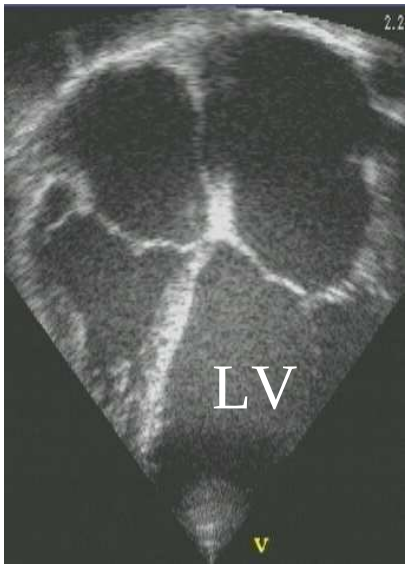
Segmental approach to normal and abnormal situs arrangement
- Echocardiography -

Jan Marek
Great Ormond Street Hospital
London

How the heart should be imaged?
"European Chaos"

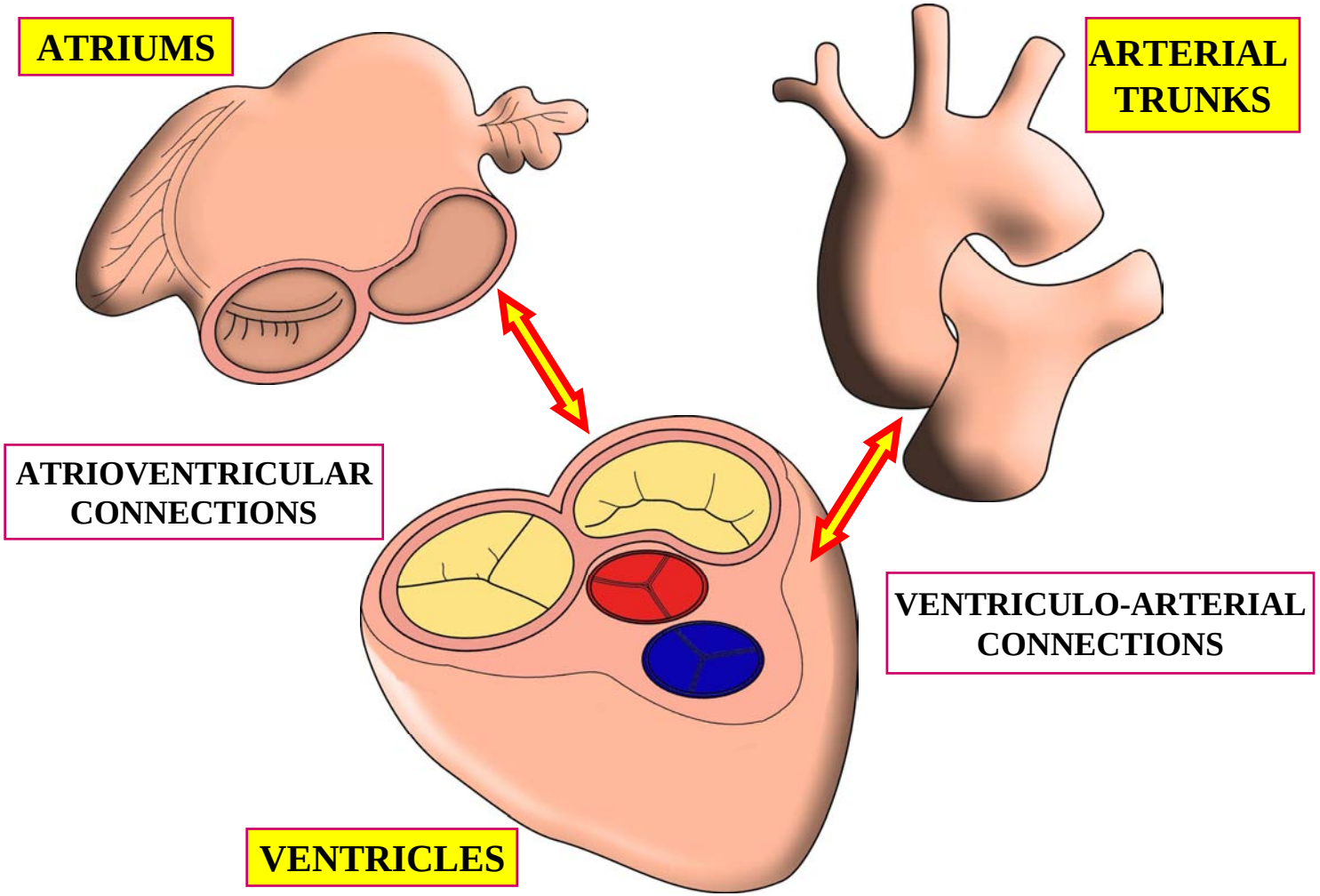
- "Transatlantic" way



- "Adult" way

- "Dutch" way

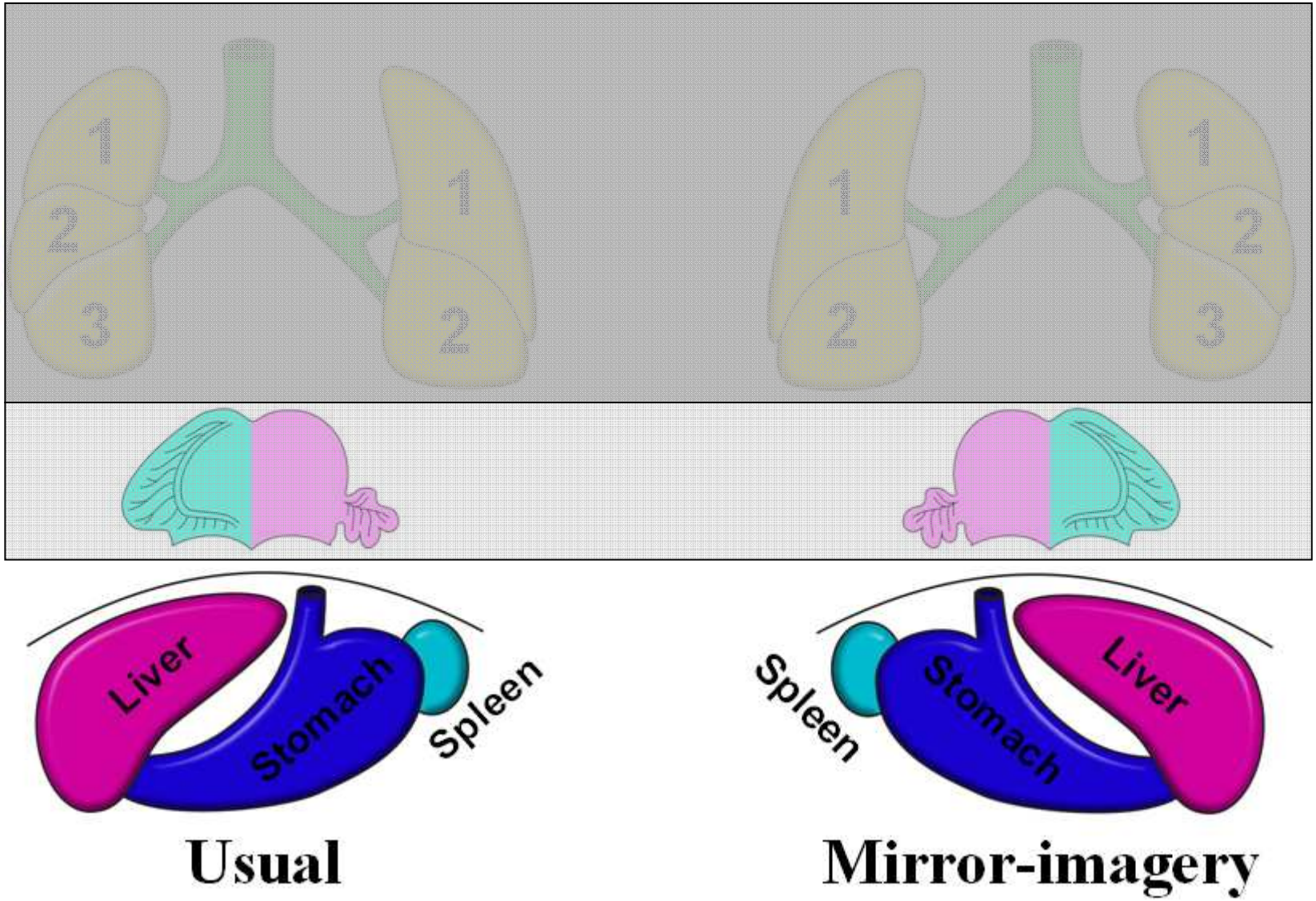
SEQUENTIAL SEGMENTAL ANALYSIS



Courtesy RH Anderson

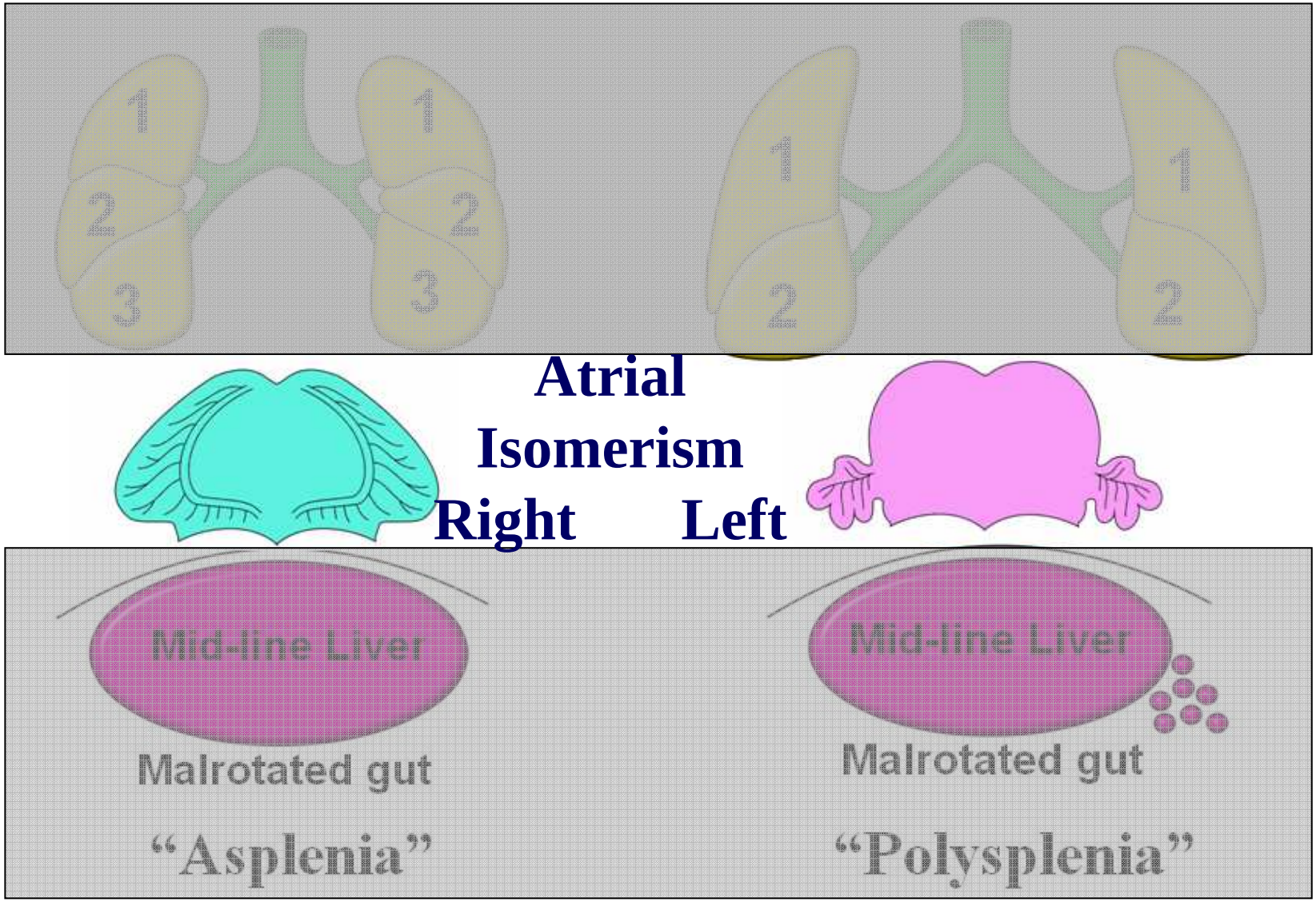
- Abdominal situs !
- Atriums - Atrial situs (systemic and pulmonary venous connections)
- AV connections
- Ventricles
- VA connections
- Aorta, PA trunk (AO arch and PA branches)

LATERALIZED BODILY ARRANGEMENT



Courtesy RH Anderson

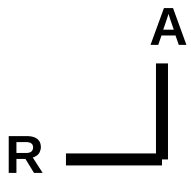
VISCERAL HETEROTAXY

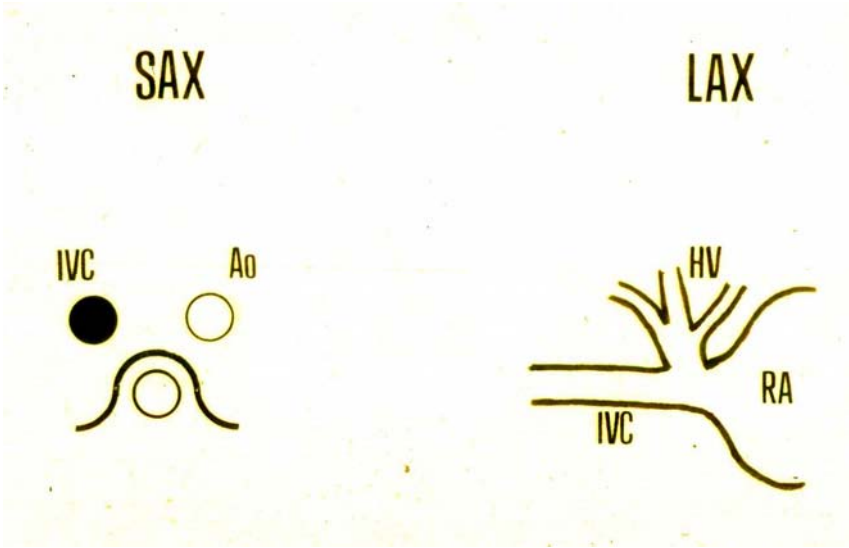


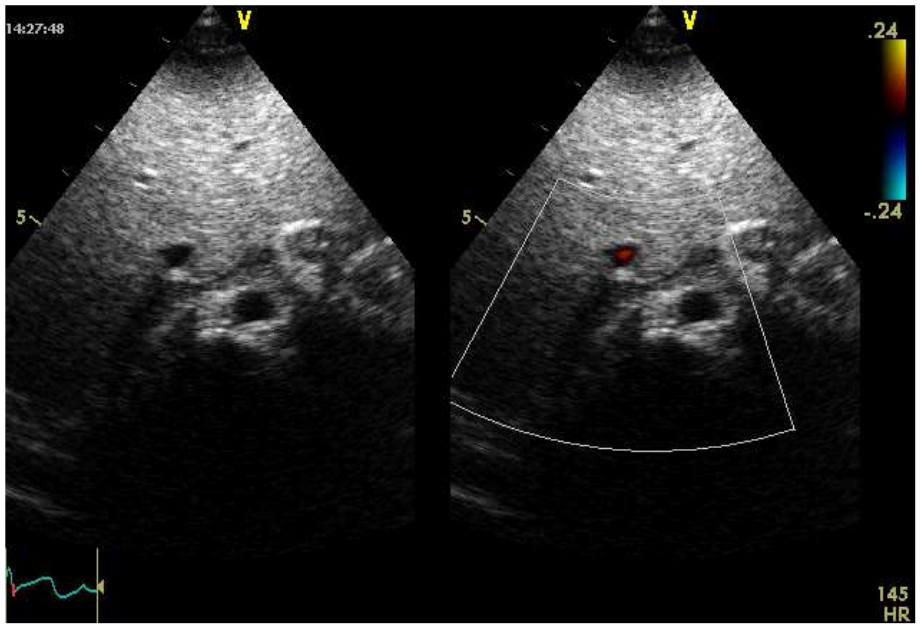
Courtesy RH Anderson

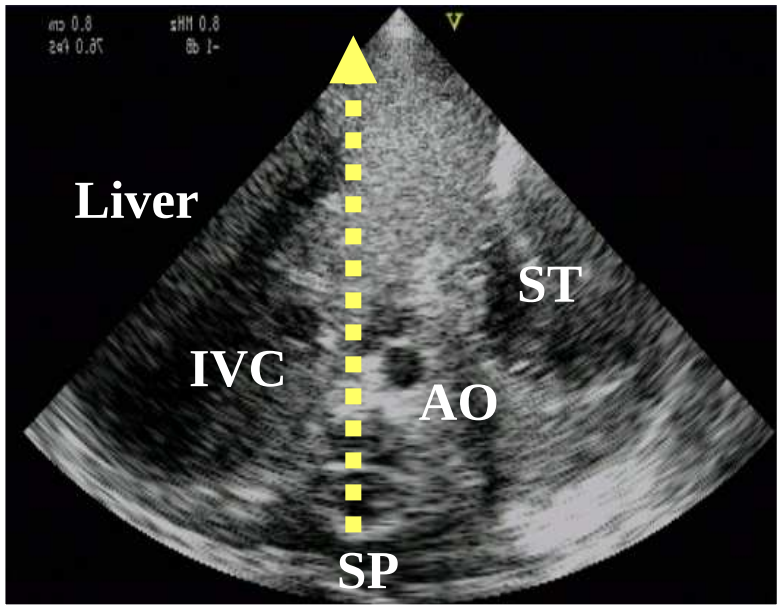
- **Abdominal situs**
- Atriums - Atrial situs (systemic and pulmonary venous connections)
- AV connections
- Ventricles
- VA connections
- Aorta, PA trunk (AO arch and PA branches)

Usual Arrangement (Solitus)

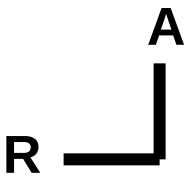


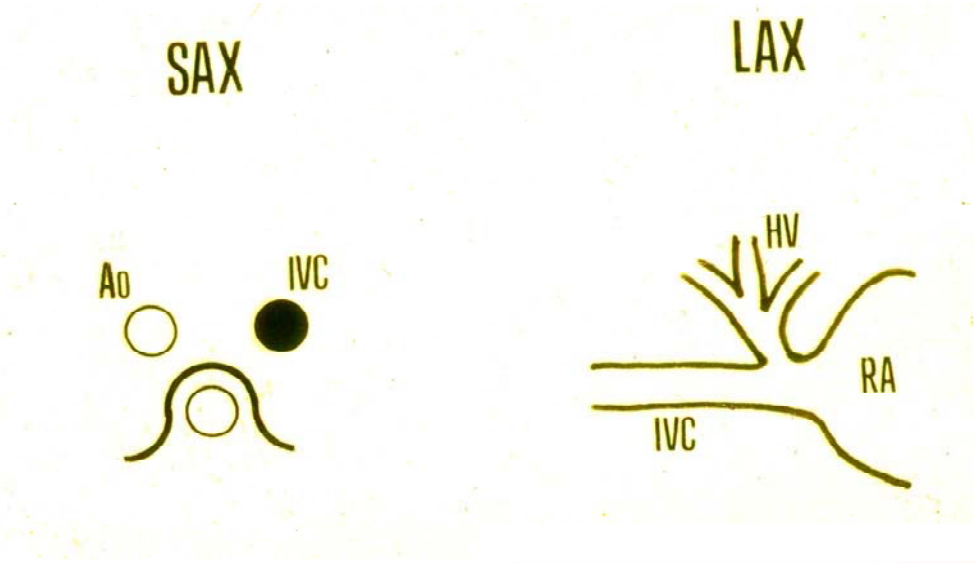


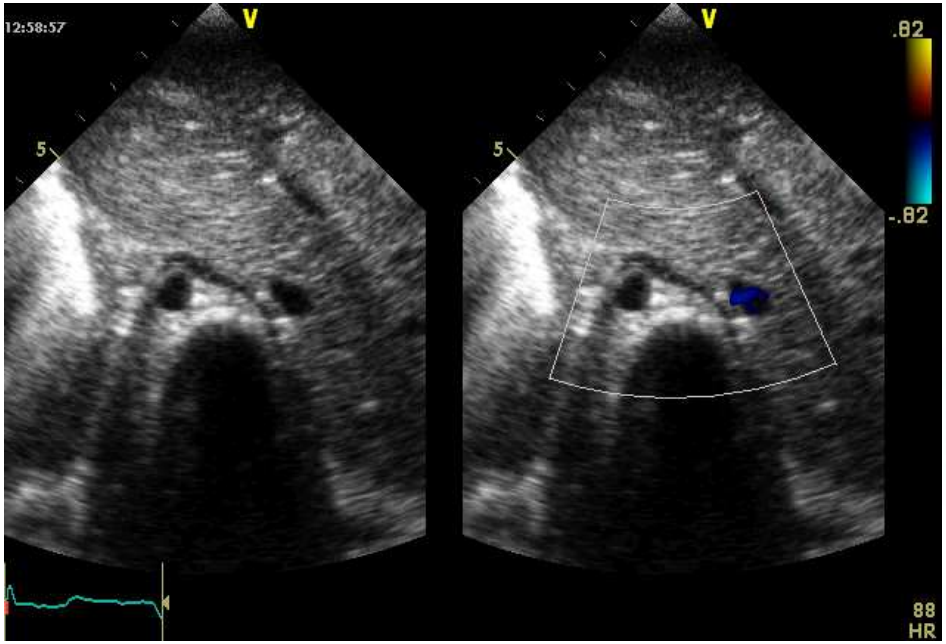


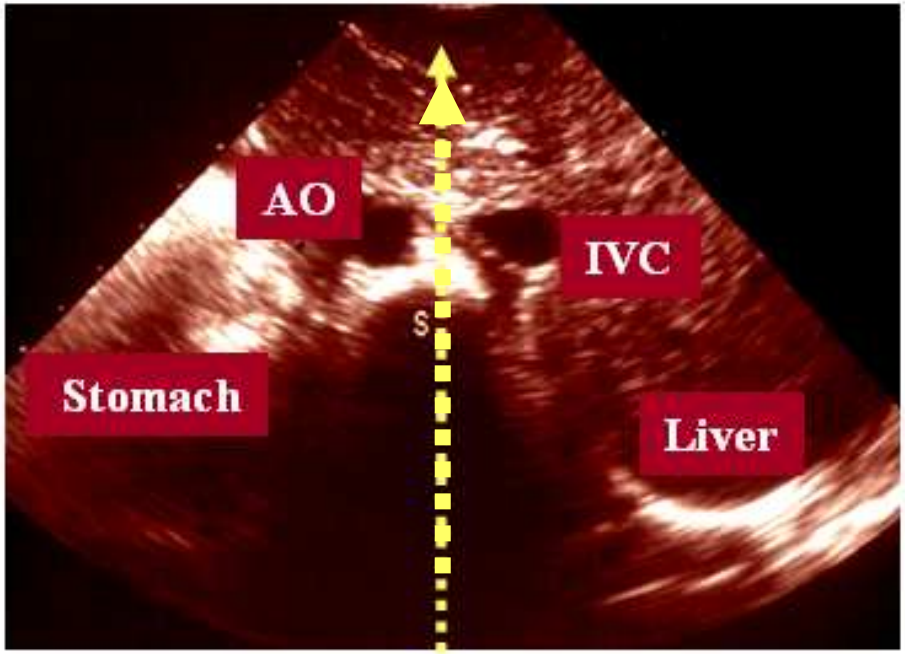


Mirror Imagery (Inversus)

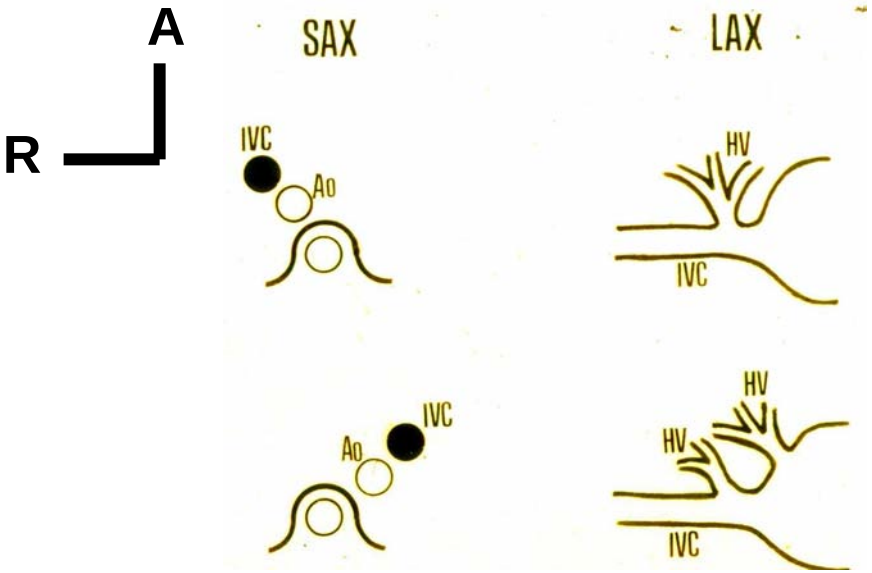


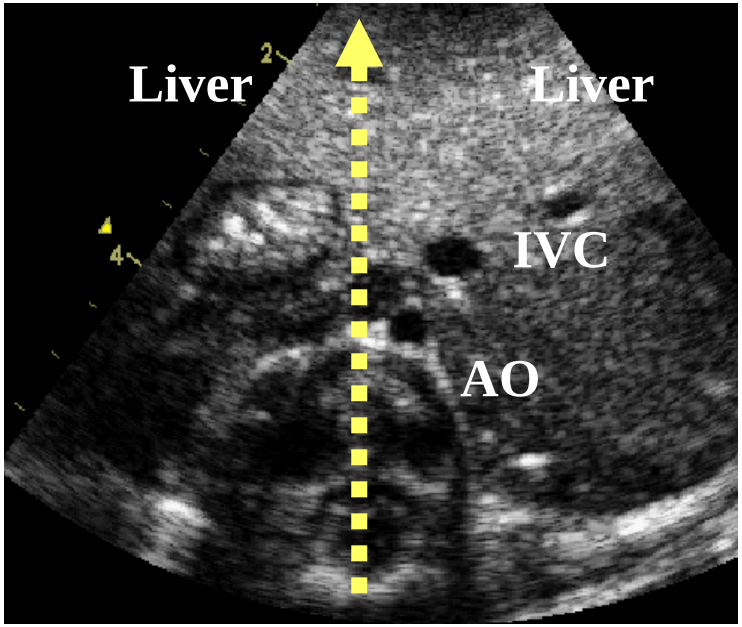


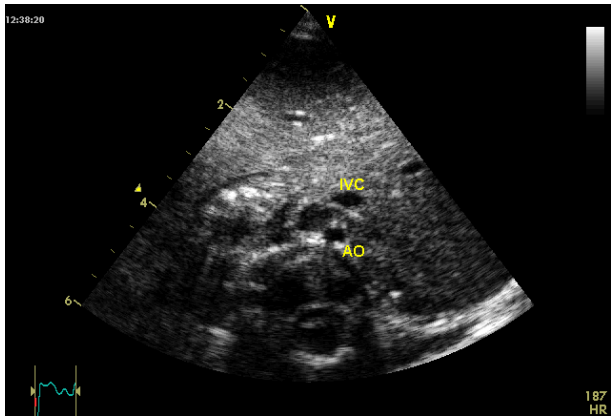


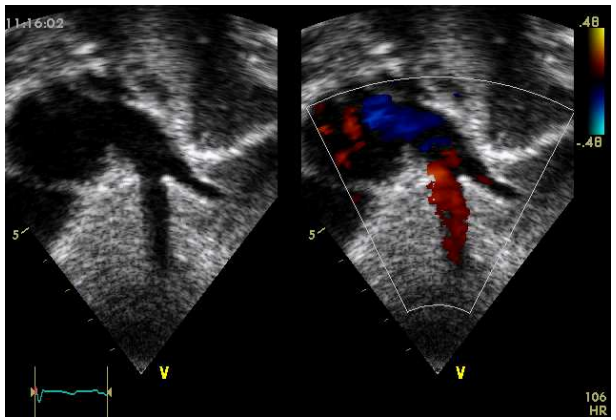


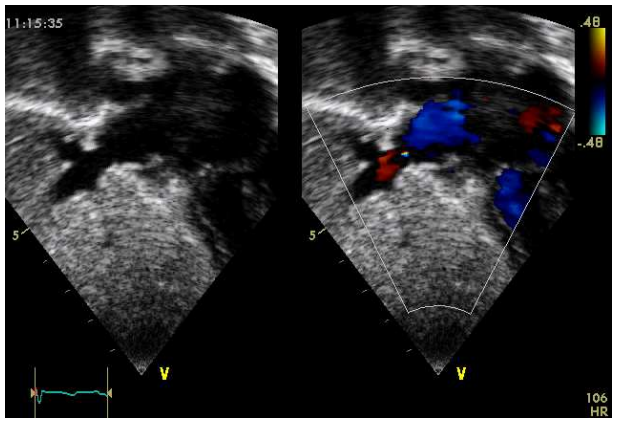
Right Isomerism (Asplenia)



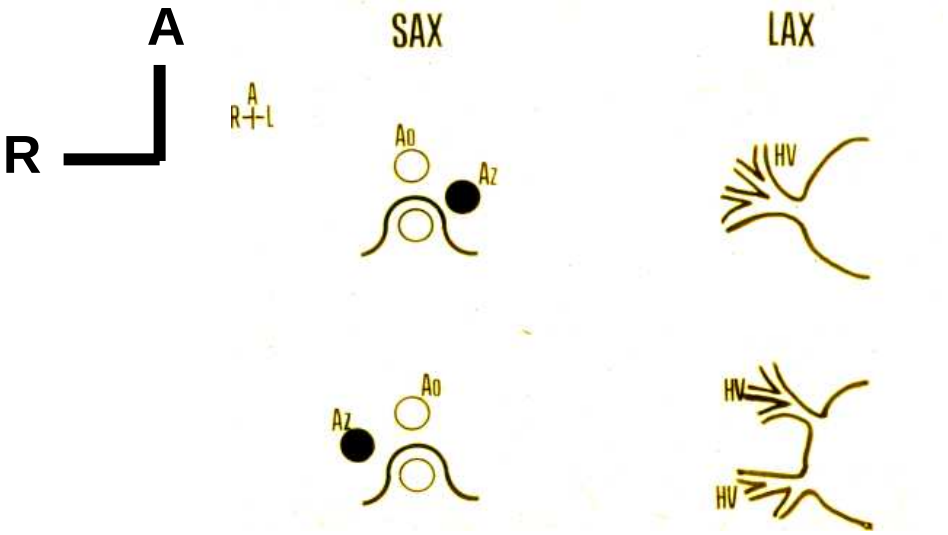


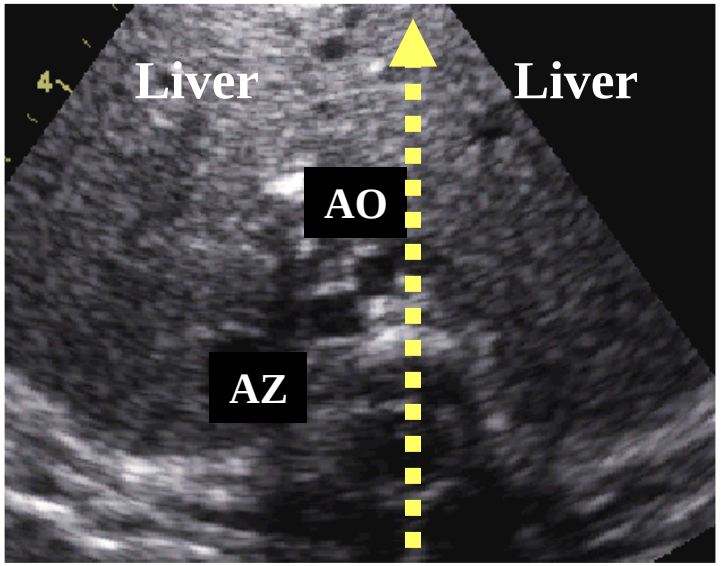


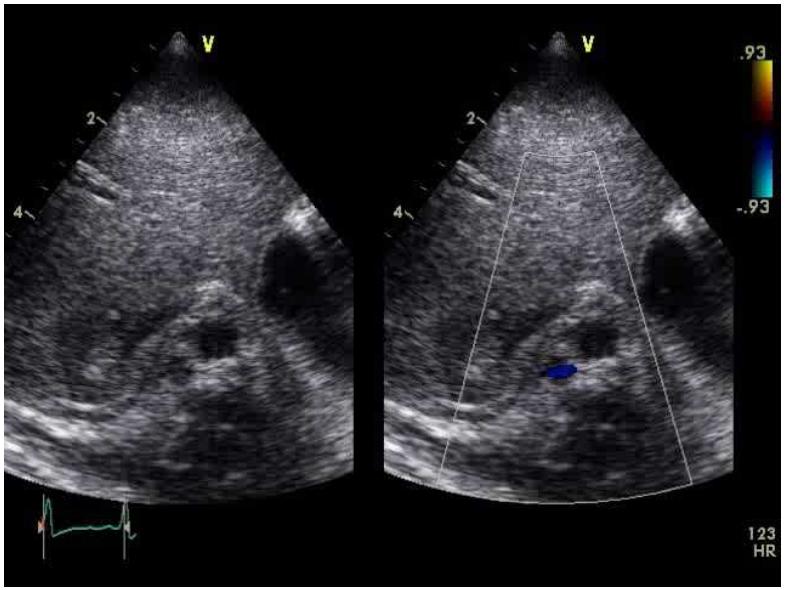


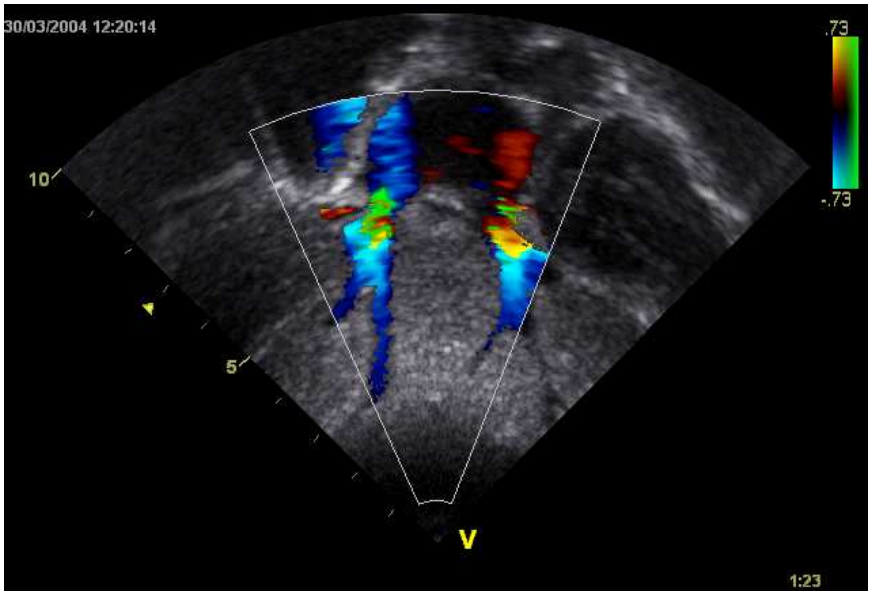


Left Isomerism (Polysplenia)

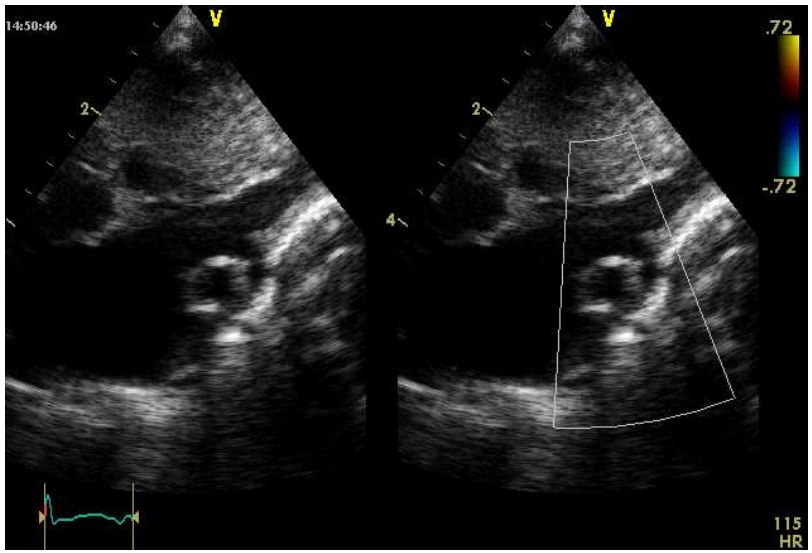


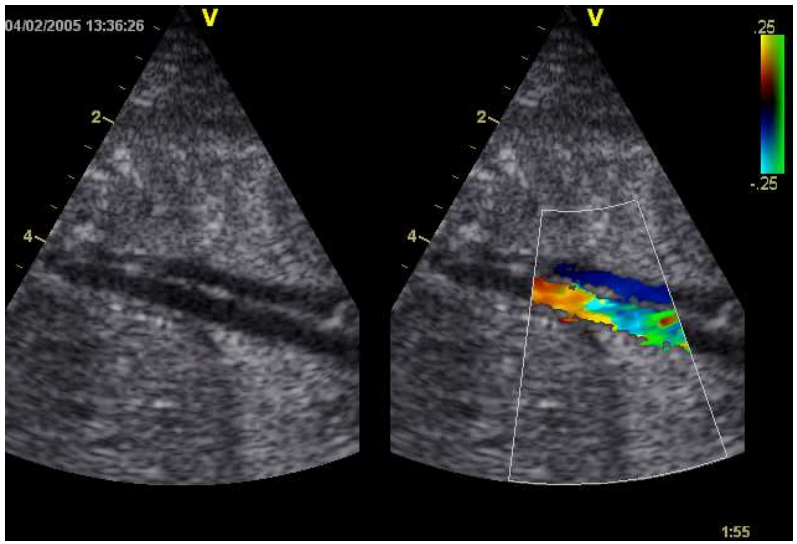




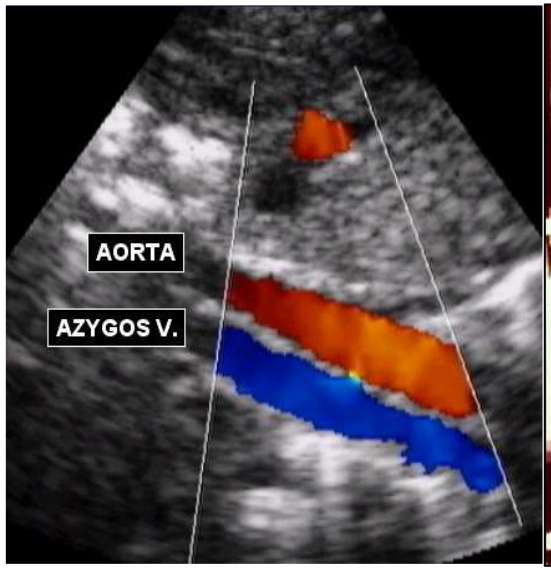


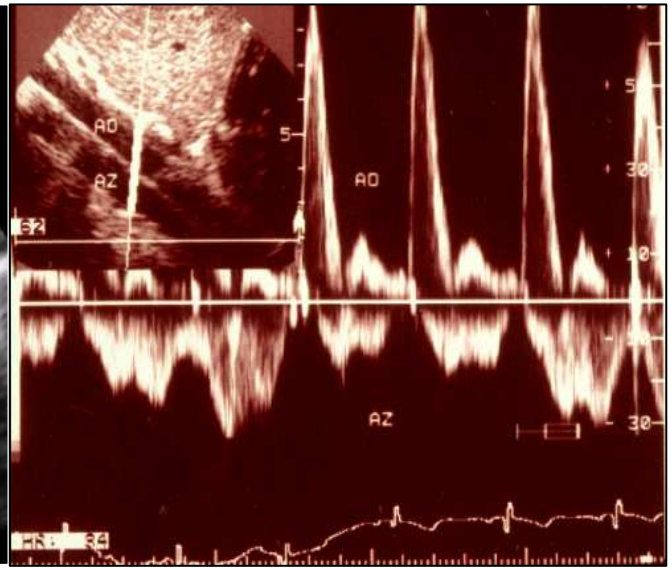
Left Isomerism (Polysplenia)





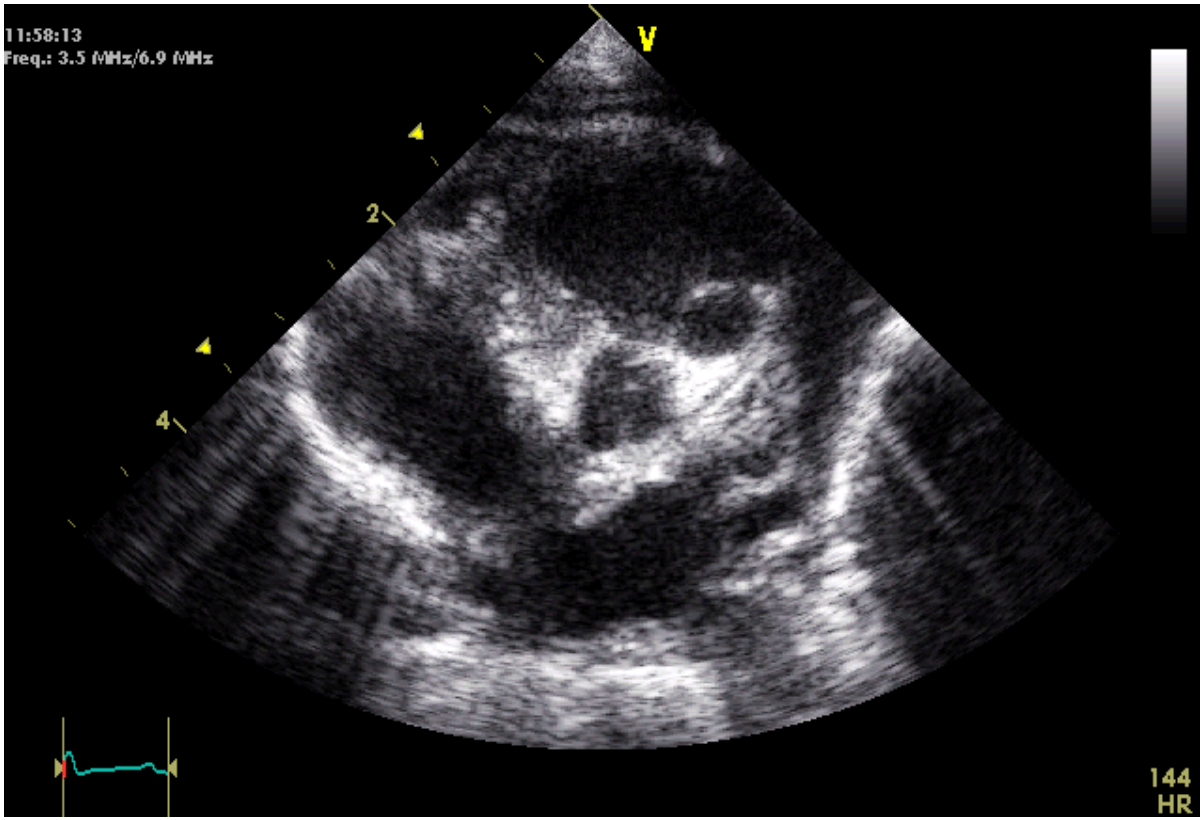
Fetus
32 WoG

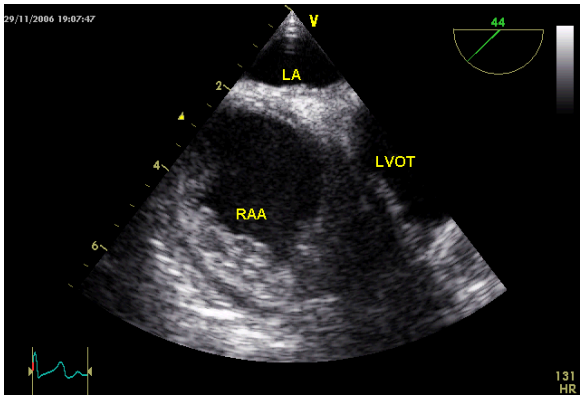


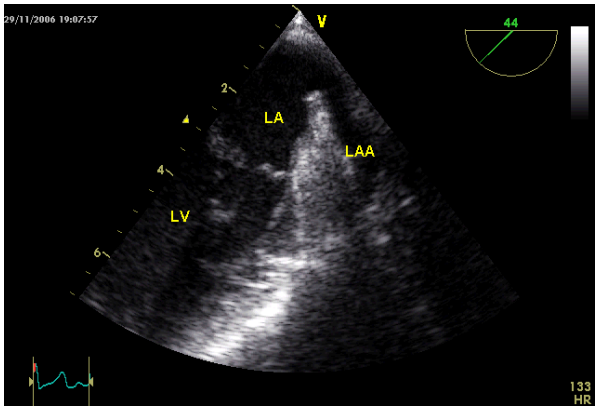


- Abdominal situs
- **Atriums - Atrial situs** (systemic and pulmonary venous connections)
- AV connections
- Ventricles
- VA connections
- Aorta, PA trunk (AO arch and PA branches)

Usual Arrangement (Solitus)
- Atrial appendages -

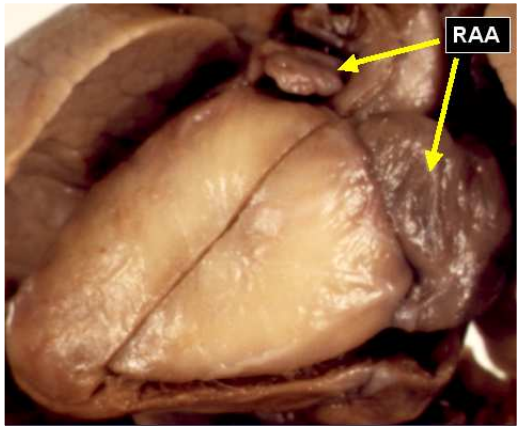




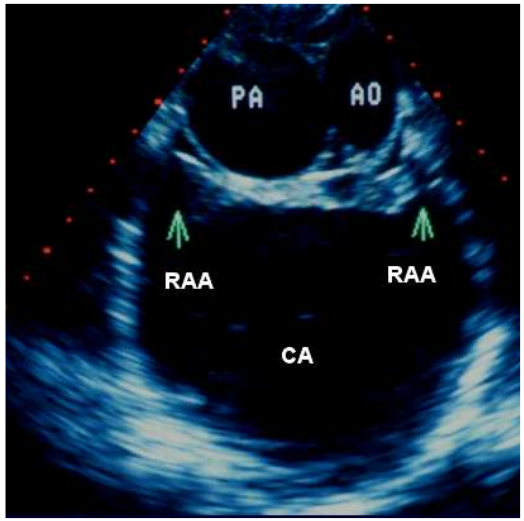


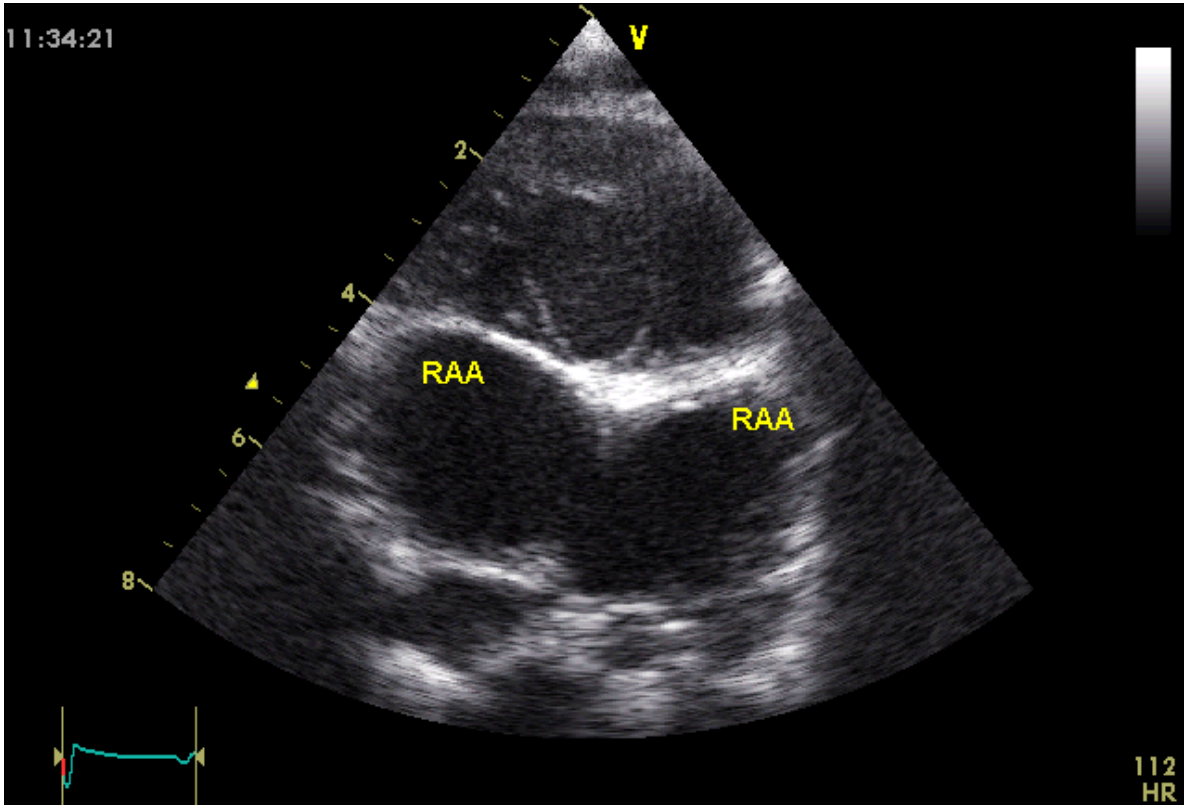
Right Isomerism (Asplenia)
- Atrial appendages -

Fetus 20. WoG

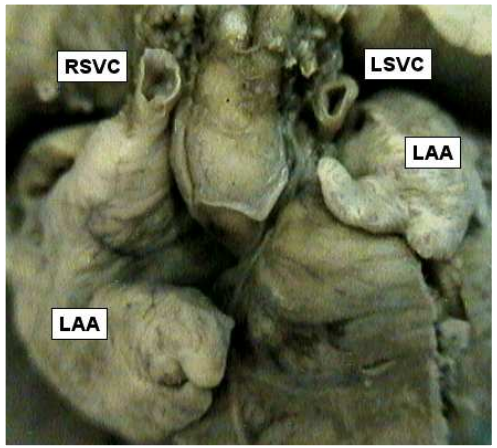


Courtesy V.Povysilova

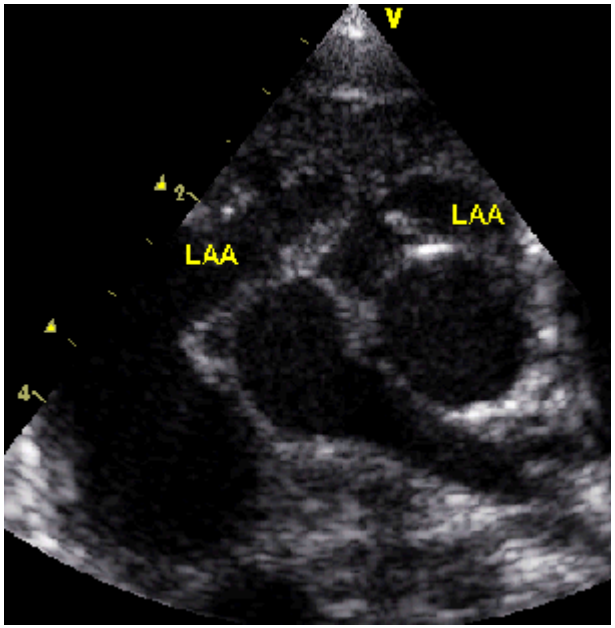


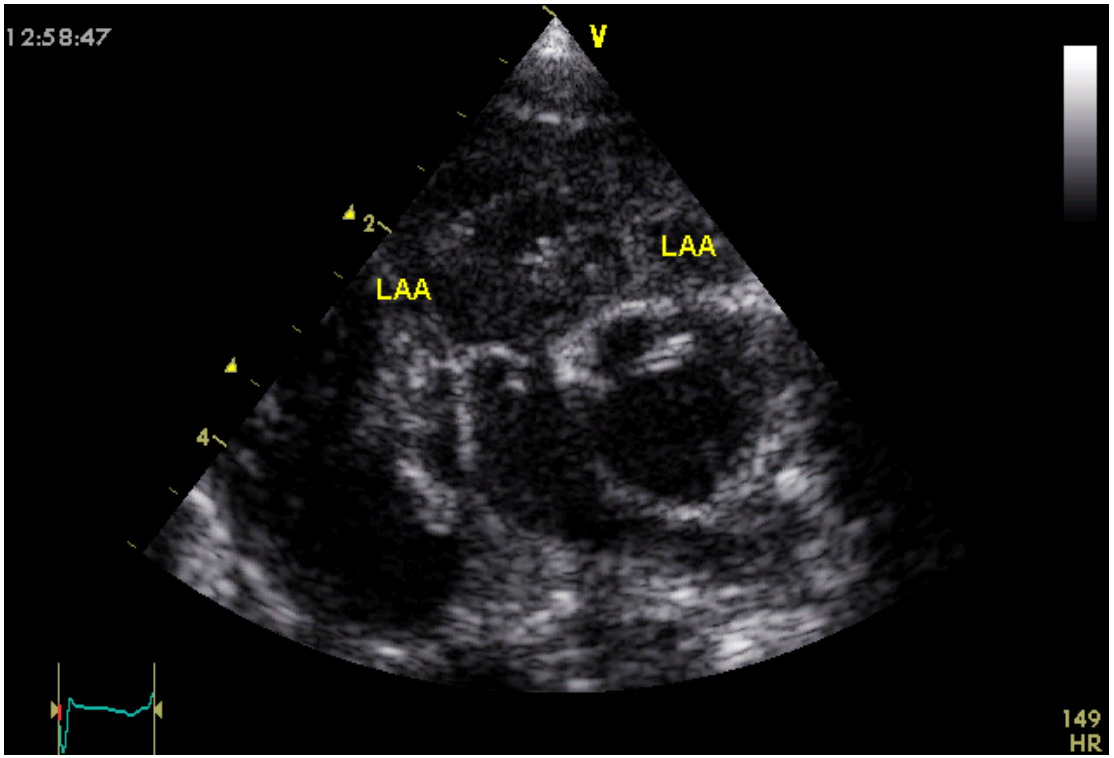


Left Isomerism (Polysplenia)
- Atrial appendages -

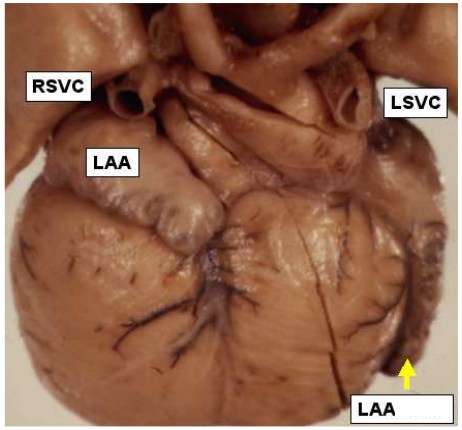


Courtesy V. Povysilova

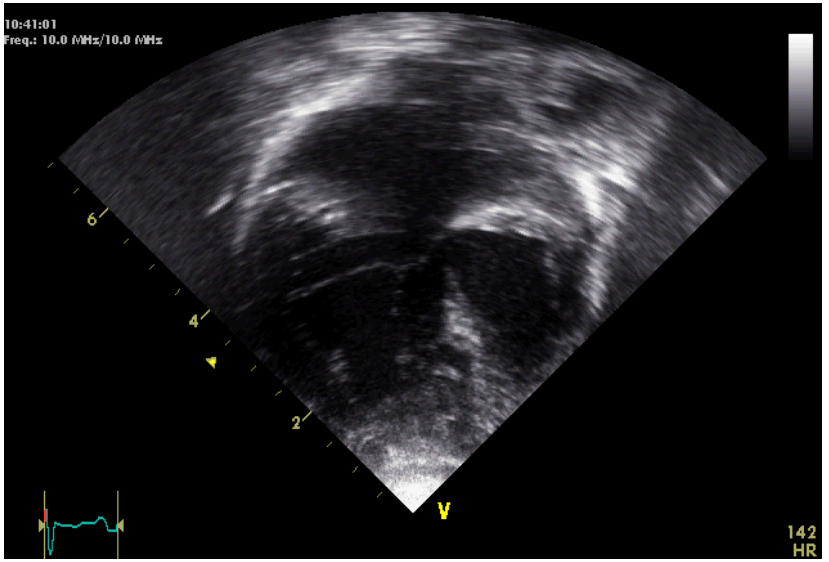


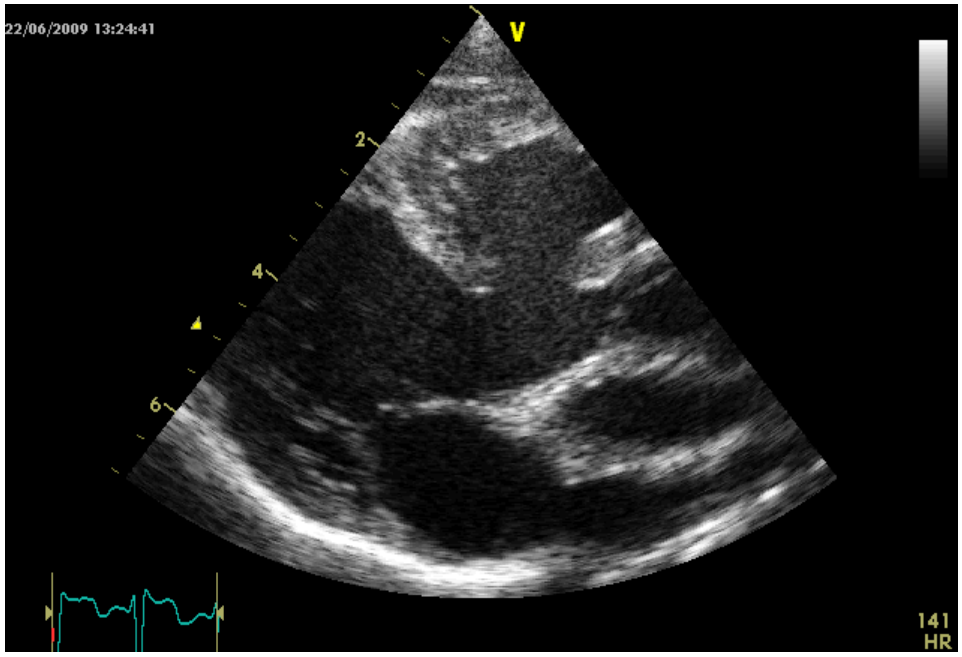


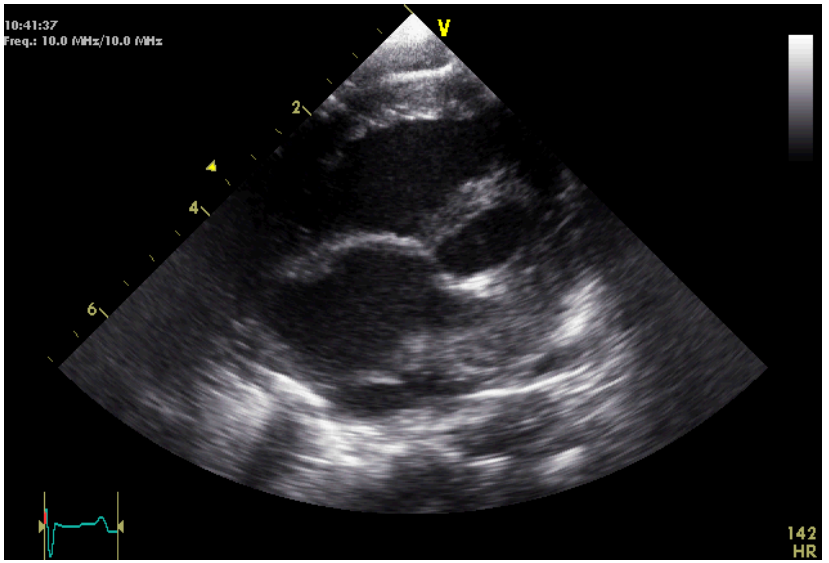
Atrial appendages
- Juxtaposition -



Courtesy V. Povysilova







“Usual” arrangement
SOLITUS

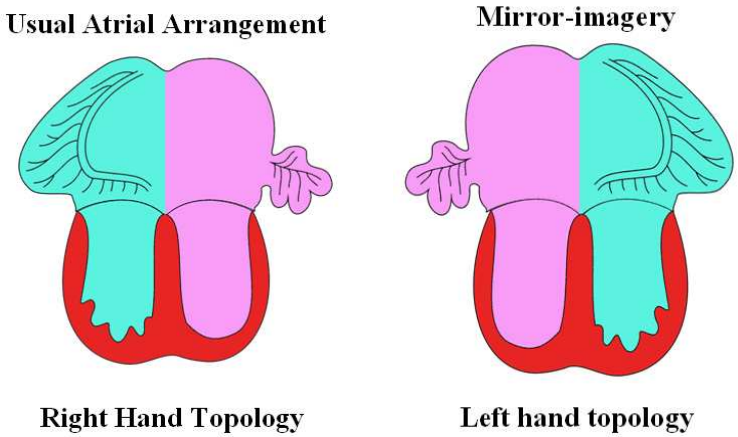
“Unusual arrangement”
ISOMERISMUS

Courtesy Ian D Sullivan

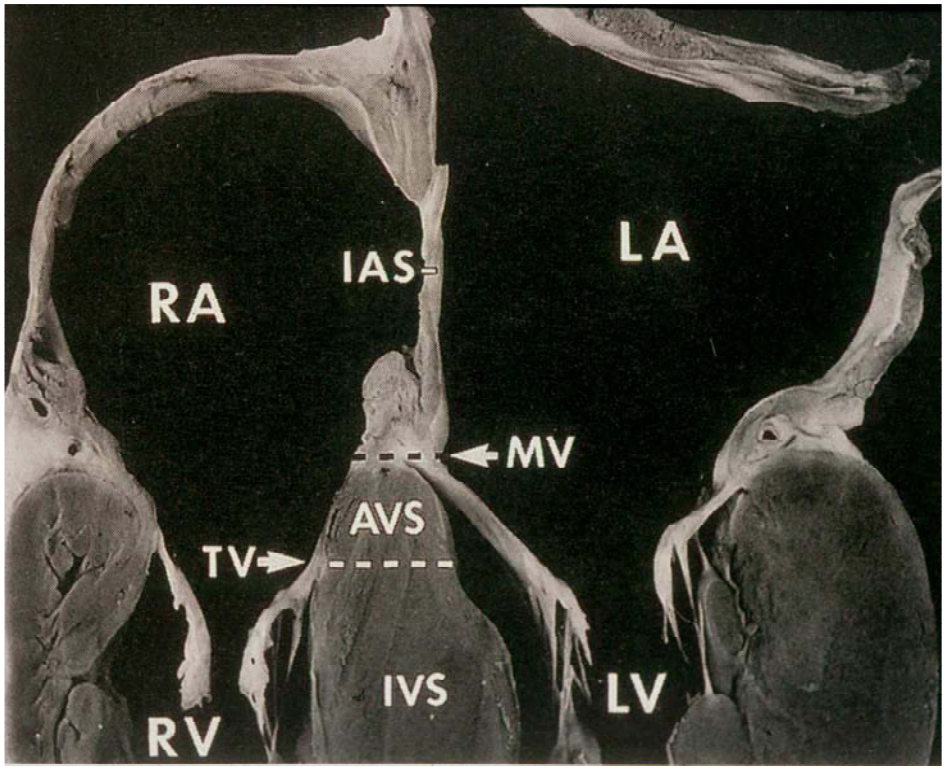
- Abdominal situs
- Atriums - Atrial situs (systemic and pulmonary venous connections)
- **AV connections**
- Ventricles
- VA connections
- Aorta, PA trunk (AO arch and PA branches)

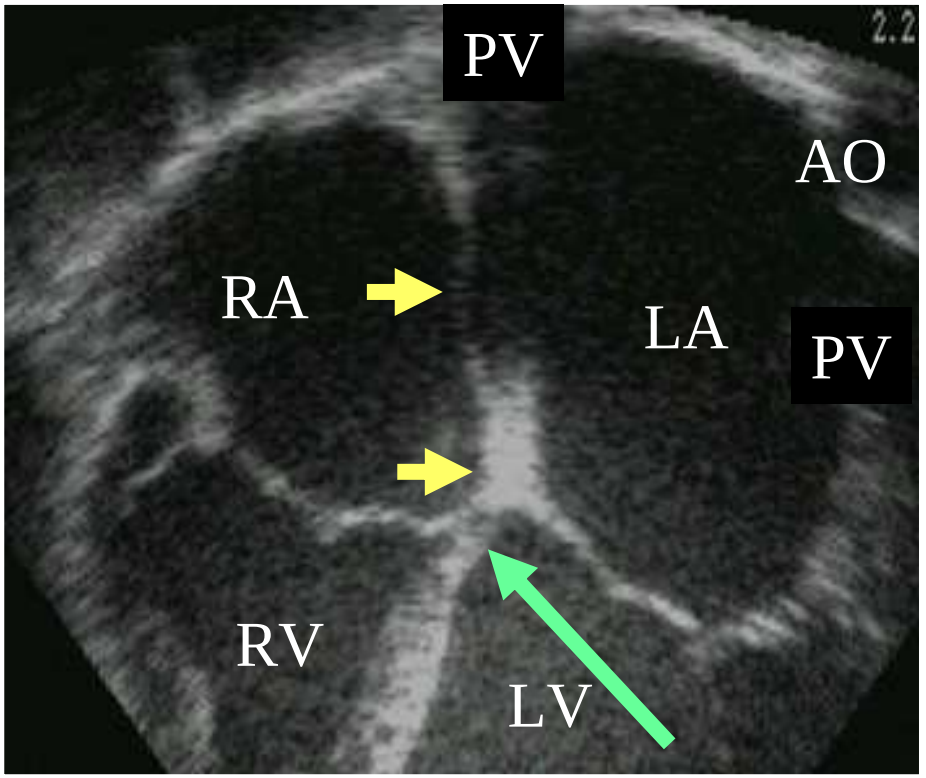
Atrio-ventricular Connections

- Concordant
- Discordant
- Univentricular AV connections
  - Absent AV connection
  - Common AV valve
  - Double inlet connections



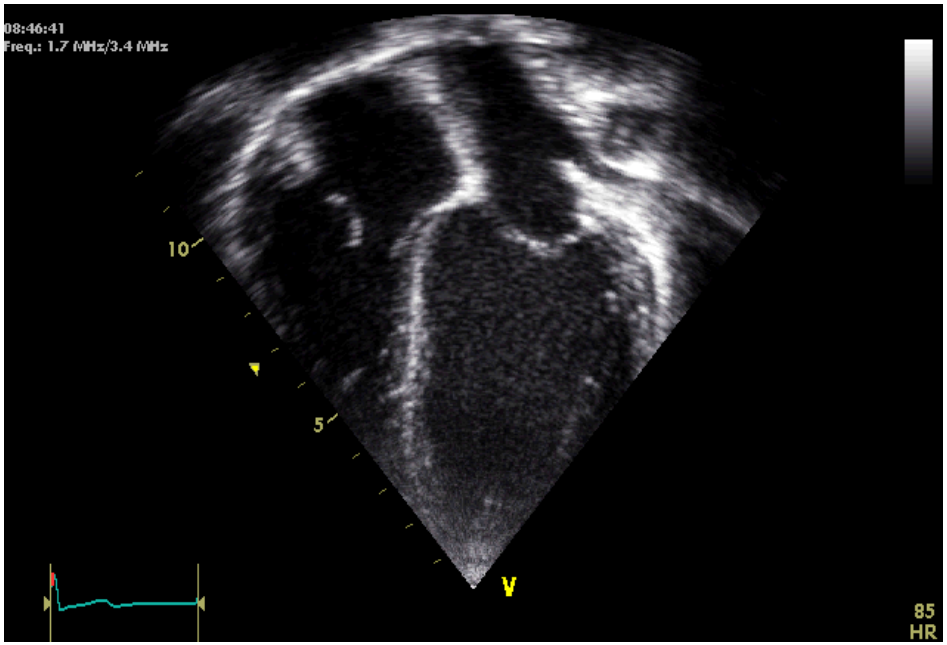
Concordant Connections



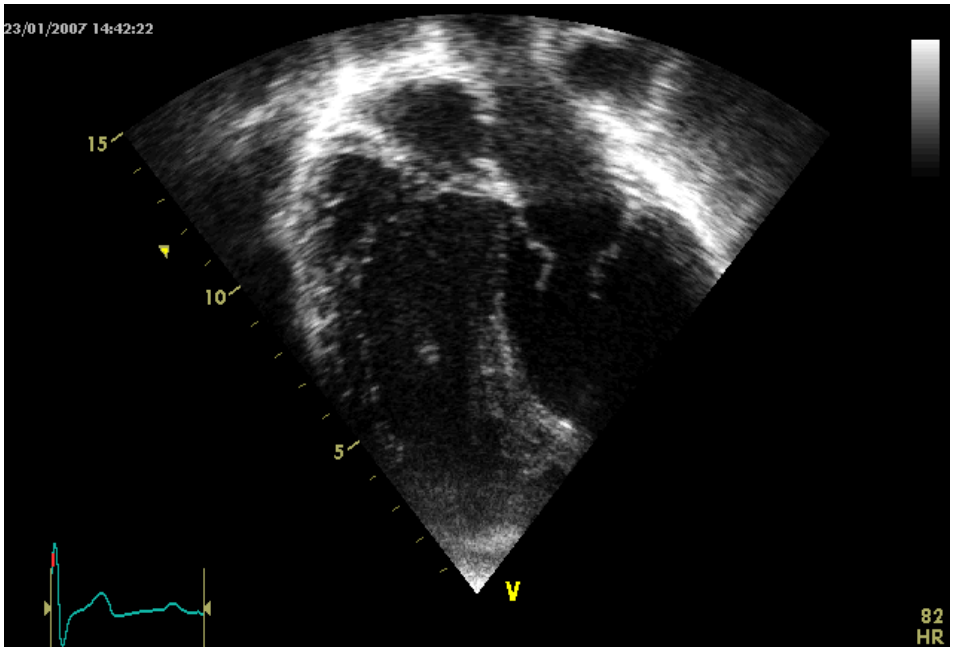


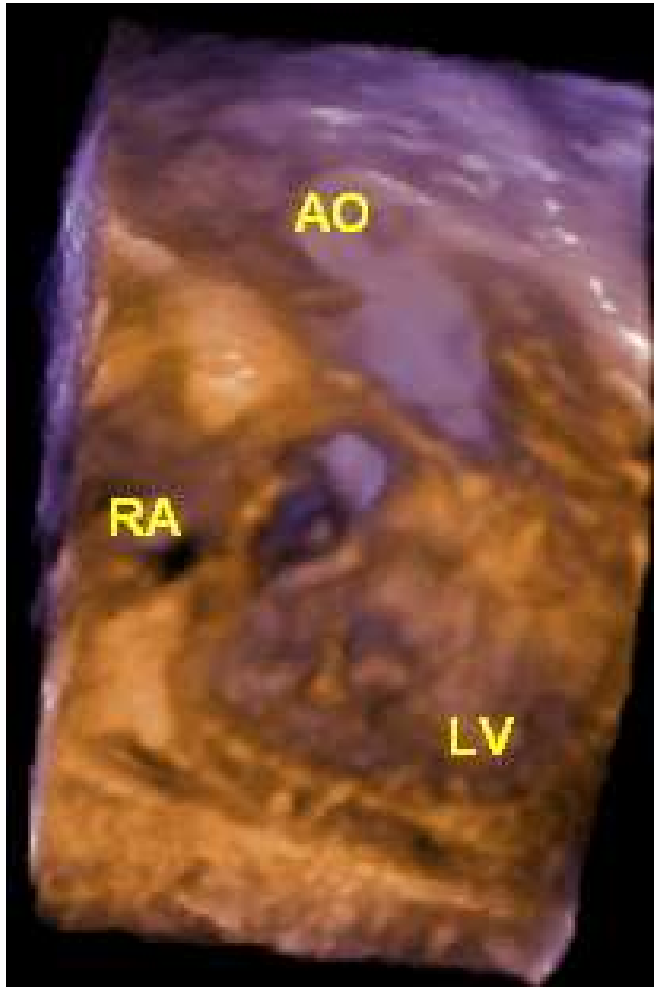
Offsetting

Concordant AV connection



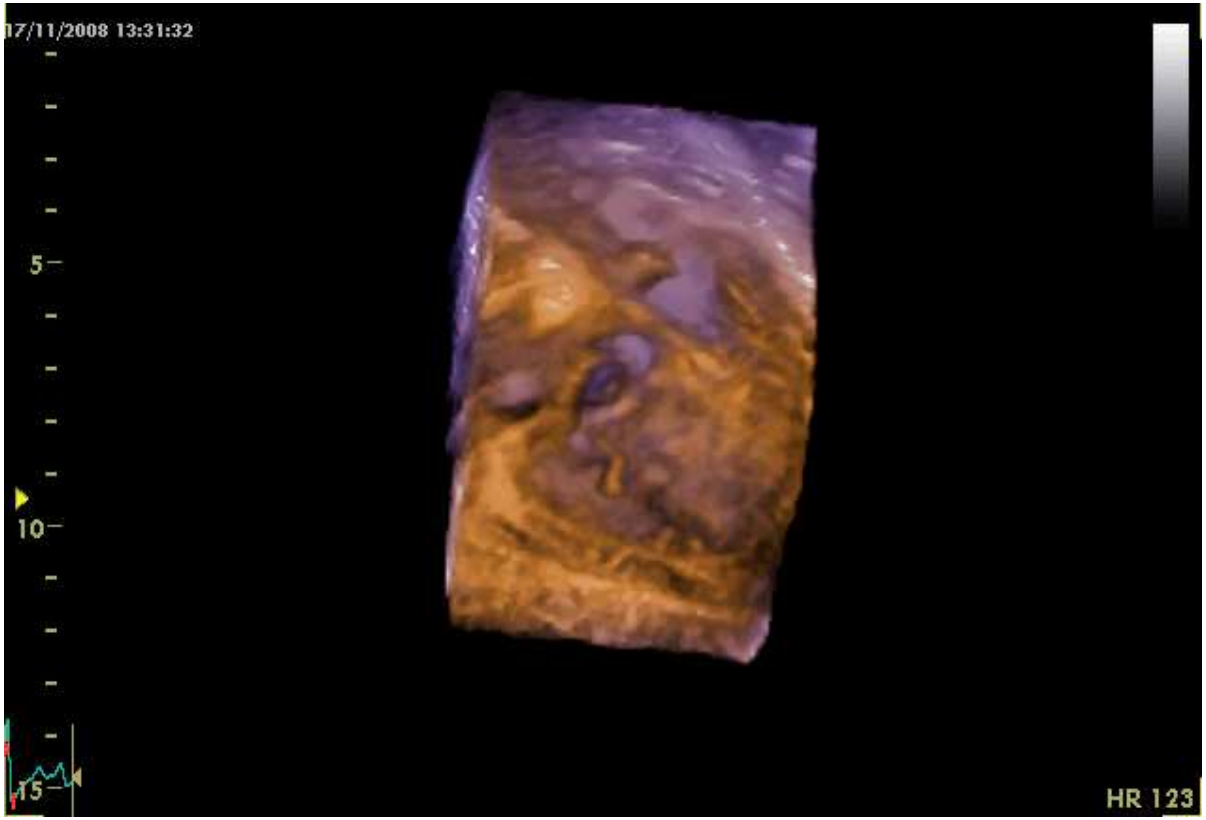
Discordant AV connection





Discordant Connections

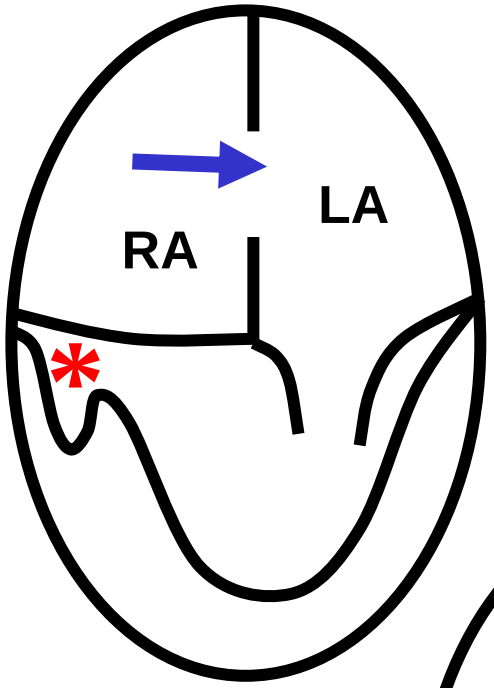
CCTGA
DORV/VI
PA/VSD/VI



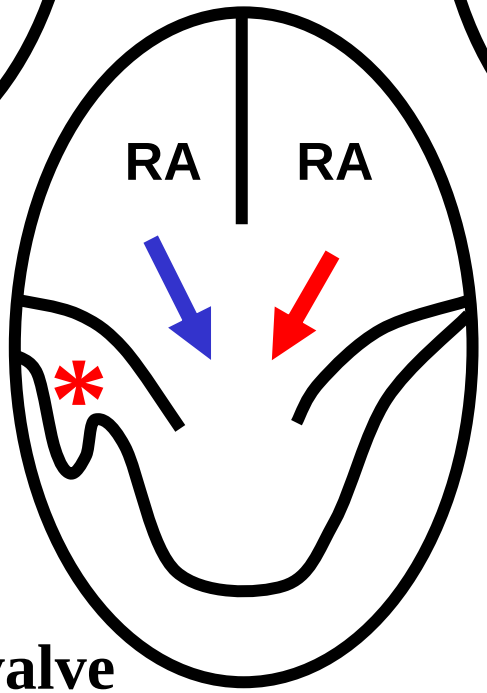
Univentricular AV Connections

- Absent AV connection (right / left)
  - Tricuspid / mitral atresia
- Common AV valve
  - With single ventricle
- Double inlet ventricle
  - Connection of both AV valve to the same ventricle:
    - Anatomically left
    - Anatomically right
    - Undetermined
  - (rudimentary chamber always present)

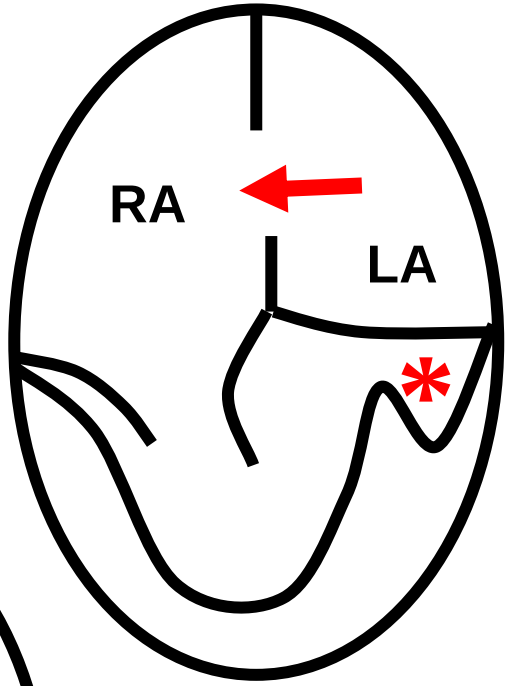
Univentricular AV connections



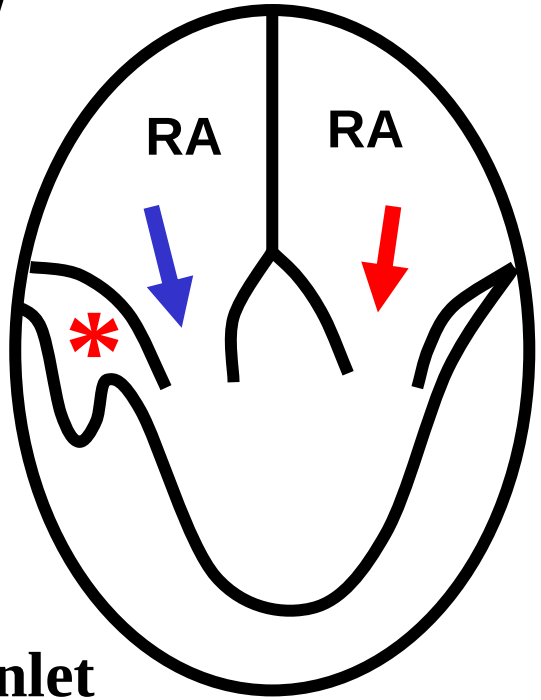
Common AV valve



Absent right AV connection

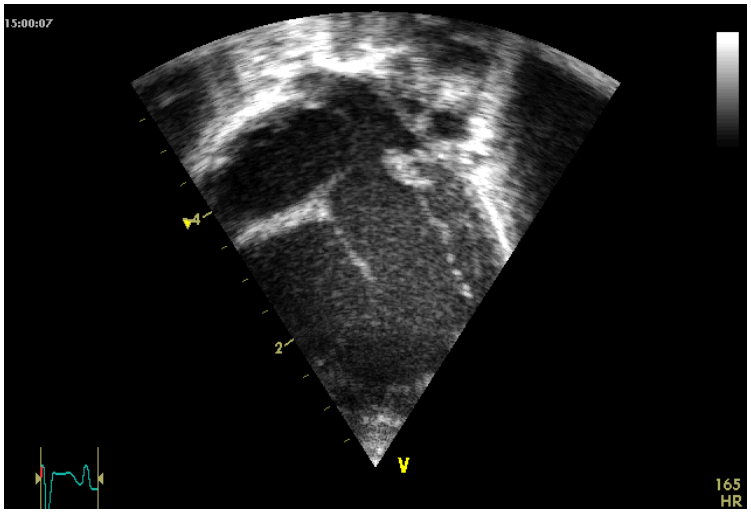


Absent left AV connection

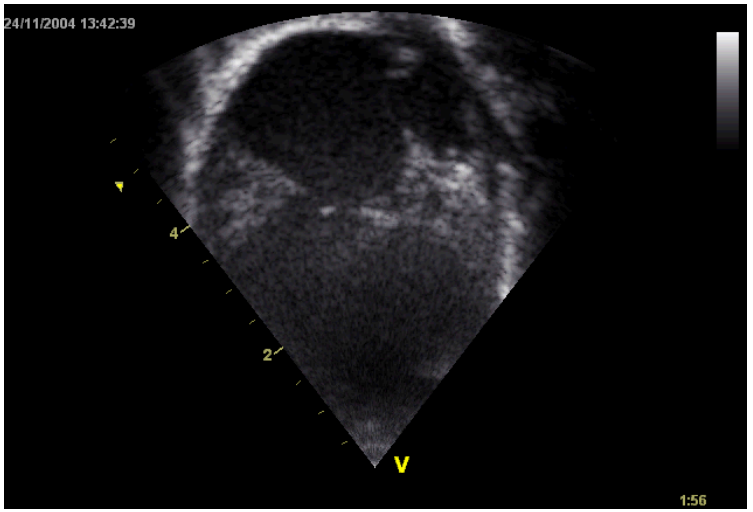


Double inlet

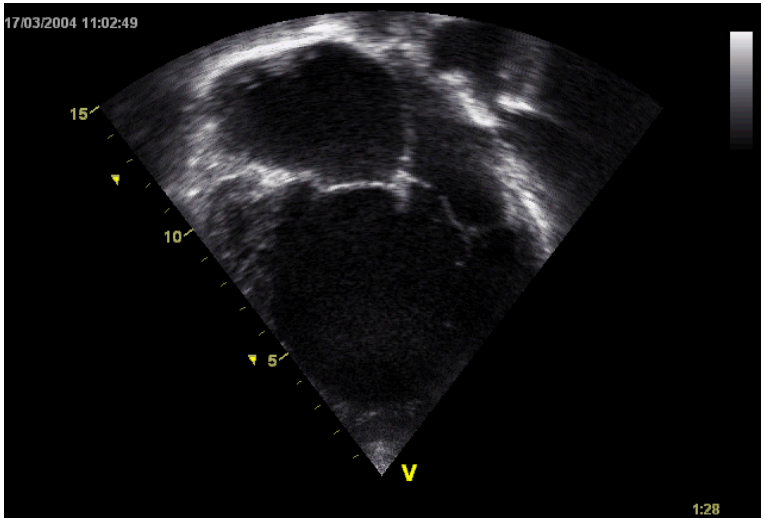
Absent right AV connection



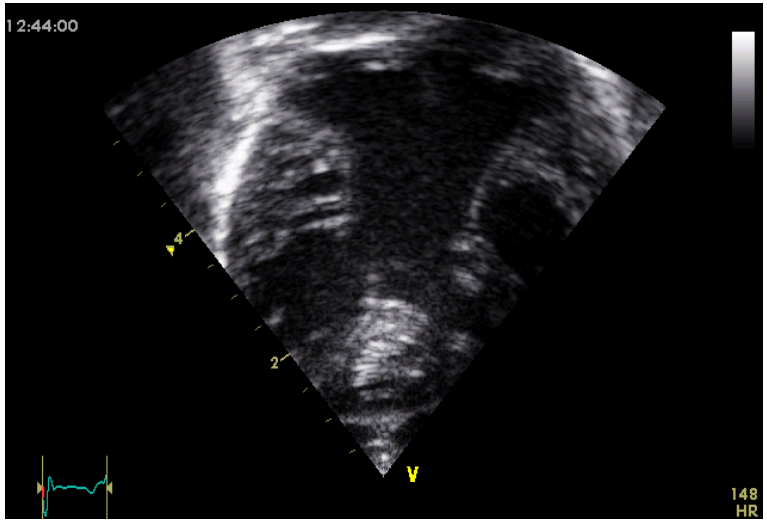
Absent left AV connection



Double inlet



Common AV valve



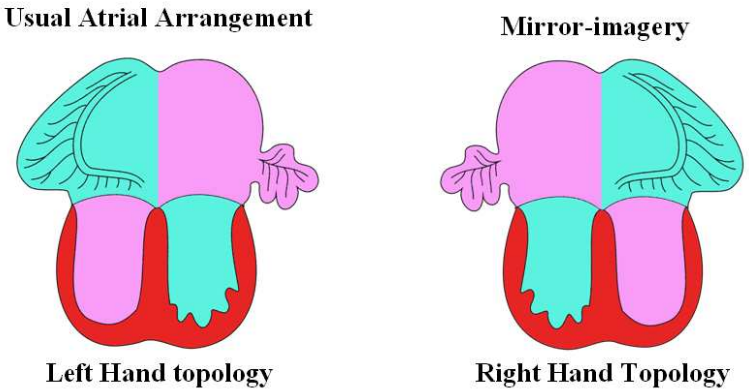
- Abdominal situs
- Atriums - Atrial situs (systemic and pulmonary venous connections)
- AV connections
- Ventricles
- **VA connections**
- Aorta, PA trunk (AO arch and PA branches)

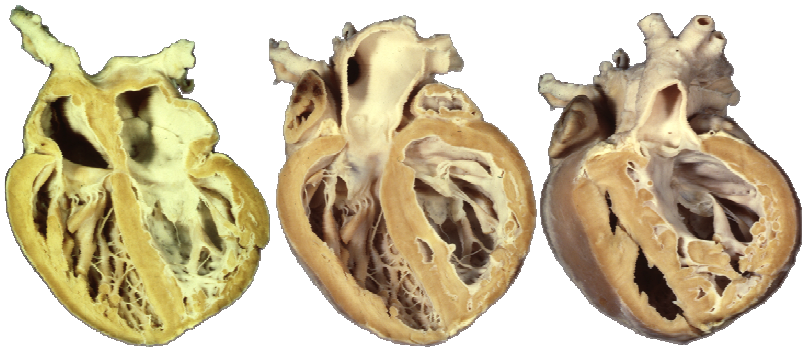
Ventriculo-arterial connections

- Concordant (=normal)
  - Ventricular septal defect, tetralogy of Fallot…
- Discordant
  - Transposition
- Double outlet ventricle
  - With subaortic VSD
    - subpulmonary VSD
    - doubly committed VSD
    - non-committed VSD
- Common arterial trunk

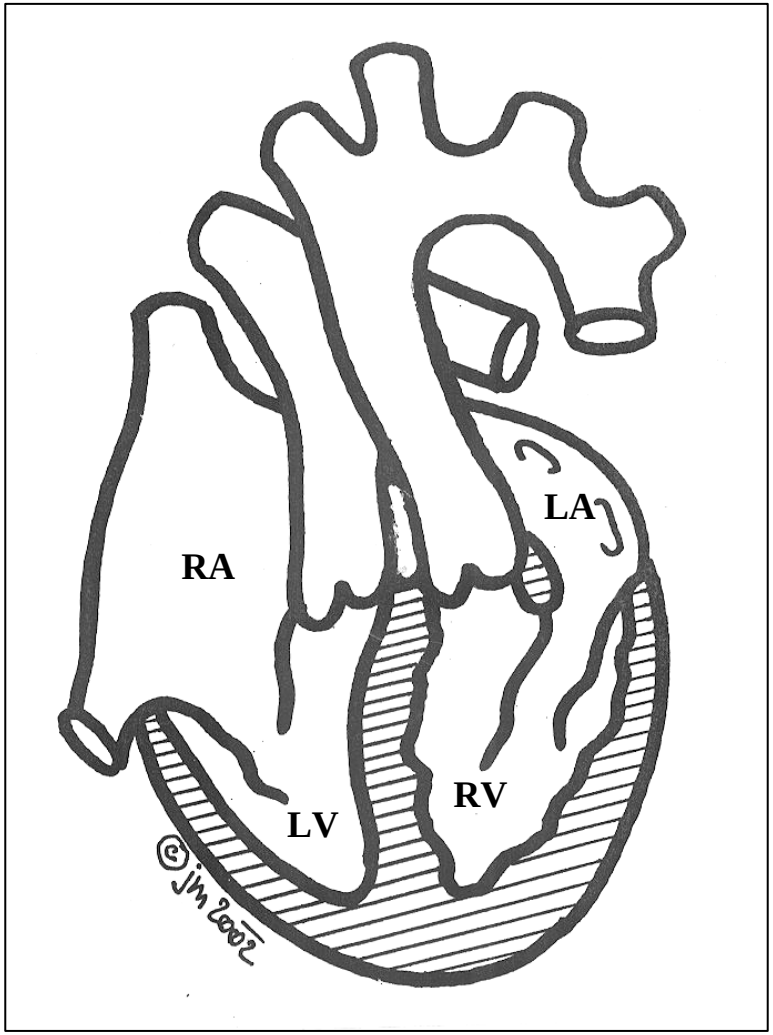
Discordant AV / VA connections

(AV & VA discordance = Congenitally corrected TGA)

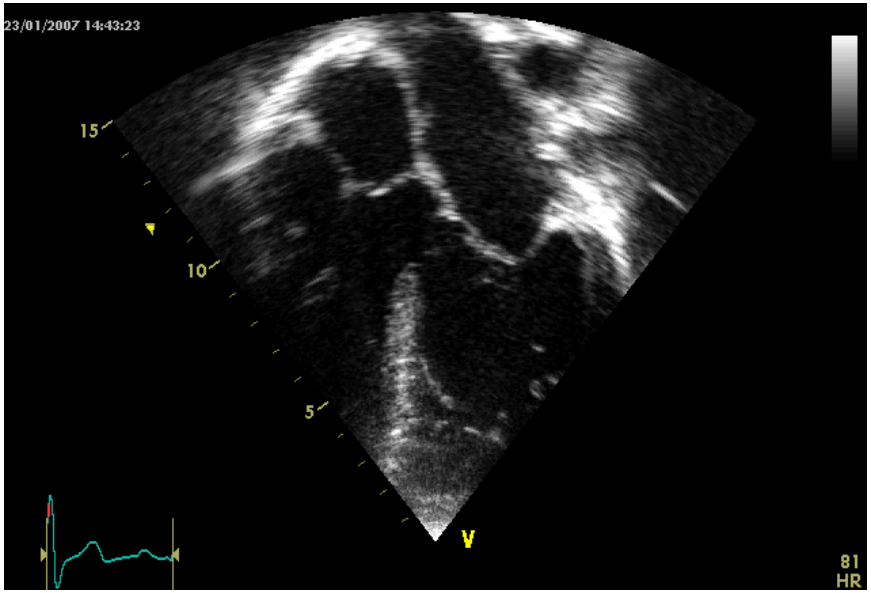


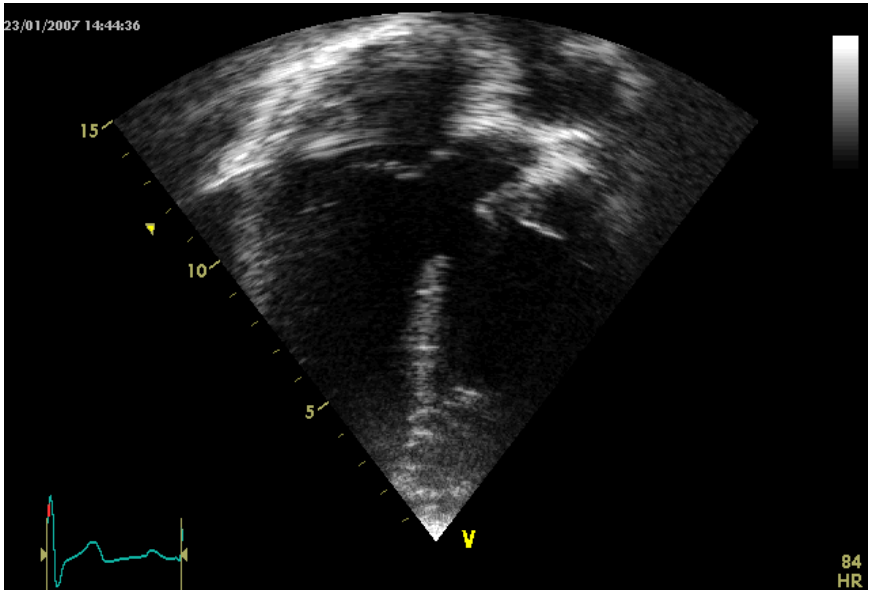


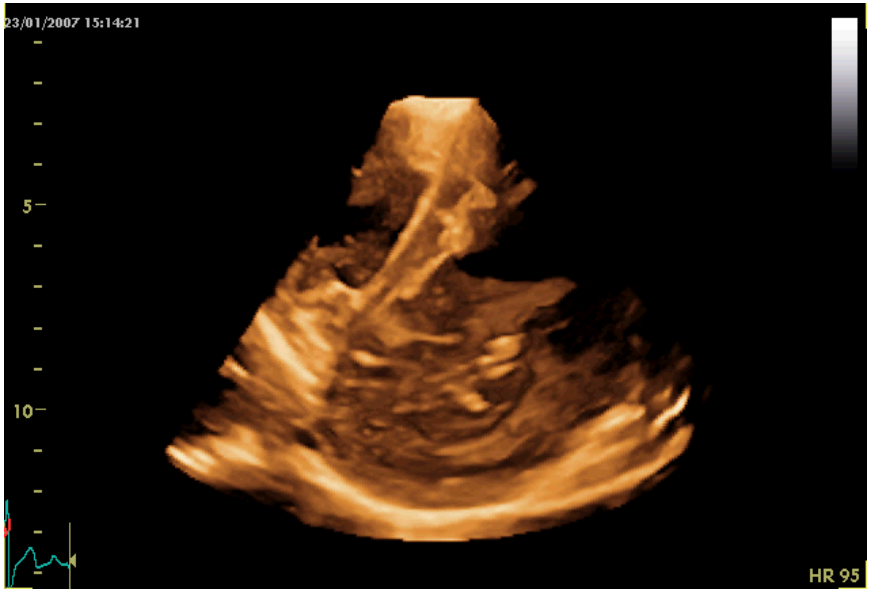
Courtesy RH Anderson

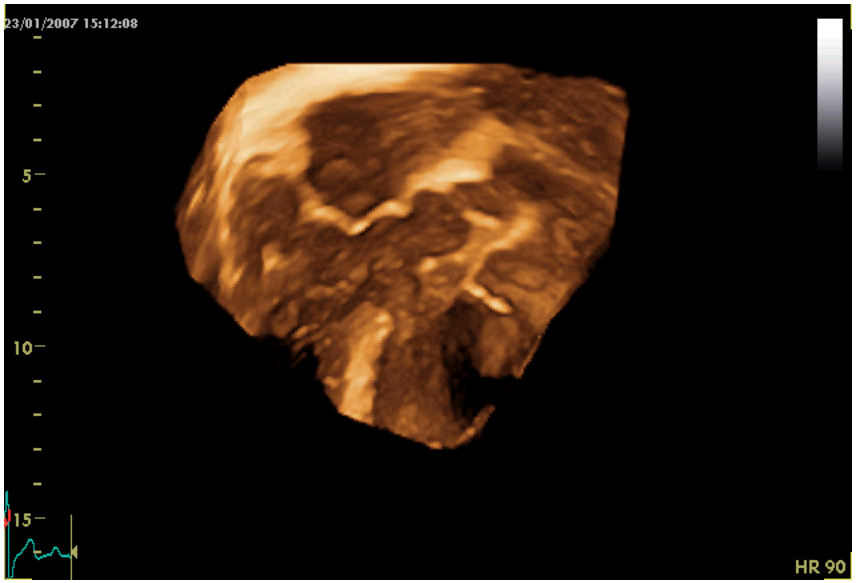


Discordant AV / VA connections



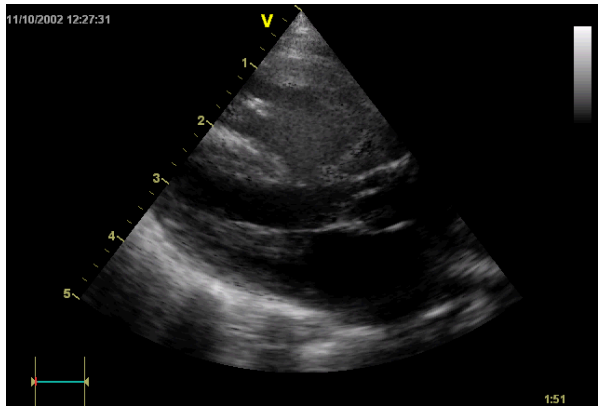


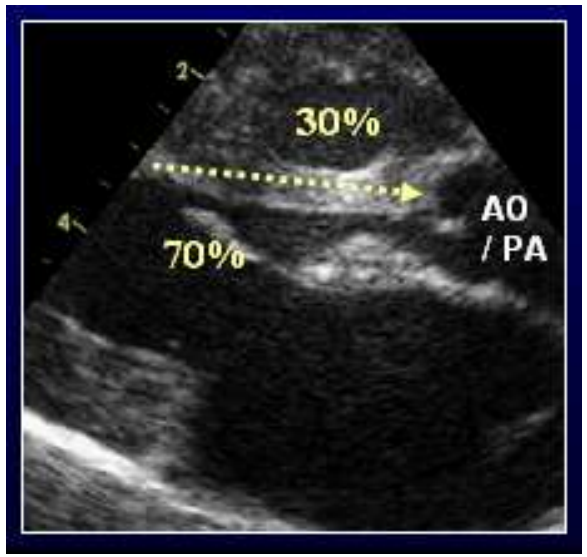




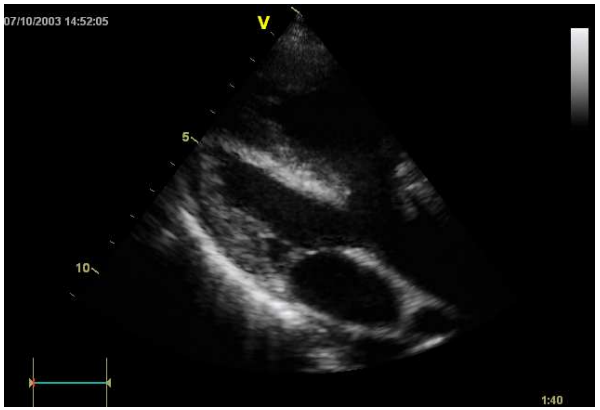
Overriding aortic valve: 50% rule

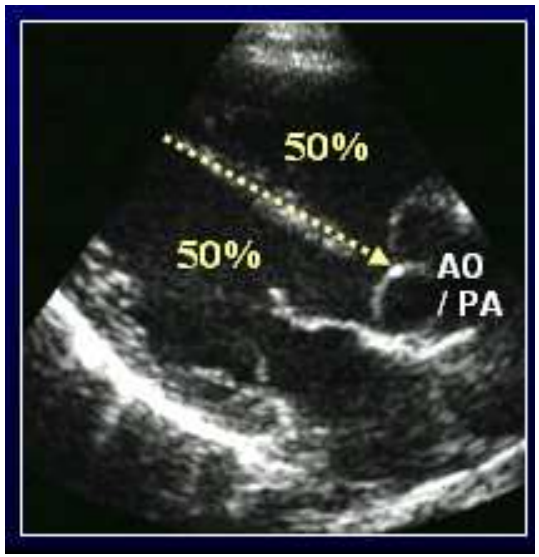
VSD



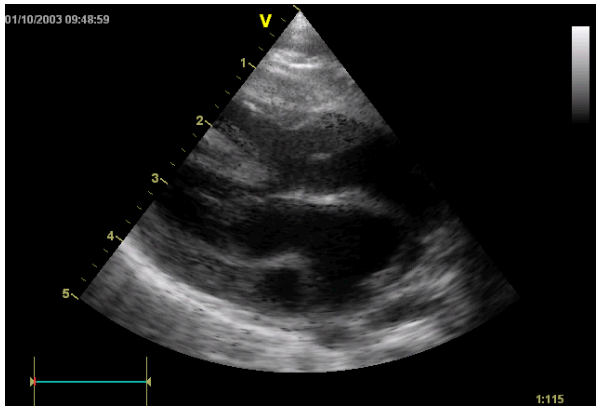


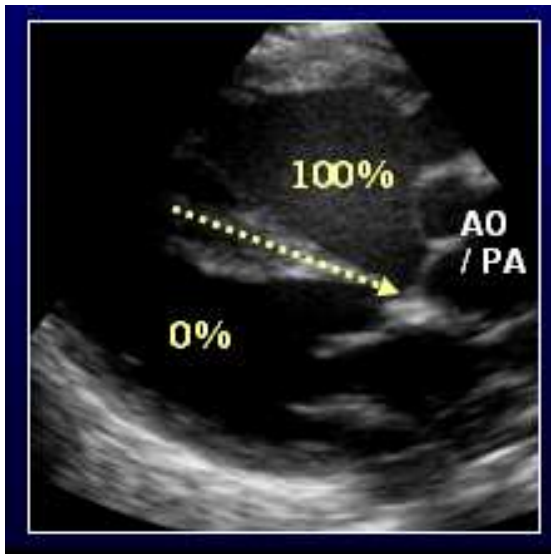
TOF



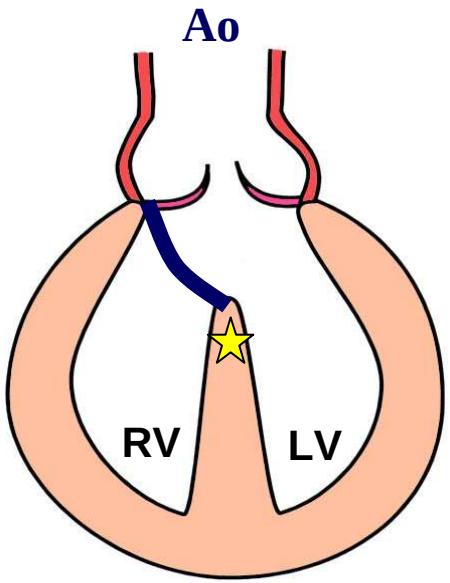


DORV

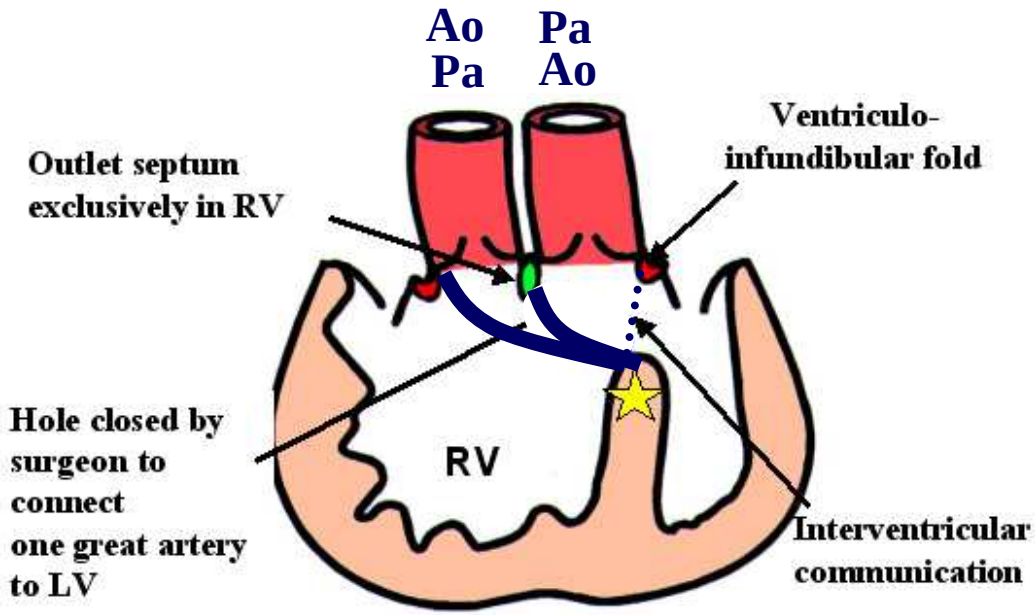




TOF vs Double outlet right ventricle



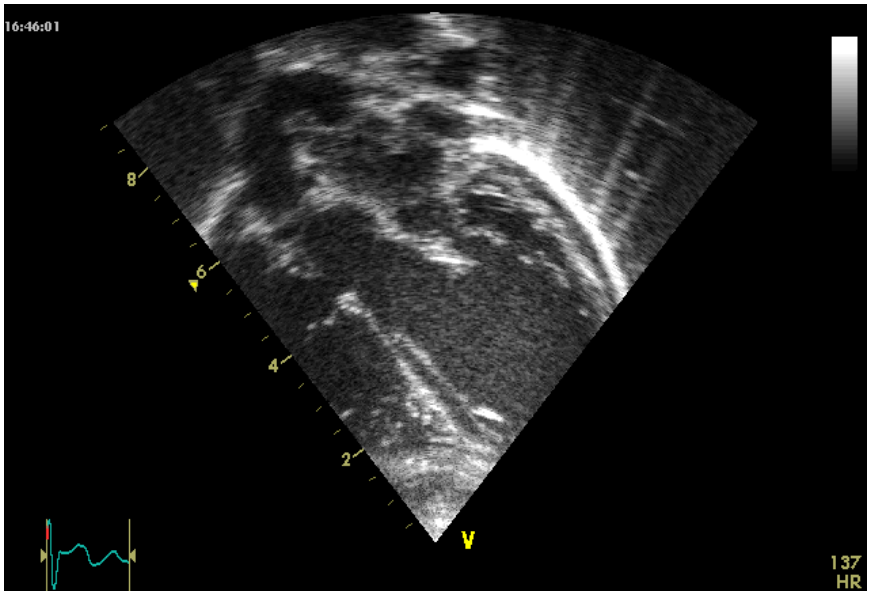
TOF

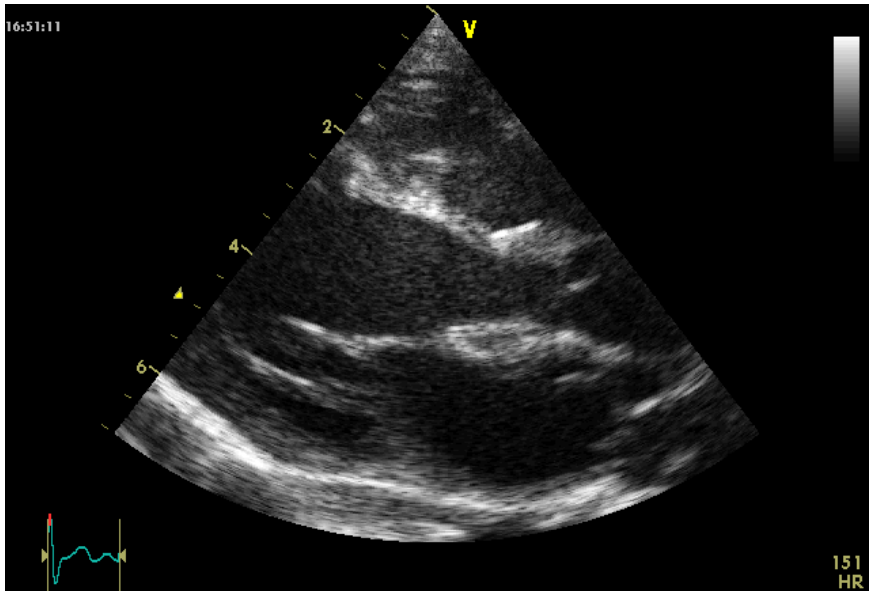


Double outlet right ventricle

RH Anderson 2005

Double conus = Double outlet right ventricle?





Double conus does not determine DORV!

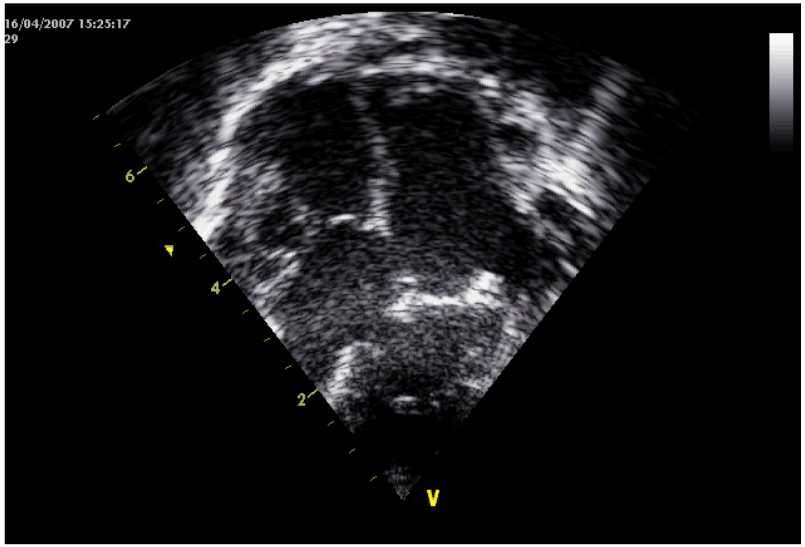
How to diagnose

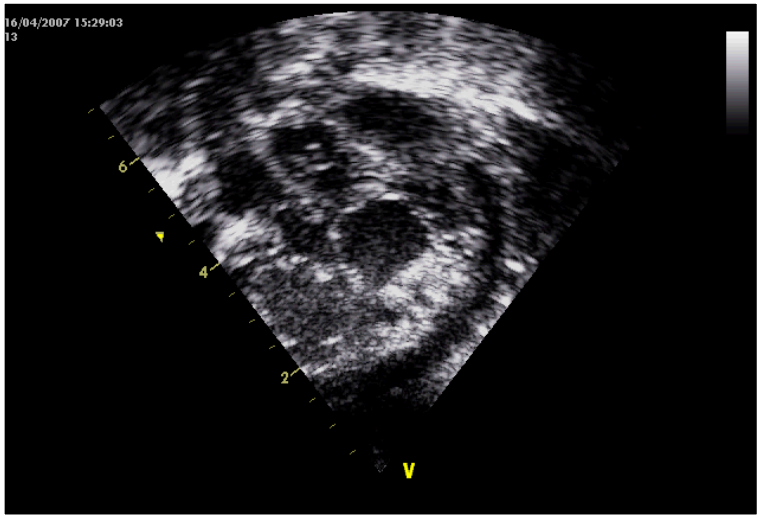
Correct definition of disease?

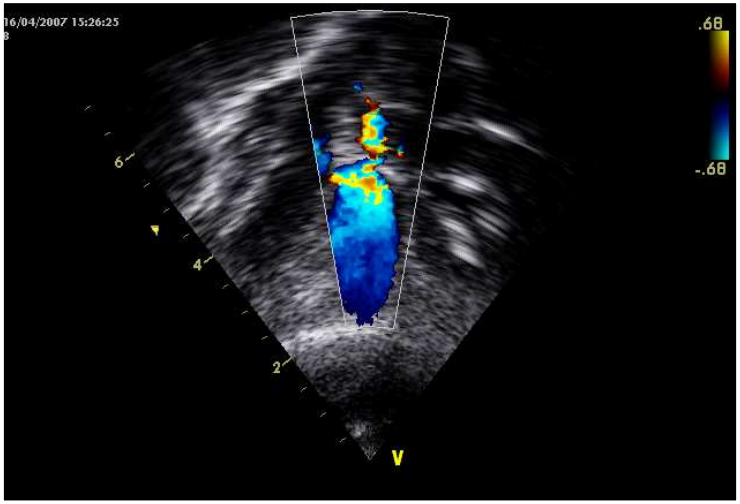
- Simple vs. Complex transposition?
- Transposition or Double outlet right ventricle?
- Transposition or Criss-cross heart
  or Supero-inferior ventricles
- Transposition or Malposition (corrected or not, right or left?)

AV concordance & VA discordance	Right/Left ventricle with two outlets	AV discordance & VA discordance	AV discordance & VA concordance
TGA	**DORV DOLV**	**CCTGA**	**CCMGA**

AV discordance & VA concordance (Congenitally corrected malposition)



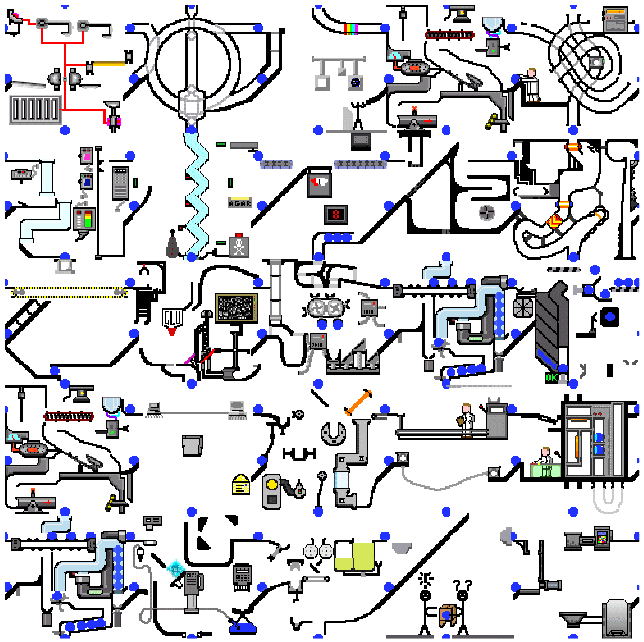




Segmental approach

- Important to understand situs arrangement
- Provides complete coverage of lesion
- Minimises potential errors
- Easy for reading and interpretation

Sequential Segmental Approach



KISS

Keep
It
Simple,
Stupid