

Congenital Heart Disease: An Introduction

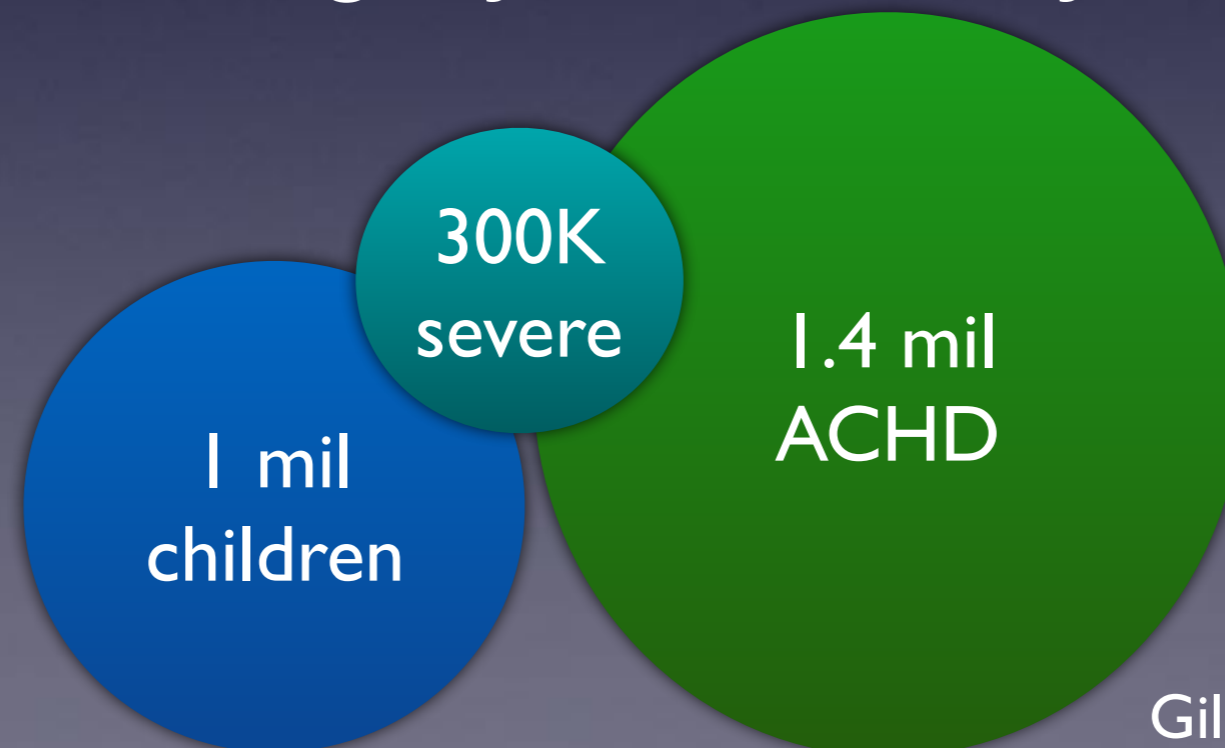


Robert Elder, MD



Epidemiology

- CHD occurs in 8/1000 live births
- The most common birth defect
- About 1/4 of infants with CHD will require surgery in the 1st year of life



Categories

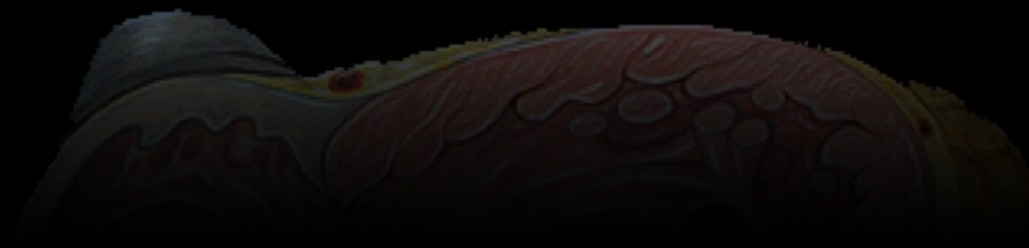
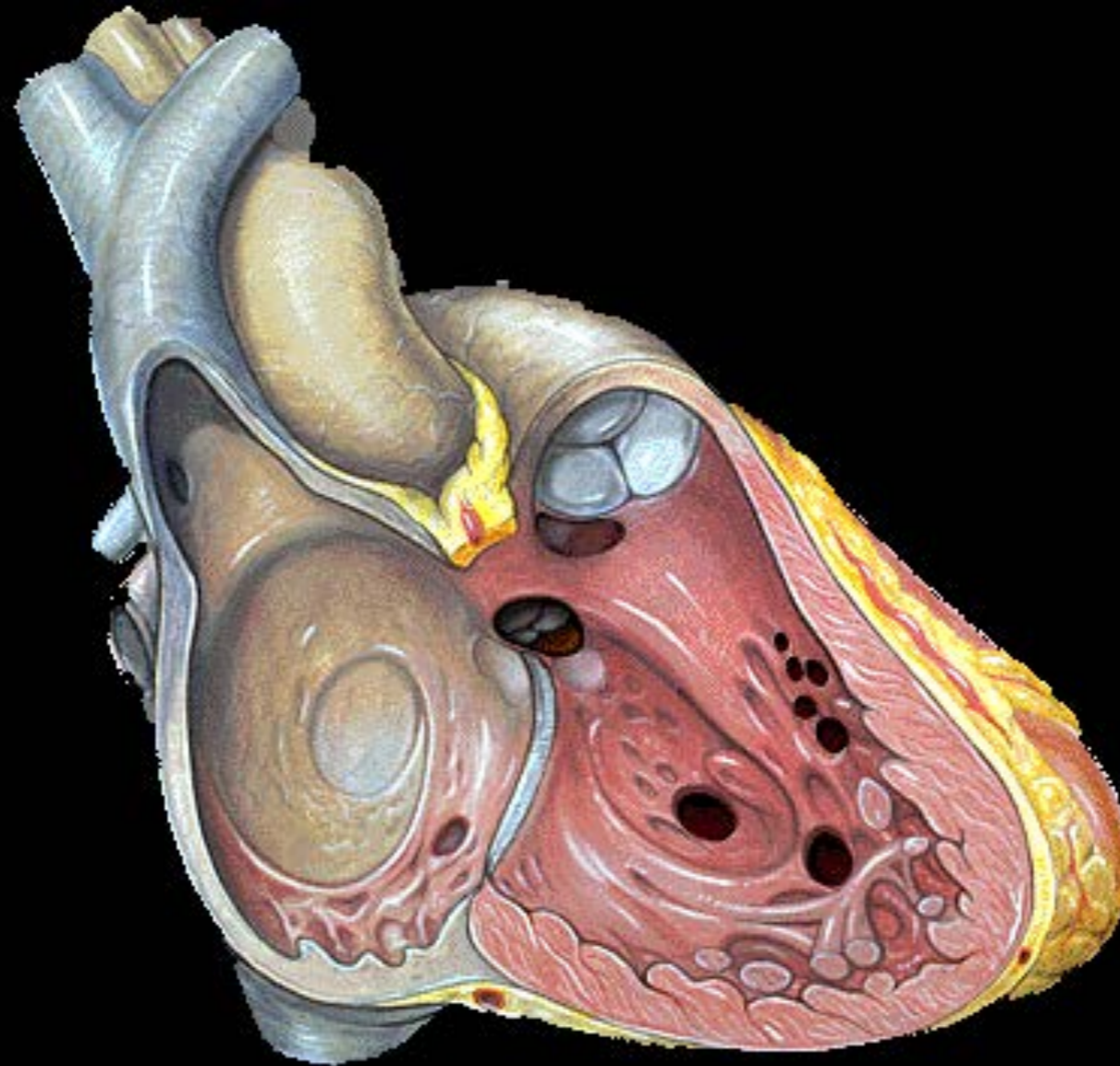
- I. Left to right shunts
- II. Left heart obstructive lesions
- III. Cyanotic lesions
- IV. Others

I. Left to Right Shunts

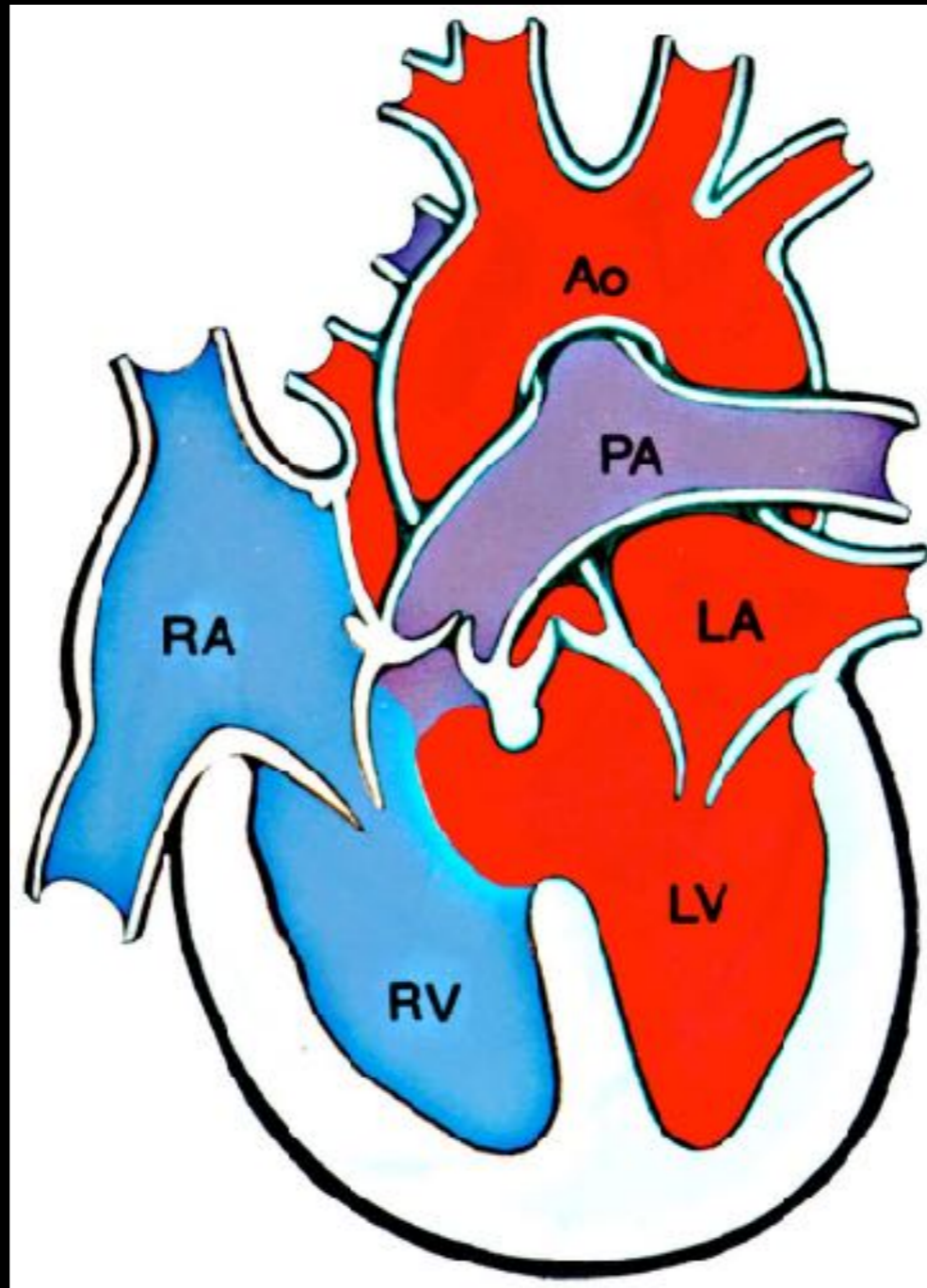
Left to Right Shunting Lesions:

- Ventricular Septal Defects
- Atrial Septal Defects
- Atrioventricular Septal Defects
- Patent Ductus Arteriosus
- Aorto-Pulmonary Window

Ventricular Septal Defects



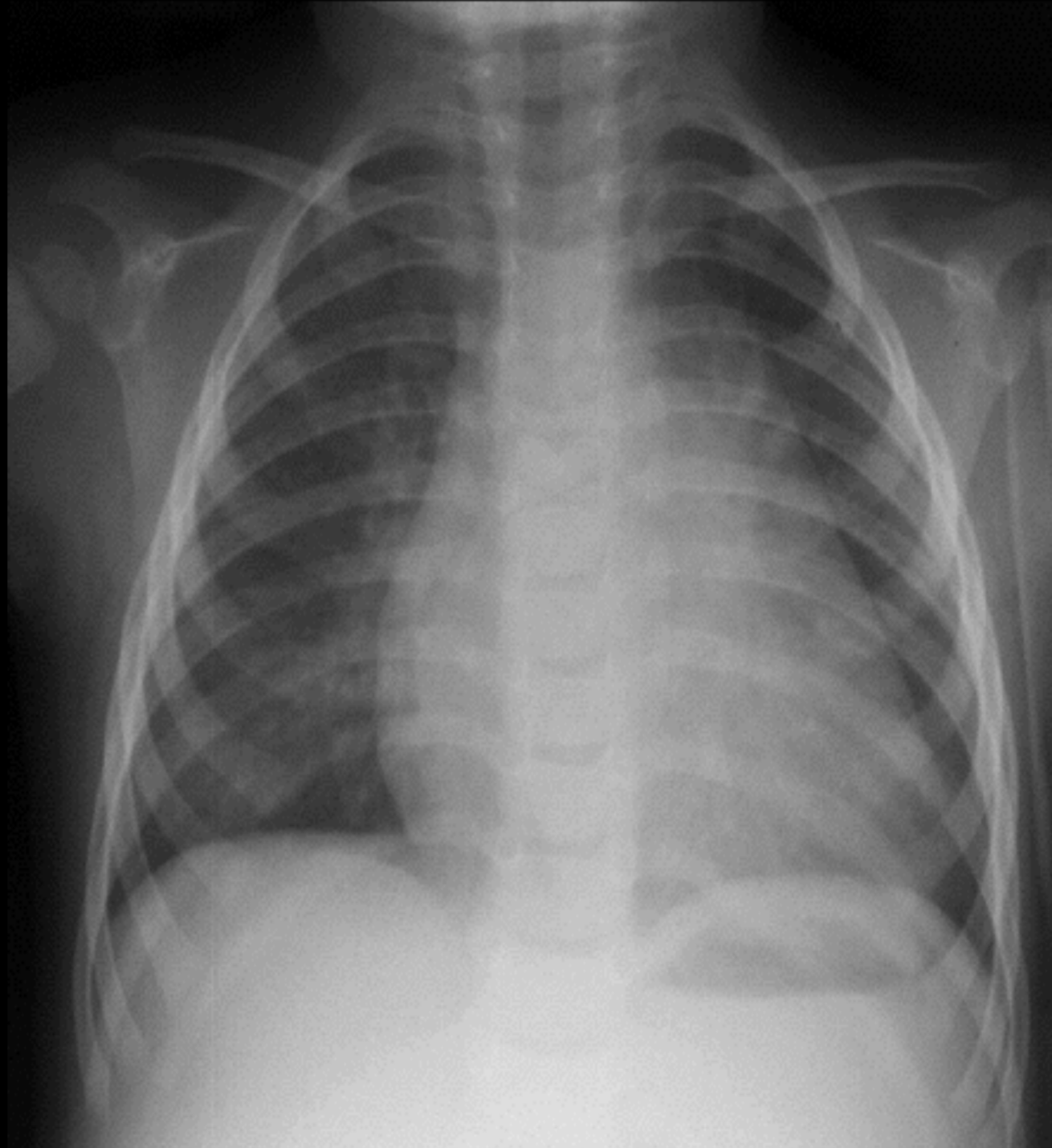
VSD - Physiology



VSD - Presentation

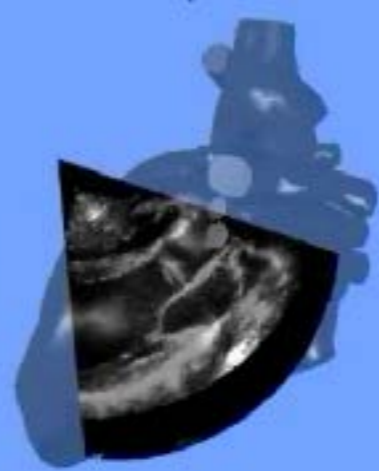
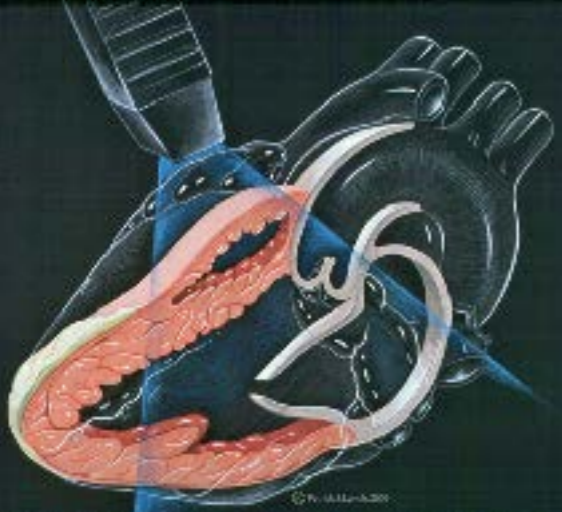
Small vs Large Defects

VSD - CXR



09/21/2010 07:34:10PM TIS1.3 MI 1.1

S8-3/Ped-CHD



P Off
Res

CF
77%
3.0MHz
WF High
Med



M3 M4
+61.6



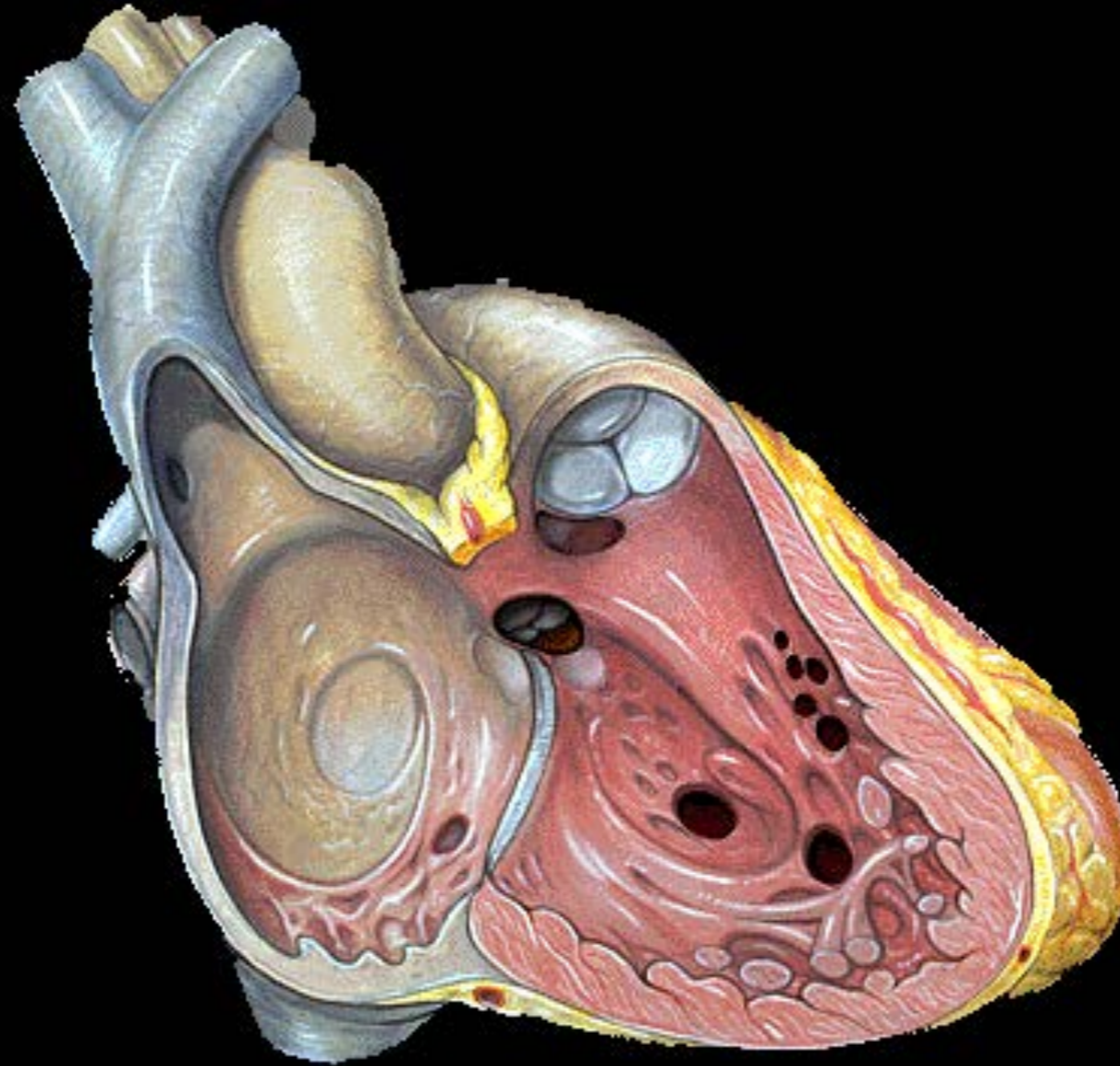
-61.6
cm/s

Echo is diagnostic

JPEG

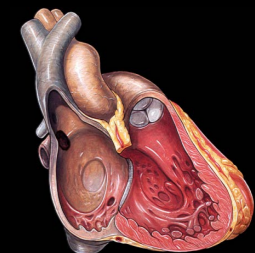
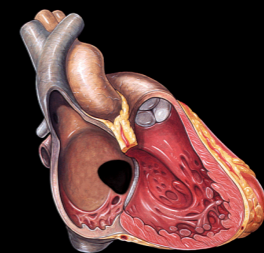
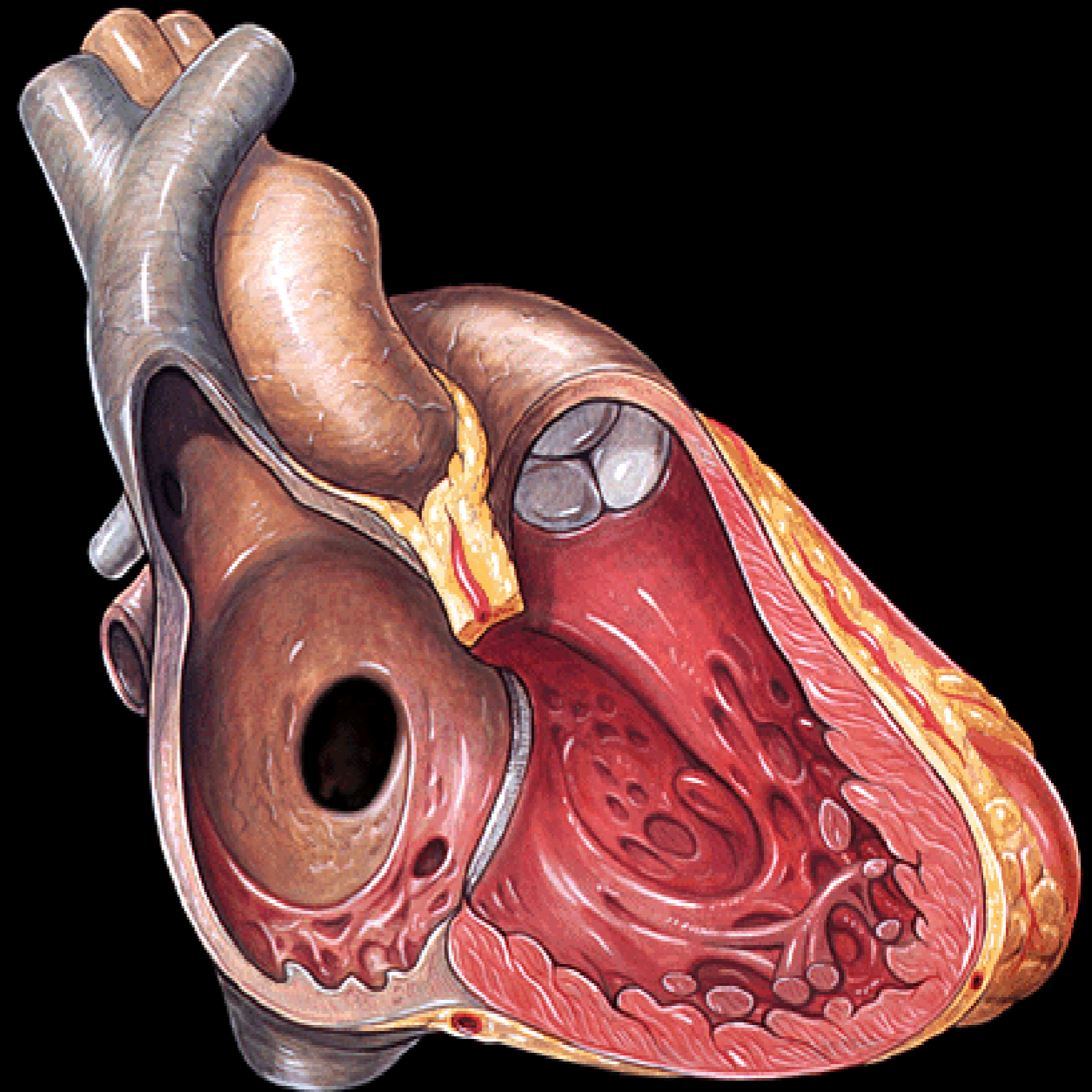
154 bpm

VSD - Management



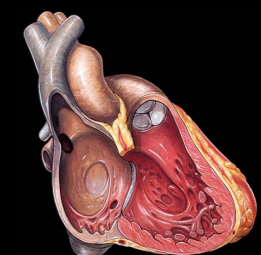
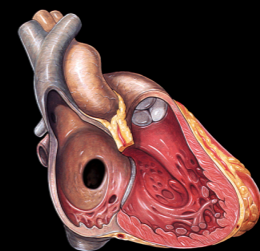
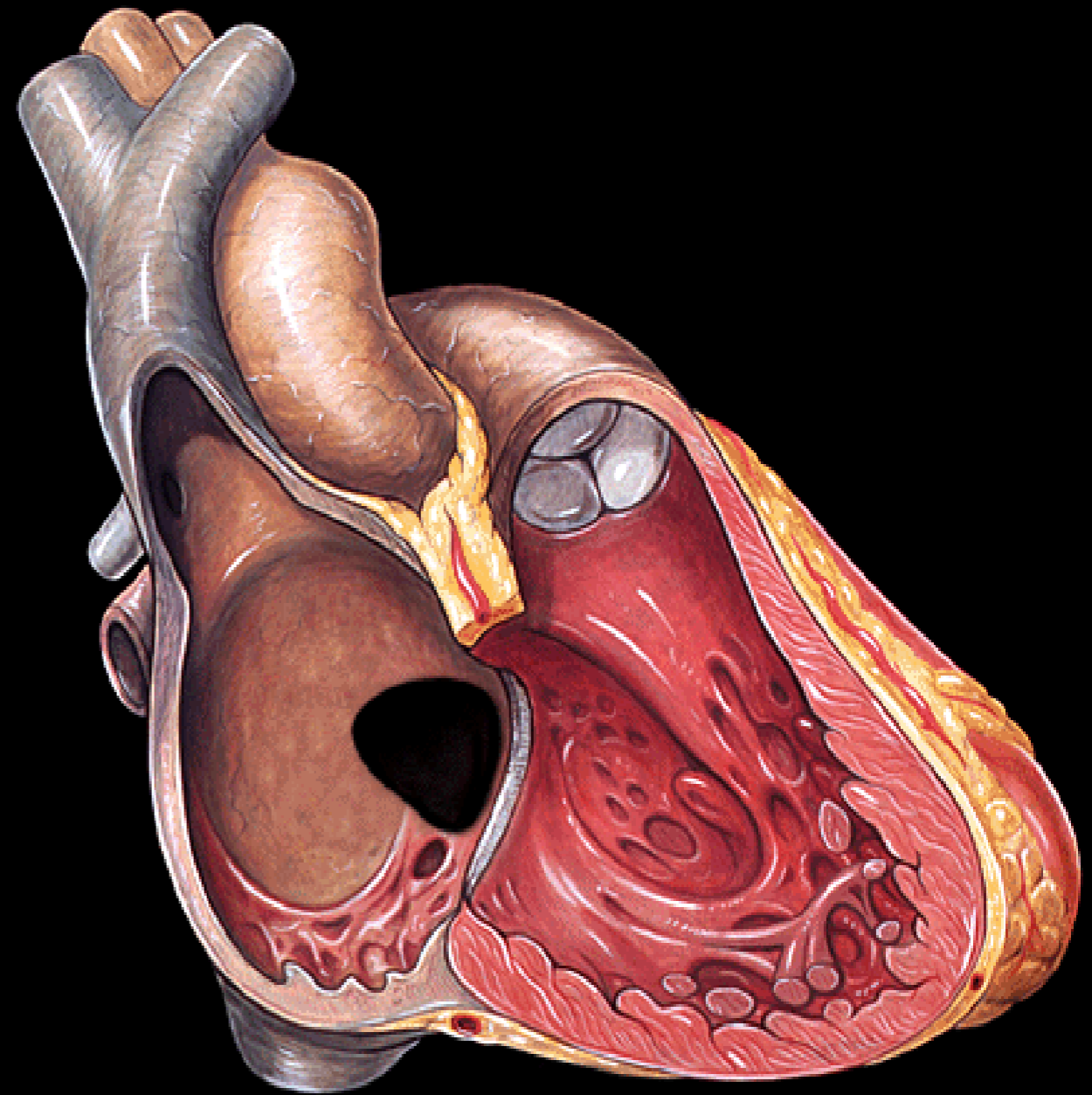
Atrial Septal Defects

- 2nd most common type of CHD
- classified by location in septum

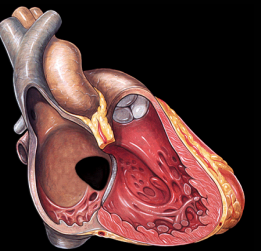
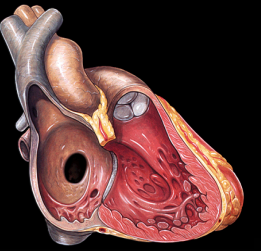


Atrial Septal Defects

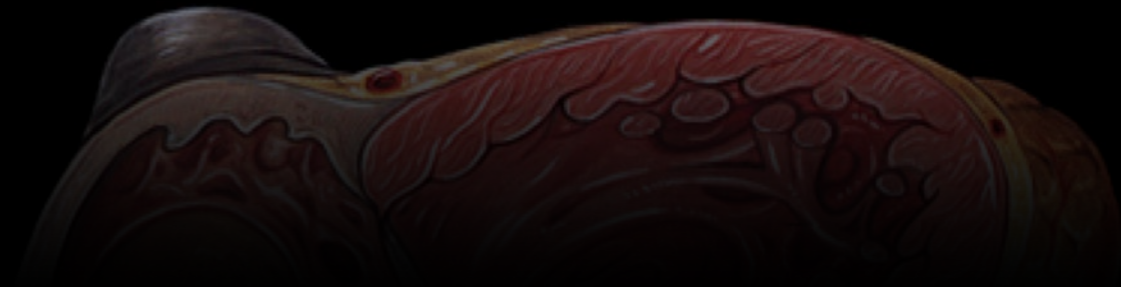
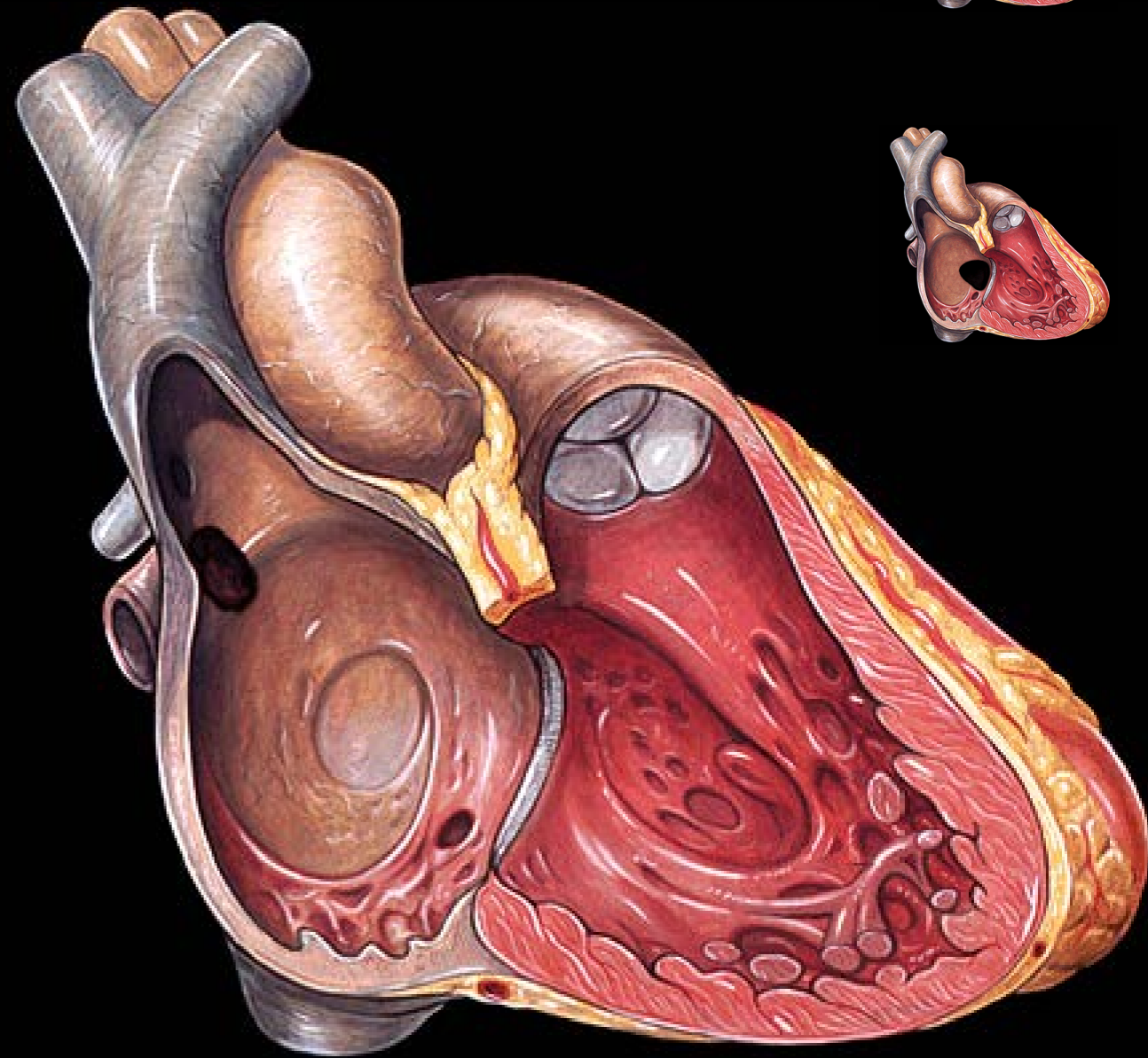
- 2nd most common type of CHD
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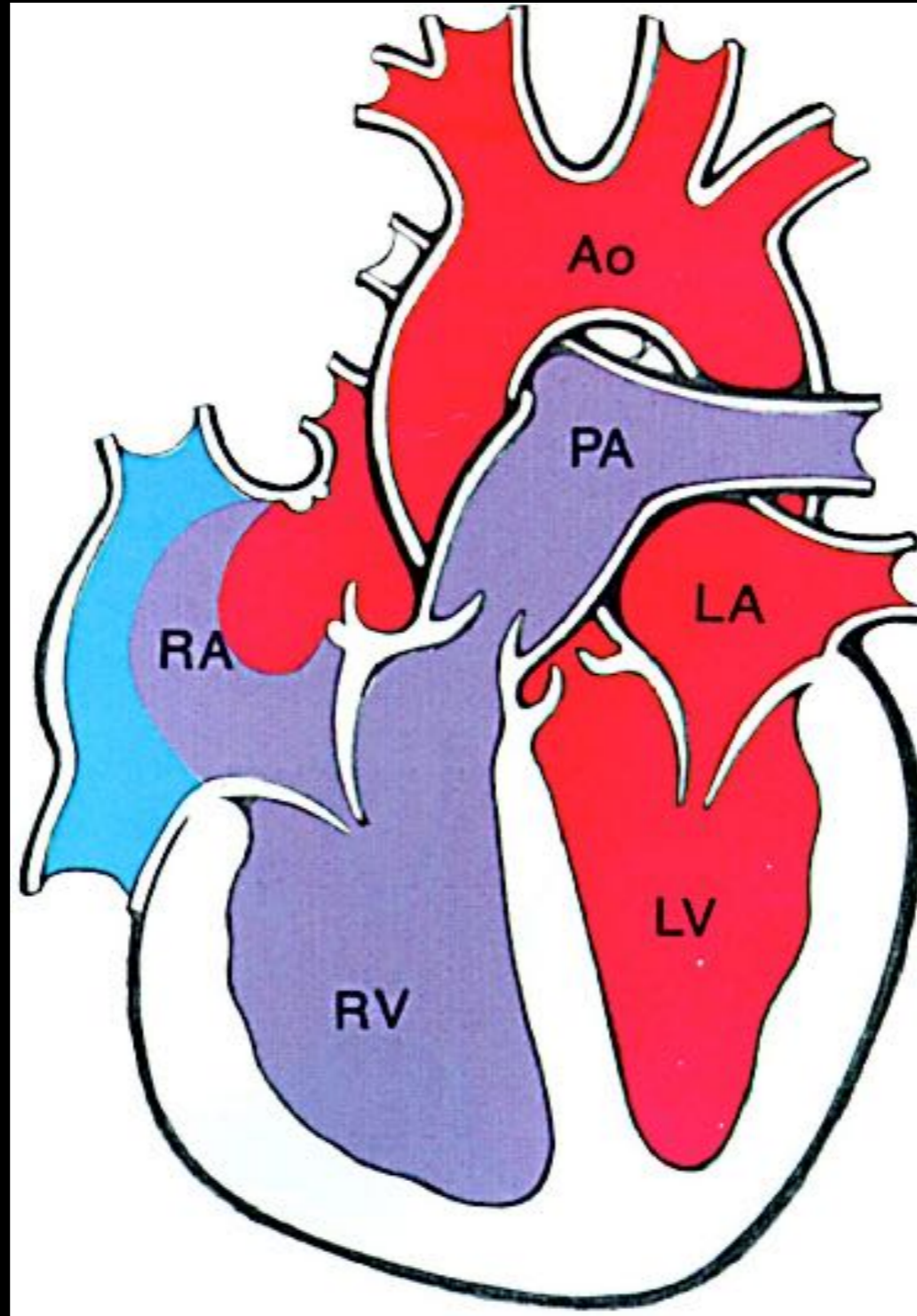
Atrial Septal Defects



- 2nd most common type of CHD
- classified by location in septum
 - sinus venosus
 - anomalous return of R pulmonary veins

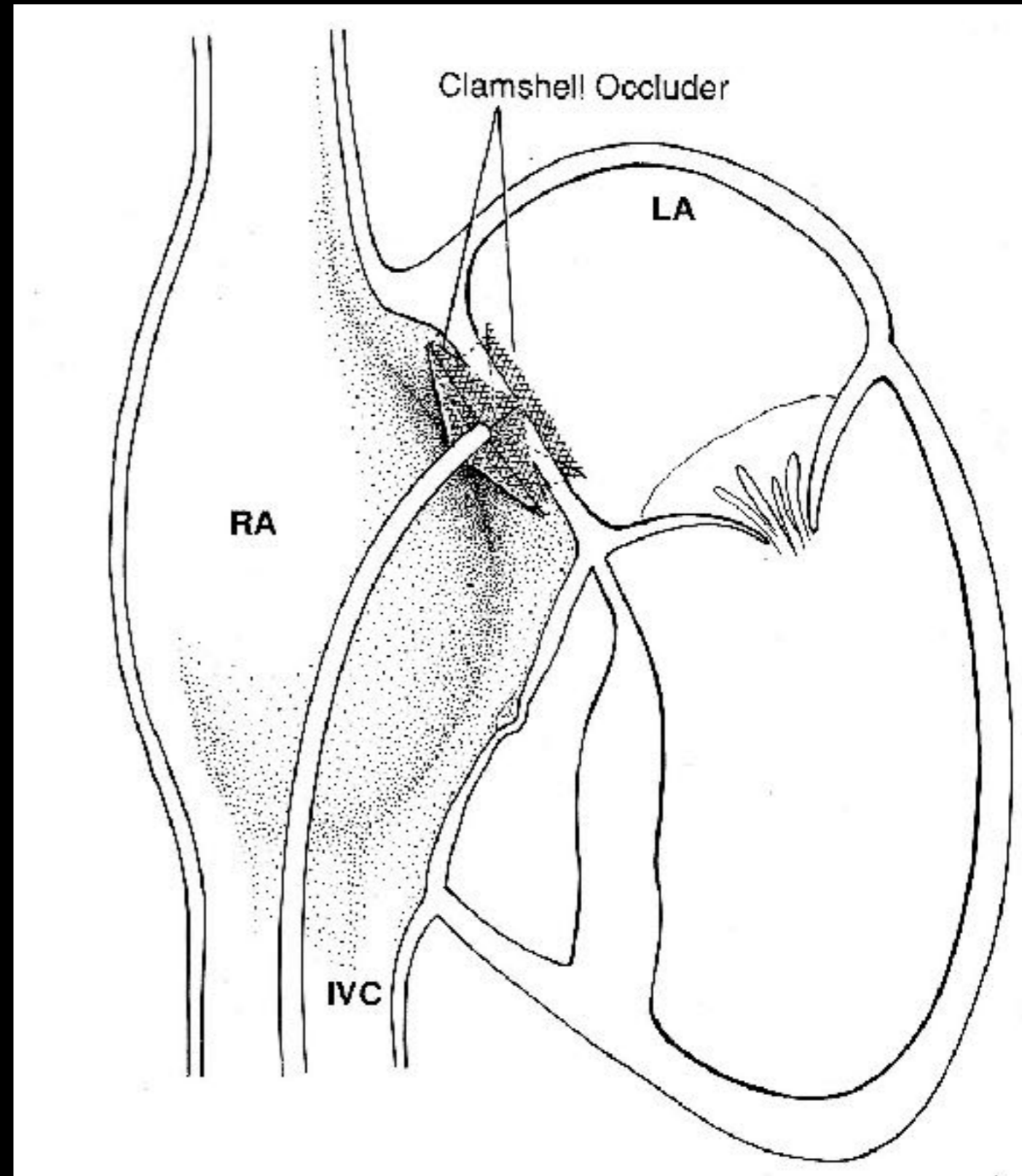


ASD - Physiology



ASD - Management

- elective closure before school age
- earlier for primum, sinus venosus
- cath vs. surgery for secundum ASD

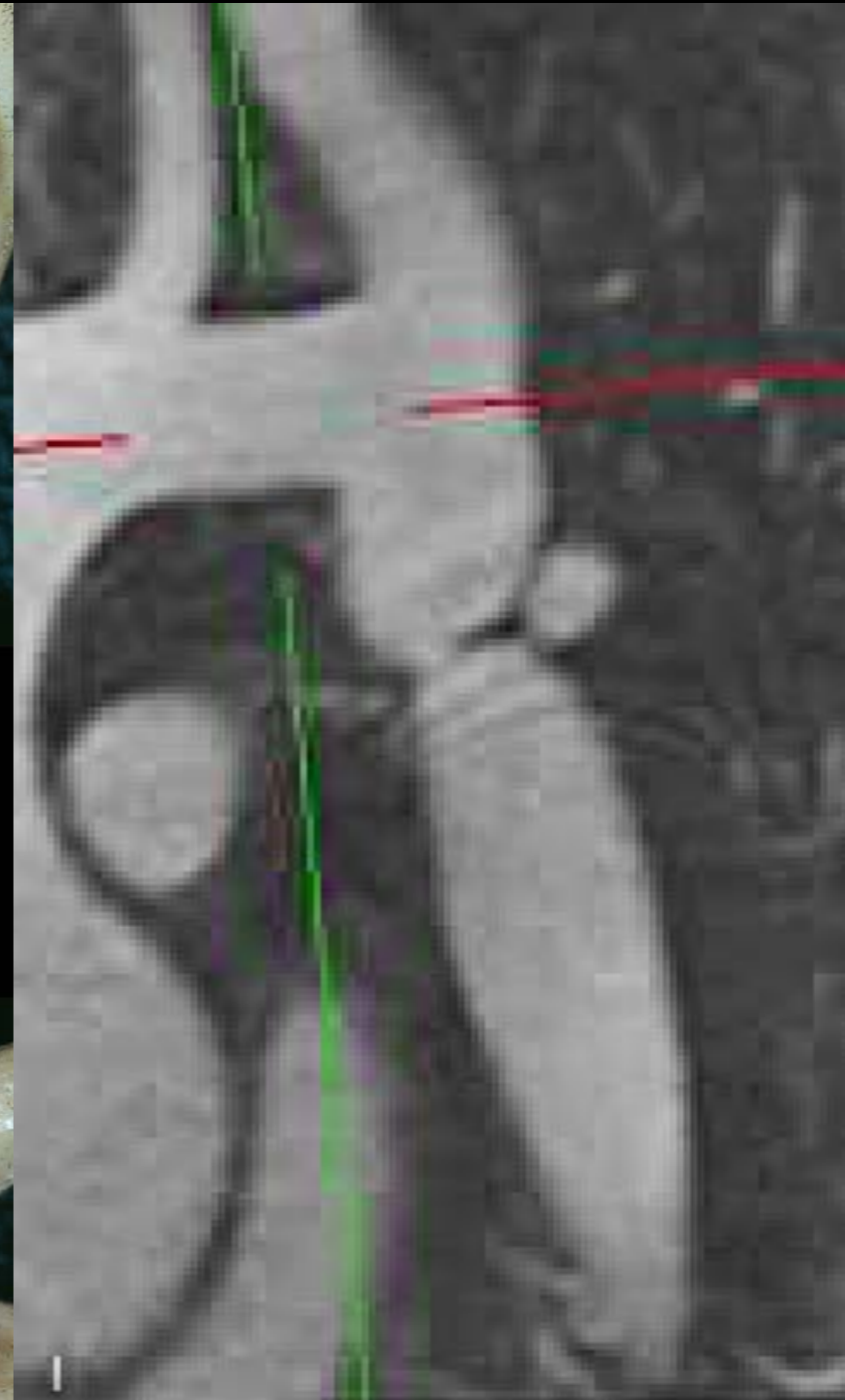
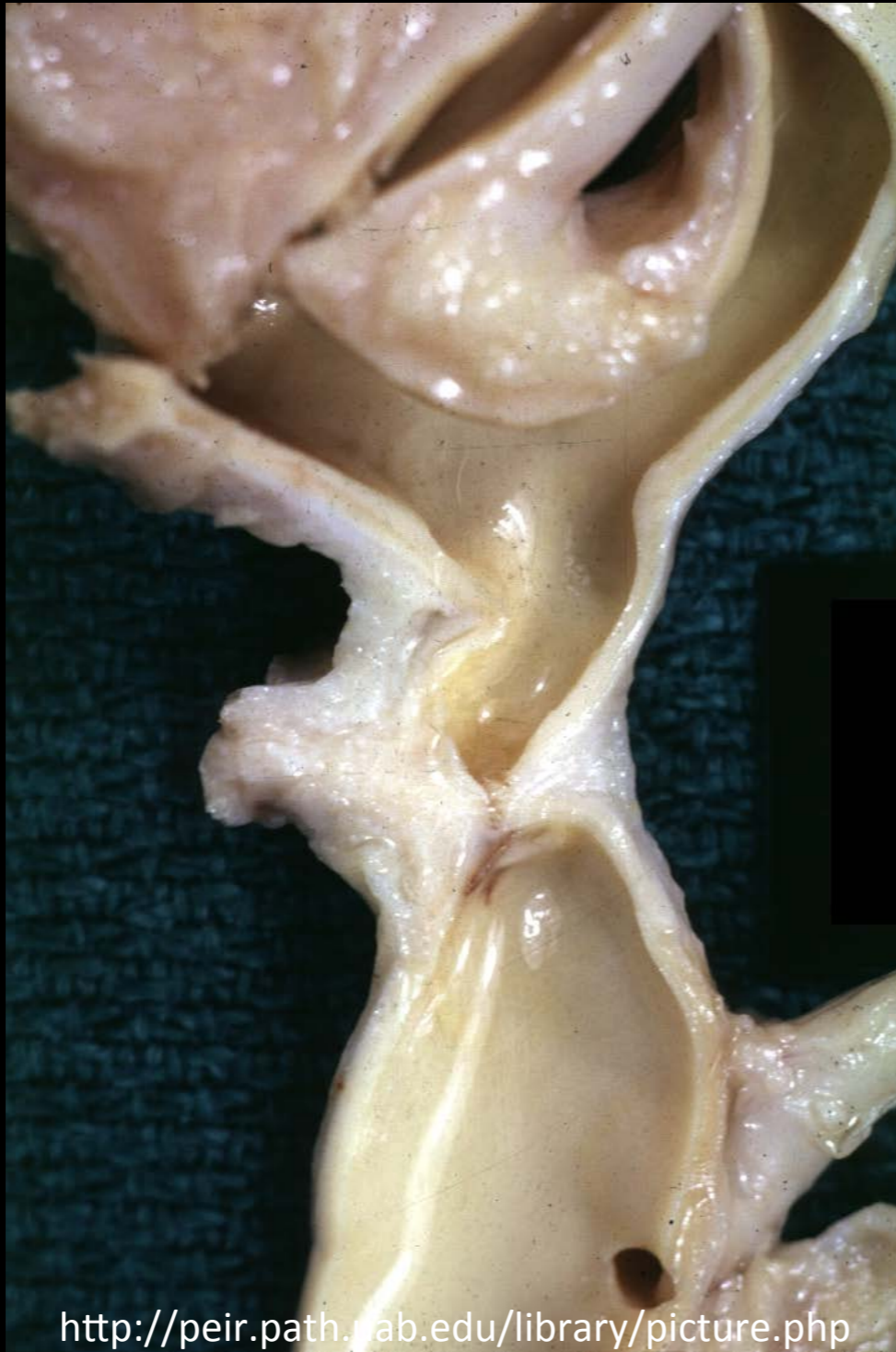


II. Obstructive Lesions

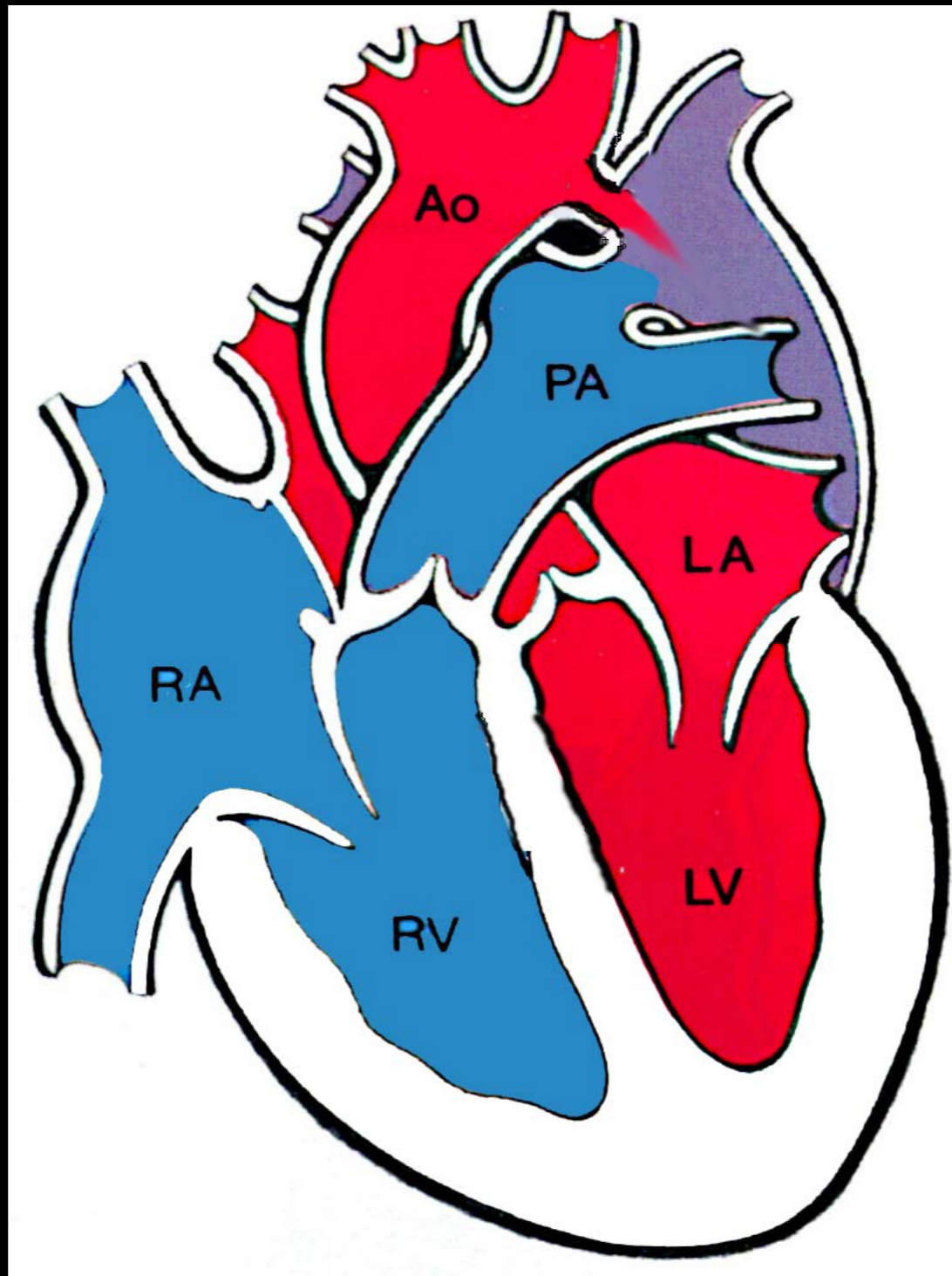
Left Heart Obstruction:

- Mitral Stenosis
- Subaortic Stenosis
- Aortic Stenosis
- Coarctation of the Aorta
- Hypoplastic Left Heart Syndrome

Coarctation of the Aorta



Coarctation - Physiology



Coarctation - Presentation

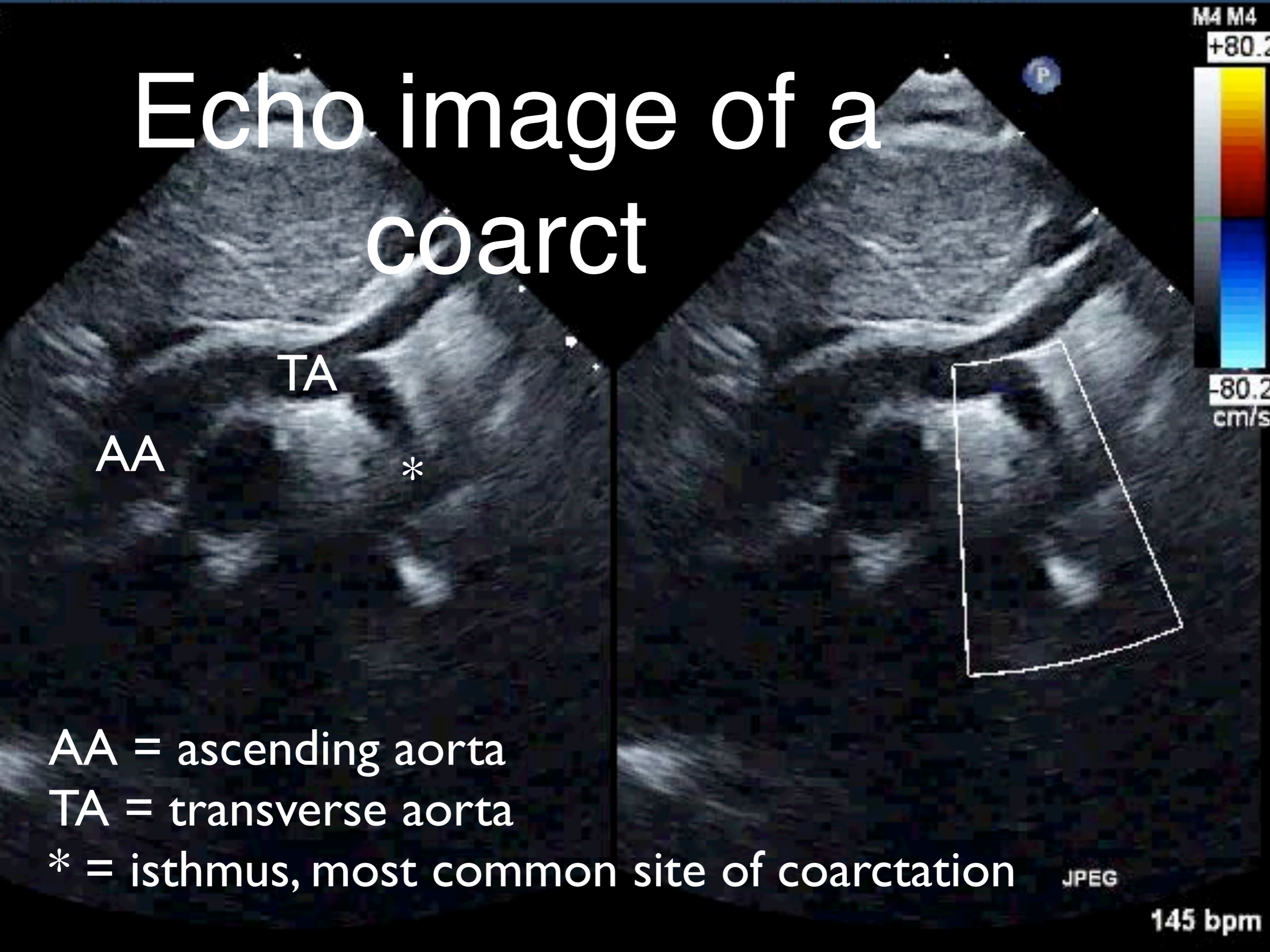
- Discrepant pulse
- Cardiogenic Shock (infant)
- Hypertension (older child/adult)
- Murmur over the back

Coarctation - Diagnosis

Clinical: with your fingers
and your ears

Confirm with the echo

Echo image of a coarct



AA

TA

*

AA = ascending aorta

TA = transverse aorta

* = isthmus, most common site of coarctation

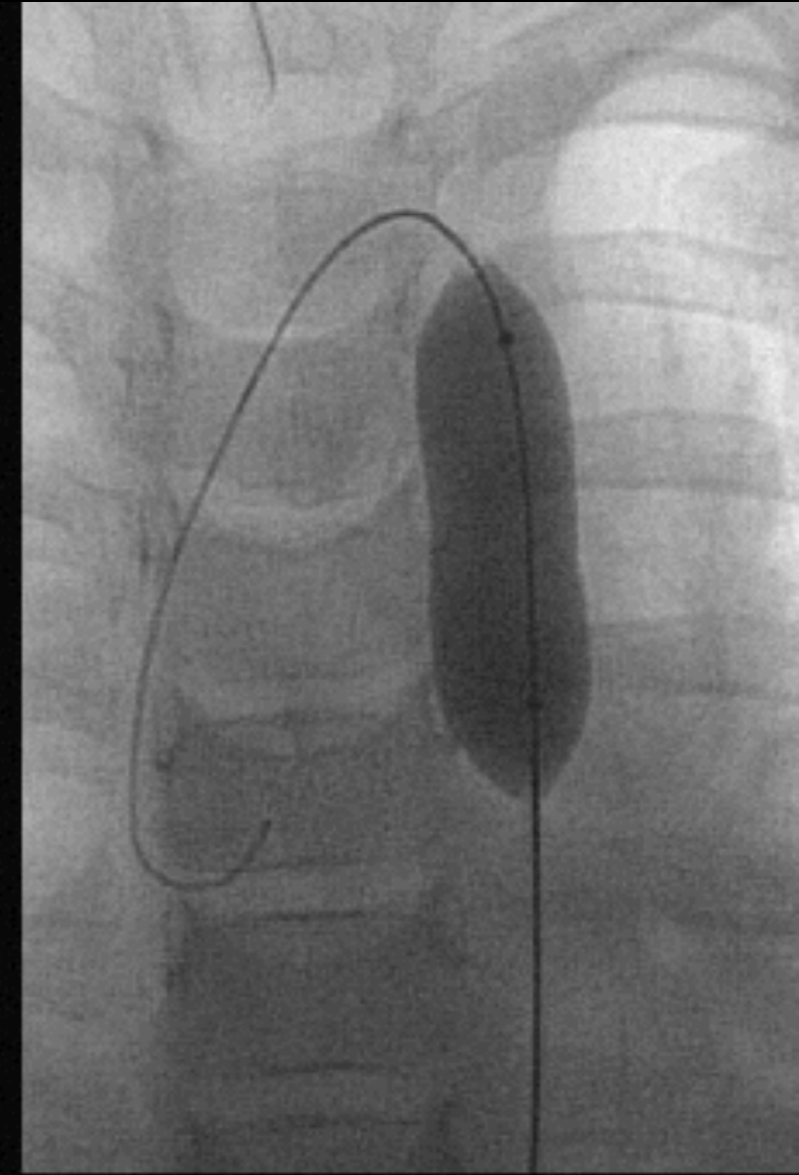
Coarctation: Management

- Infant: PGE until surgery
 - end to end anastomosis
- Child/Adult:
 - balloon angioplasty
 - stent placement
 - surgery



pre-dilation

pre-dilation



balloon inflation

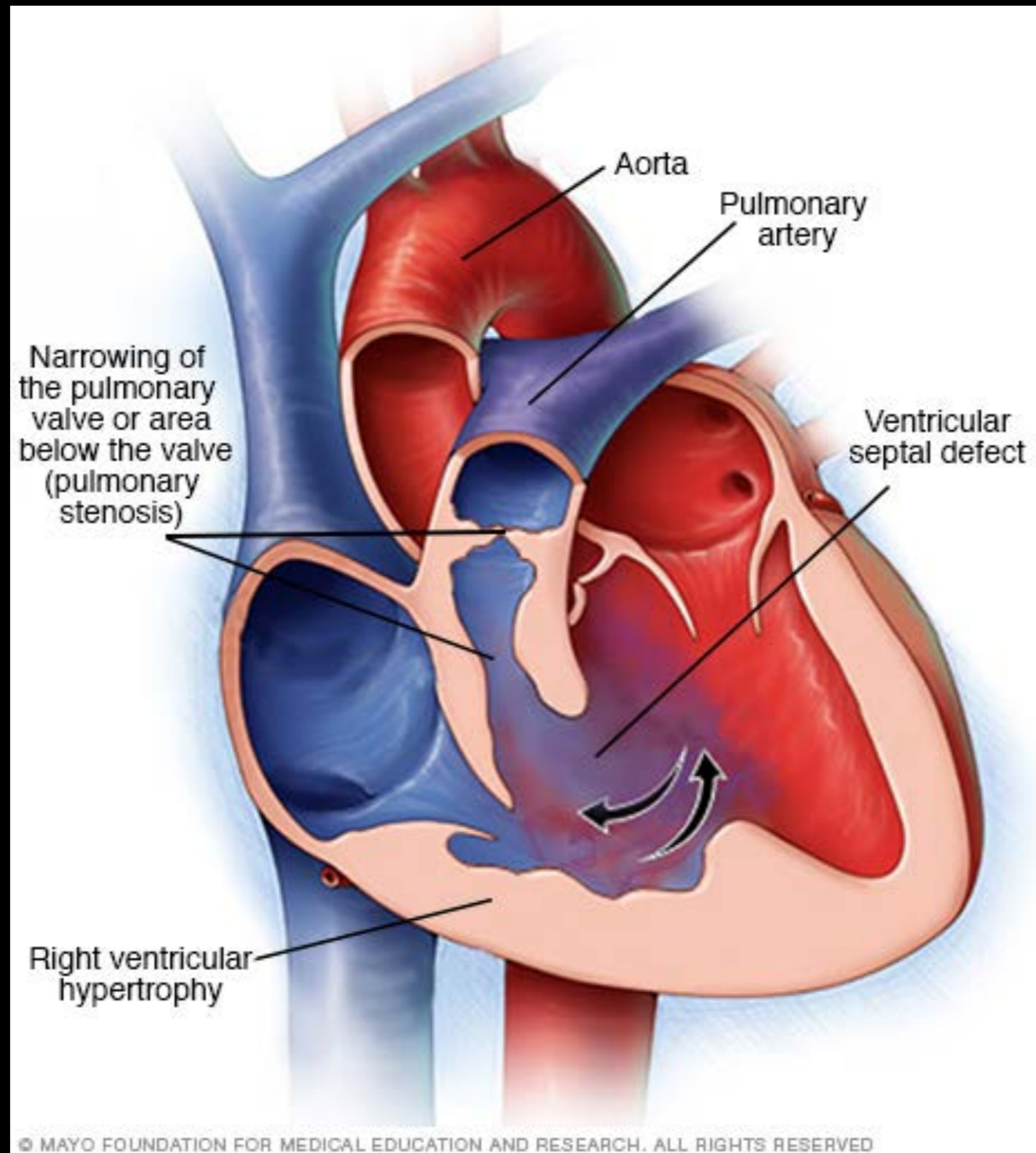
balloon inflation

III. Cyanotic Heart Disease

5 T's of Cyanotic Heart Disease:

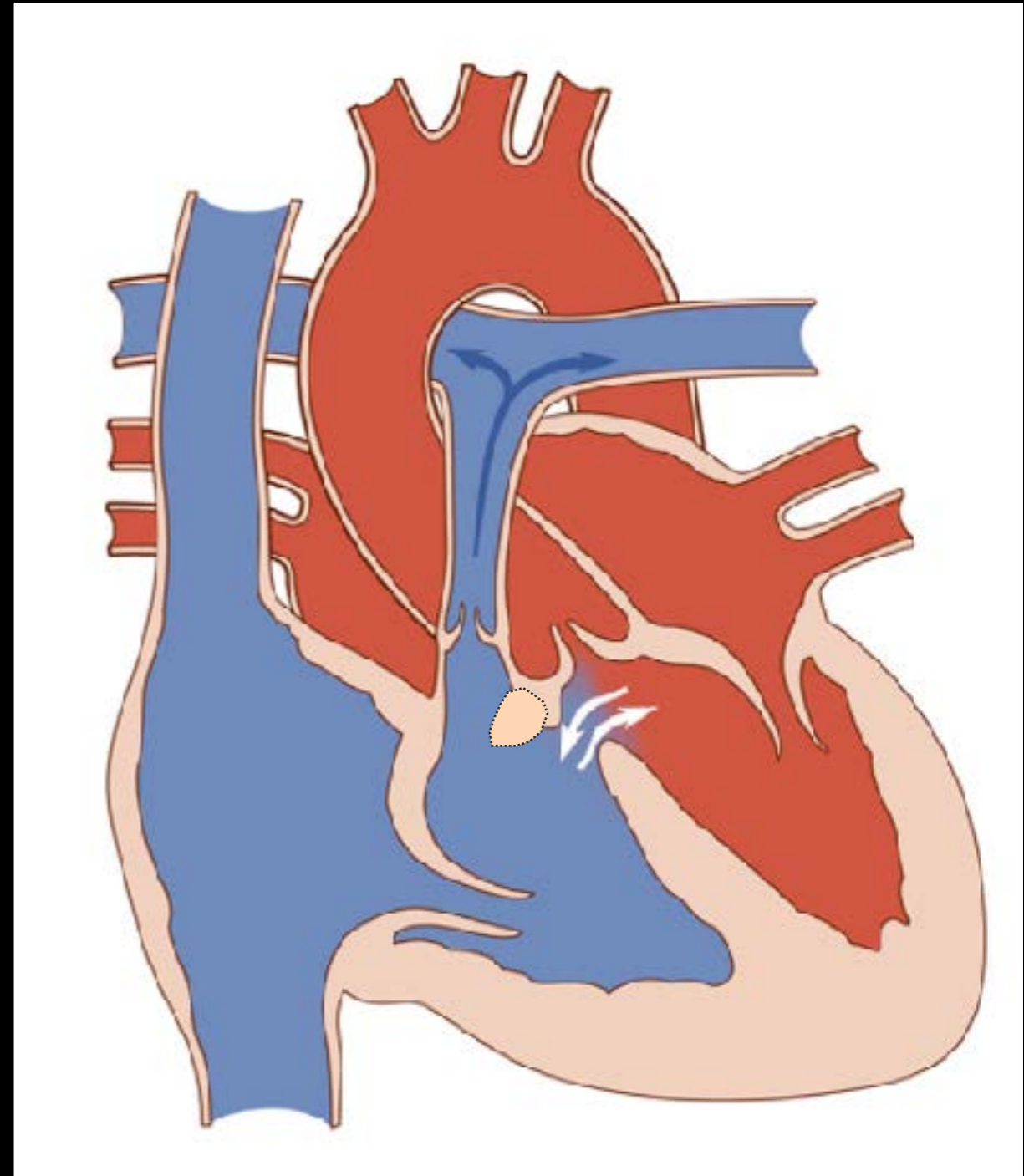
- Tetralogy of Fallot (TOF)
- Transposition of the Great Arteries (TGA)
- Tricuspid Atresia
- Truncus Arteriosus
- Total Anomalous Pulmonary Venous Return (TAPVR)

Tetralogy of Fallot (TOF)



TOF - Physiology

- Degree of cyanosis results from amount of pulmonary blood flow
- Murmur reflects pulmonary blood flow
 - no murmur = no flow
- Spectrum of disease, from pink to severe cyanosis and PGE dependent



TOF - Presentation

Clinical Manifestations:

- Murmur
- Progressive cyanosis
- Single S2, loud murmur
- Cyanotic “Tet” spell

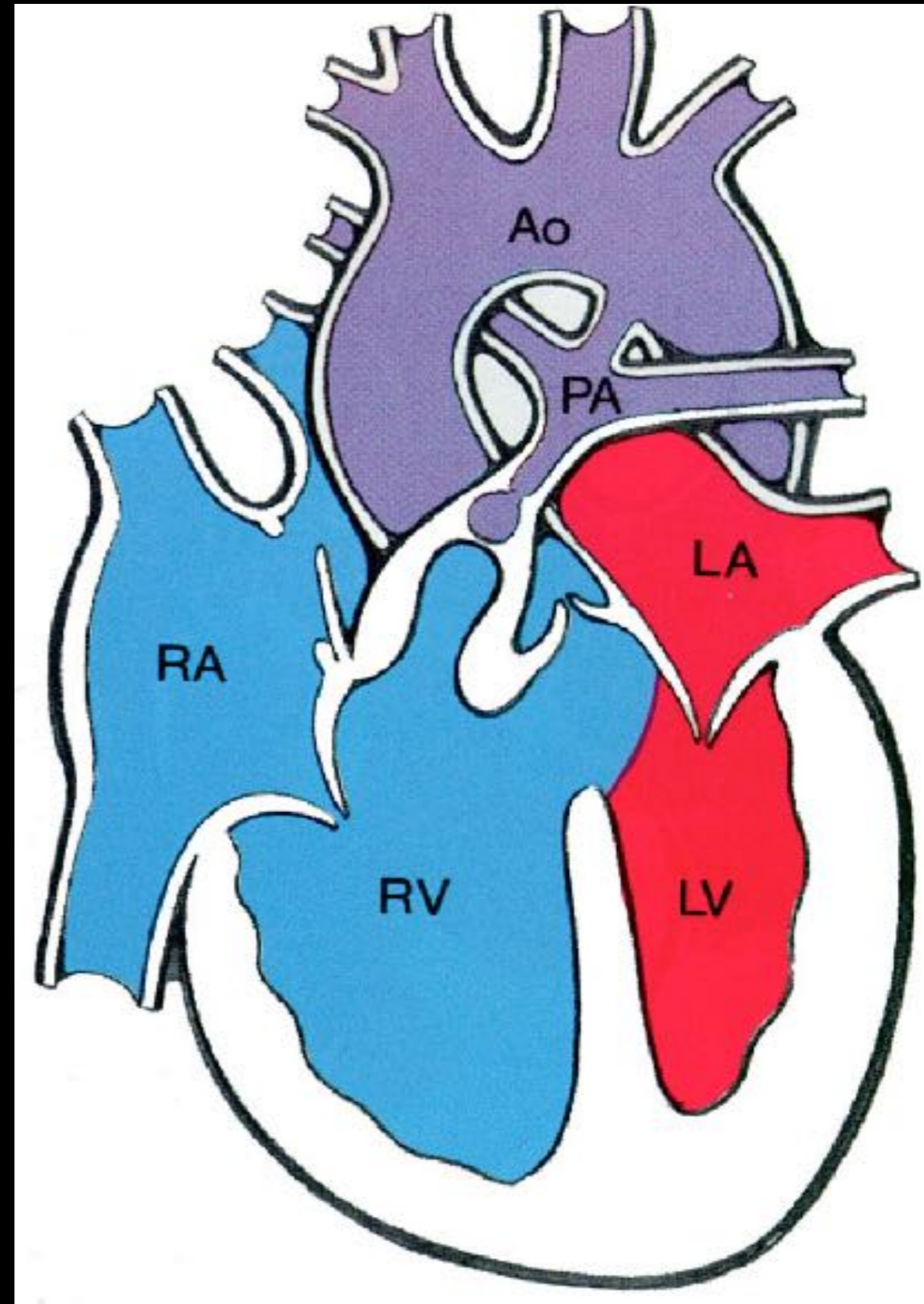
TOF - Management

Spell treatment:

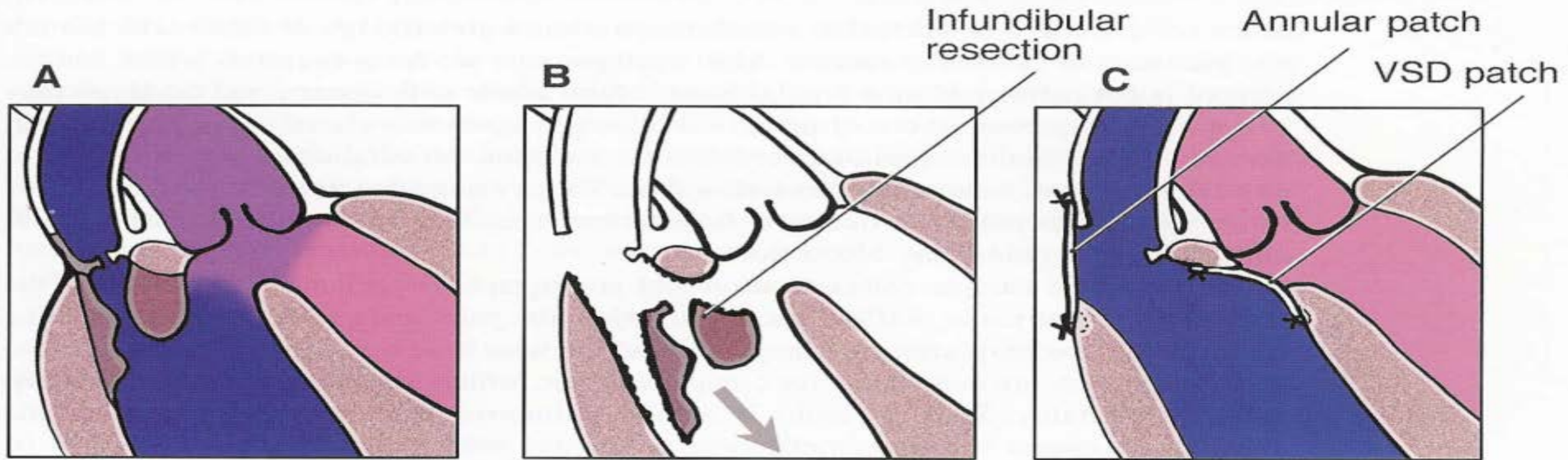
- increase pulmonary blood flow
- alter the ratio of PVR/SVR

Surgical

- Blalock - Taussig Shunt
- Rastelli Repair
- Complete repair

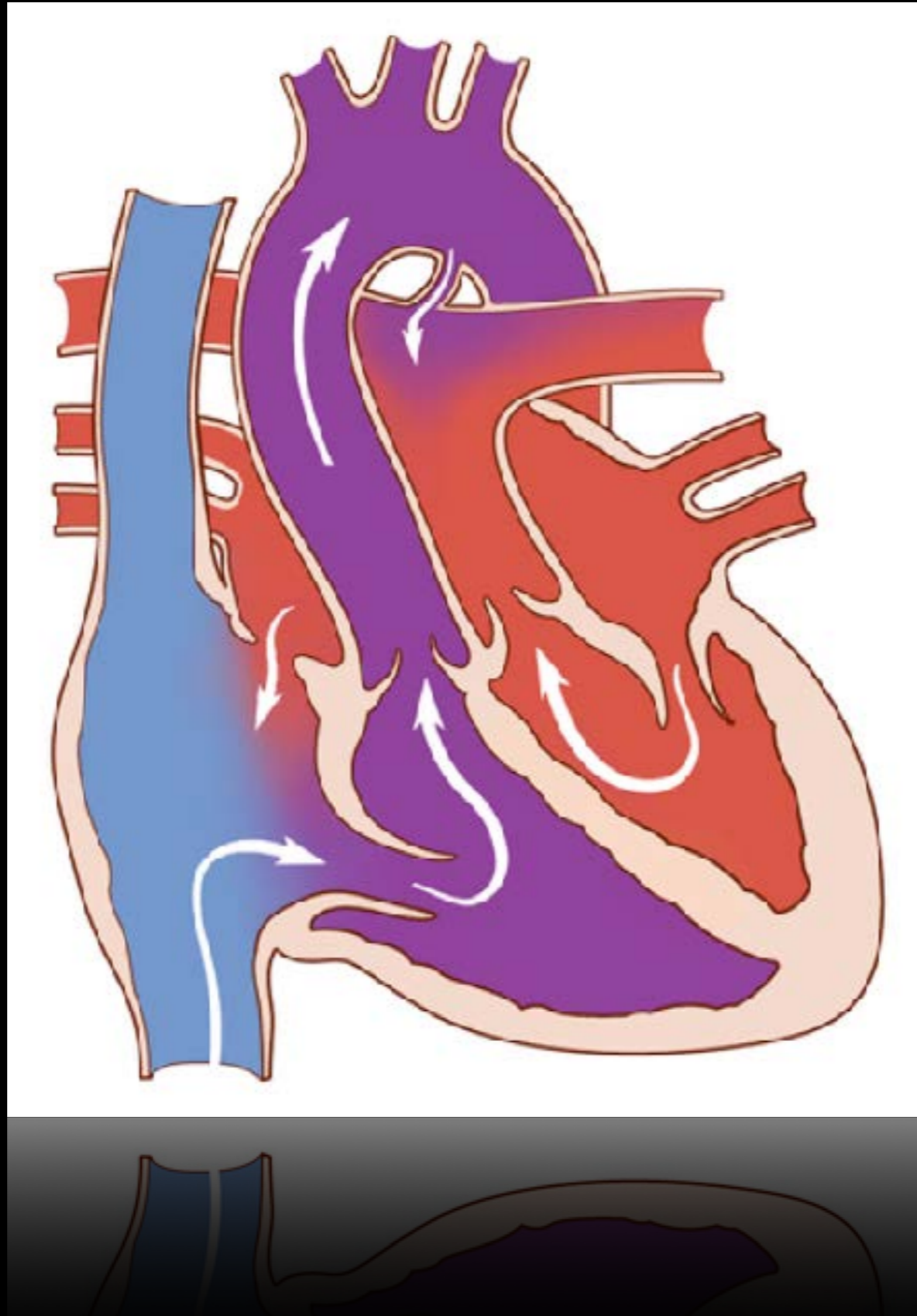


TOF - “Complete” Repair



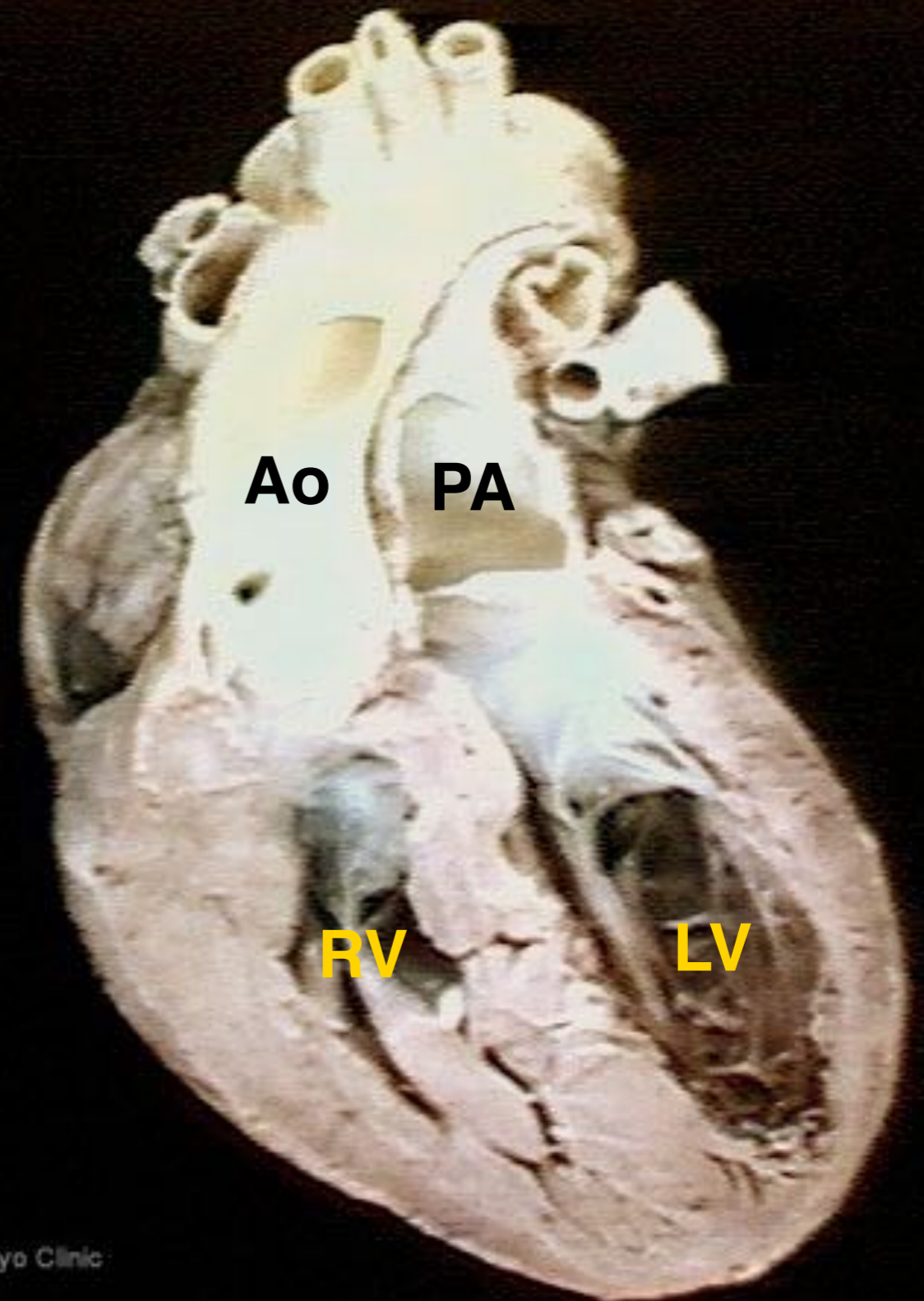
Surgical repair of tetralogy of Fallot: (A) preoperatively; (B) resection of the obstructive infundibular tissue; (C) patch closure of the ventricular septal defect; and, when enlargement of the annulus is necessary, an annular patch from the right ventricular outflow tract to the main pulmonary artery.

Transposition of the Great Arteries



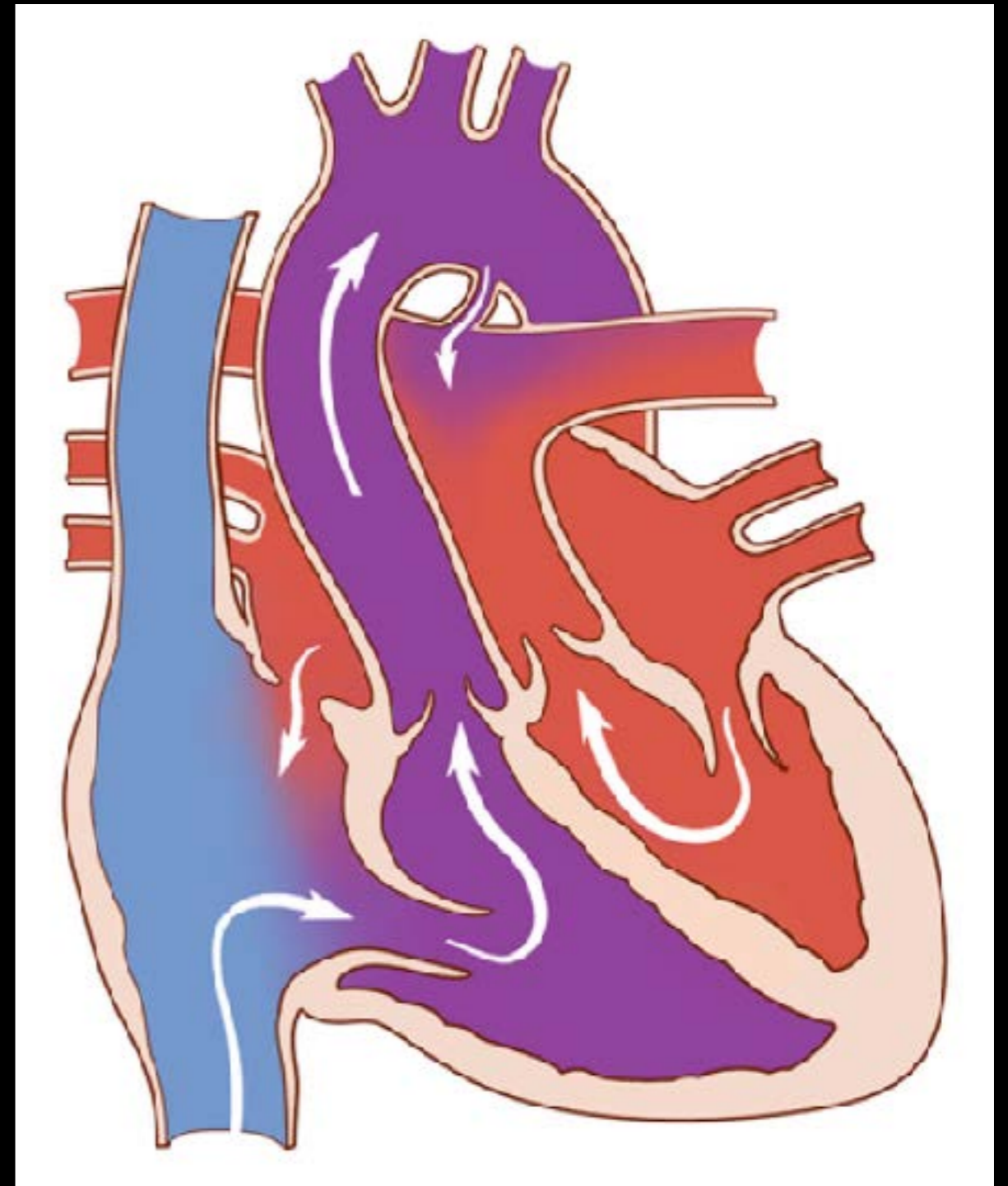
TGA - Anatomy

- VentriculoArterial Discordance
- VSDs
- Coronary Artery Anomalies
- Dynamic LVOT obstruction



TGA - Physiology

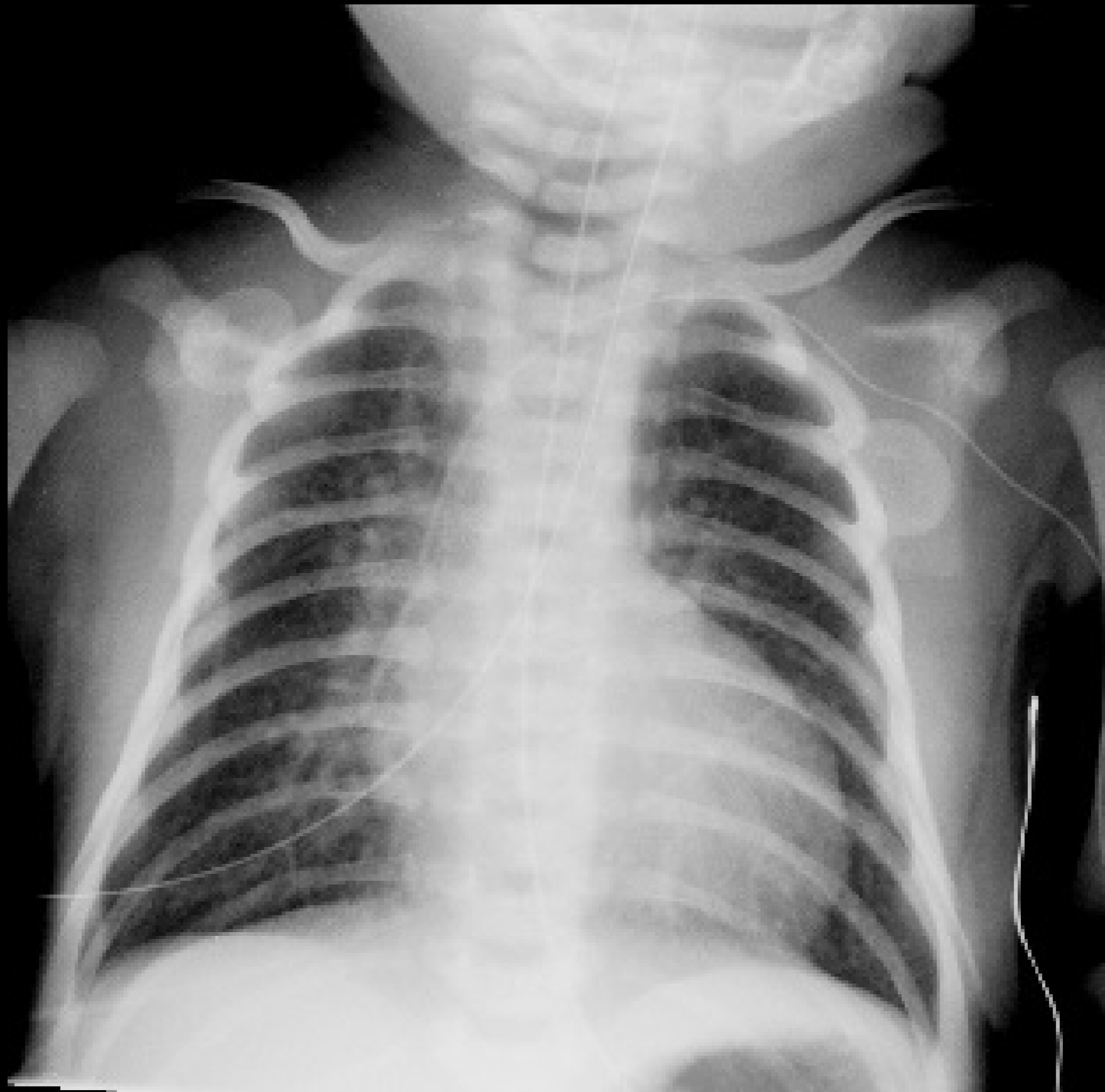
- Parallel Circulations
- Shunting
 - Ductus Arteriosus
- Mixing
 - Atrial Septum
 - Ventricular Septum



TGA - Clinical Manifestations

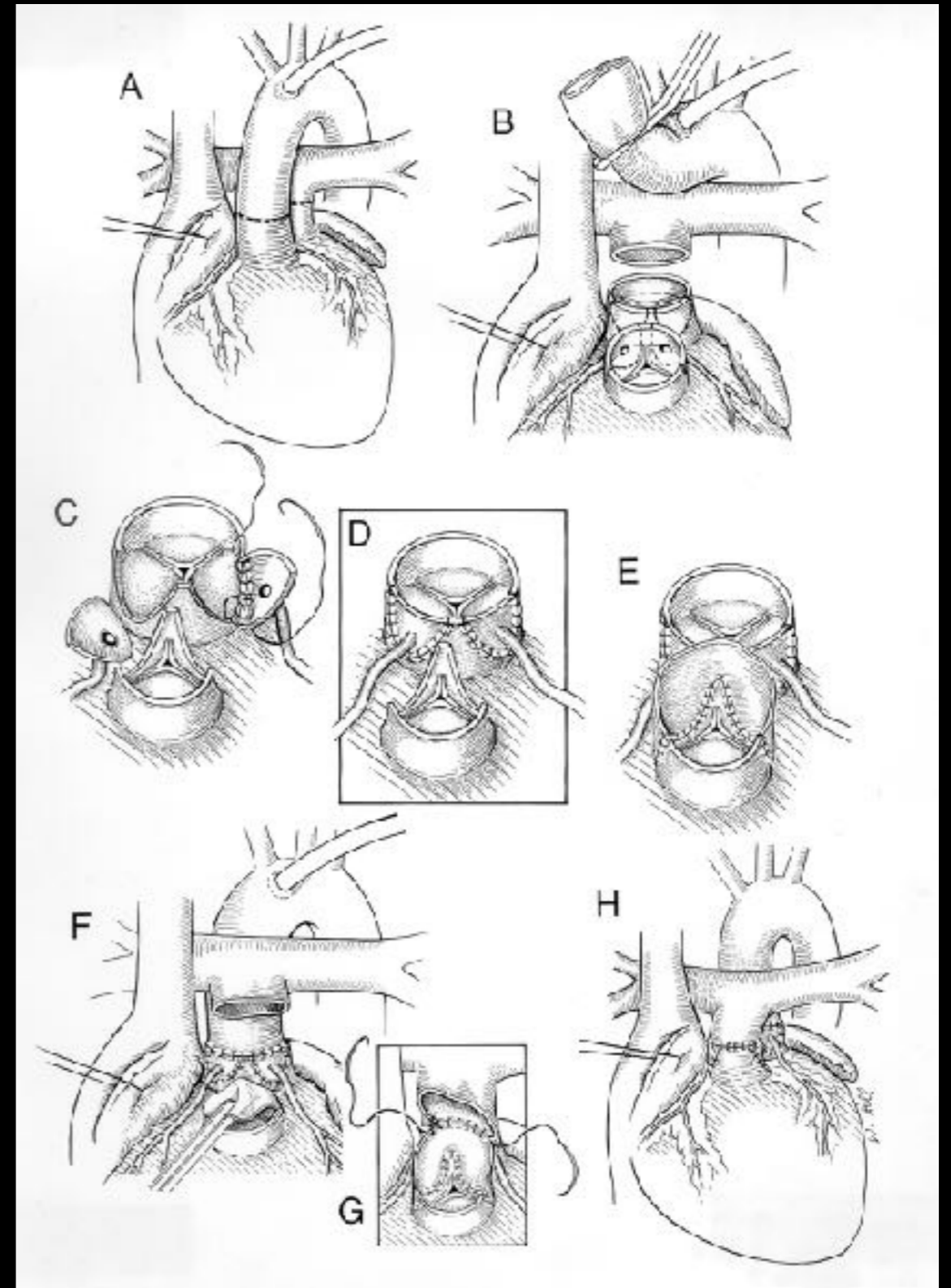
- Cyanosis
- Tachypnea
- If no VSD, no murmur
- If not recognized: moribund

CXR: “egg on string”



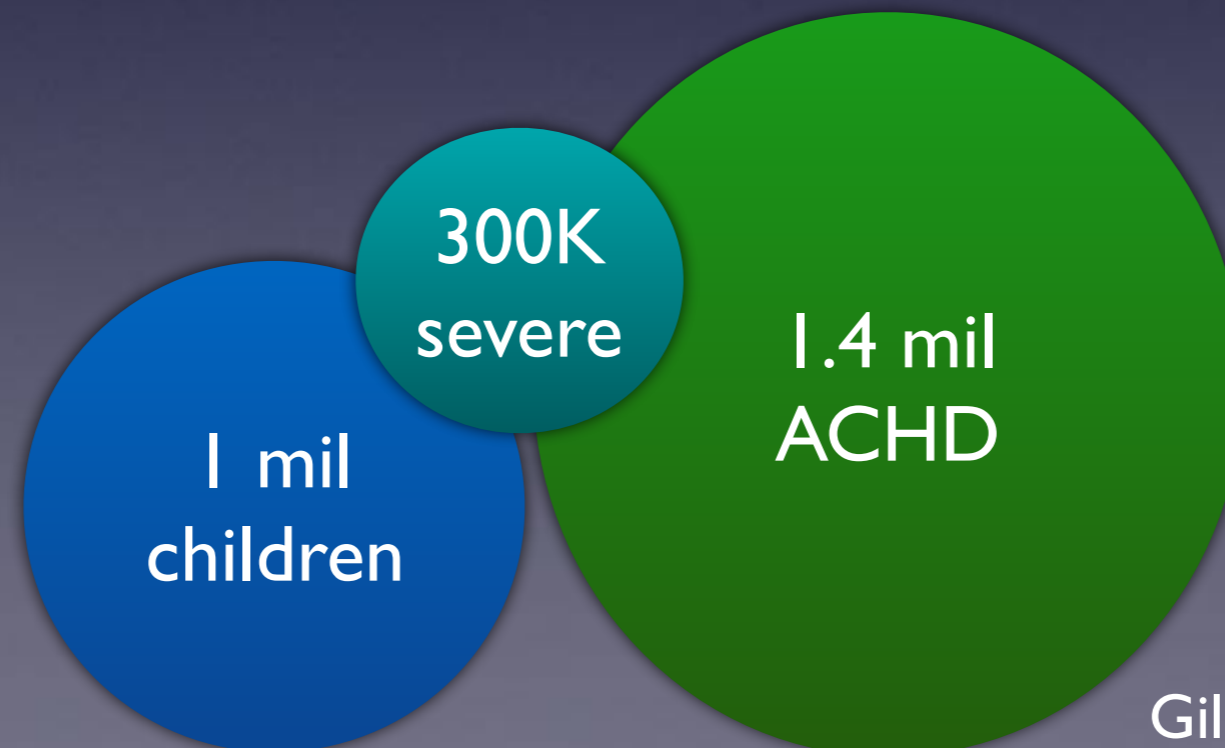
TGA - Management

- PGE
- Balloon Atrial Septostomy
- Surgical: Arterial Switch Operation

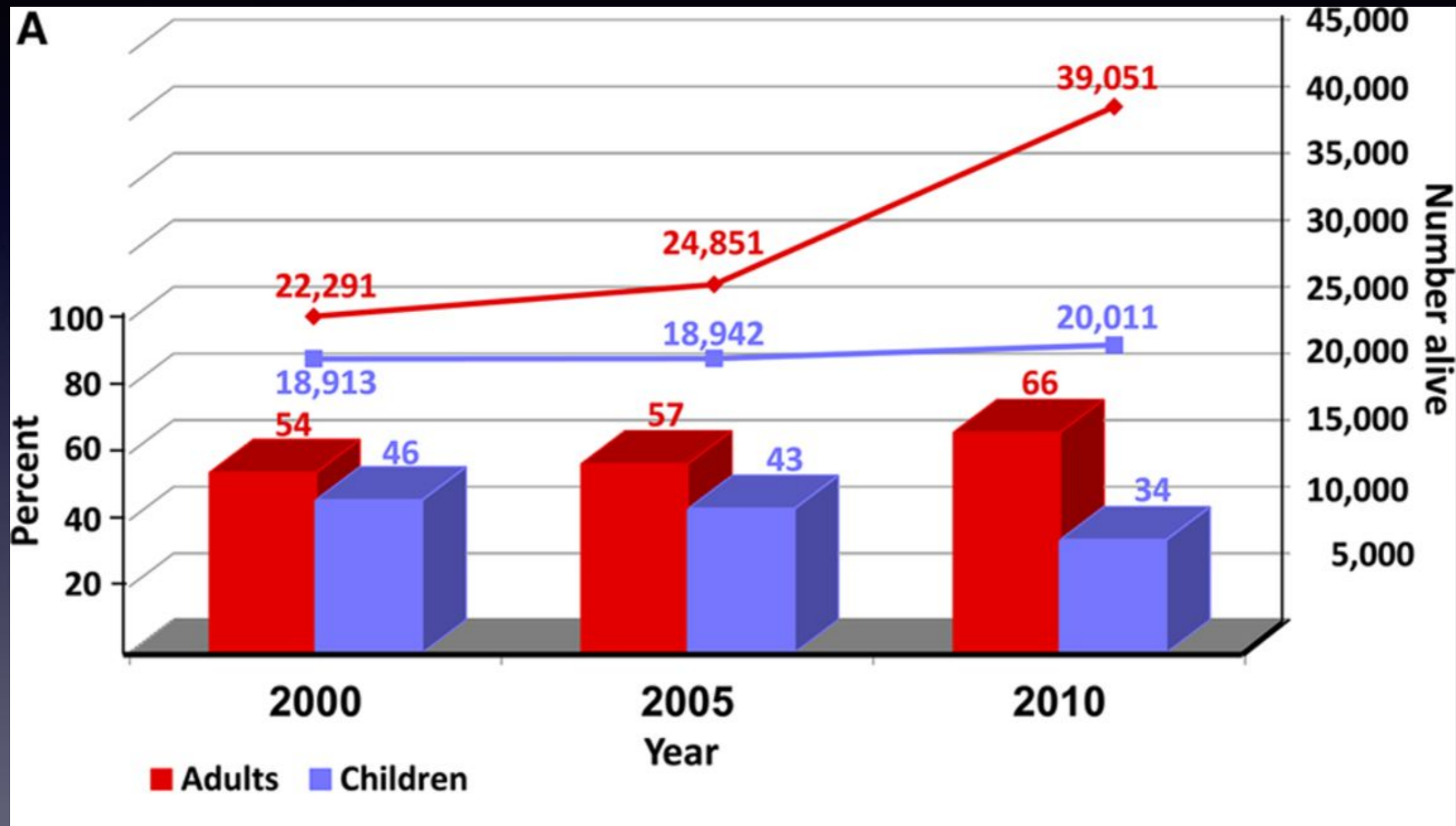


Epidemiology

- CHD occurs in 8/1000 live births
- The most common birth defect
- >90% of patients with severe disease survive to adulthood



CHD Population Growth



Marelli A et al. Lifetime Prevalence of Congenital Heart Disease in the General Population From 2000 to 2010. *Circ*. 2019.

Triumph: survival to adulthood is the



Challenges

Individual Concerns

Heart failure

Arrhythmias

Cyanosis

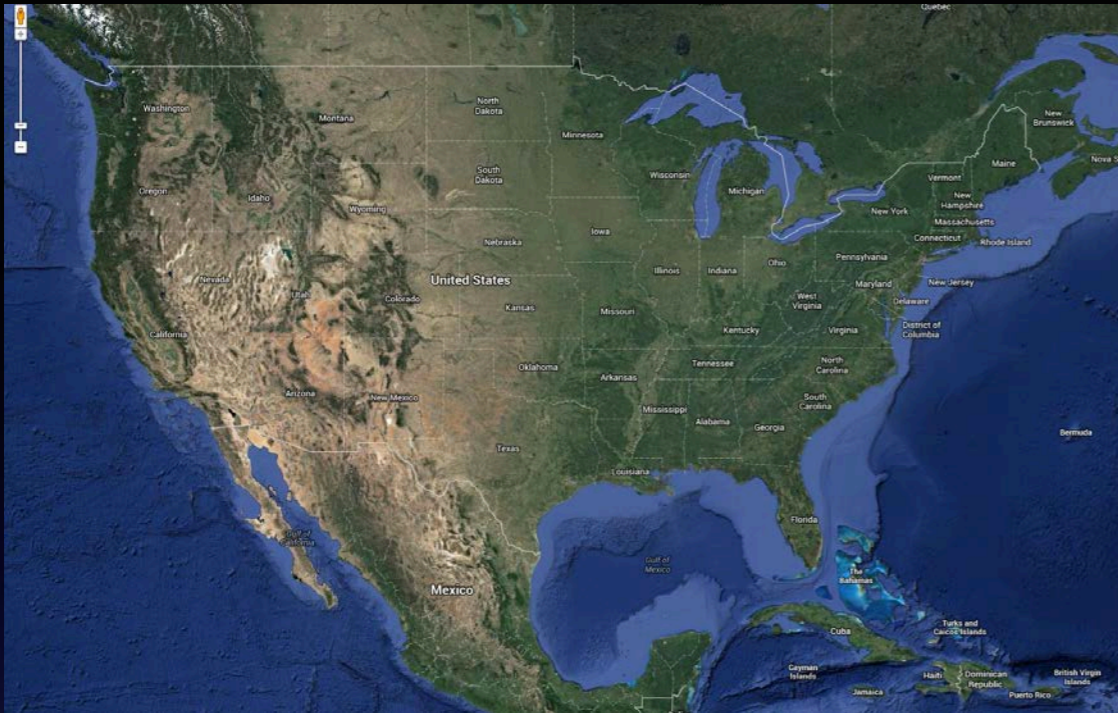
Unforeseen complications

ACHD Population

Do we have resources to care for this population?

Do we have the knowledge?

Do we have the quality metrics?



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