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Aortic arches – Echo cases

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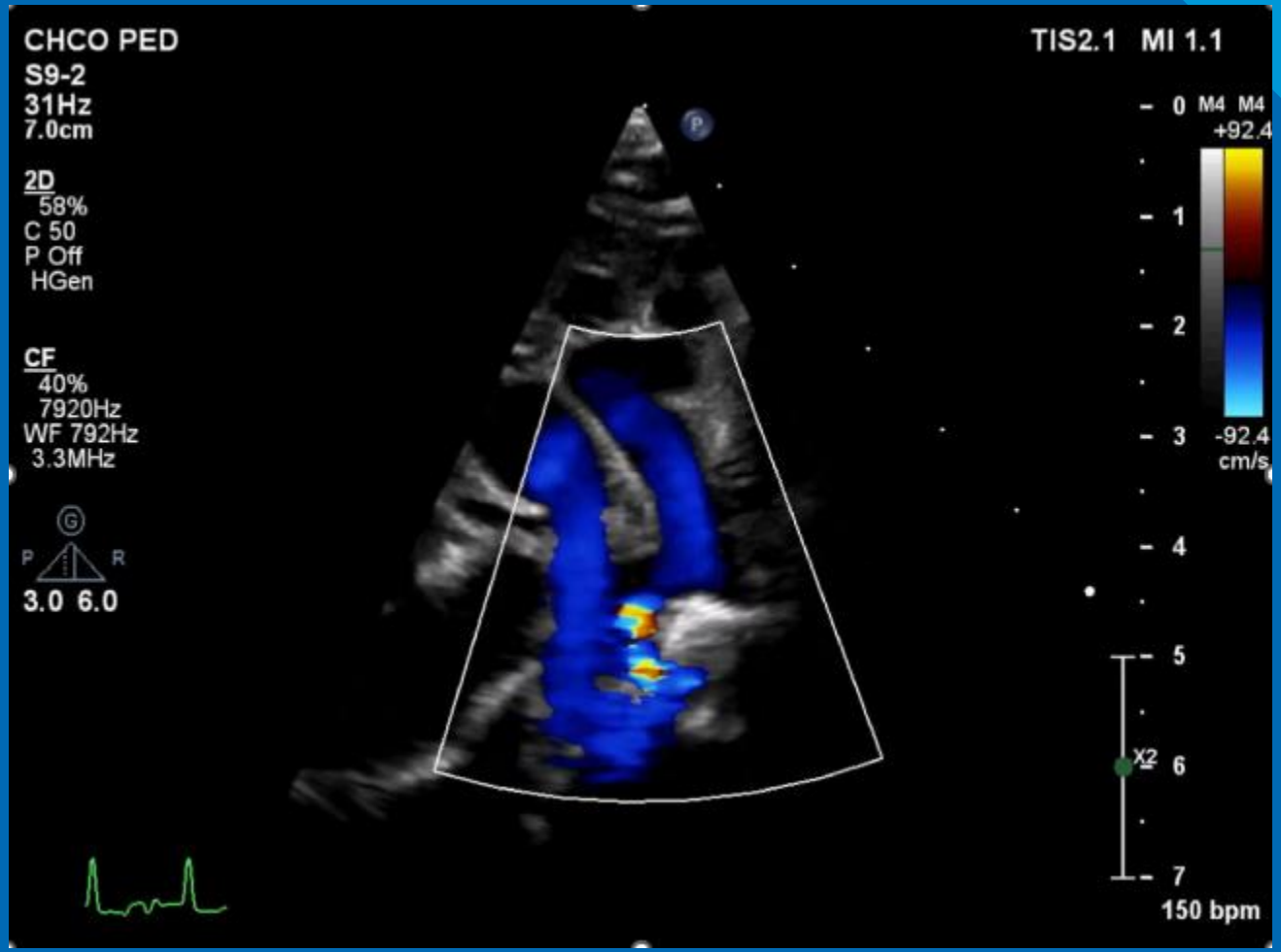
Here, it's different.™

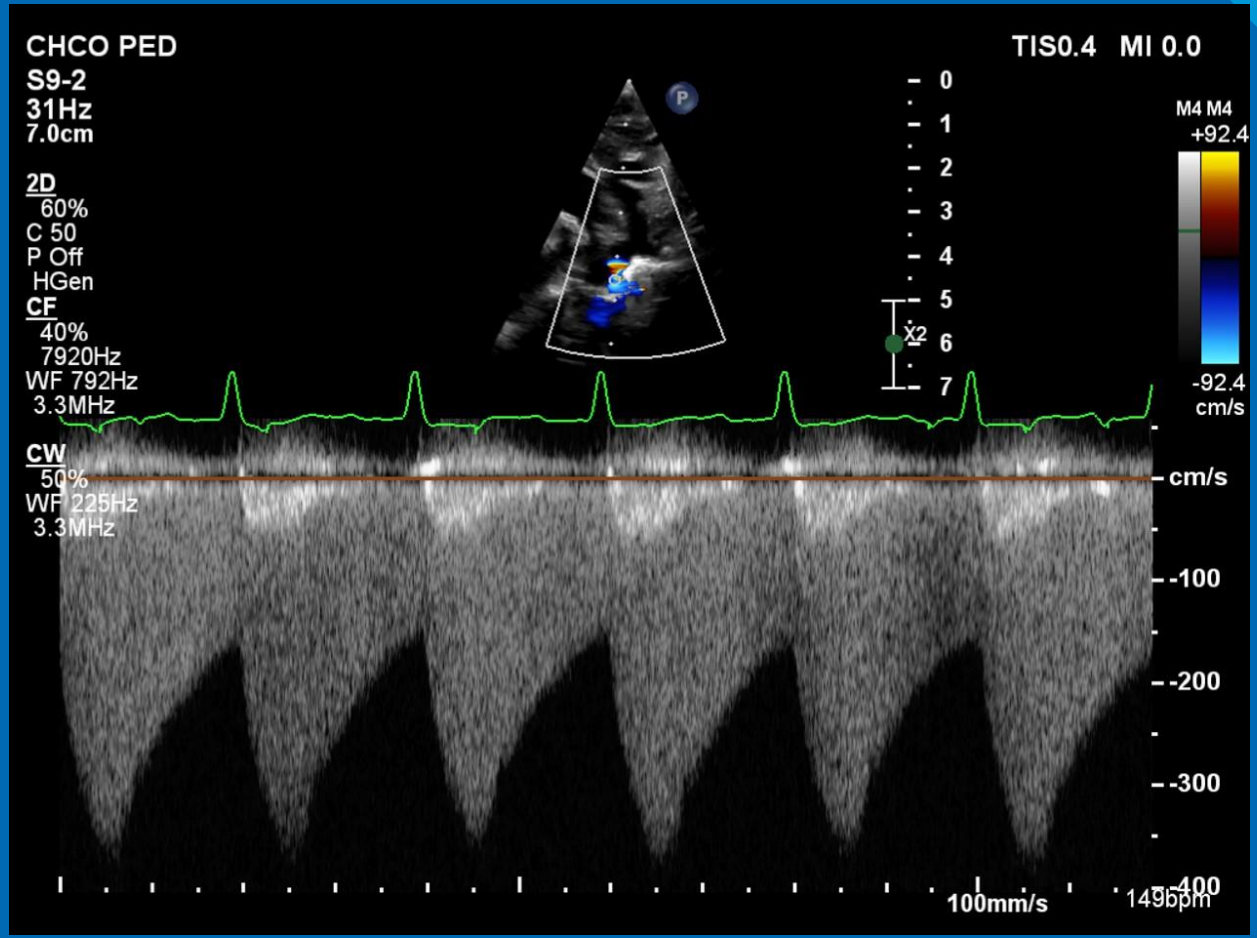
Case #1

- An 11-day old male infant presents to the PCP's office for a routine check
- PCP is unable to palpate femoral pulses, so infant is referred for a cardiology consultation and an echocardiogram
- What diagnosis are you mostly concerned about?

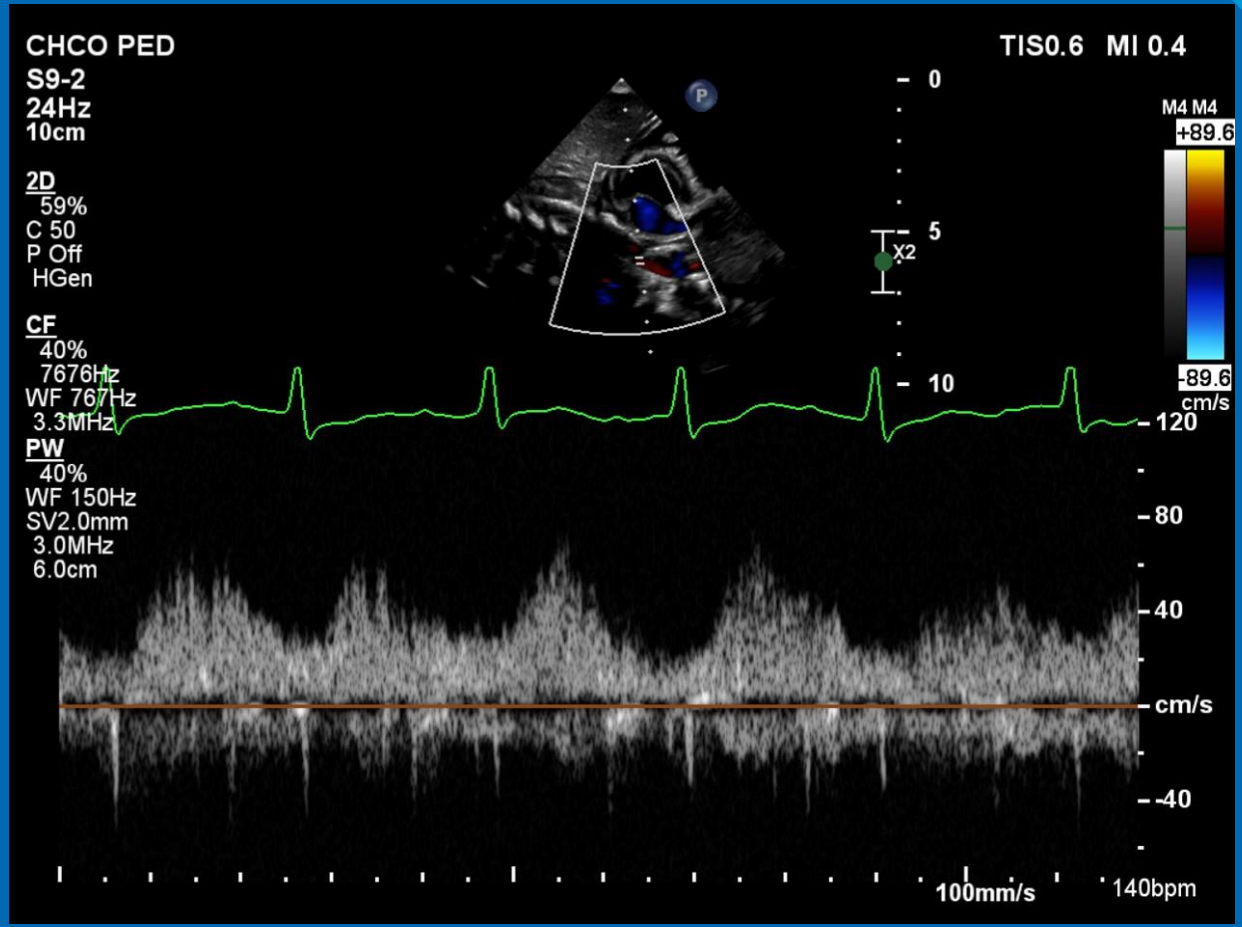

CHCO PED
S9-2
163Hz
6.0cm
2D
56%
C 50
P Off
HGen
TIS1.8 MI 1.1
M4
0
1
2
3
4
5
6
X2
155 bpm
G
P
R
3.0 6.0

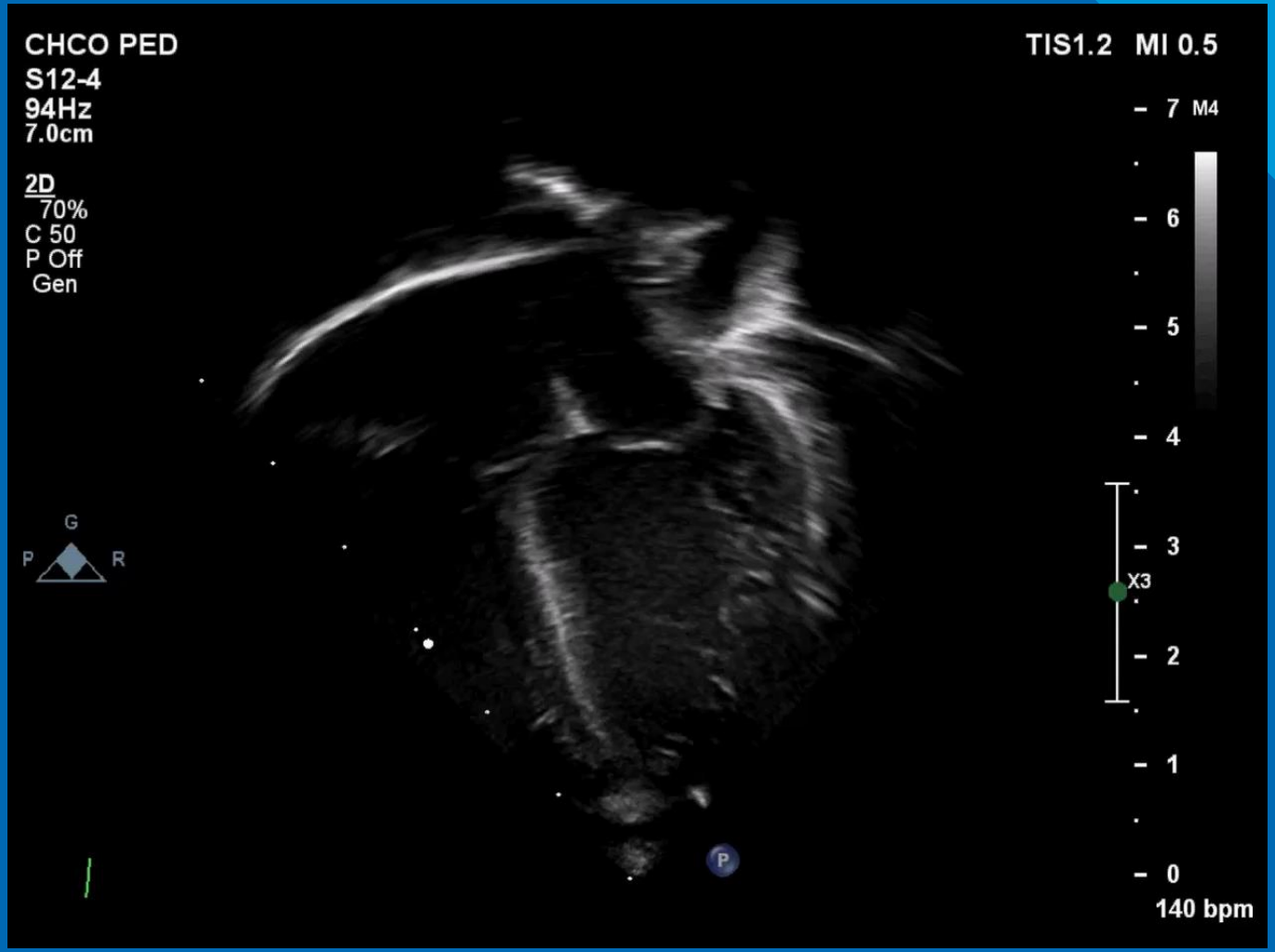

CHCO PED
S9-2
31Hz
7.0cm
2D
58%
C 50
P Off
HGen
CF
40%
7920Hz
WF 792Hz
3.3MHz
3.0 6.0
TIS2.1 MI 1.1
M4 M4
+92.4
-92.4
cm/s
0
1
2
3
4
5
6
7
150 bpm

Sawtooth Doppler pattern

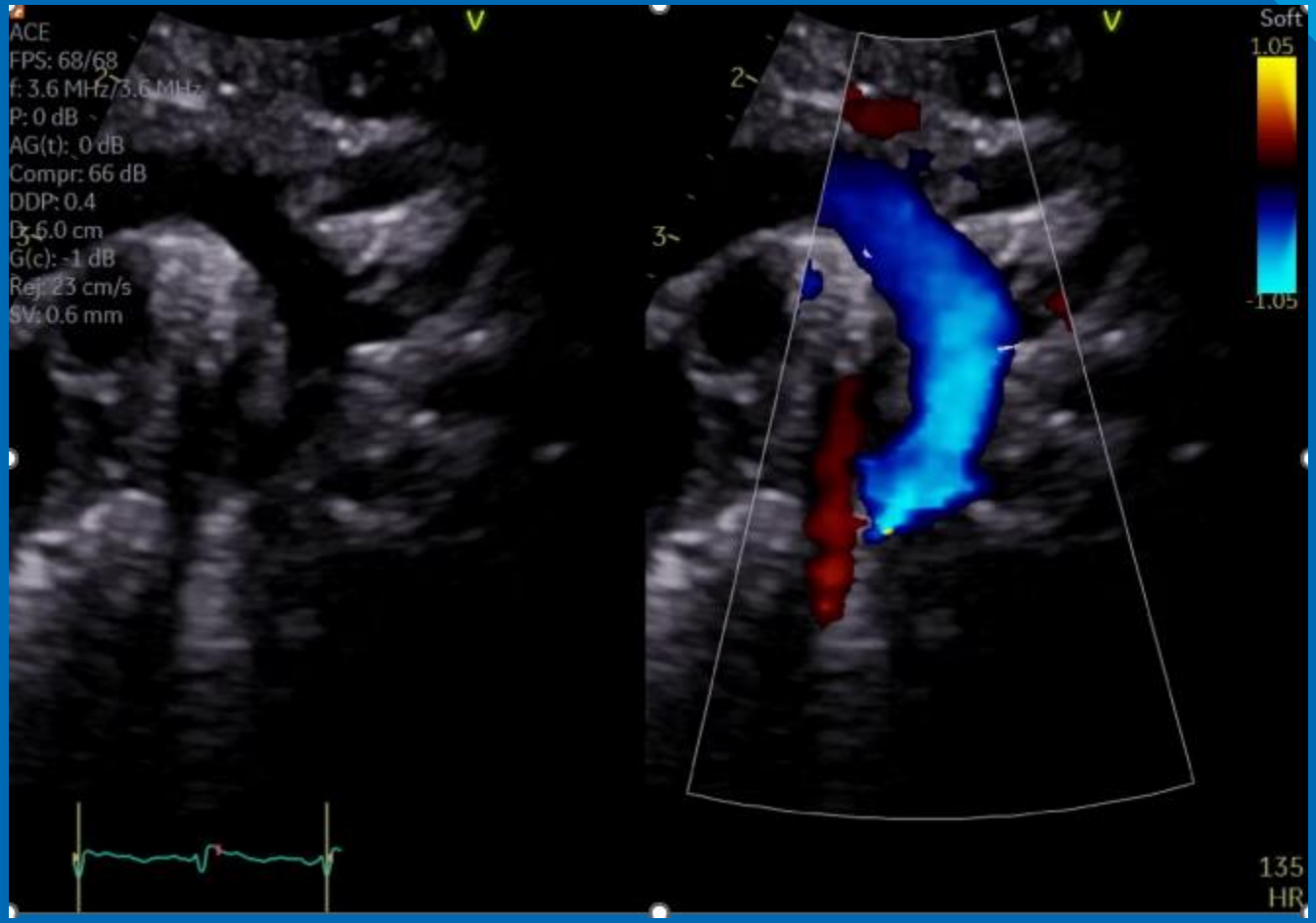


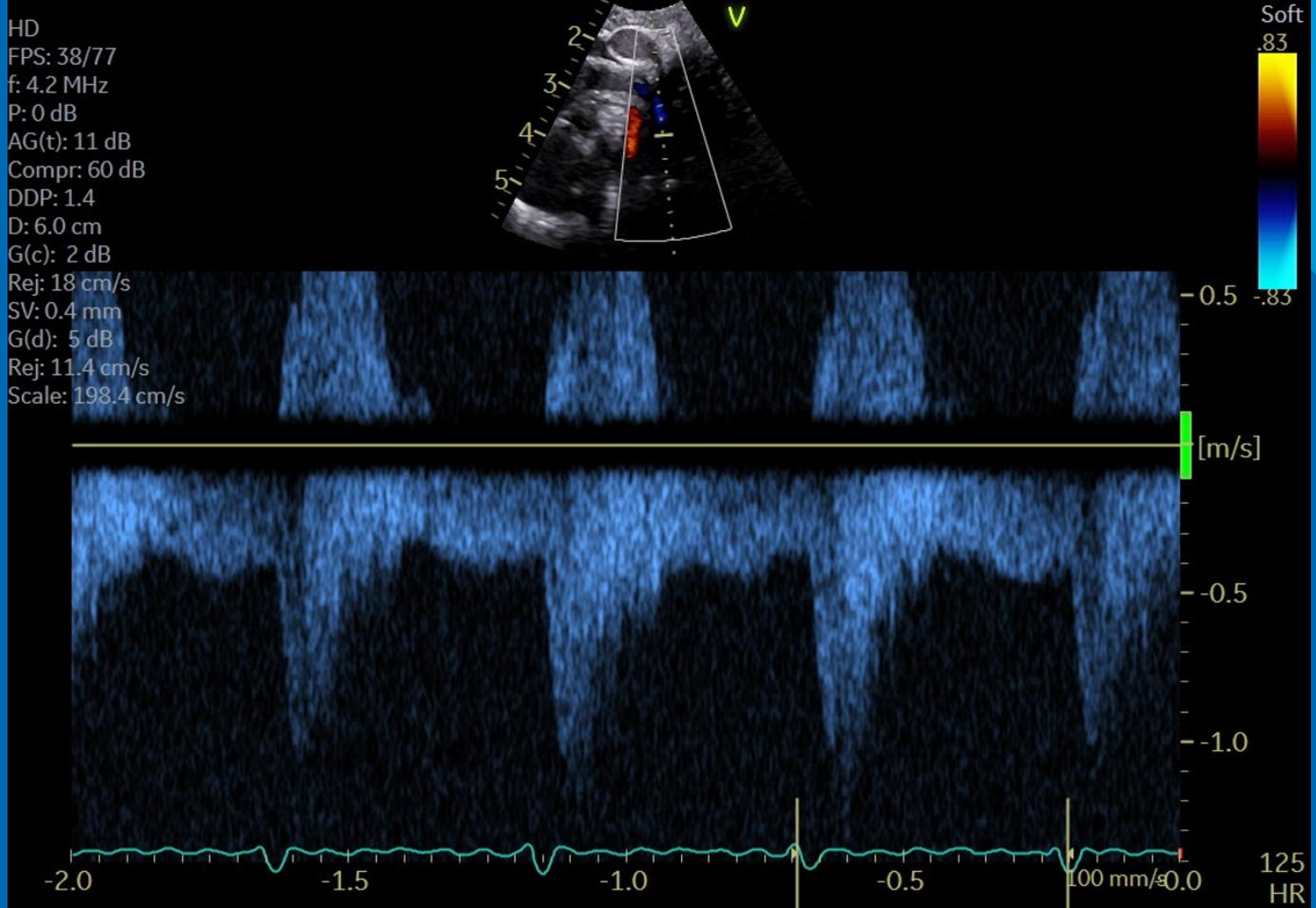
DAO Doppler

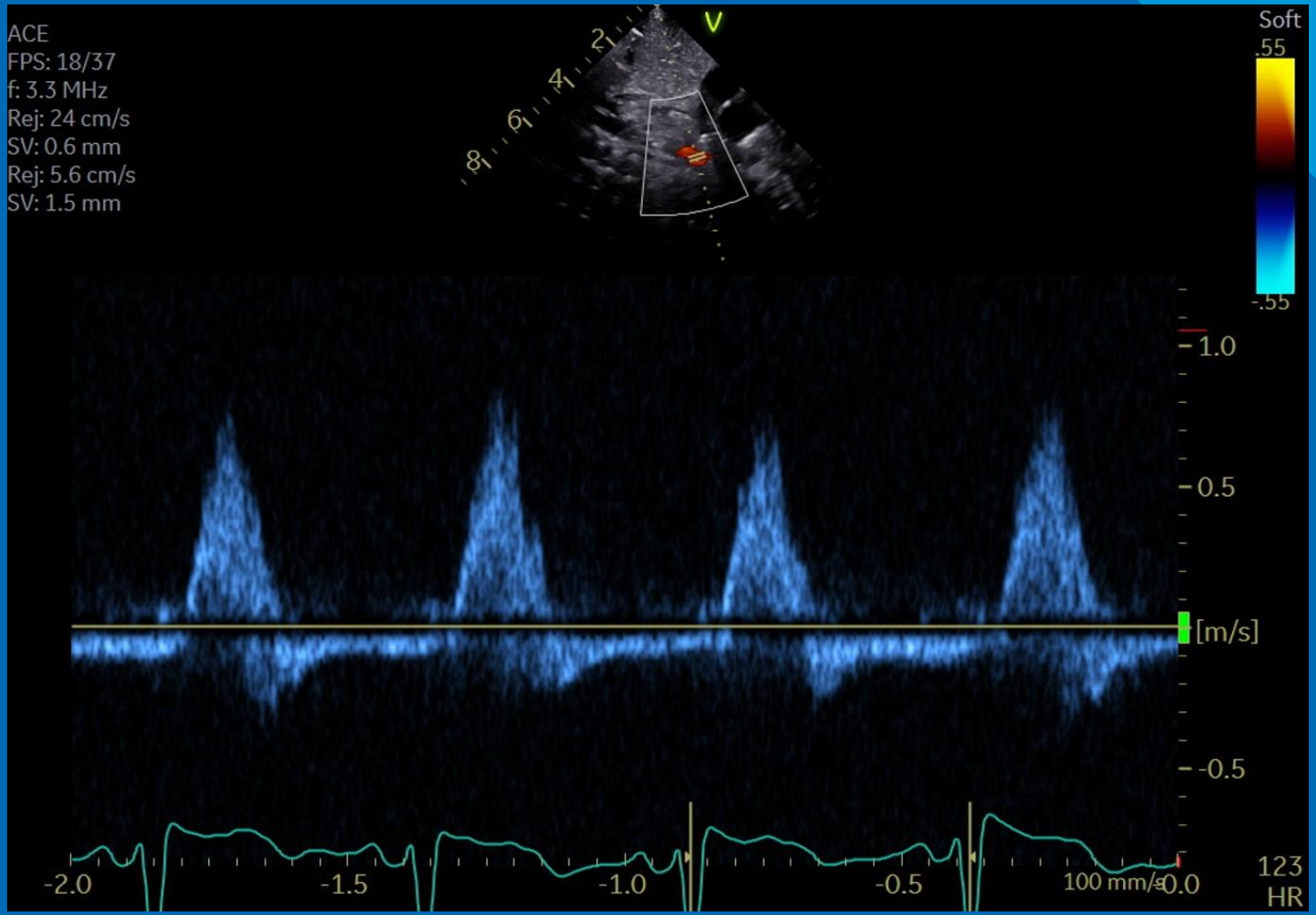

CHCO PED
S9-2
24Hz
10cm
2D
59%
C 50
P Off
HGen
CF
40%
7676Hz
WF 767Hz
3.3MHz
PW
40%
WF 150Hz
SV2.0mm
3.0MHz
6.0cm
TIS0.6 MI 0.4
M4 M4
+89.6
-89.6
cm/s
0
5
10
X2
120
80
40
cm/s
-40
100mm/s
140bpm


CHCO PED
S12-4
94Hz
7.0cm
2D
70%
C 50
P Off
Gen
TIS1.2 MI 0.5
7 M4
6
5
4
3
X3
2
1
0
140 bpm
G
P
R
P

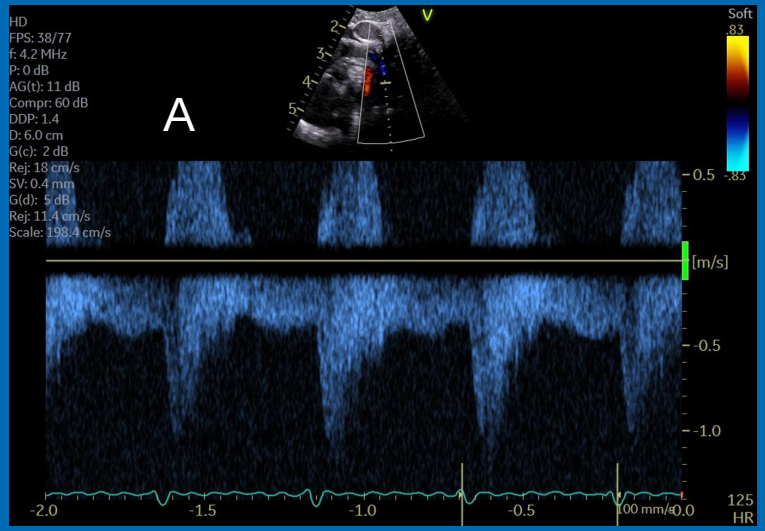
Other COA case

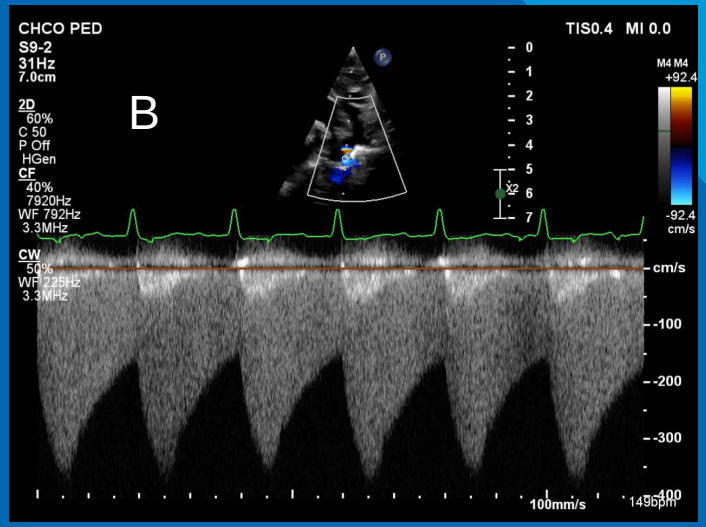


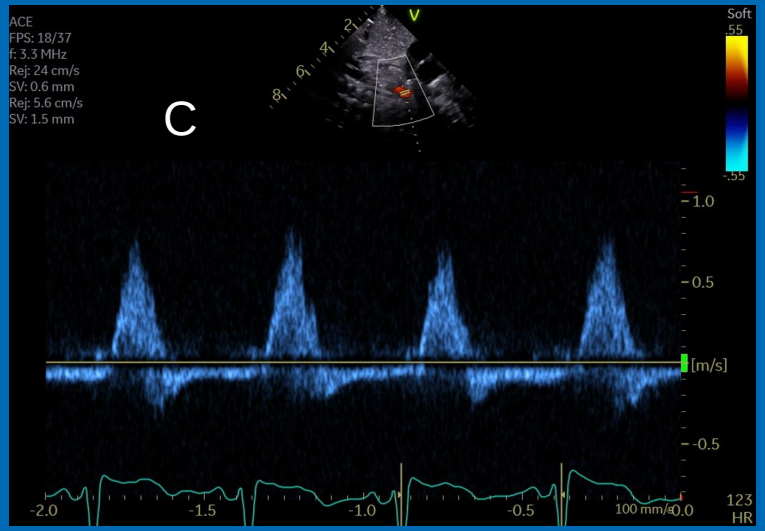

HD
FPS: 38/77
f: 4.2 MHz
P: 0 dB
AG(t): 11 dB
Compr: 60 dB
DDP: 1.4
D: 6.0 cm
G(c): 2 dB
Rej: 18 cm/s
SV: 0.4 mm
G(d): 5 dB
Rej: 11.4 cm/s
Scale: 198.4 cm/s
Soft
.83
-.83
0.5
[m/s]
-0.5
-1.0
-2.0
-1.5
-1.0
-0.5
100 mm/s
0.0
125
HR

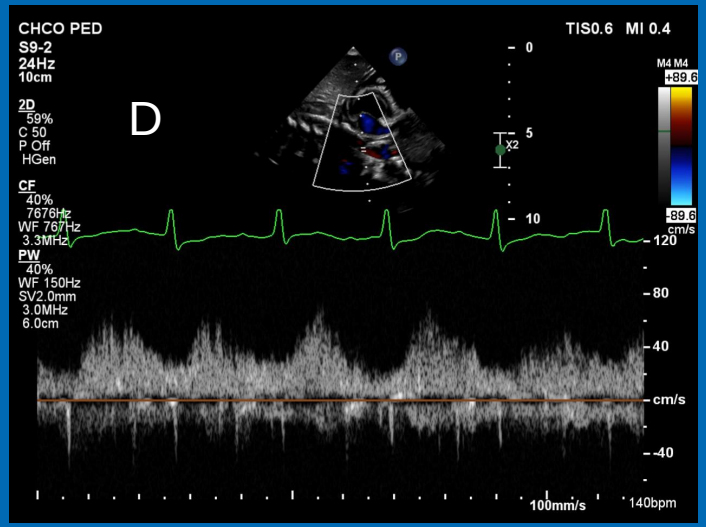

ACE
FPS: 18/37
f: 3.3 MHz
Rej: 24 cm/s
SV: 0.6 mm
Rej: 5.6 cm/s
SV: 1.5 mm
Soft
.55
-.55
1.0
0.5
[m/s]
-0.5
-2.0
-1.5
-1.0
-0.5
0.0
100 mm/s
123
HR

COA with a PDA

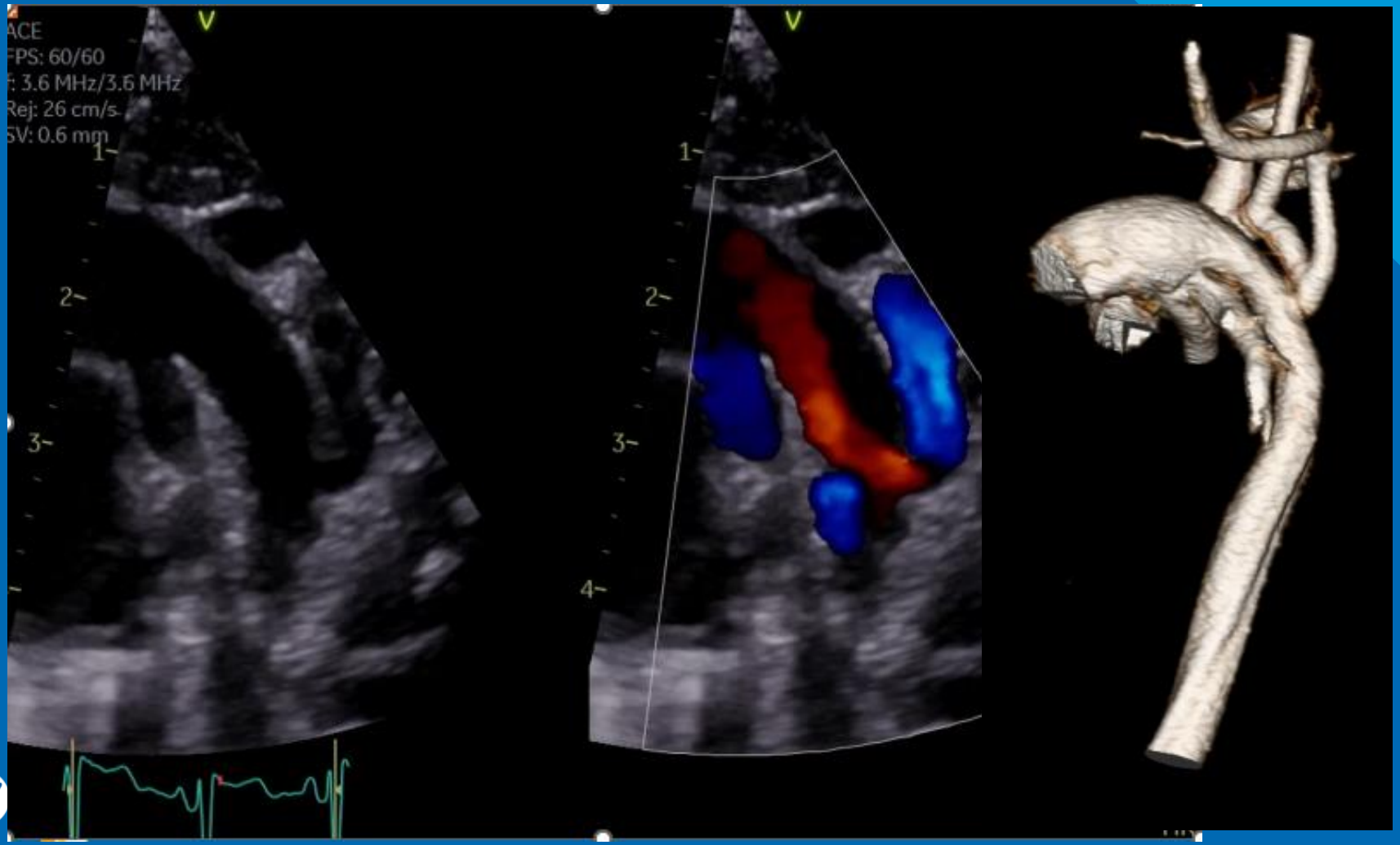








COA without a PDA


ACE
FPS: 60/60
f: 3.6 MHz/3.6 MHz
Rej: 26 cm/s
SV: 0.6 mm
1
2
3
4

Coarctation of aorta – Summary

- Suspect coarctation of the aorta whenever someone mentions lower extremity pulses cannot be felt

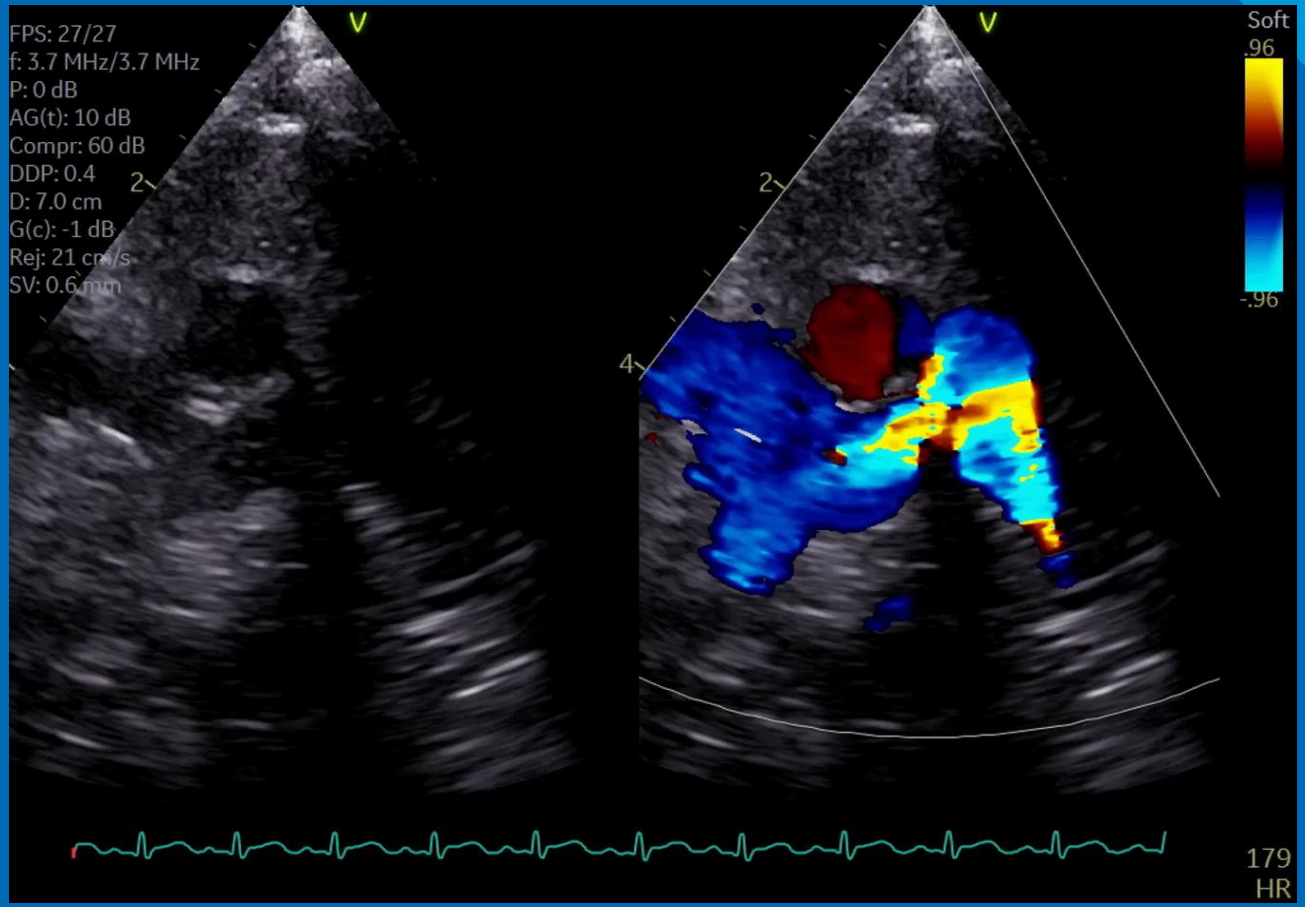
- One left sided obstructive lesion present – strongly suspect there may be others
  - Mitral valve, aortic valve, VSD (among others)

Cases #2 & #3

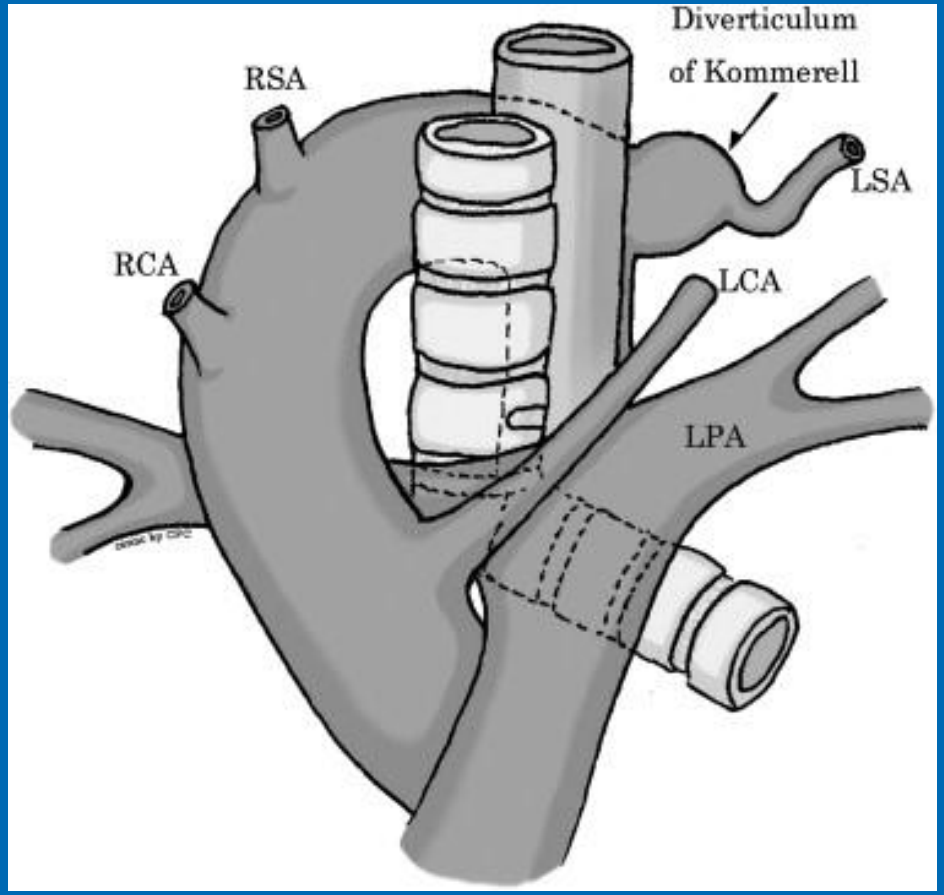
- A 6-month-old infant was referred for an echocardiogram by the PCP for concern that the infant has recurrent upper respiratory tract infections and now appears to choke with solid foods.

- What is the major differential diagnosis that needs to be assessed by echo?

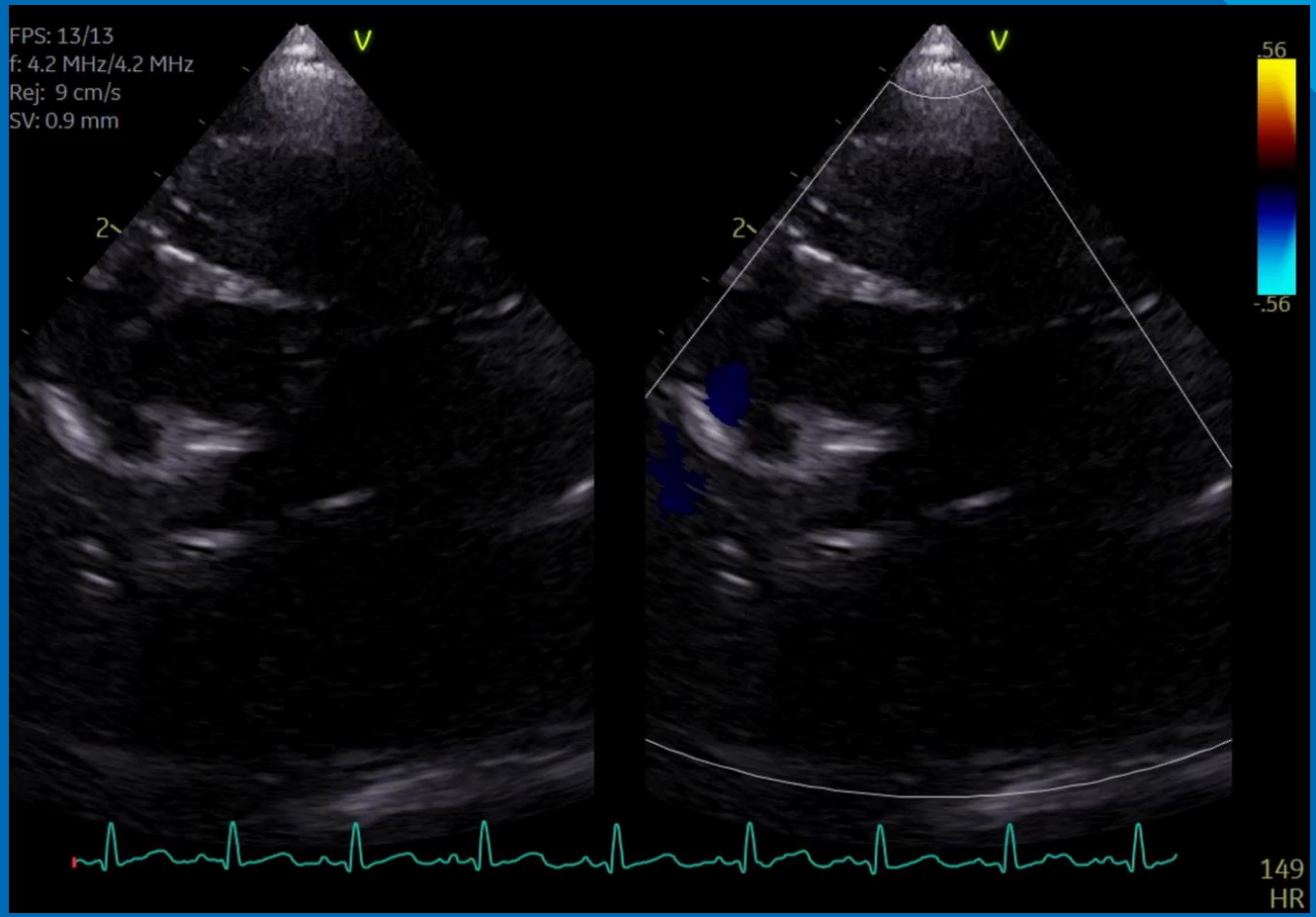
Case #2


FPS: 27/27
f: 3.7 MHz/3.7 MHz
P: 0 dB
AG(t): 10 dB
Compr: 60 dB
DDP: 0.4
D: 7.0 cm
G(c): -1 dB
Rej: 21 cm/s
SV: 0.6 mm
Soft
.96
-.96
179
HR

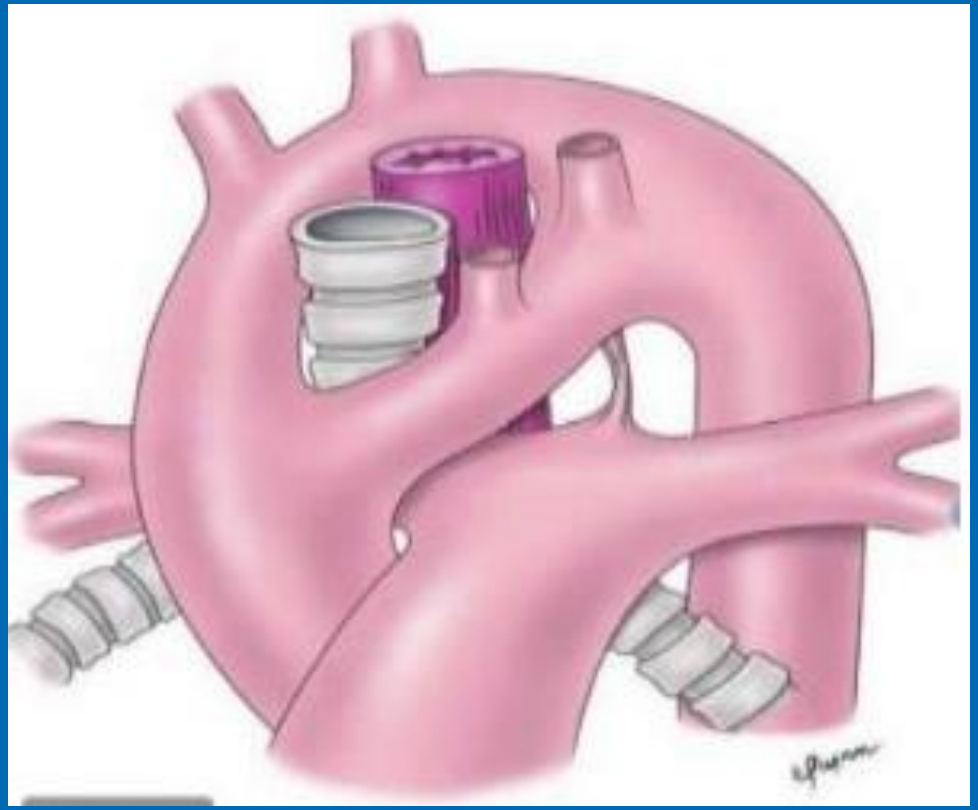
Case #2 – Right aortic arch with aberrant left subclavian artery



Case #3



Case #3 – double aortic arch



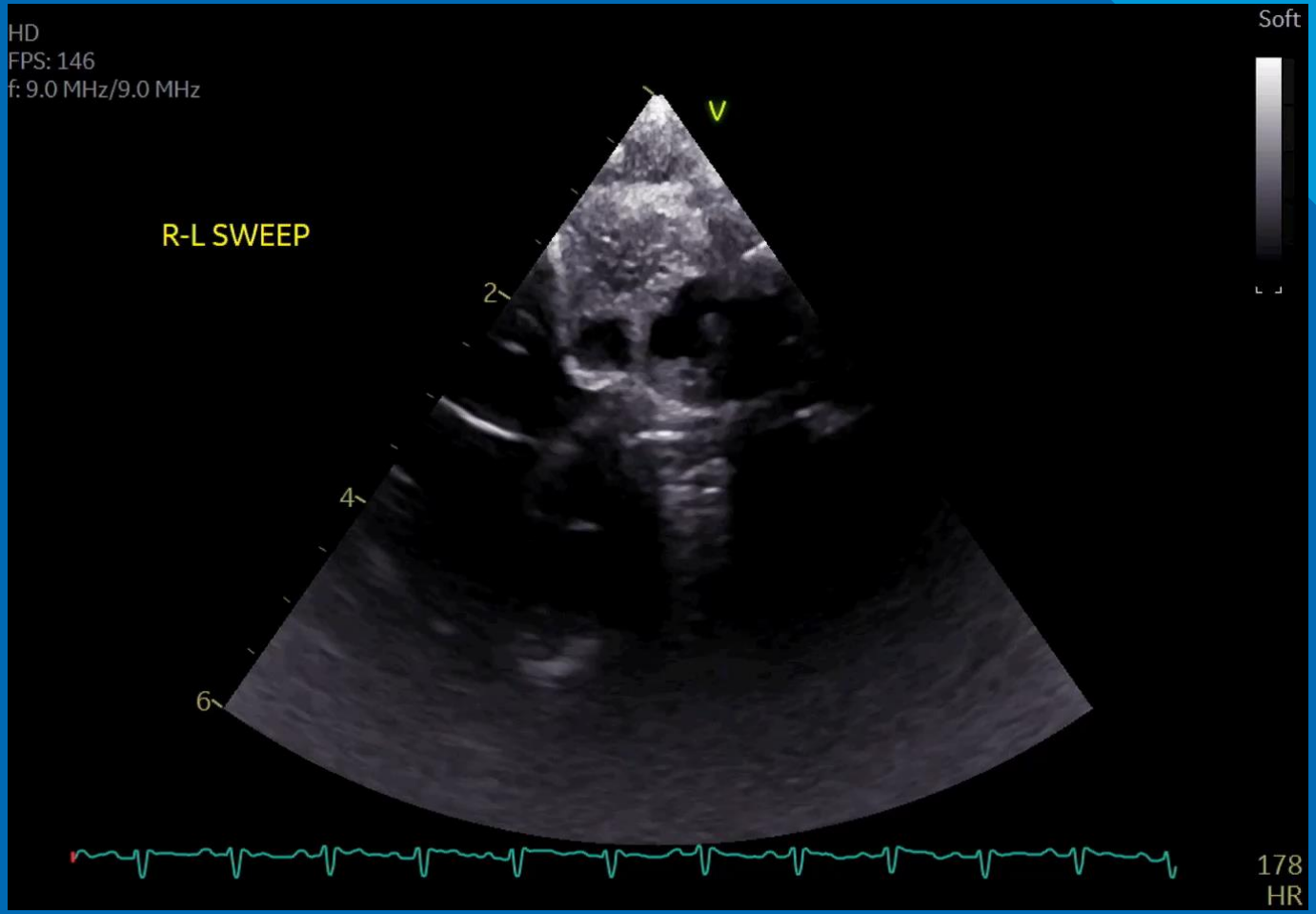
Vascular rings – Summary

- Double aortic arch (most common)
- Right aortic arch with aberrant left subclavian artery (2nd most common)
- Other (rare)
  - Circumflex aorta
  - Cervical arch
  - Left pulmonary artery sling (NOT a true ring)

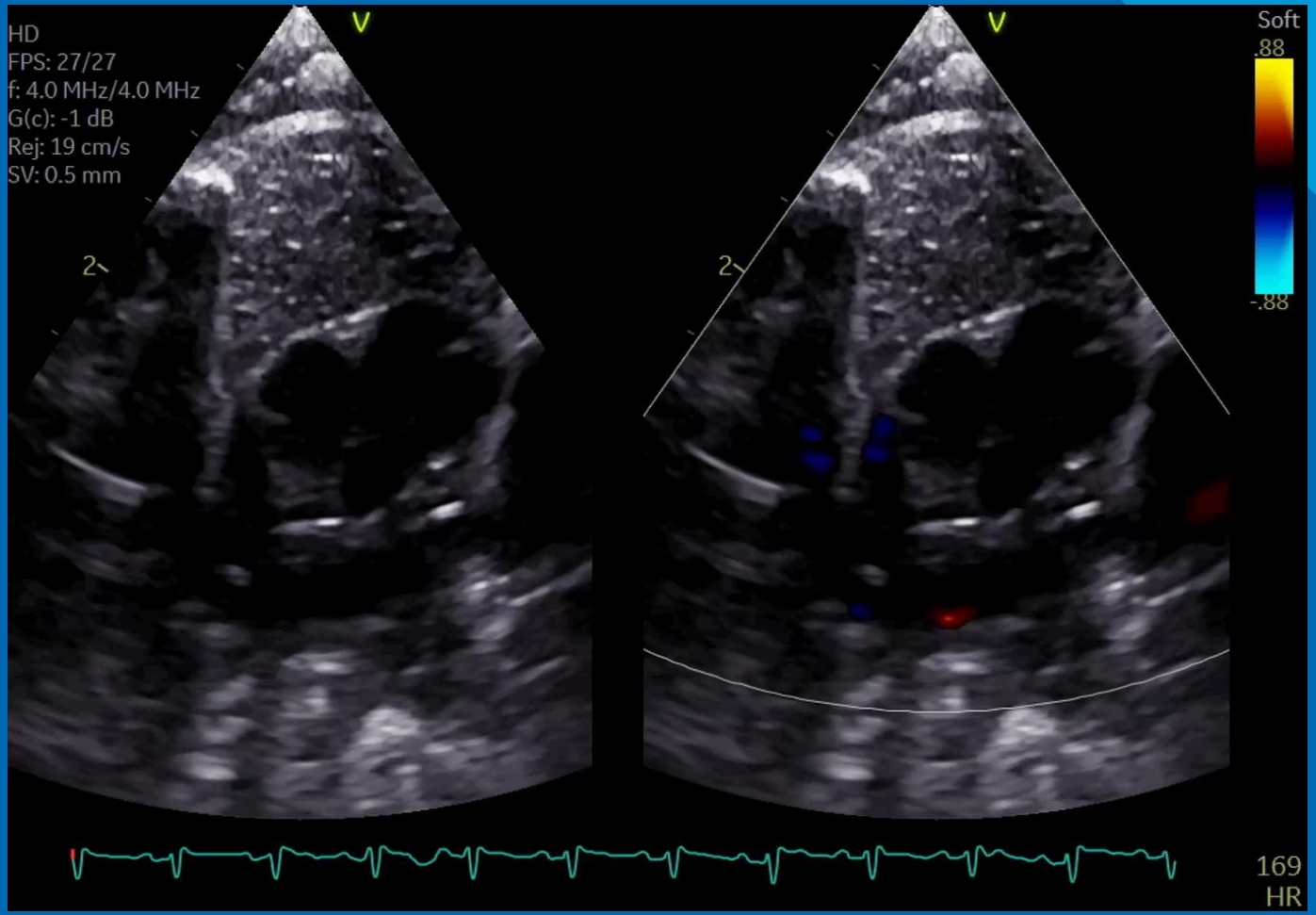
Case #4

- You're called to the NICU to perform a TTE on a newborn who's only a couple of hours old
- Baby had an abnormal fetal echo that showed double outlet right ventricle
- The fetal cardiologist is concerned that the arch looks abnormal and suspects at least a severe coarctation of aorta
- …At least?

Case #4a

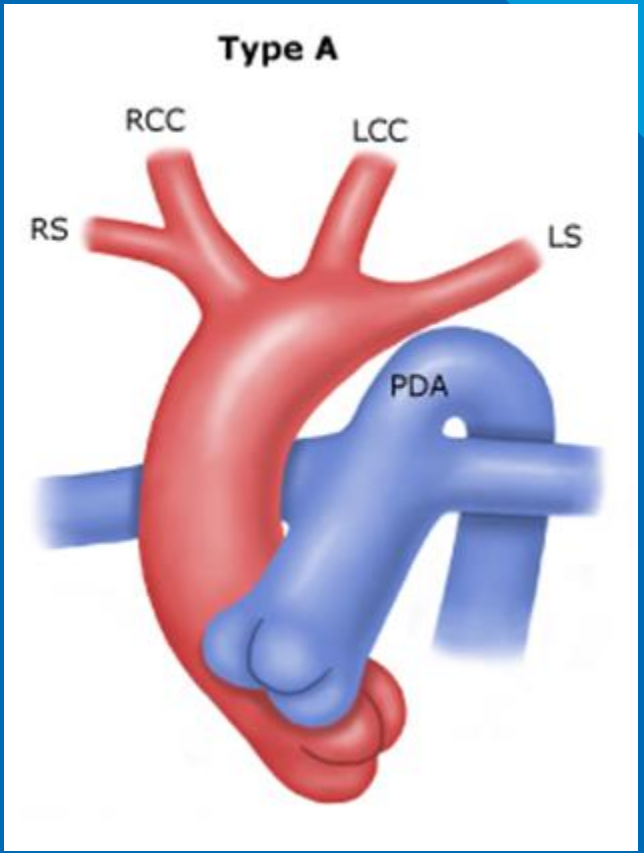


Case #4a

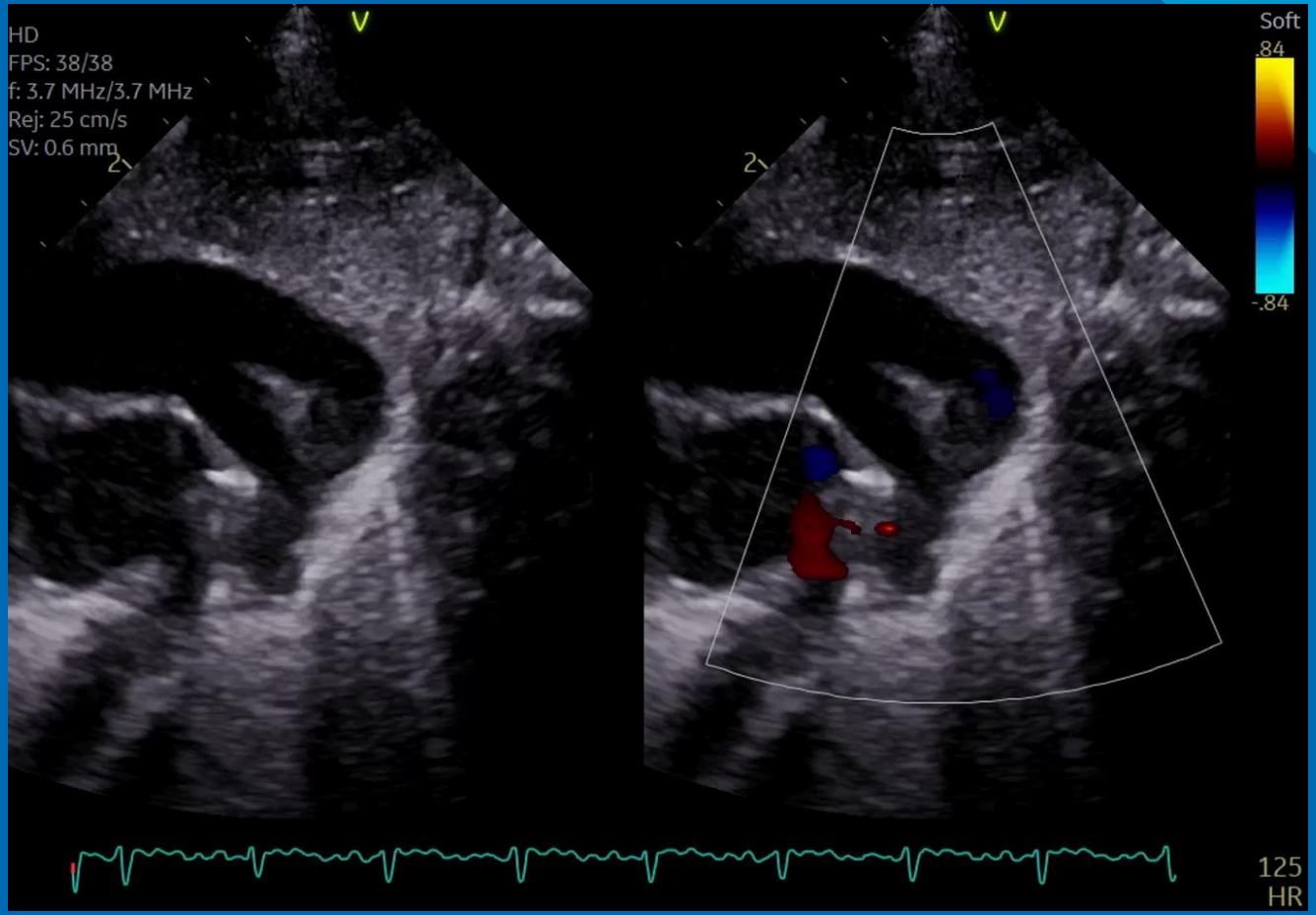

HD
FPS: 27/27
f: 4.0 MHz/4.0 MHz
G(c): -1 dB
Rej: 19 cm/s
SV: 0.5 mm
Soft
.88
-.88
169
HR

Case #4a

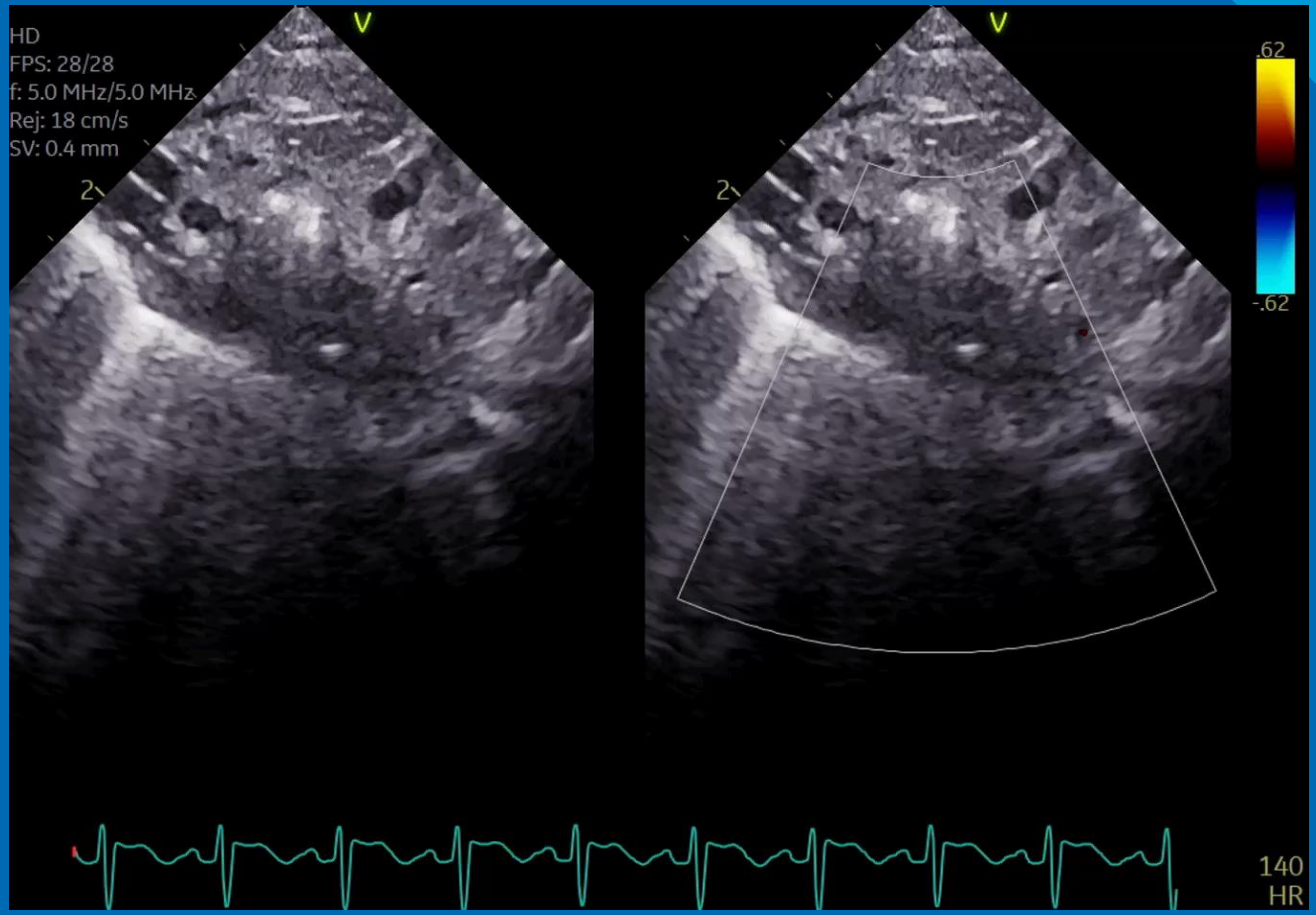
- Interrupted aortic arch type A1



Case #4b

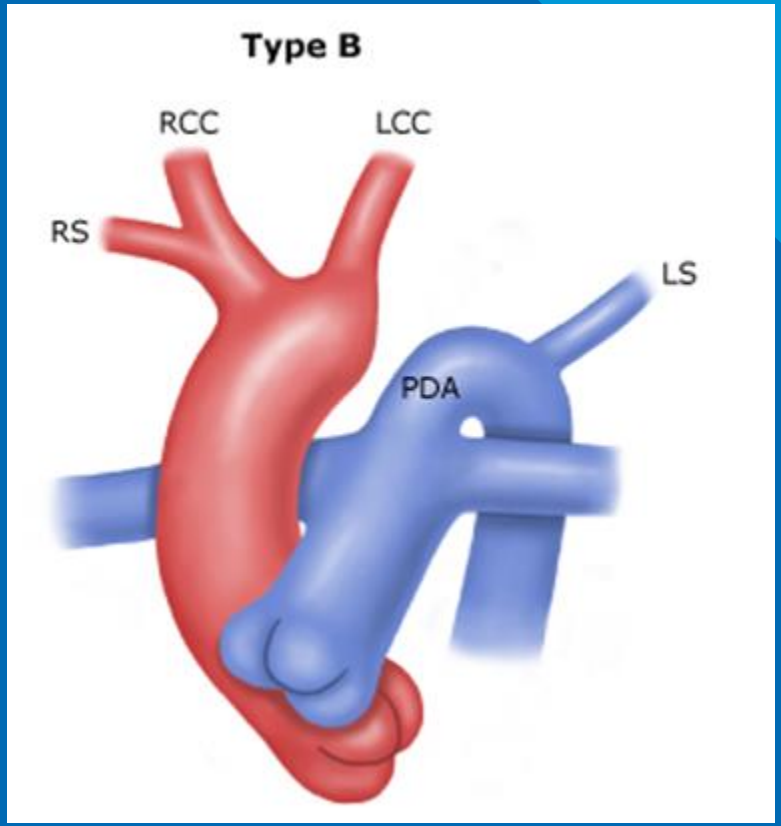


Case #4b



Case #4b

- Interrupted aortic arch type B1

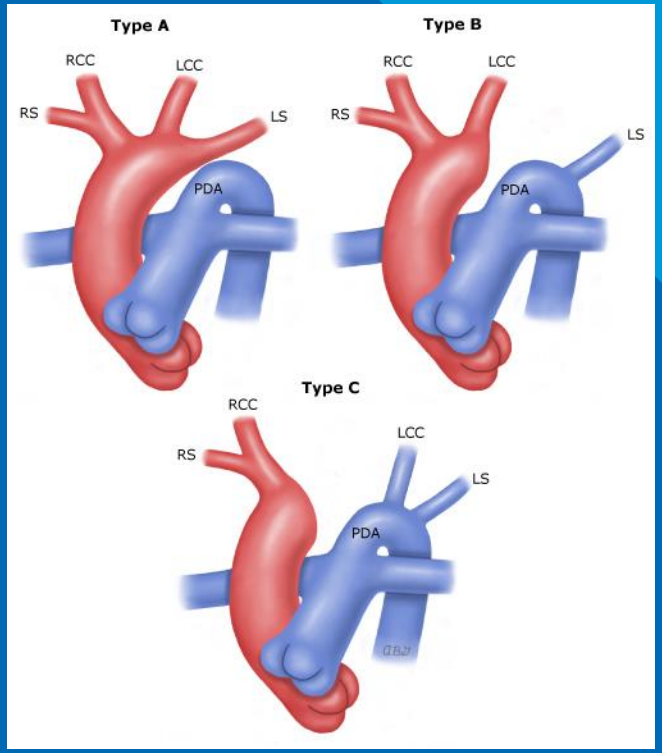


Case #4 - Summary

- Interrupted aortic arch types:
  - **Type A:** distal to the left subclavian artery (2nd most common)
  - **Type B:** Between left common carotid and left subclavian artery (most common, ~50%)
  - **Type C:** Between innominate artery and left common carotid (very rare)

  - **Subtypes:**
    - 1 – normal subclavian artery
    - 2 – aberrant subclavian artery

- Interrupted aortic arches are typically associated with complex intracardiac anatomy but not always



https://www.uptodate.com/contents/image?imageKey=PEDS%2F103748
Modified from: Celoria GC, Patton RB. Congenital absence of the aortic arch. Am Heart J 1959; 58:407.

Words of advice

- Evaluation of the aortic arch can be tricky
- Sweep, sweep, sweep – 2D and color
  - Long axis
  - Short axis (i.e. notch at 3 o'clock
  - PDA sweep
- Newborn/infant with a large right heart and a PDA – COA until proven otherwise.
  - Important differential diagnoses: TAPVR and PH

Thank you!