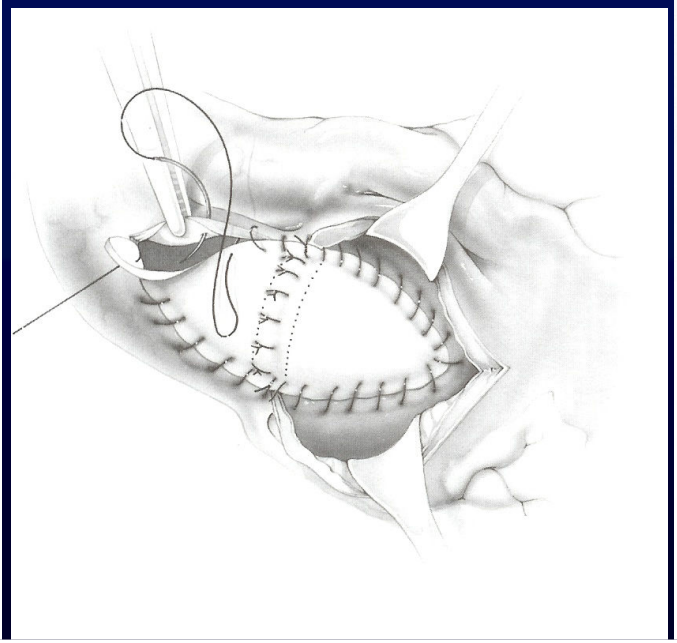
Aortoventriculoplasty

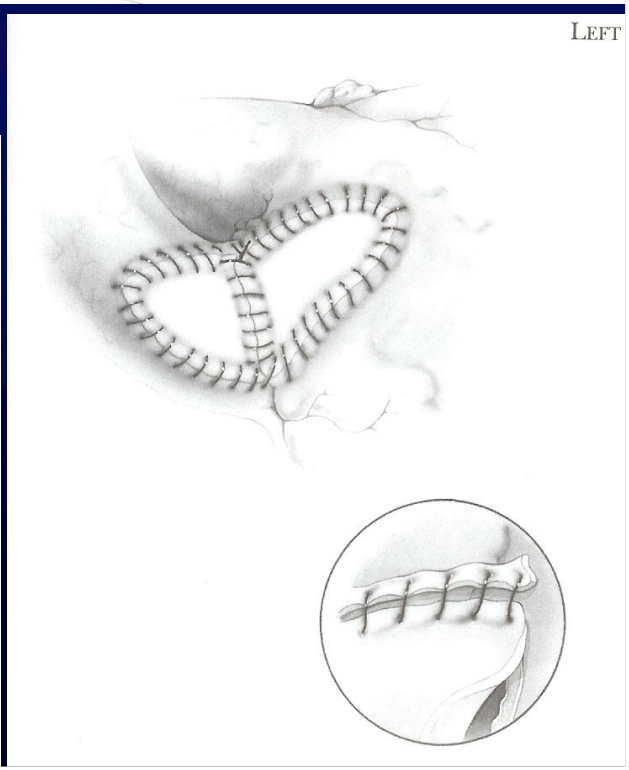
(Konno-Rastan procedure)











M / 14 / 54 kg

Congenital AS

(moderate AR, ΔP = 112 mmHg)

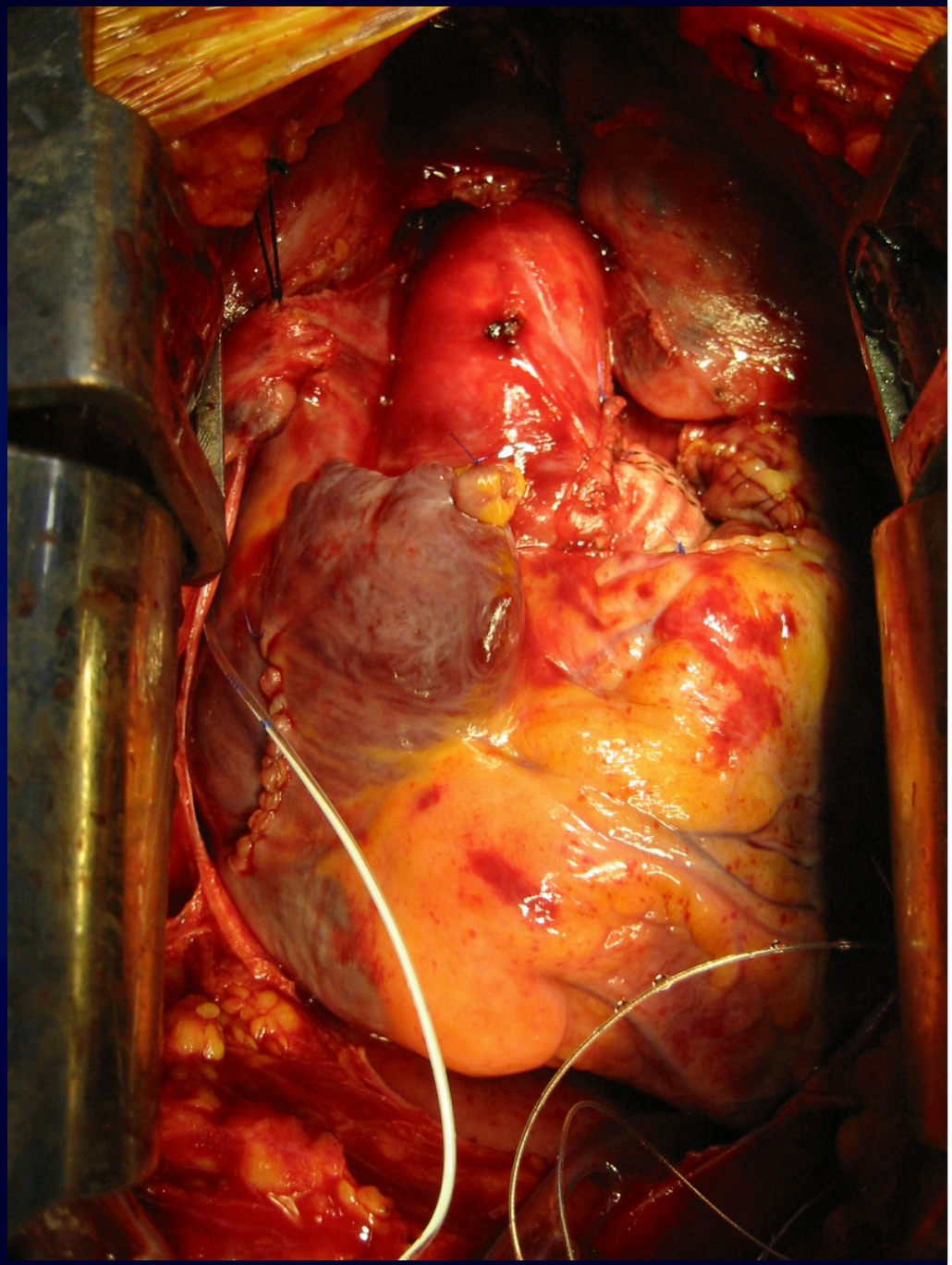
AV annulus = 13 mm

Aortoventriculoplasty

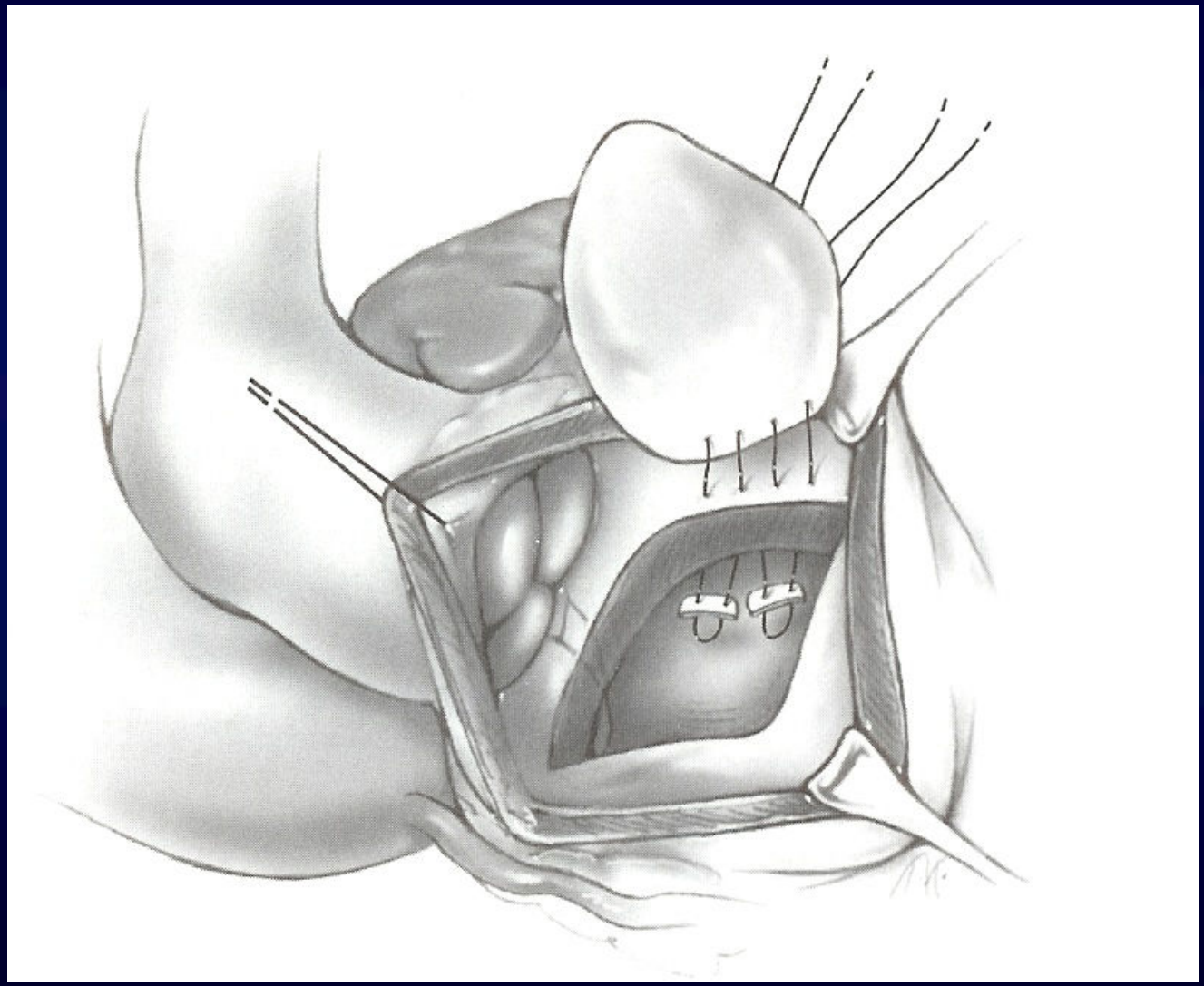
(Konno-Rastan procedure)

AVR

(St. Jude Reagent 23 mm)



Modified Konno Procedure



Supravalvular Aortic Stenosis

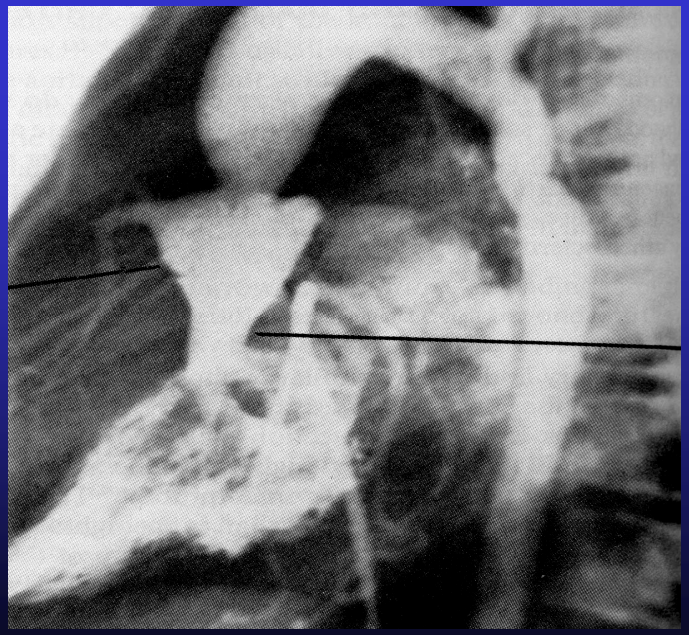
Etiology : undefined

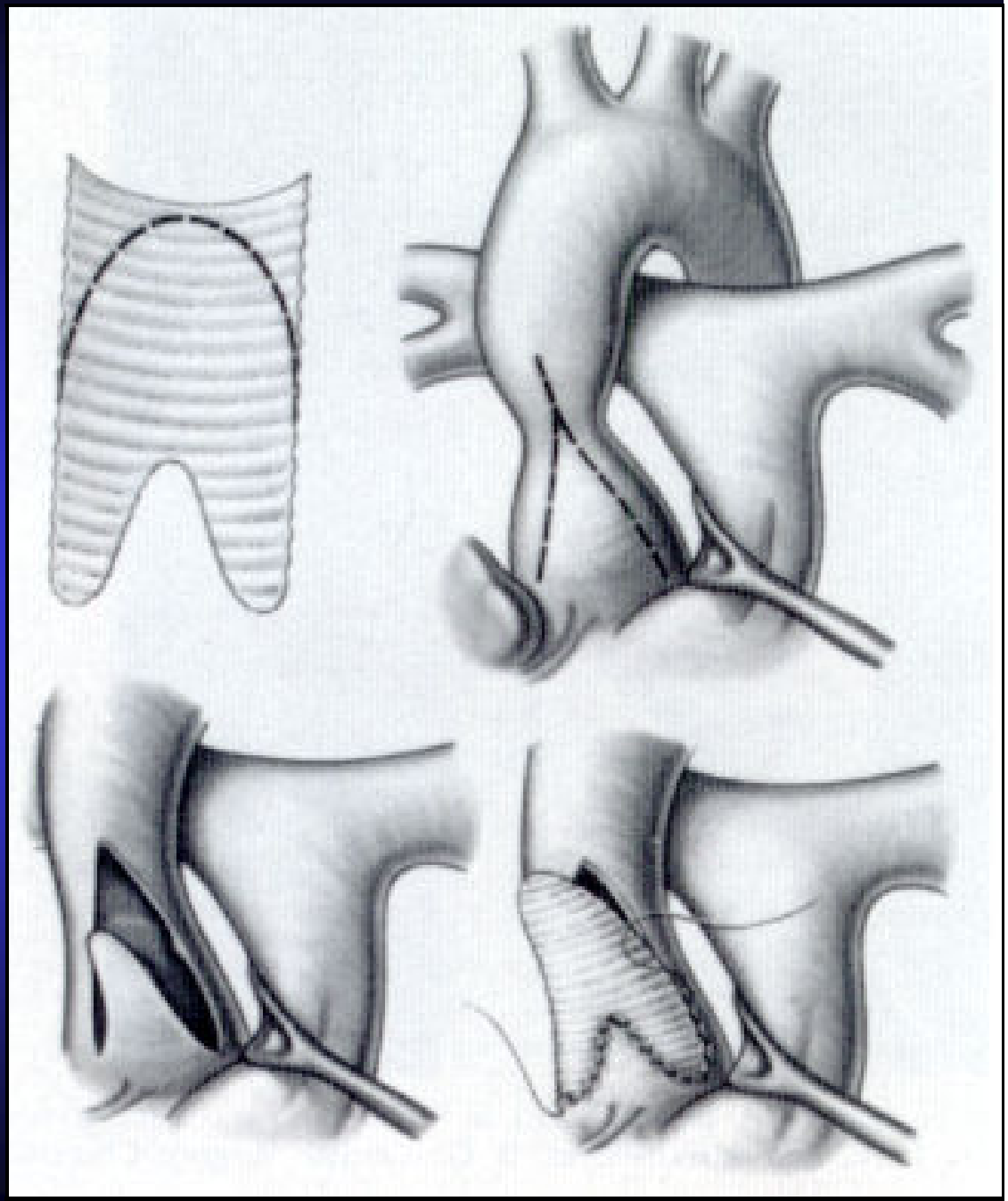
* William's syndrome

Operation (2)

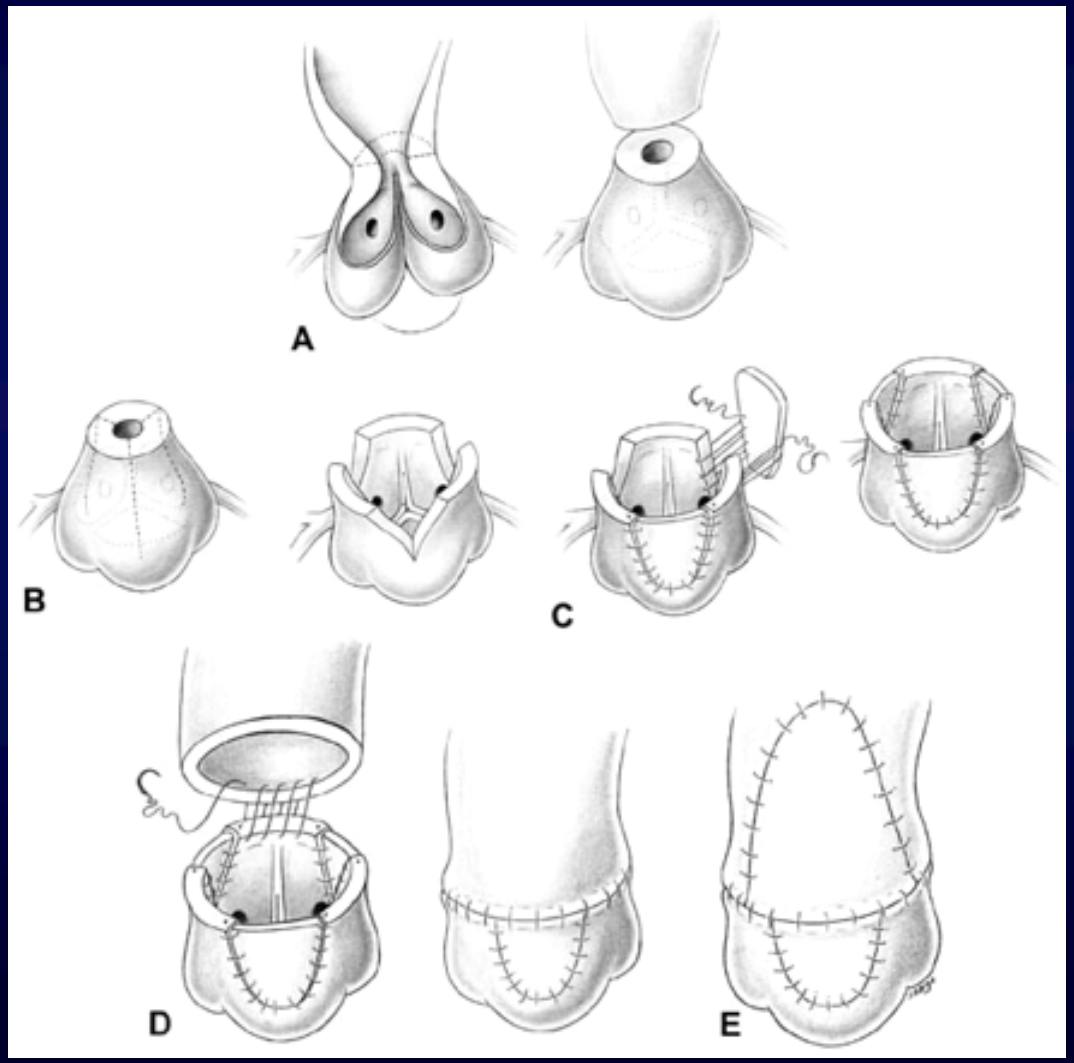
Supra valvar stenosis

: Patch enlargement





AS (Supravalvar) : *Brom technique*



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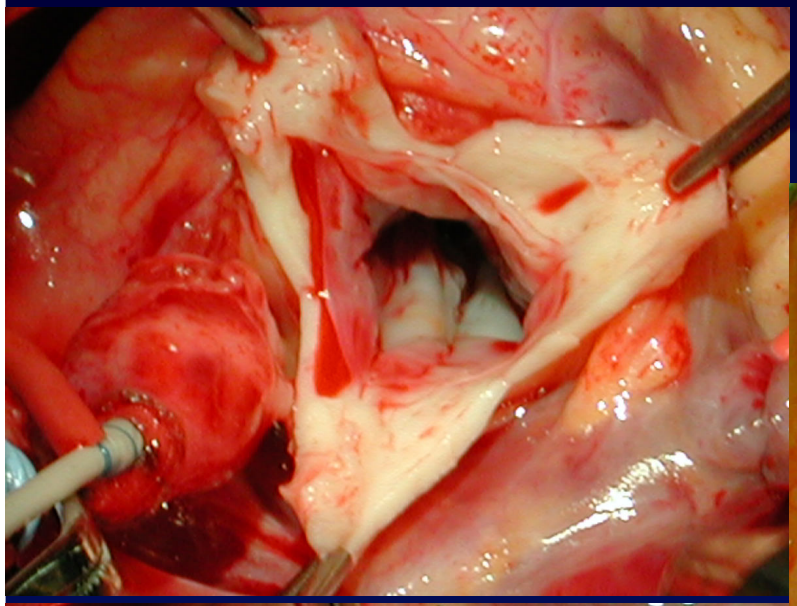
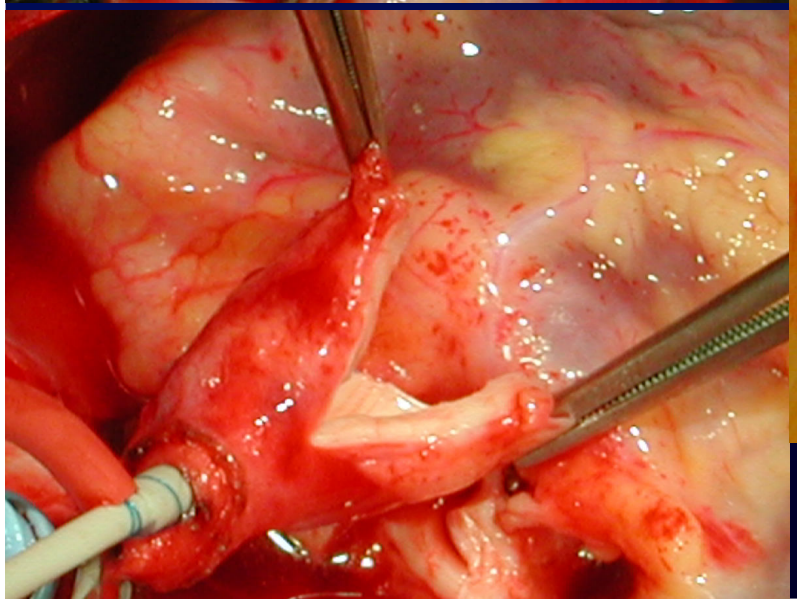
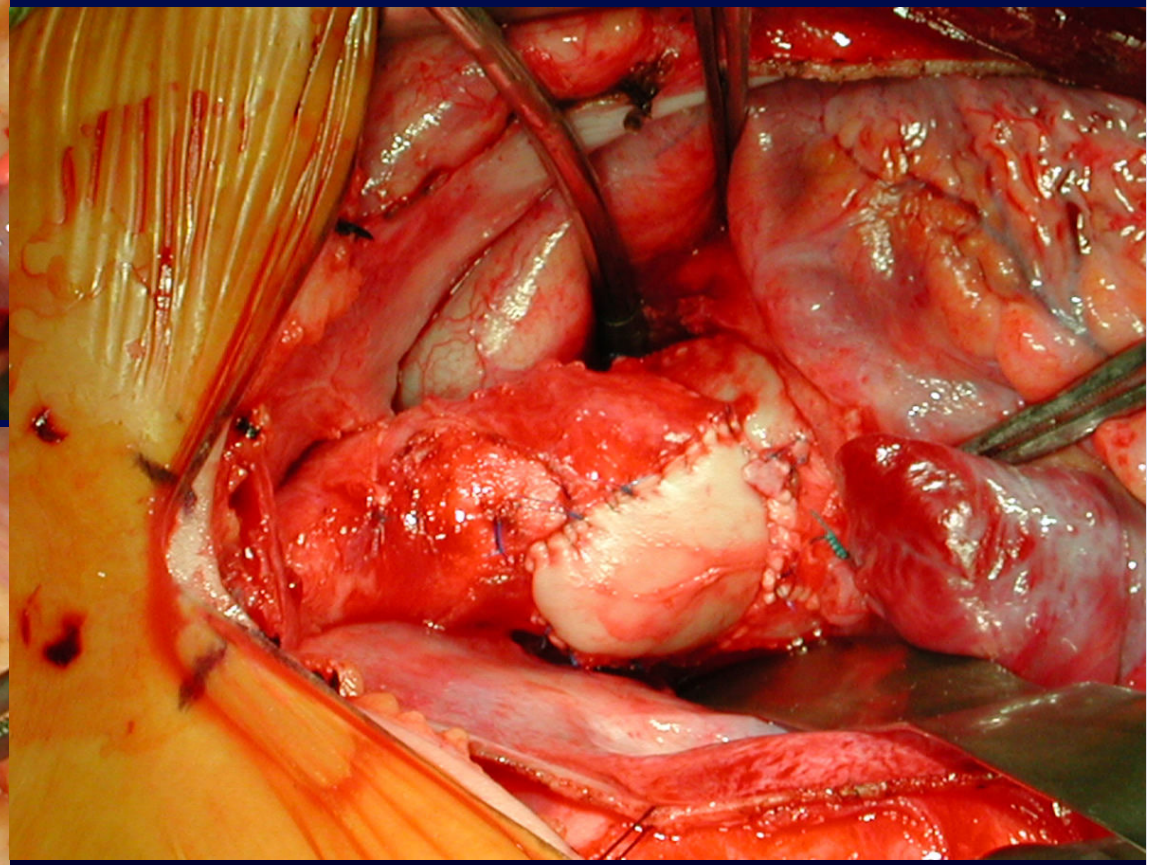


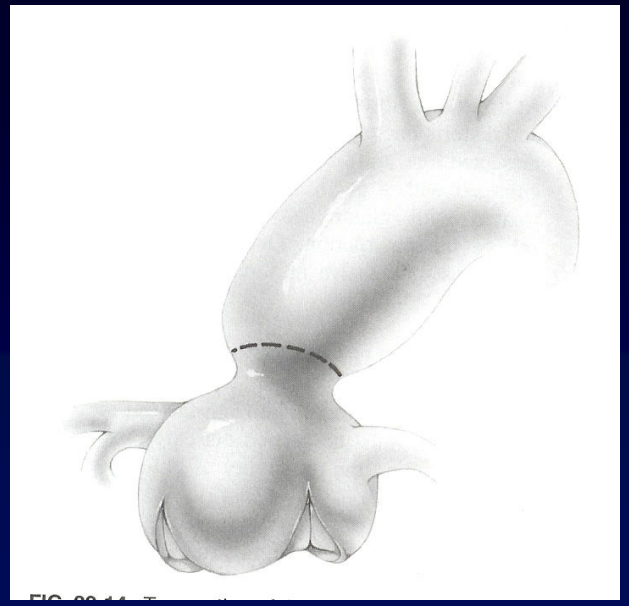


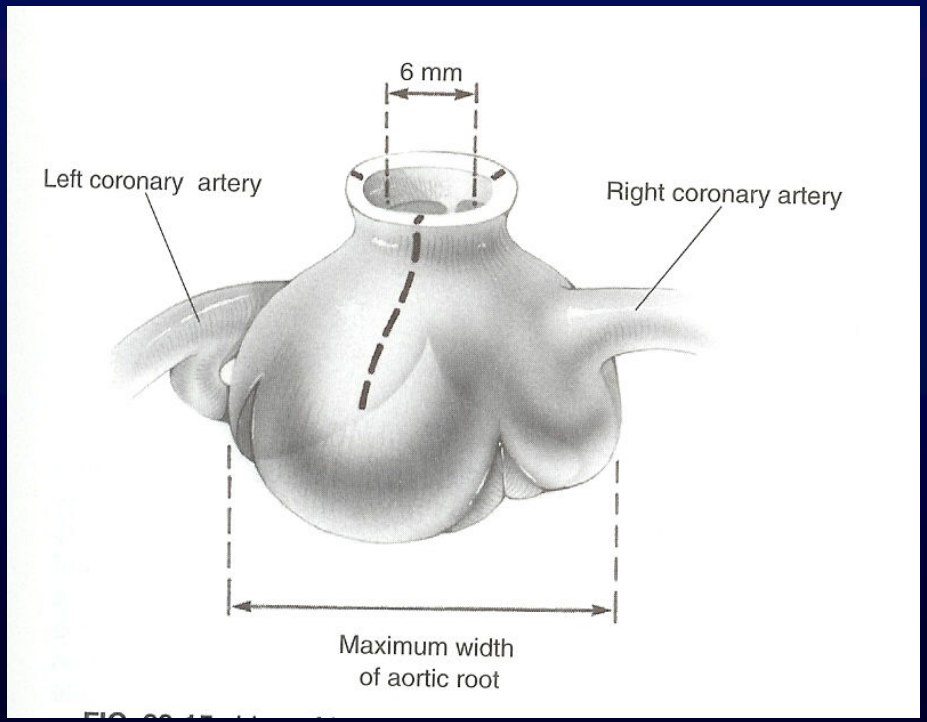


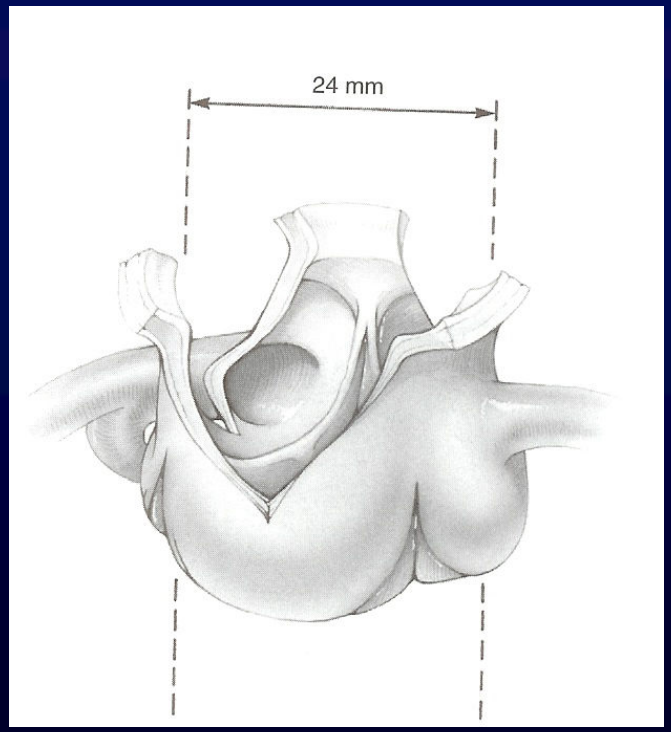
AS (Supravalvar)

Myers technique

(Native tissue-to-tissue technique)



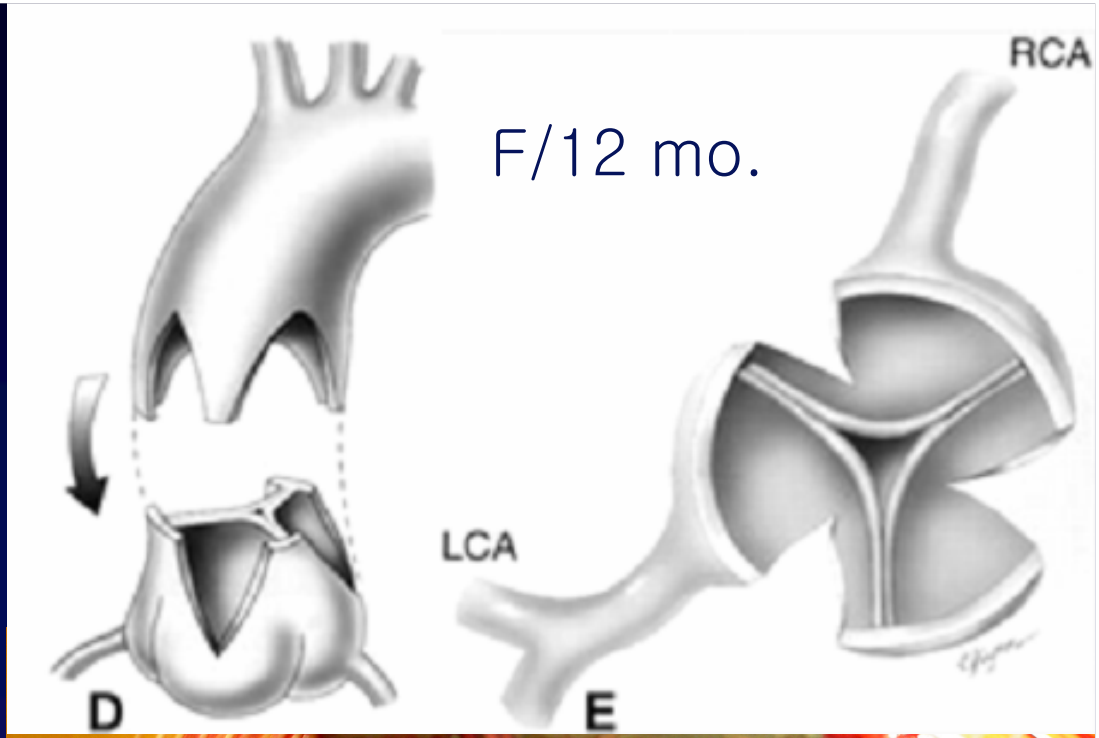


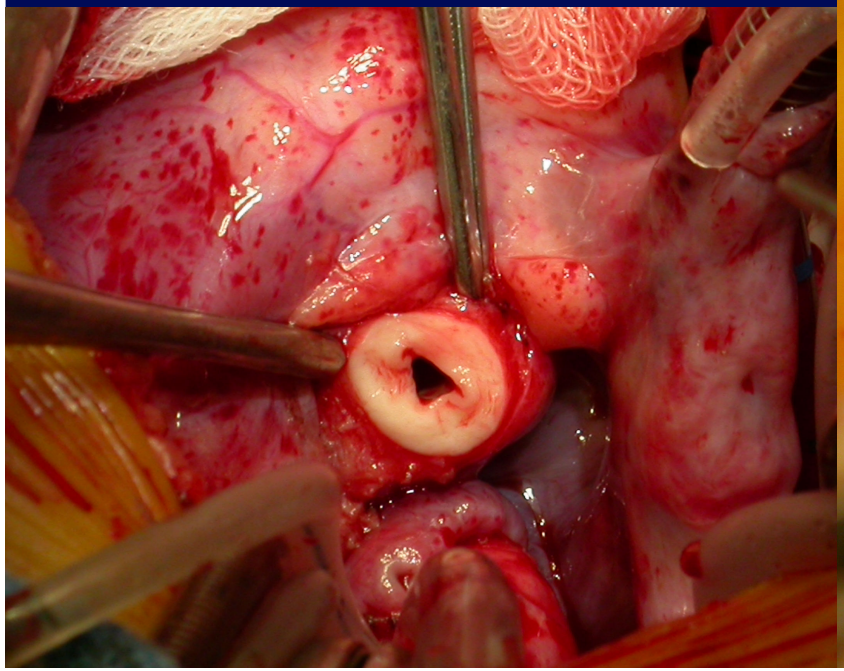


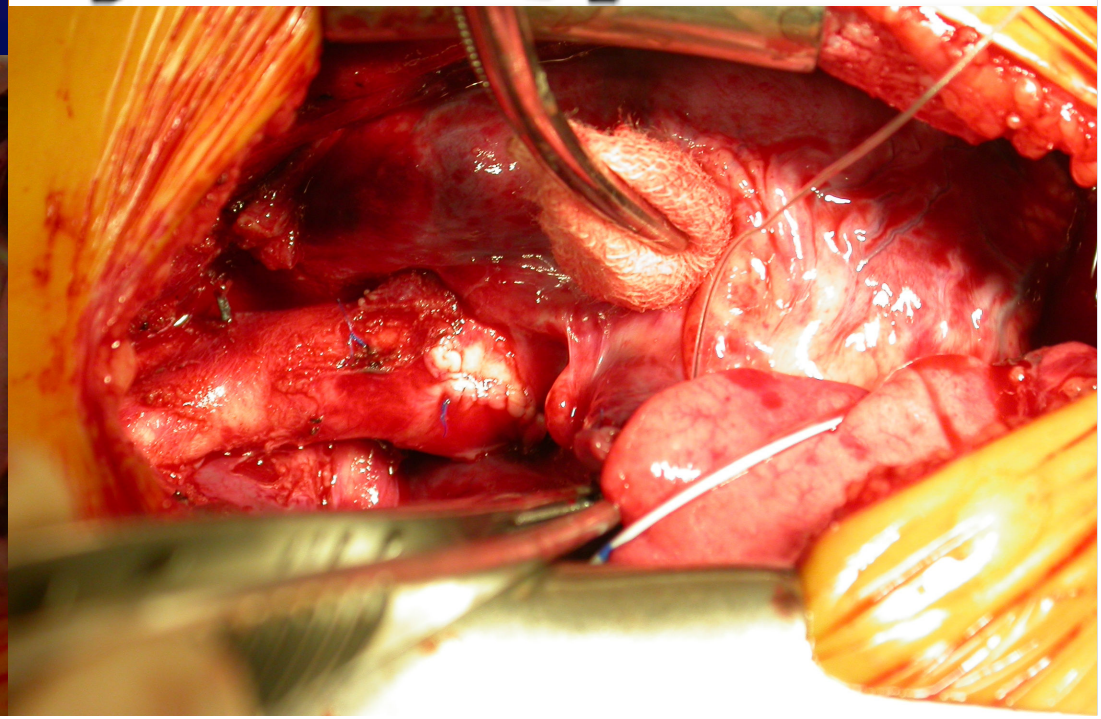
AS (Supravalvar)

Myers technique

(Native tissue-to-tissue technique)





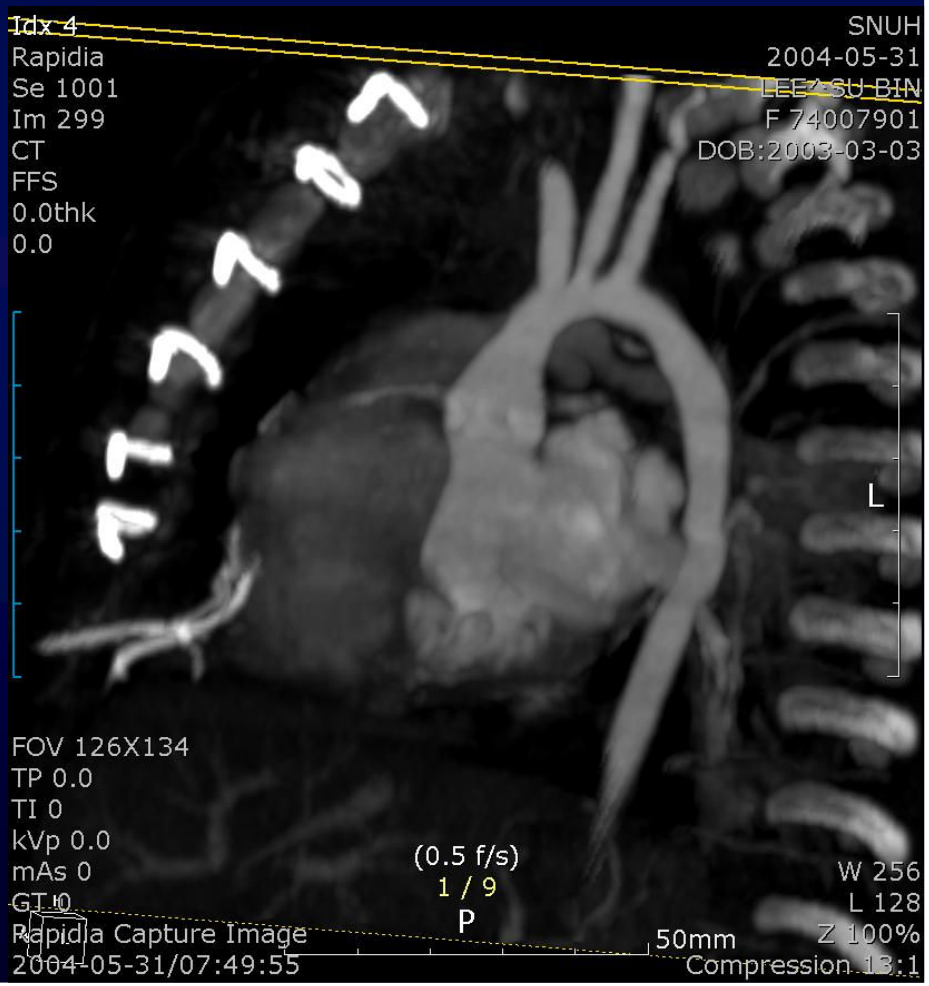


F / 12 mo. Supravalvar AS

(Elastin arteriopathy)

→ Sliding Aortoplasty

(Myers' technique)

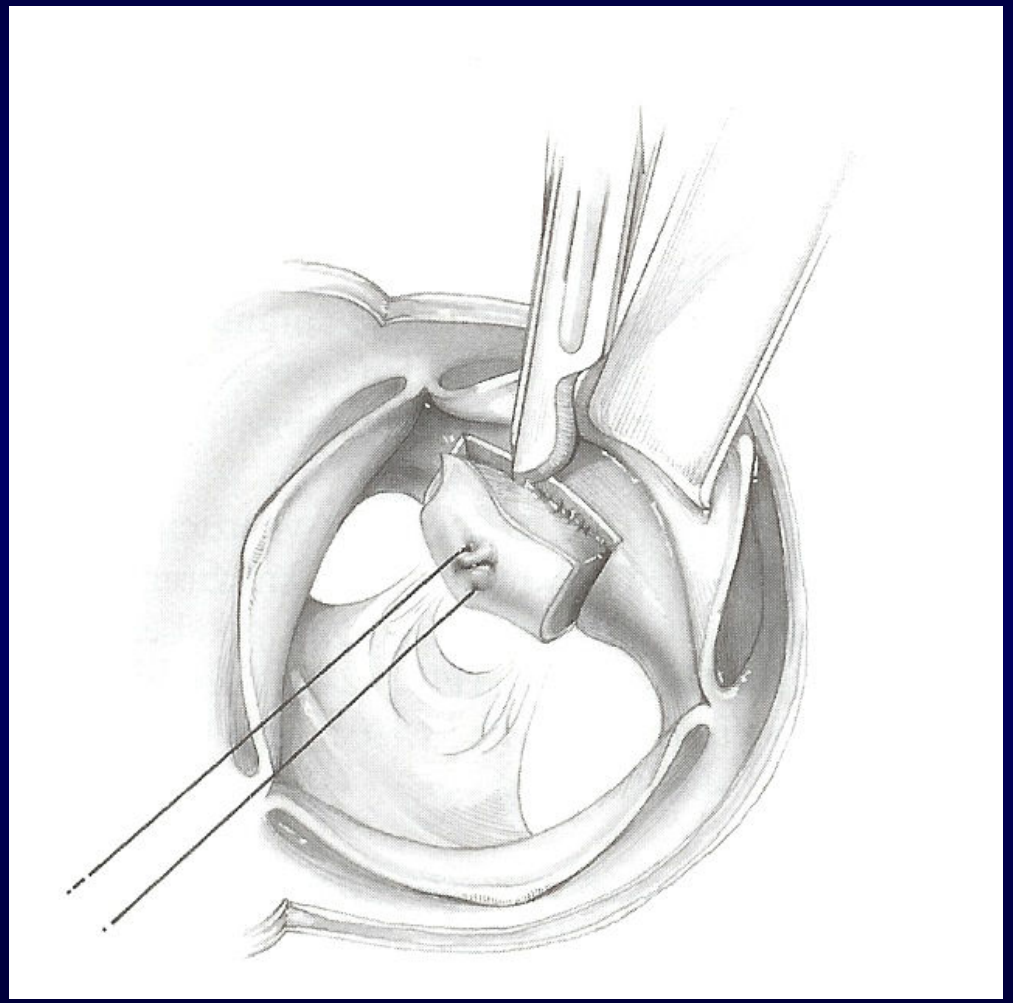


- Postop. 17 mo. (F/U Echo.)
  - AS : 2 – 2.5 m/sec
  - AR : mild, central

Operation (3)

Subvalvar stenosis

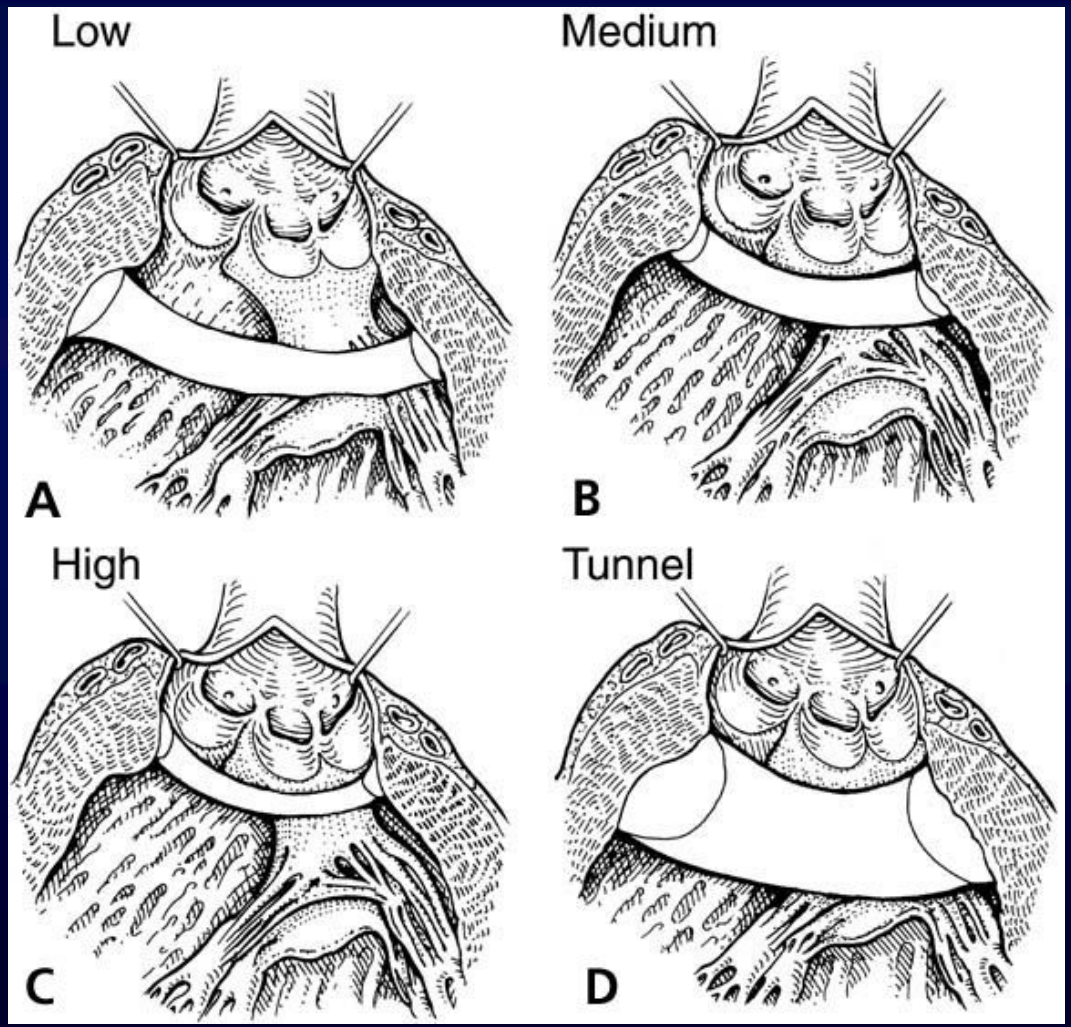
: Resection

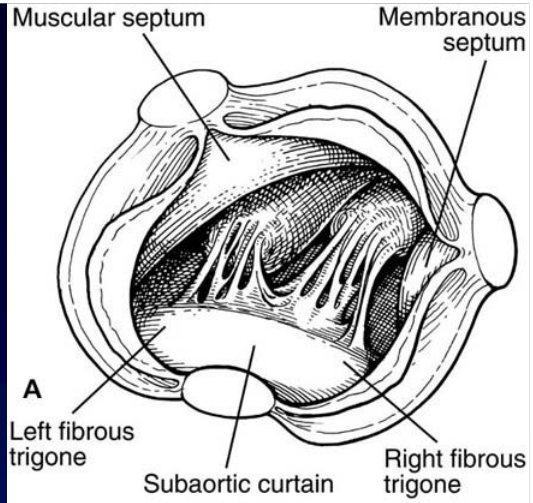


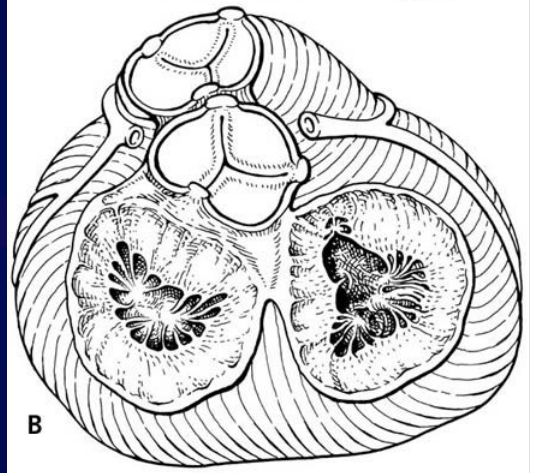

LVOT

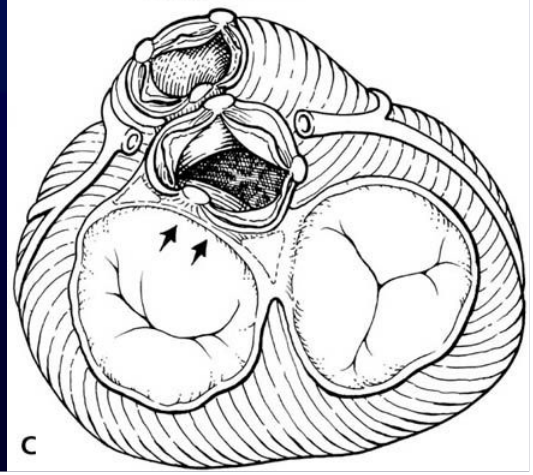
Mobilization of left and right fibrous trigones for severe LVOTO

Yacoub M et al, *J of Thorac Cardiovasc Surg 1999;117:126*



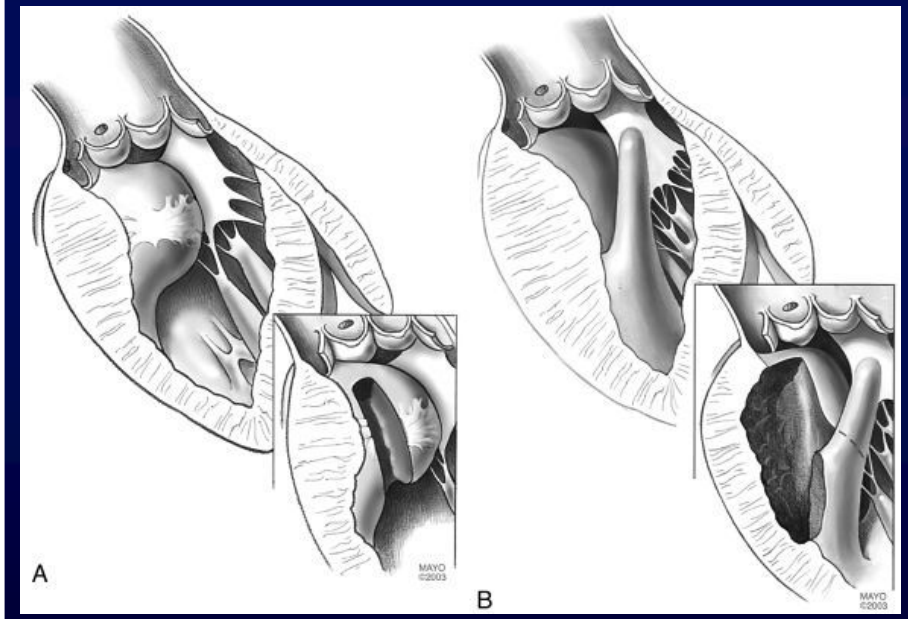


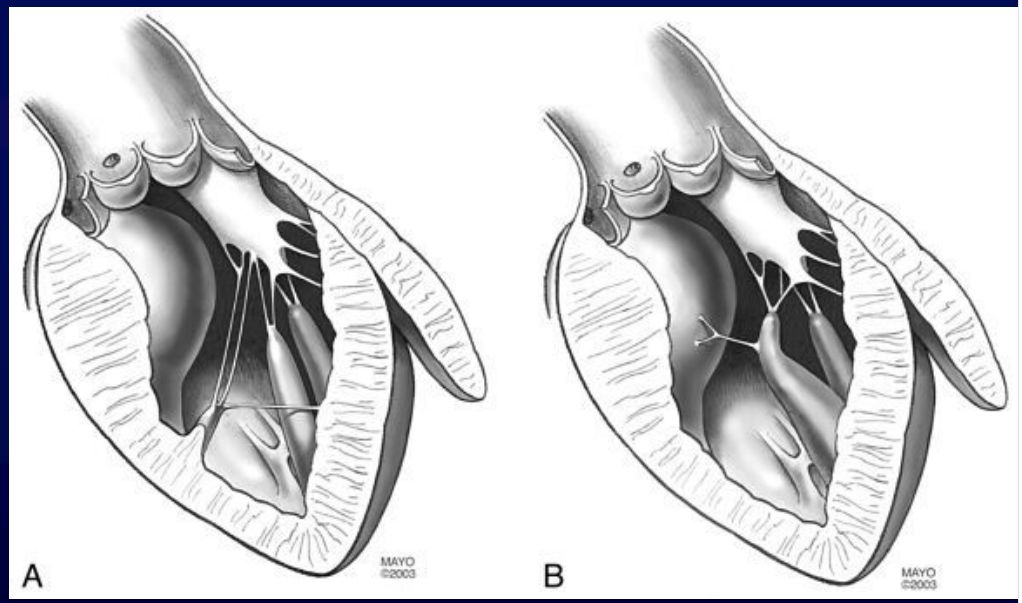




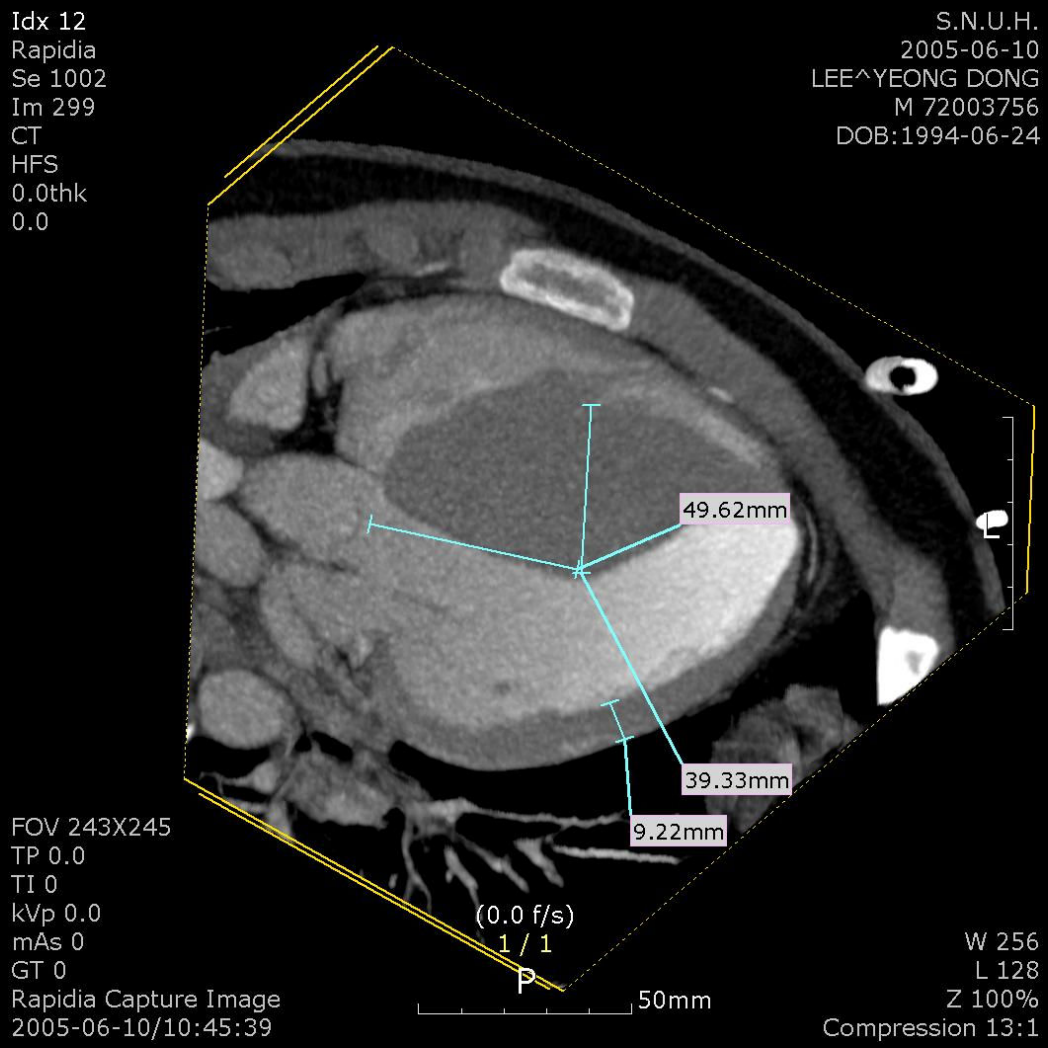
Extended septal myectomy for hypertrophic obstructive cardiomyopathy with anomalous mitral papillary muscles or chordae

Kenji Minakata, MD[a]
Joseph A. Dearani, MD[a]
Rick A. Nishimura, MD[b]
Barry J. Maron, MD[c]
Gordon K. Danielson, MD[a]

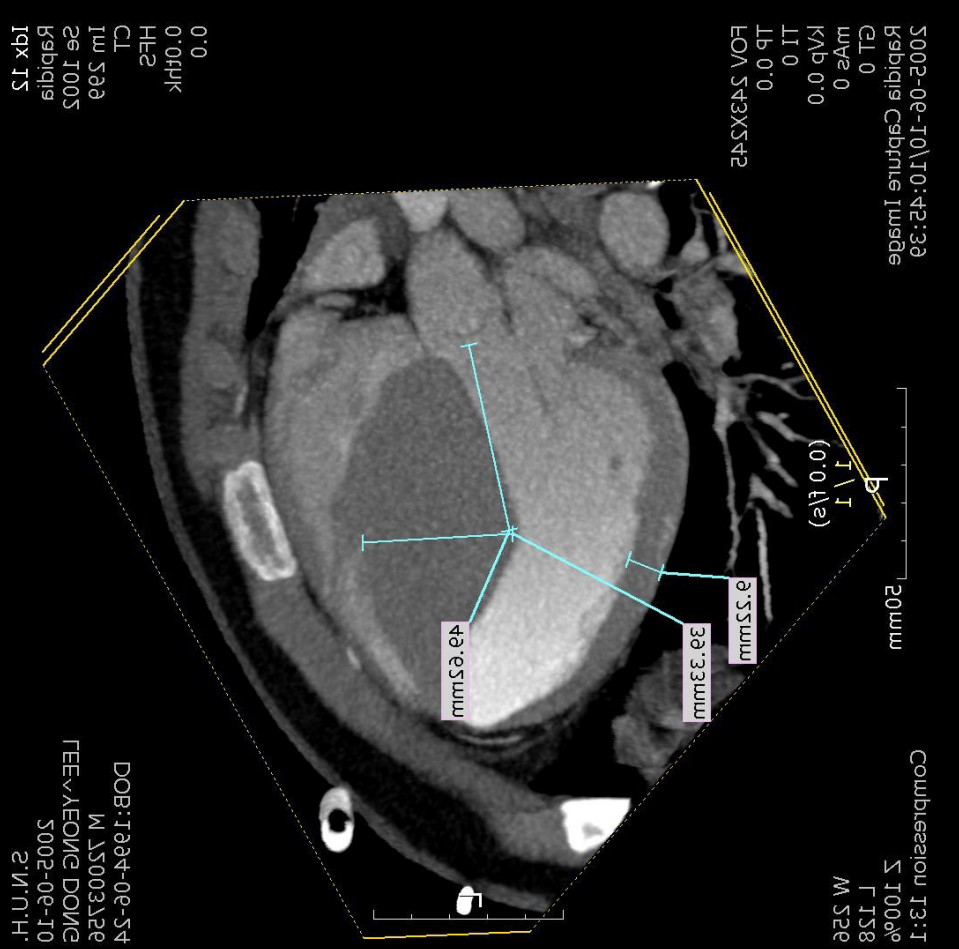


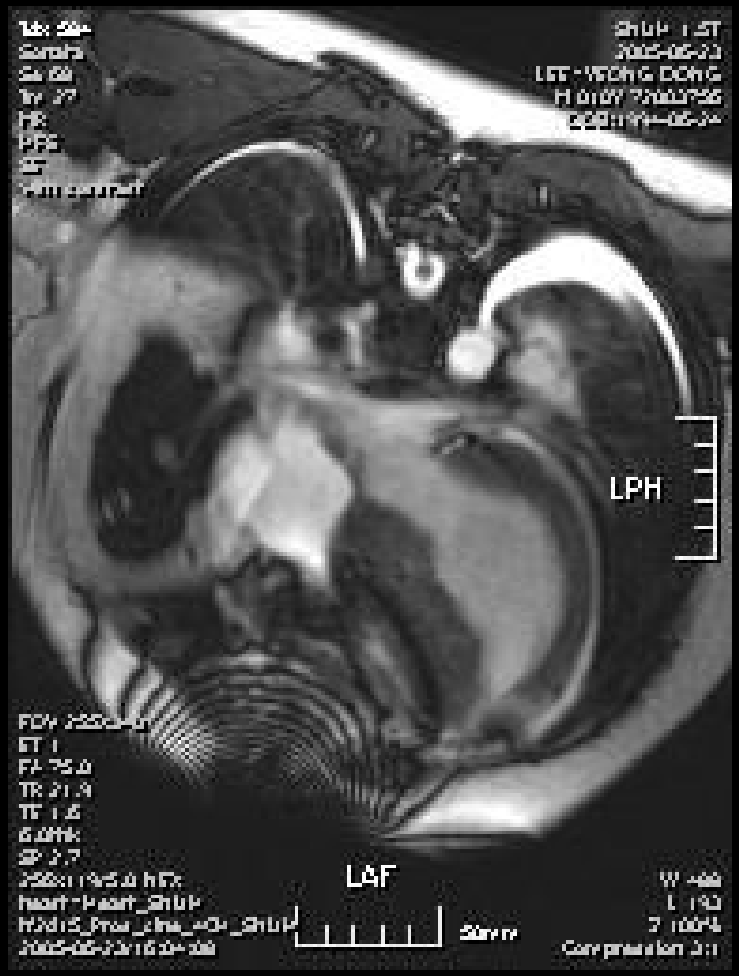


Hypertrophic Obstructive Cardiomyopathy (M/10)

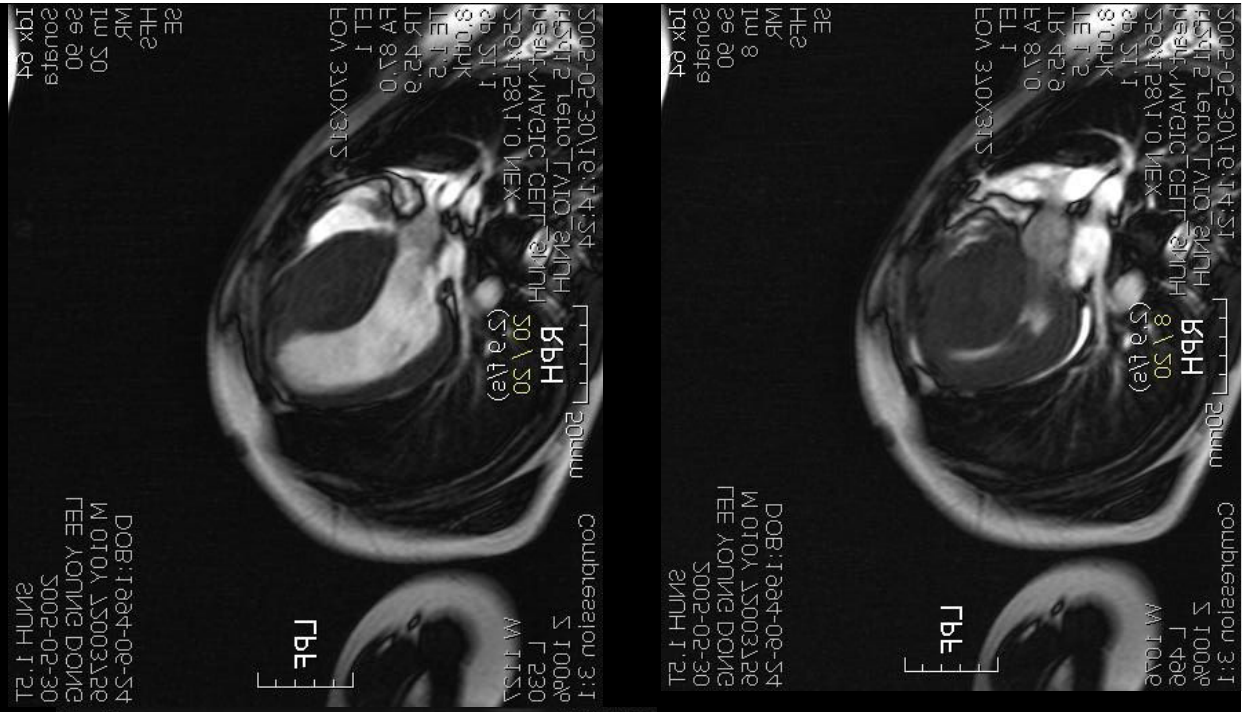


H-CMP : Extended Septal Myectomy

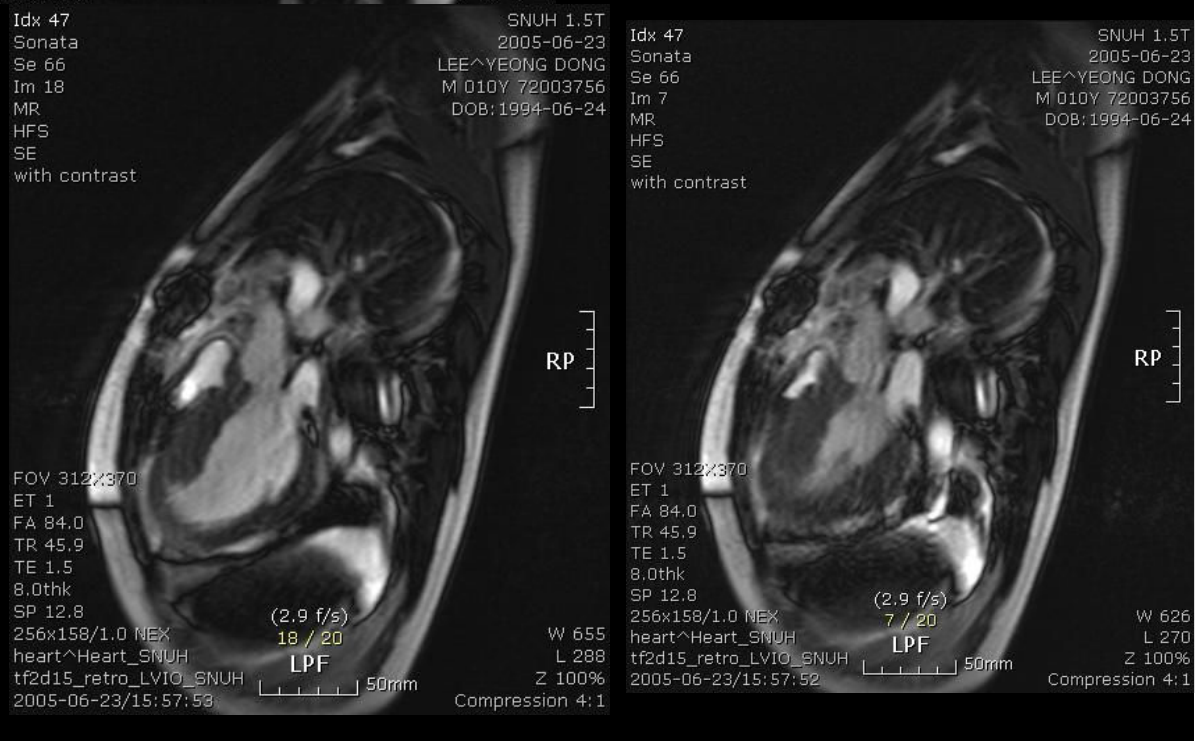




- Preop.
  - LVEDV = 91.7
  - LVESV = 16.3

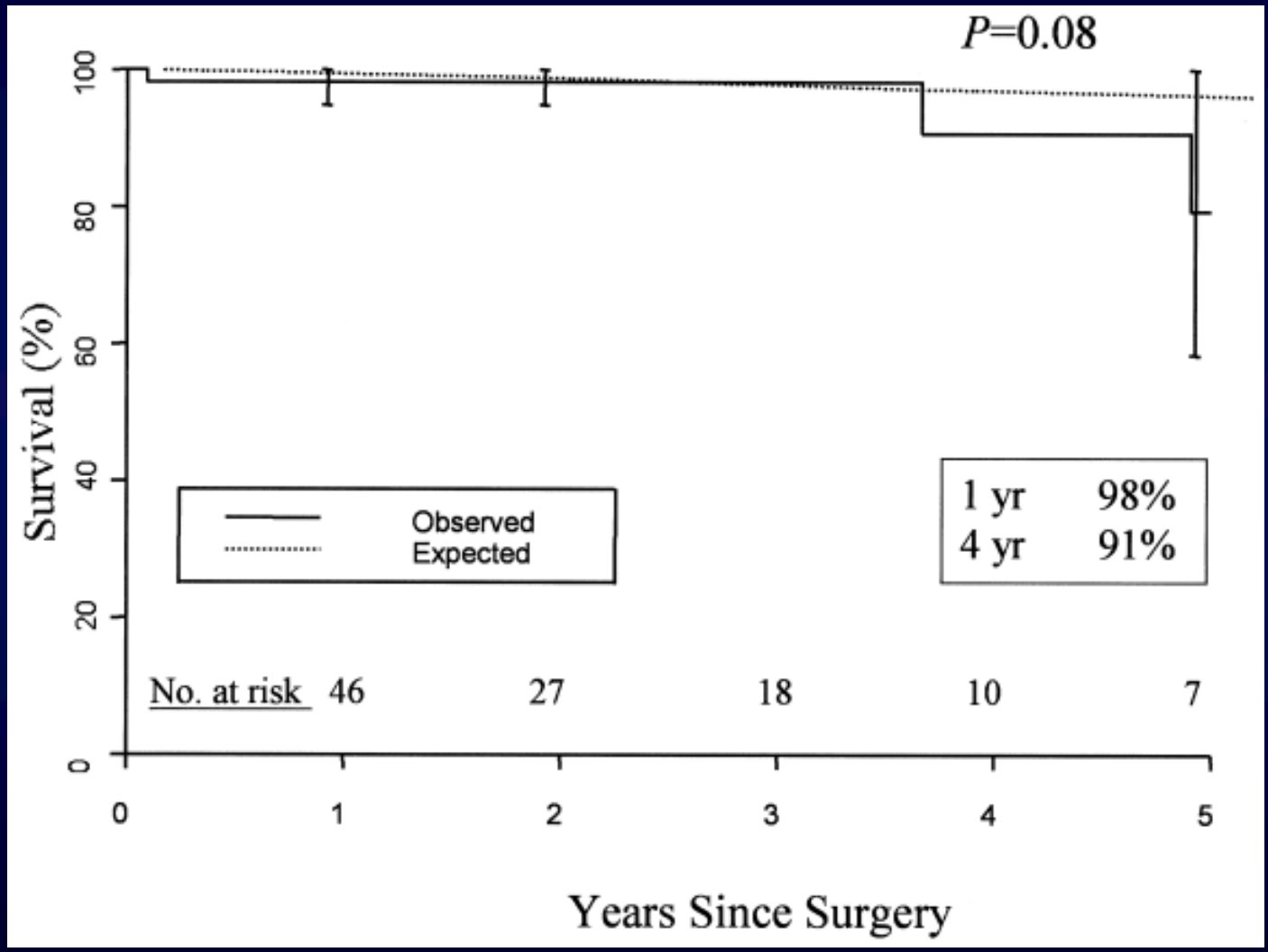


- Postop
  - LVEDV = 101.0
  - LVESV = 33.8

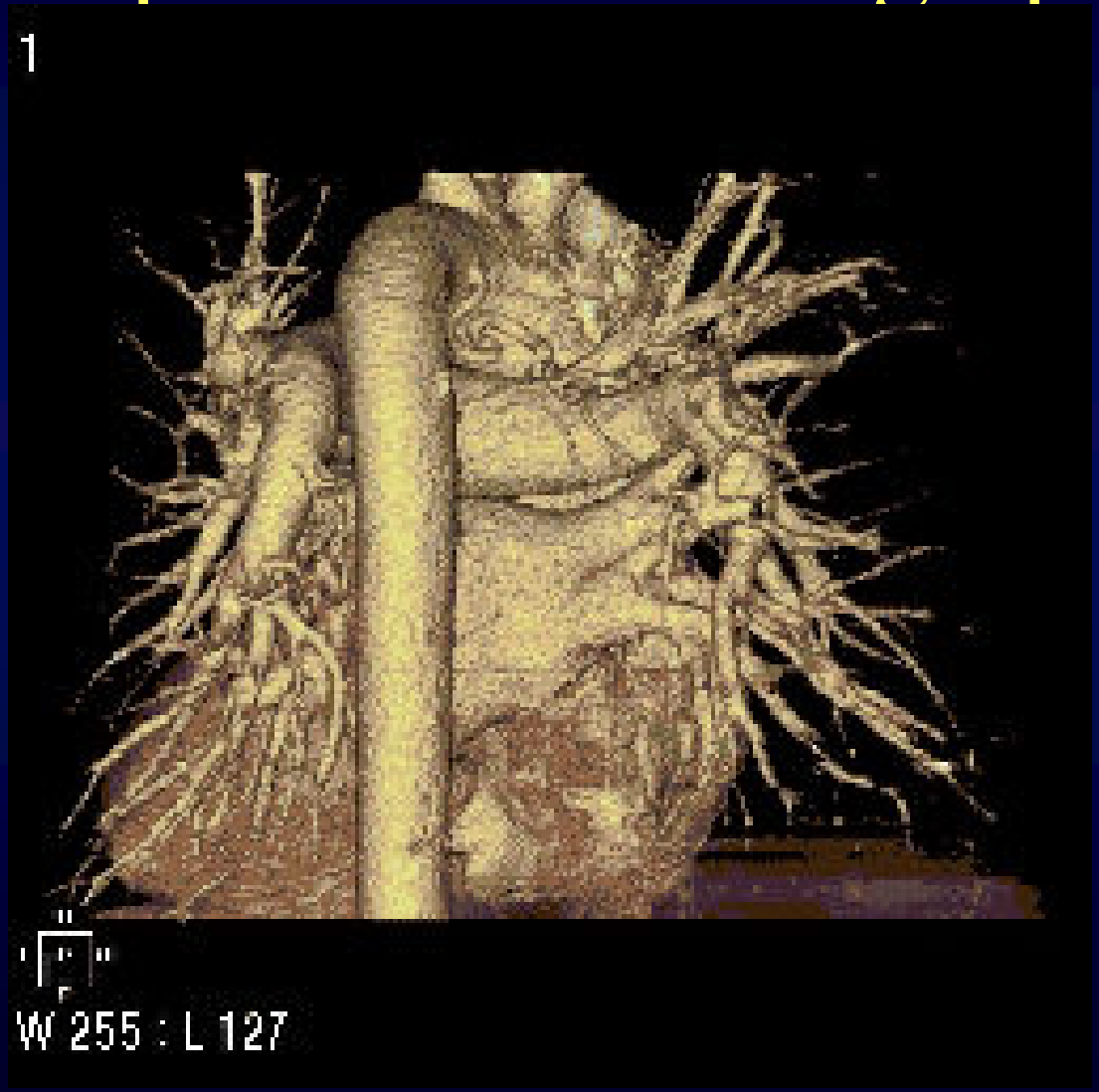


Hypertrophic Obstructive Cardiomyopathy

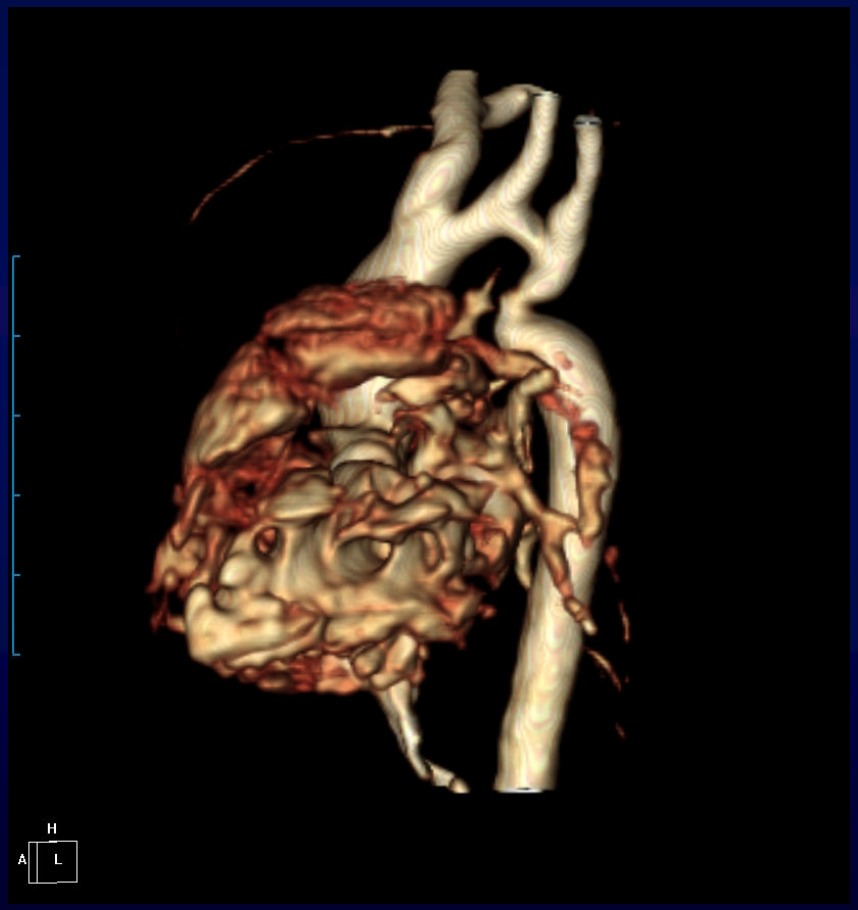
Mayo Clinic : F/U 1 mo. to 13 yr. (n = 54 pts.)



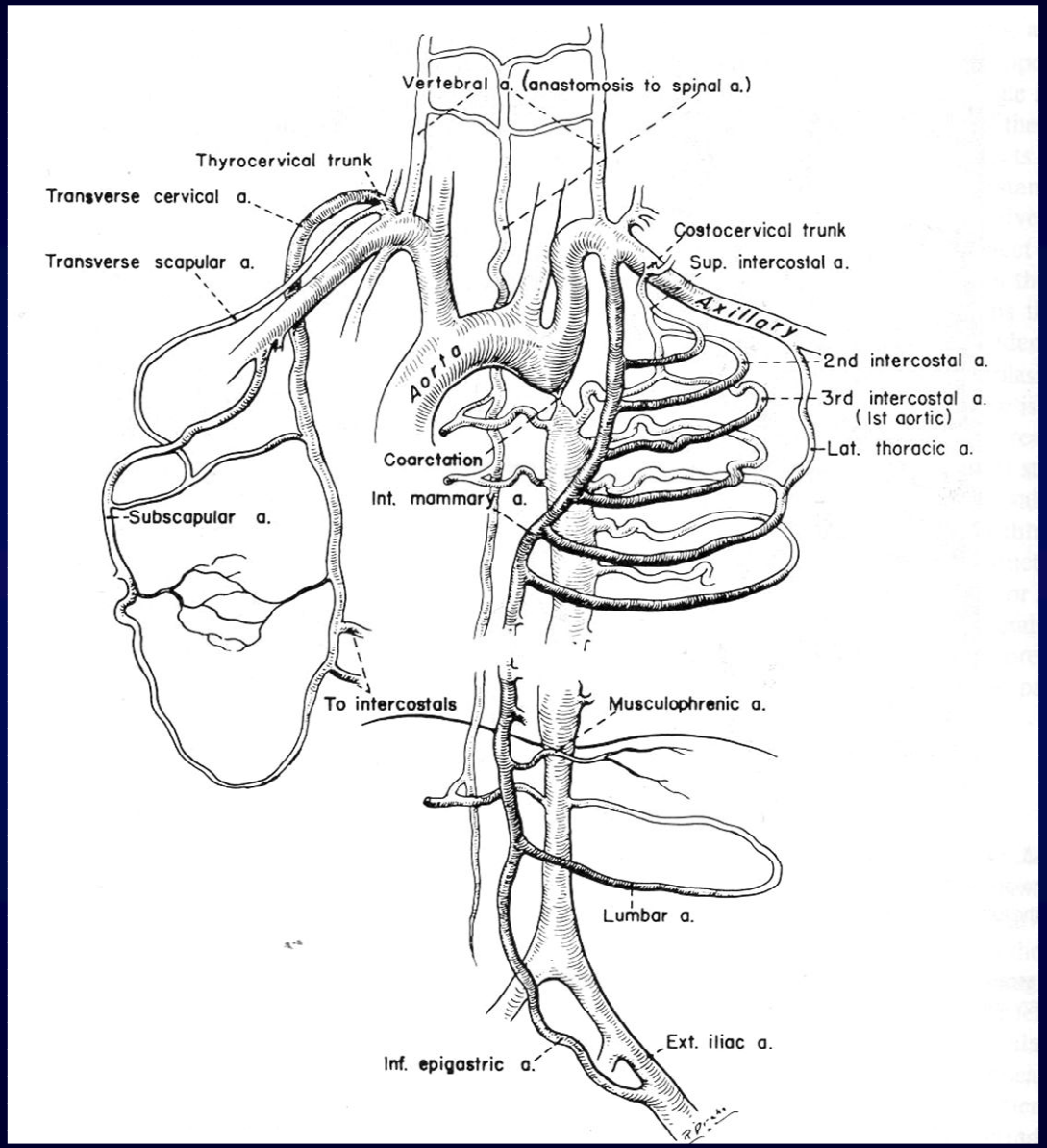
Computerized Tomography



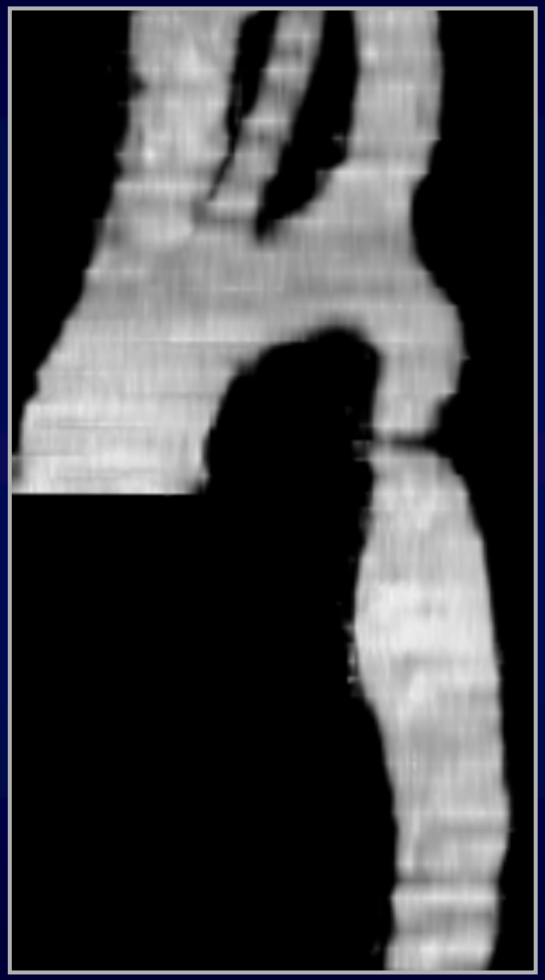
Coarctation of Aorta (CoA)

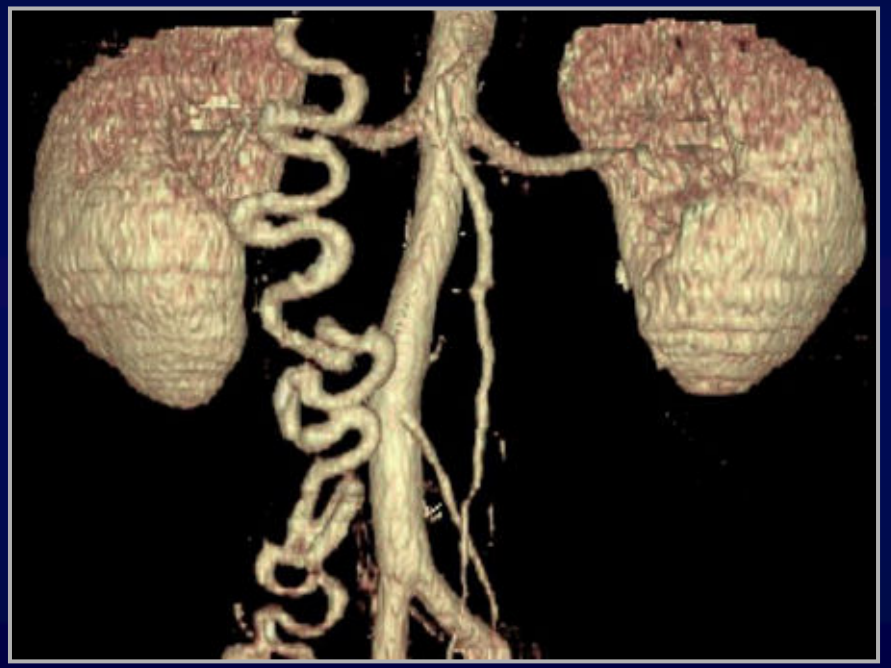


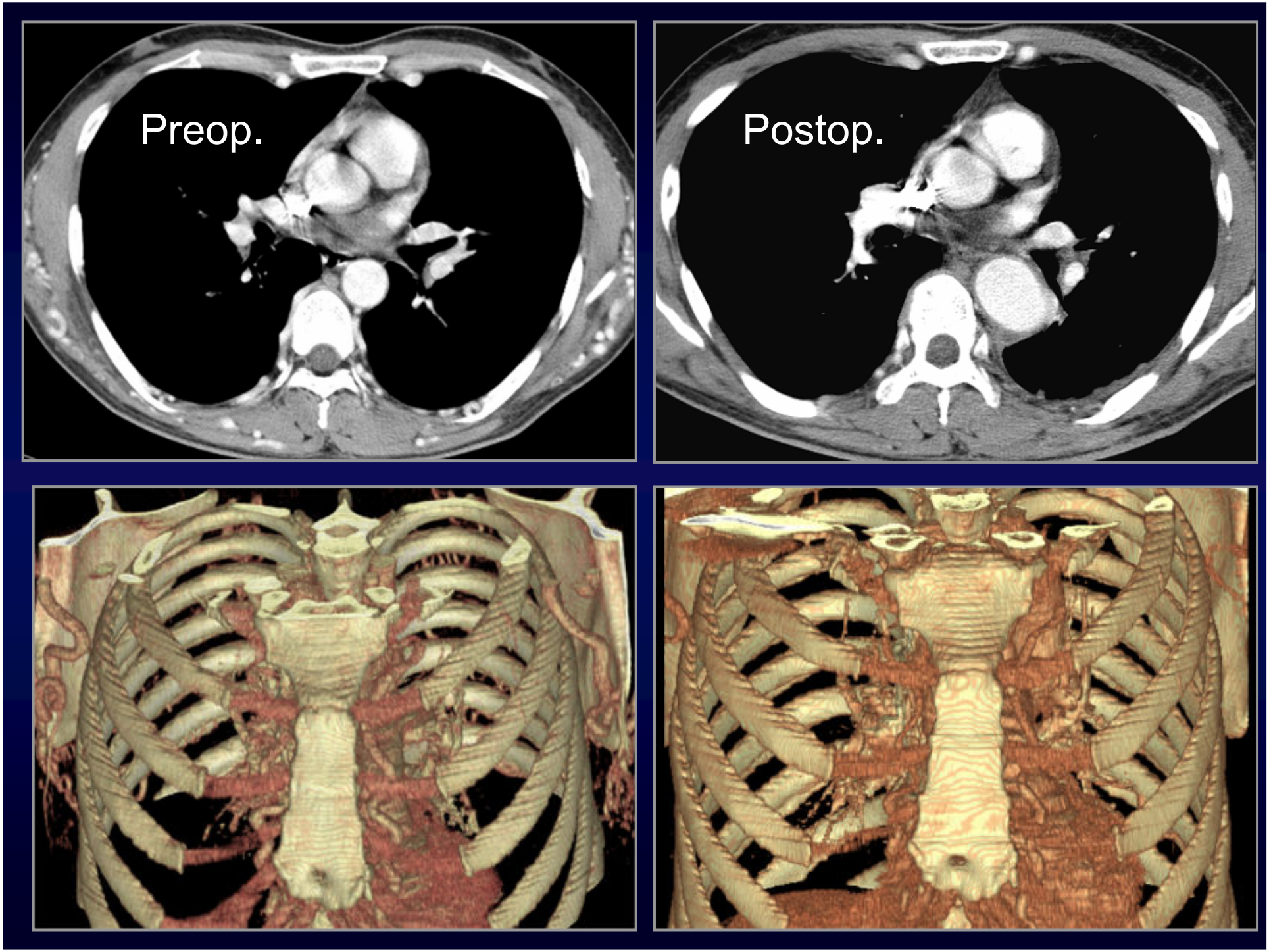
Collaterals in COA



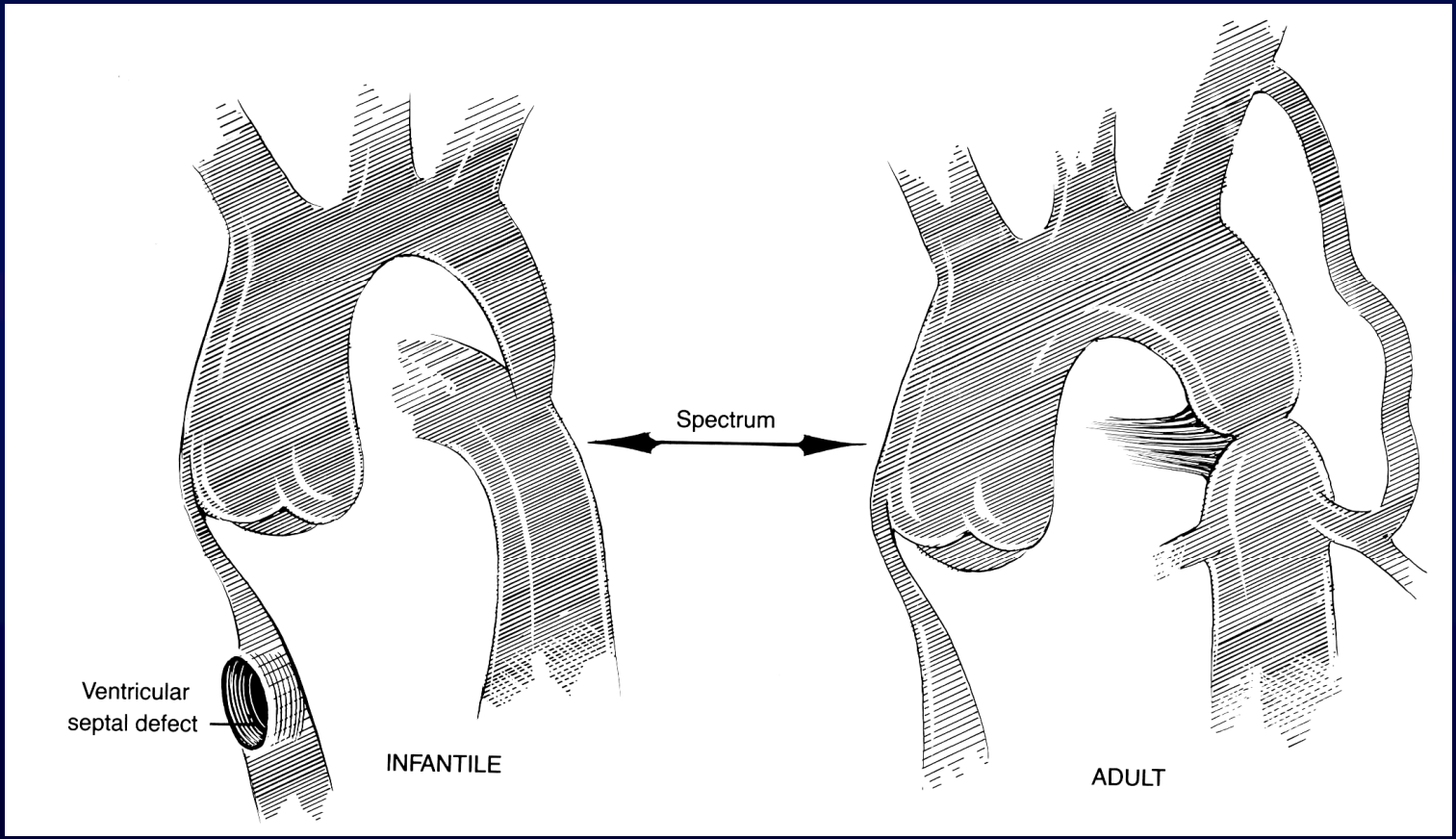
M/13






Preop.
Postop.

Evolution of Coarctation



Associated Pathology of COA

1. Collateral circulation : rib notching
2. Coronary artery : dilatation, tortuosity, atherosclerosis

   due to LVH & hypertension
3. Aortic valve

   bicuspid (about 50 %)

   stenosis (6- 7%)
4. Intracranial aneurysm

   berry type intracranial aneurysm in some patients
5. Associated cardiac anomaly

   85% of neonates presenting COA

Natural History of COA

1. Incidence

   5-8% of CHD

   Isolated COA (82%) ; M / F = 2 /1

2. Survival of isolated COA

   15% : CHF in neonate or infancy

   65% : survive 3rd decade of life (2% at 60years)

3. Bacterial endocarditis

4. Aortic rupture : 2~3rd decade

5. Intracranial lesion : subarachnoid hemorrhage

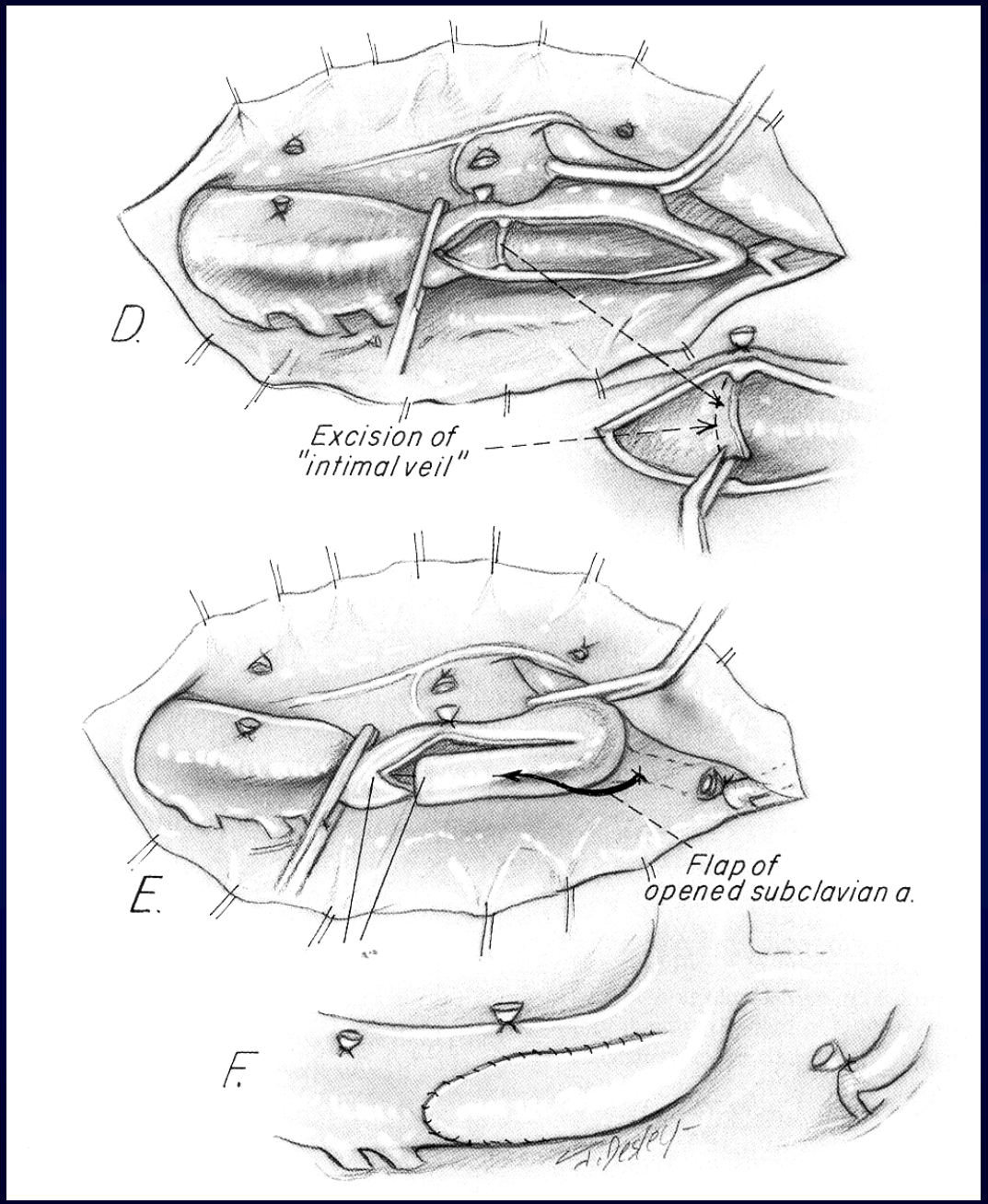
Optimal Age for Repair of COA

Still controversy !

Early correction as soon as possible !!!

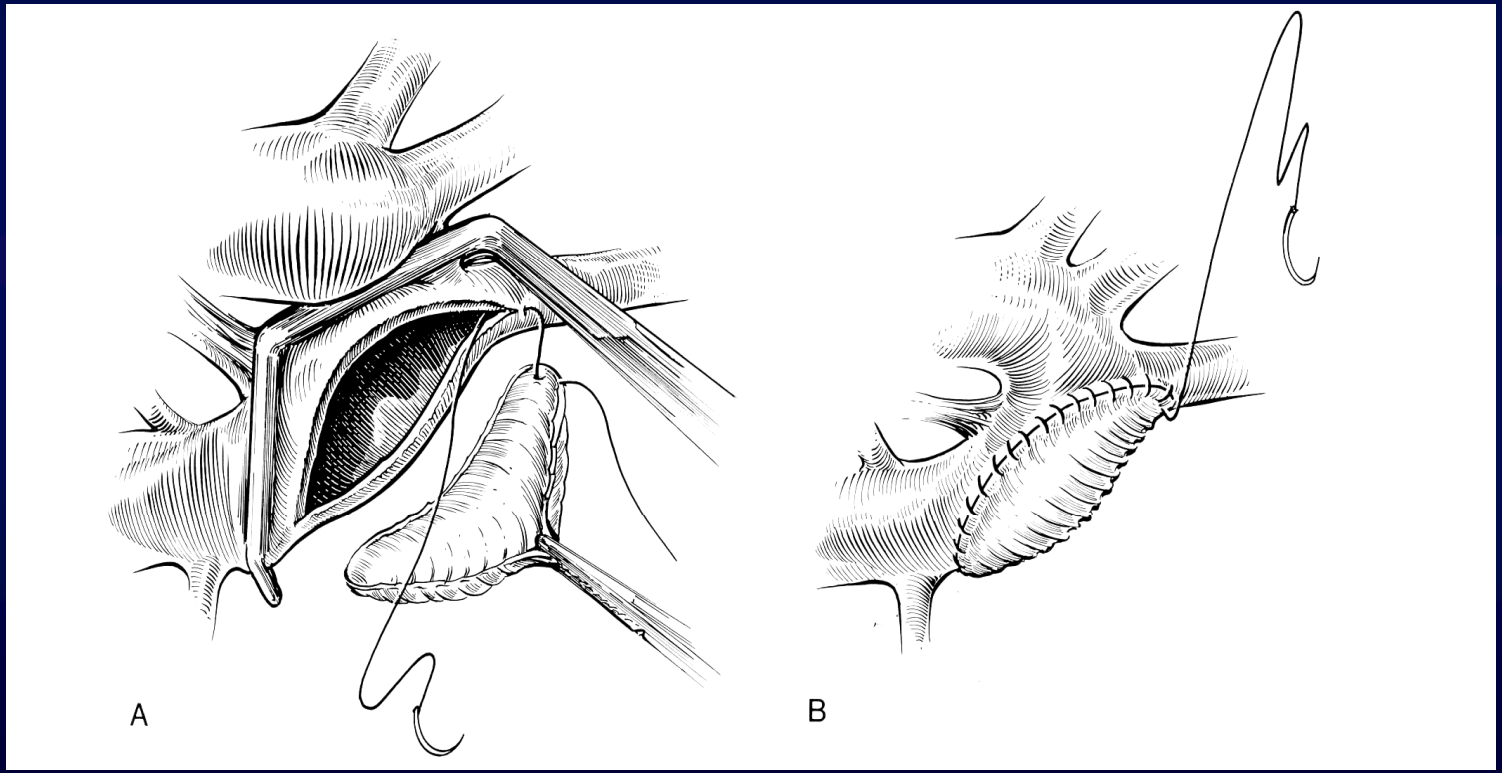
Technique of Operation in COA

1. Subclavian flap aortoplasty



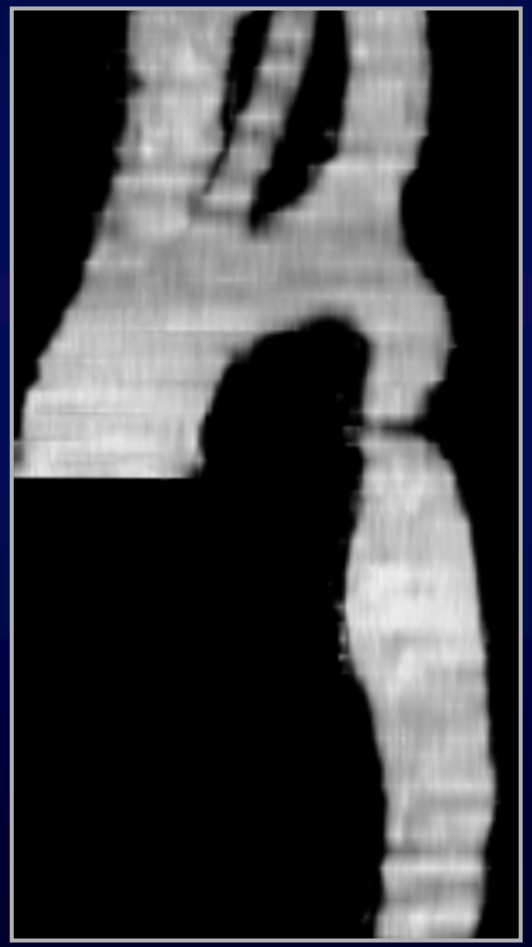
Technique of Operation in COA

2. Patch angioplasty



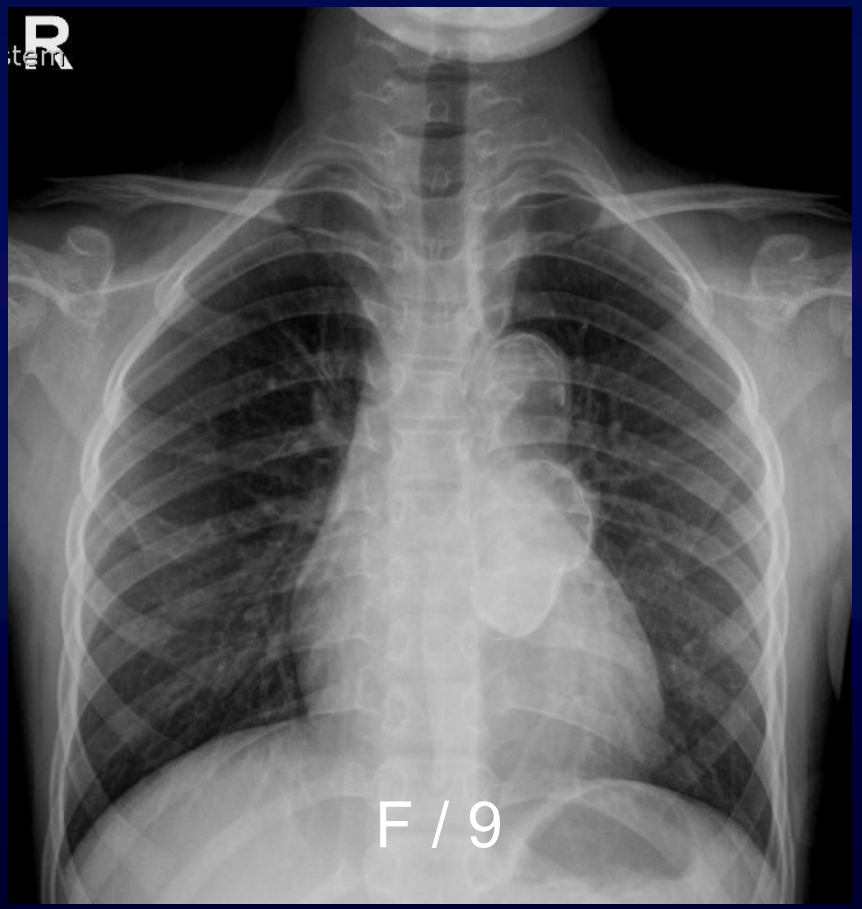
Technique of Operation in COA

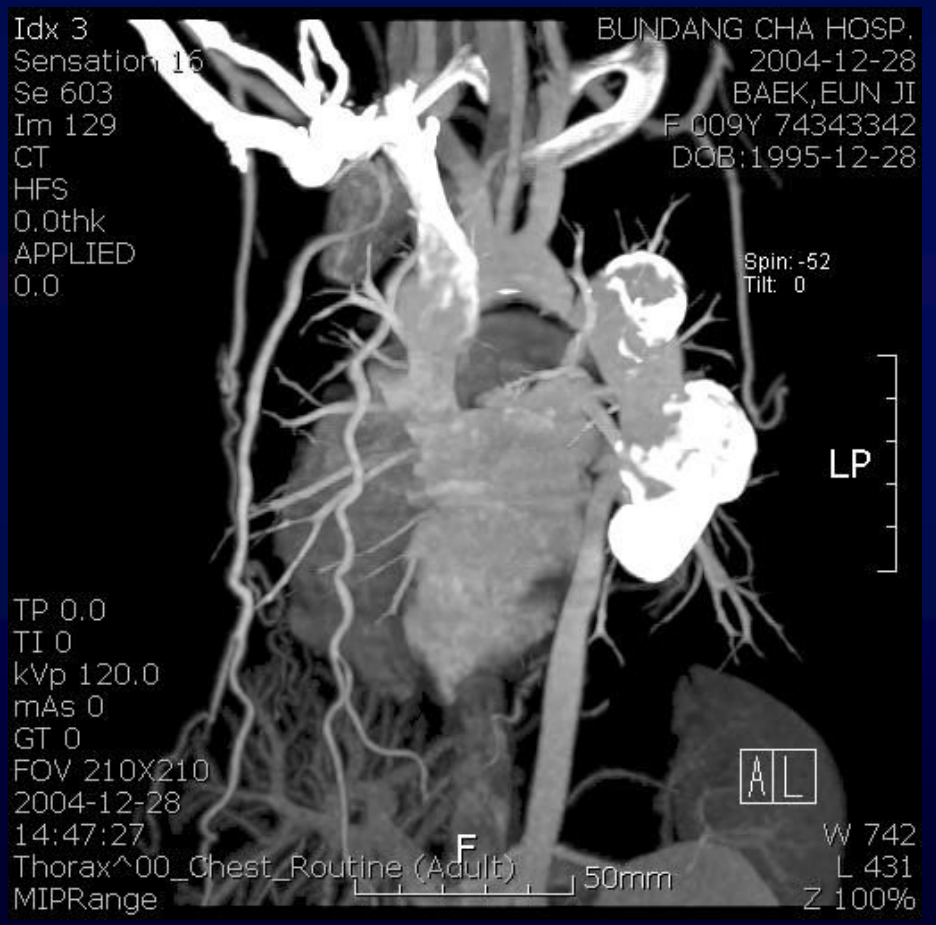
3. Graft interposition or replacement



Technique of Operation in COA

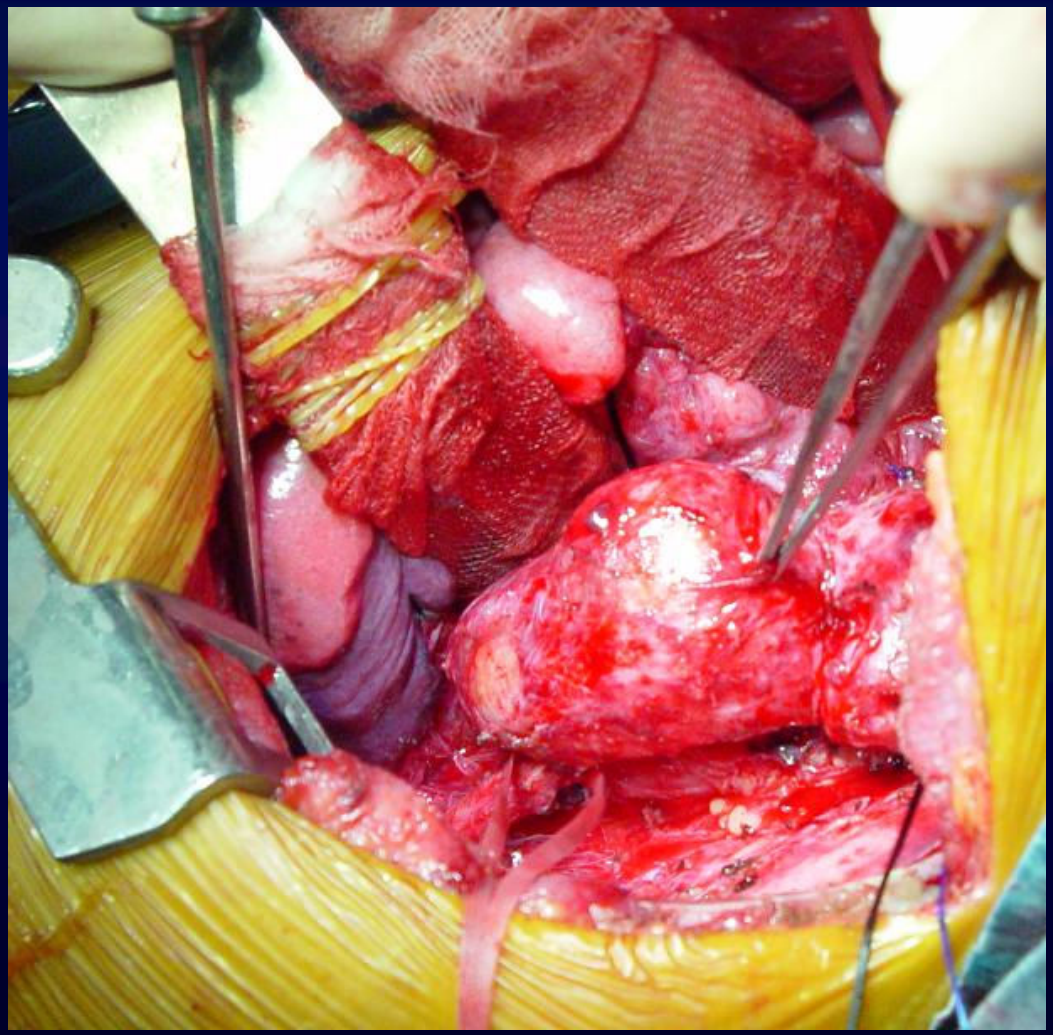
3. Graft interposition or replacement





Technique of Operation in COA

3. Graft interposition or replacement

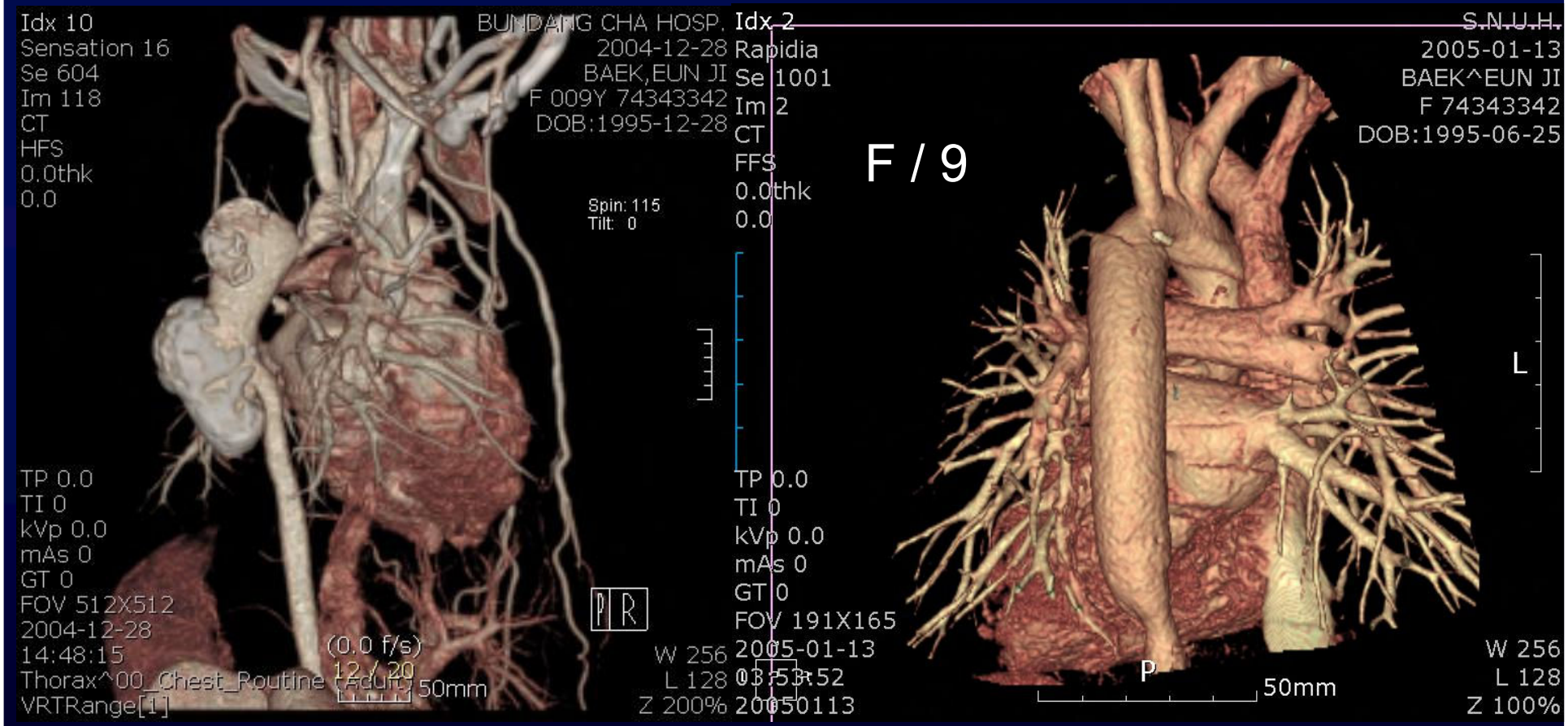


Technique of Operation in COA

3. Graft interposition or replacement

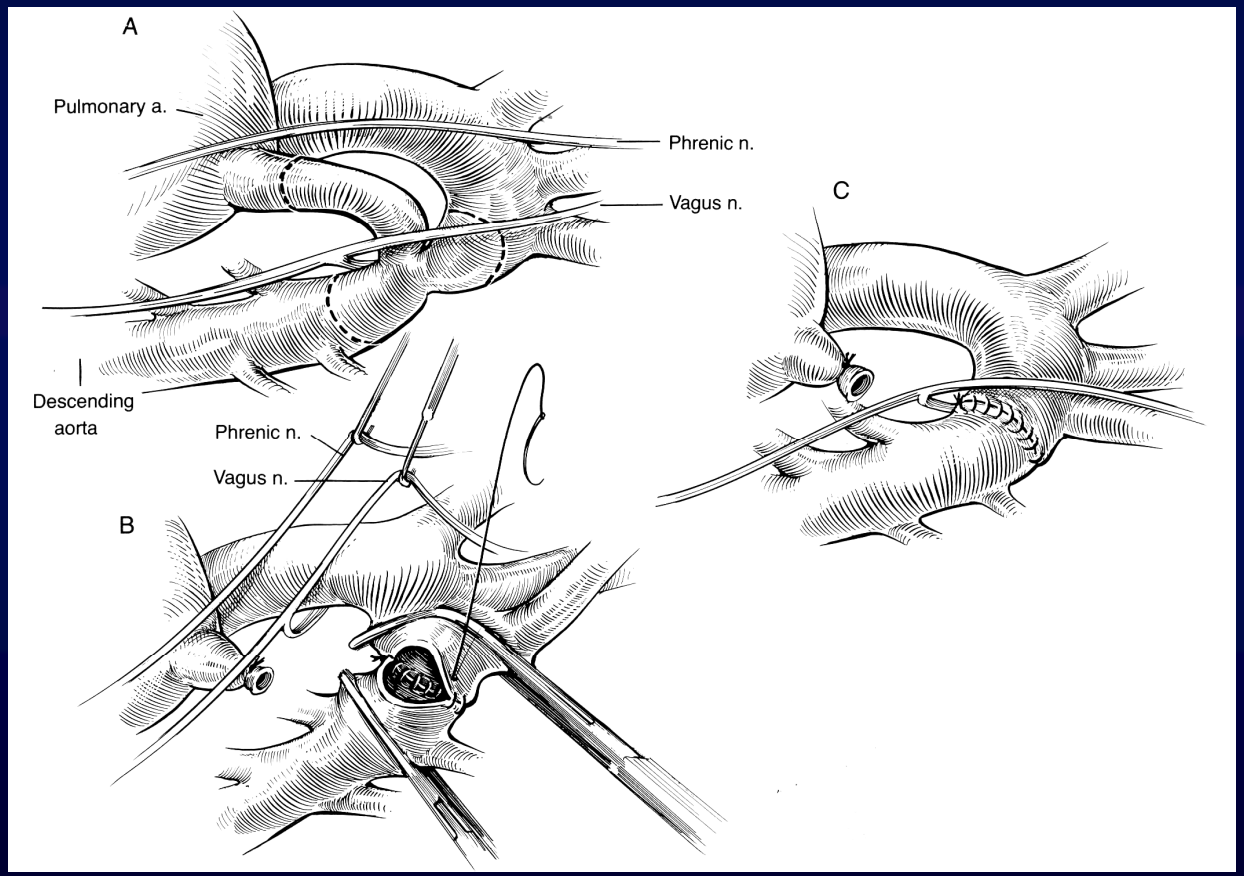
Technique of Operation in COA

3. Graft interposition or replacement



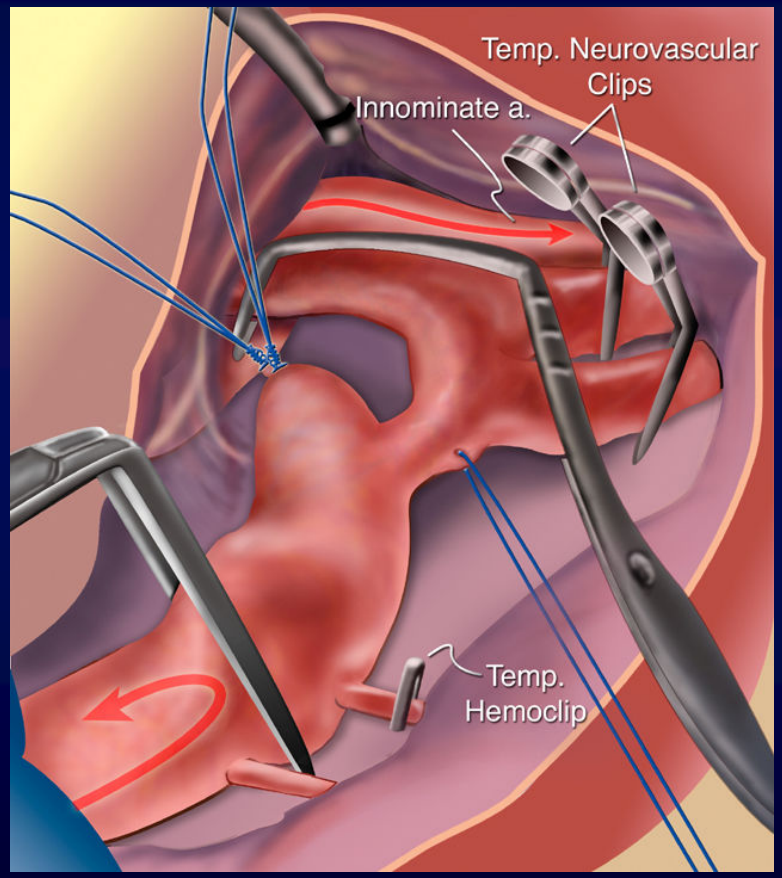
Technique of Operation in COA

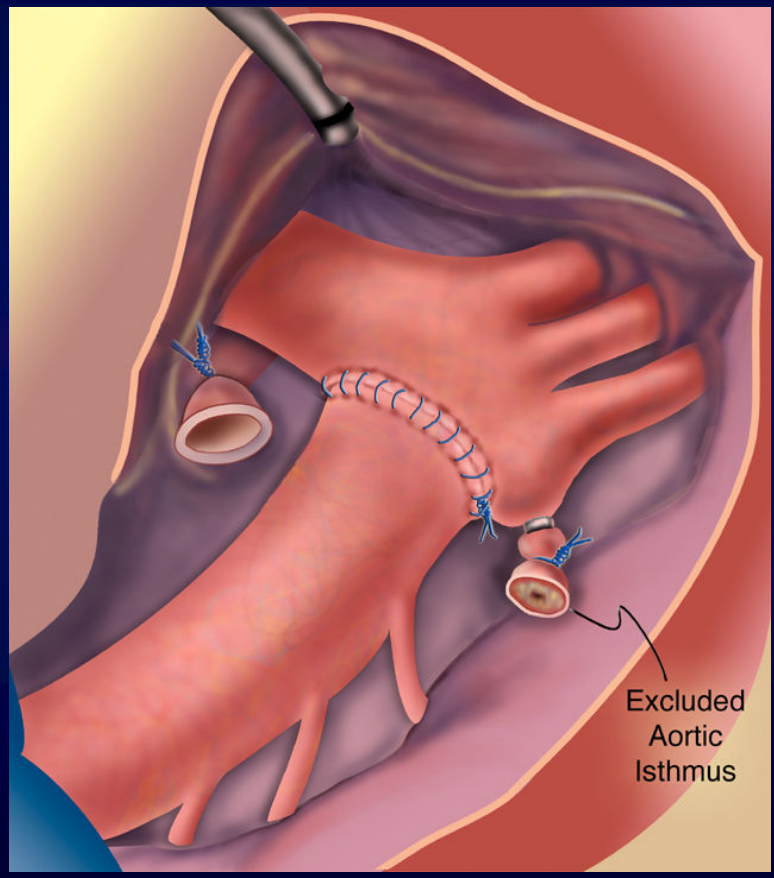
4. End-to-end anastomosis



Technique of Operation in COA

5. Extended end-to-end anastomosis

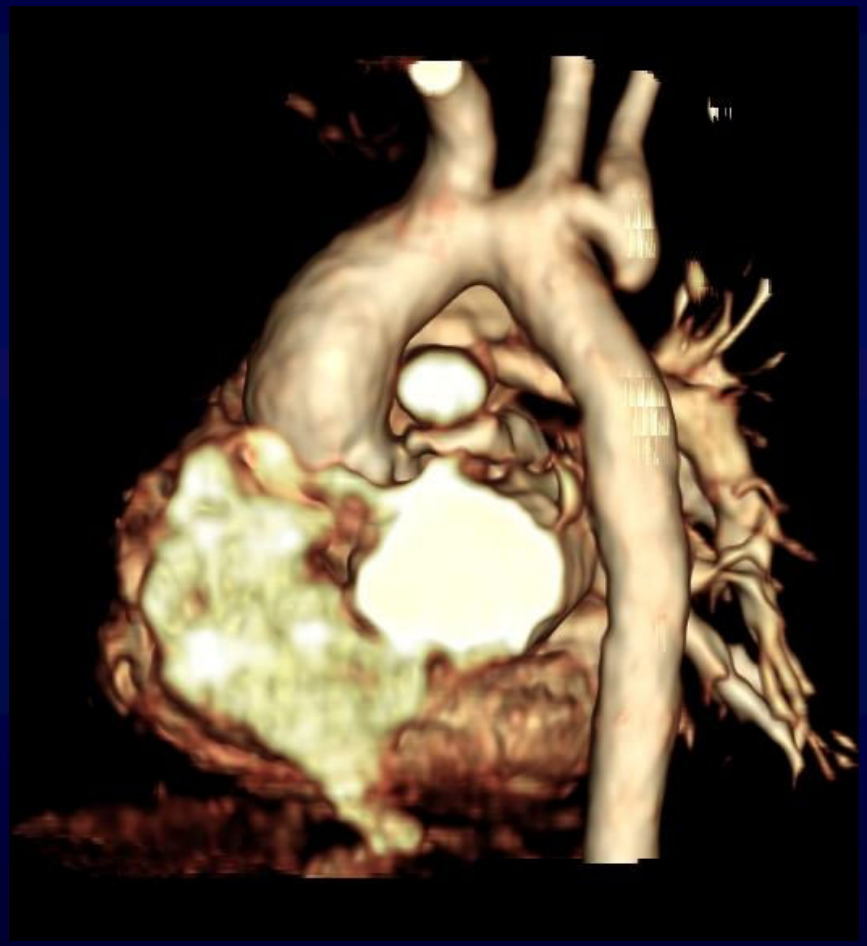




neonate with CoA combined with arch hypoplasia

M / 45 day-old CoA with Arch hypoplasia

(Extended end-to-side anastomosis)



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Aortic arch reconstruction using regional perfusion without circulatory arrest☆

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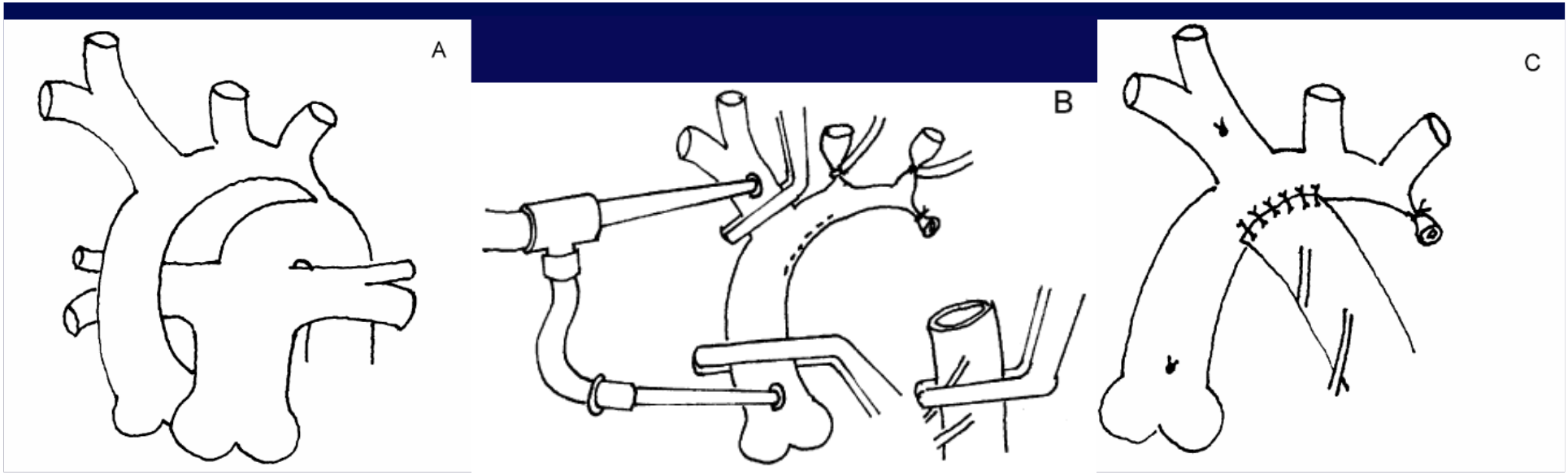

One-Stage Total Repair of the Aortic Arch Anomaly using the Regional Perfusion

Woong-Han Kim, et al.

Seoul National University Children's Hospital

Sejong General Hospital

Material and methods

- 2000. 3. – 2005. 12.
- 69 neonates or infants
- One stage biventricular repair
- Regional perfusion technique by single surgeon

서울대학교병원

Material and methods

Group	Total
Age(days)	41±52
Bwt.(Kg)	3.6±1.5
BSA(㎡)	0.22±0.06

서울대학교병원

Material and methods

Dx.	Combined Anomaly
CoA (46)	VSD (51)
IAA (12)	TAPVR (1)
HLHS (2)	PAPVR (1)
Truncus arteriosus (2)	AVSD (2)

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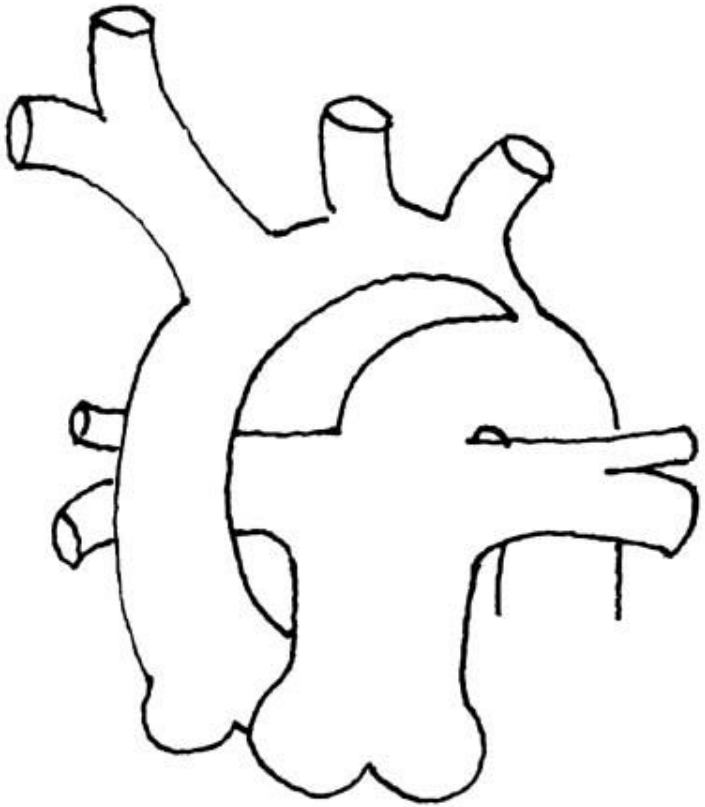
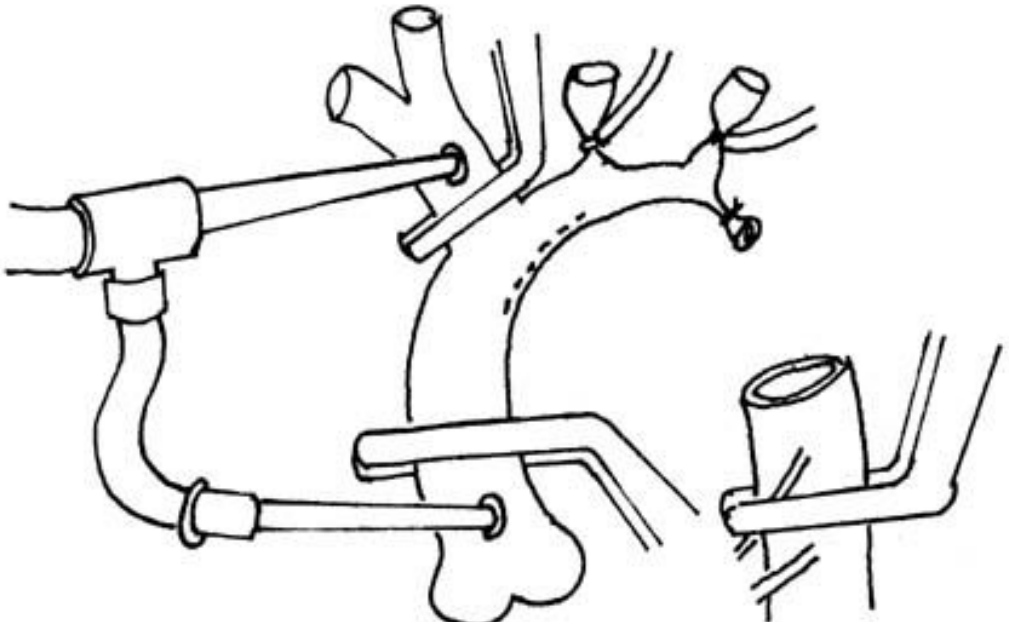
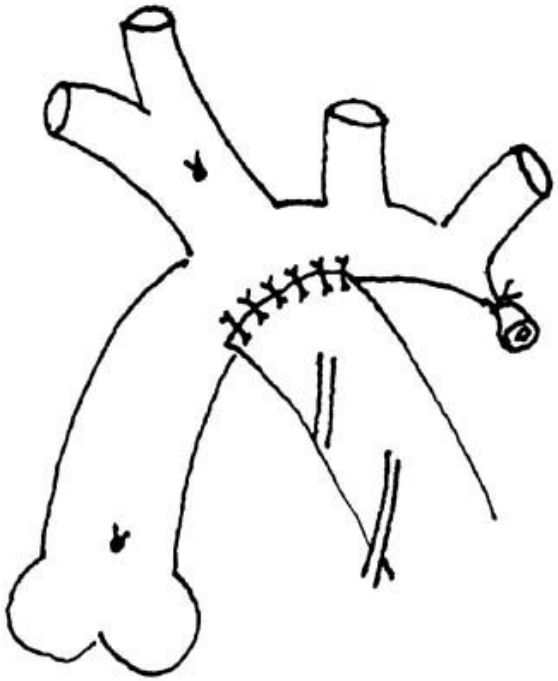
Surgical technique







– Native tissue to tissue conn

- C-AVSD, CoA
  - 1 mo. 3.2 kg
  - One-stage total repair

Results

Regional perfusion

Simple type		
CoA one-stage total repair	54	
IAA one-stage total repair	15	
Complex type		
Norwood+ Reastelli	2	HLHS(2)
IAA repair + DORV	1	
CoA repair + Rastelli	1	Truncus arteriosus with CoA(1)
CoA repair + AVSD repair	1	
IAA repair + AVSD repair	1	
IAA repair + Rastelli	1	Tuncus arteriosus with IAA(1)
CoA repair + TAPVR repair	1	
CoA repair + Warden operation	1	CoA+PAPVR

Results

	Number
Early mortality	0% (0/62)
Late mortality	1.6% (1/62)
Complication	1. Transient chorea (1/62) : complete recover 2. Compression of left main bronchus (1/62)

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Conclusions

- One-stage total arch repair using the regional perfusion in CHD

⇒ may minimize the neurologic and myocardial complication

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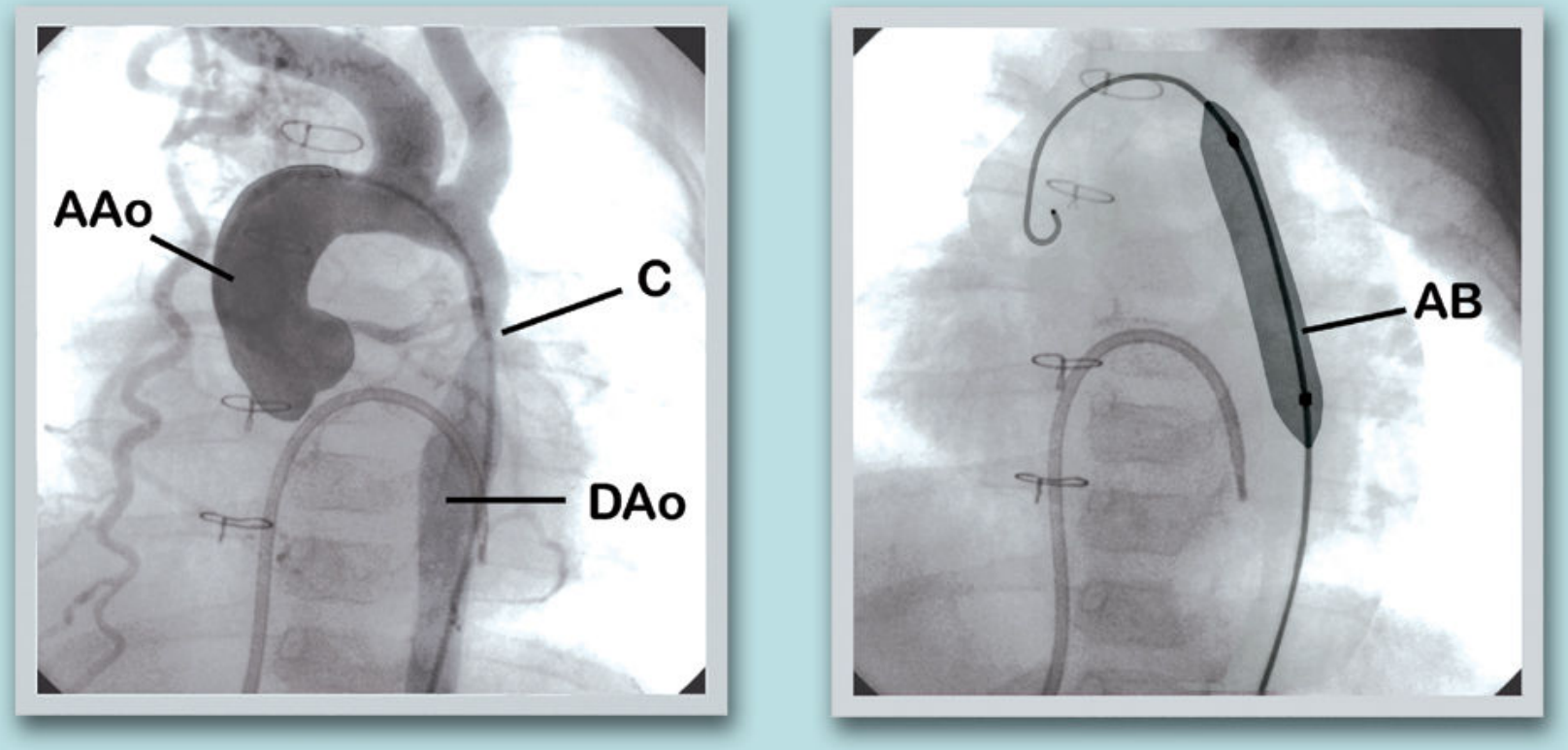
Angioplasty

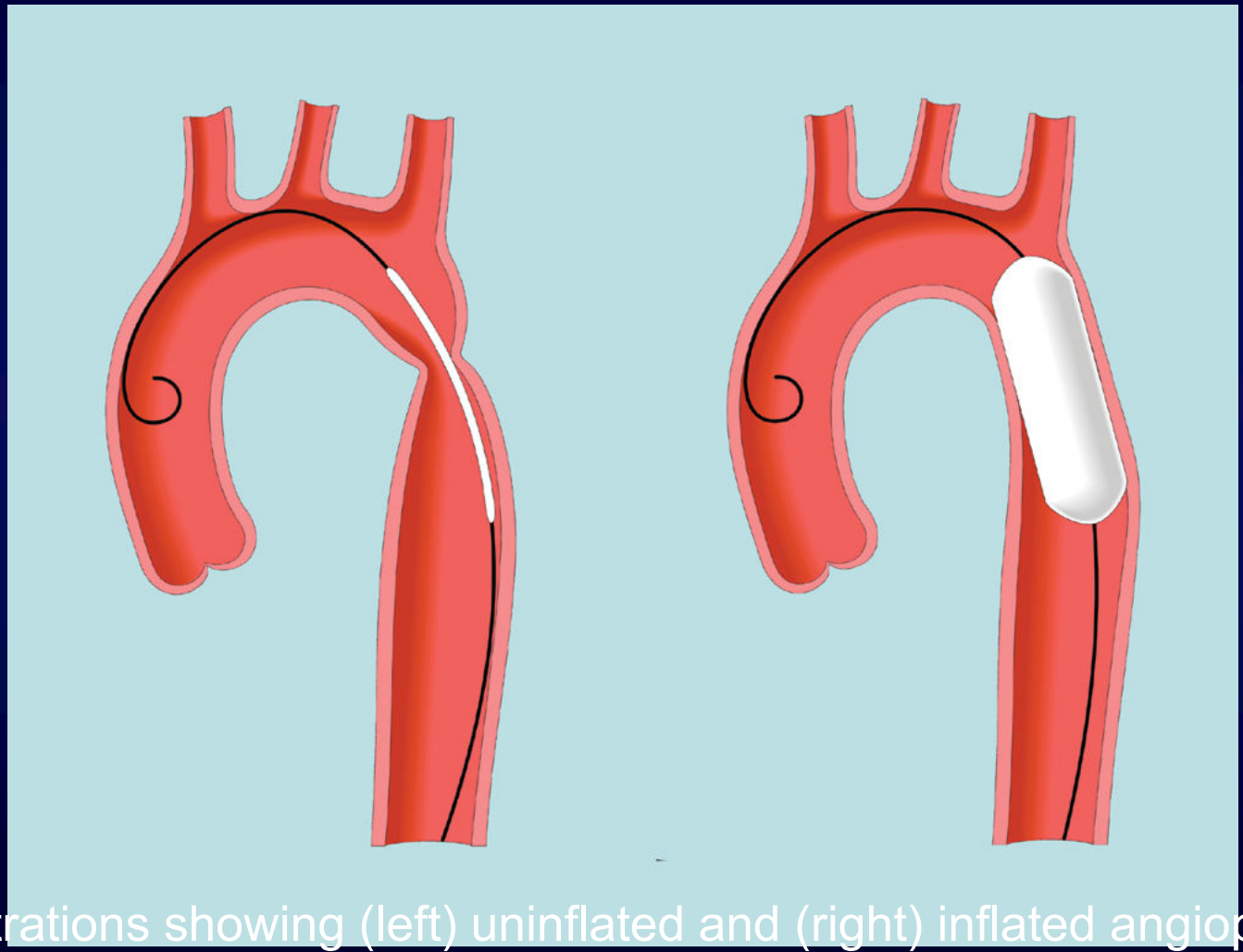
Aortic Coarctation Angioplasty



Angiograms showing (left) post-surgical coarctation of the aorta and (right) angioplasty balloon inflated across coarctation site

Angioplasty

Aortic Coarctation Angioplasty



Illustrations showing (left) uninflated and (right) inflated angioplasty balloon positioned within coarctation of the descending aorta

Aortic arch shape deformation
: Effect on BP response

TABLE 3. Comparison of clinical and geometric variables in the HT and N groups

	HT	N	*P* value
n (total = 75)	35	40	
Age (y)	14.9 ± 4	13.7 ± 5	.0001
Weight (kg)	59 ± 12	52 ± 11	<.0001
Height (cm)	170 ± 12	163 ± 13	<.0001
Age at operation, median (mo)	0.3	0.29	.6
Duration of follow-up (y)	14.6 ± 6	14.2 ± 5	.04
BP at rest			
Systolic BP (mm Hg)	125.9 ± 10.8	110.1 ± 12.6	<.0001
Diastolic BP (mm Hg)	75.7 ± 6.1	72 ± 6.2	.01
Arm-leg systolic BP gradient (mm Hg)	2.4 ± 7.9	−1.3 ± 10.5	.09
BP at peak exercise			
Systolic BP (mm Hg)	220.1 ± 26.4	162.7 ± 17.3	<.0001
Diastolic BP (mm Hg)	74.9 ± 6.6	71.6 ± 6.3	.036

BP, Blood pressure.

J Thorac Cardiovasc Surg 2006;132:1105-1111