

Sample Applied Exam – Cardiology (Pediatric)

Case 1

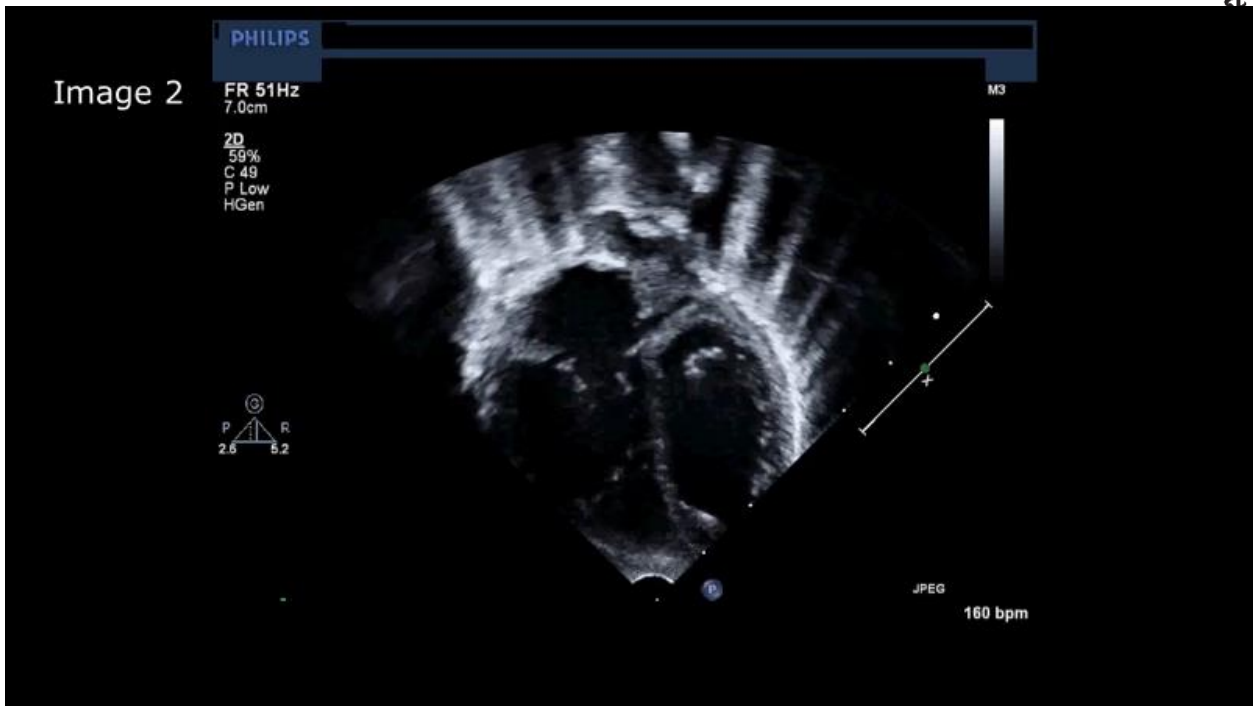
An infant was born at 34 weeks' gestation weighing 1.9 kg. A fetal ultrasound performed in a community hospital suggested a dilated right ventricle.

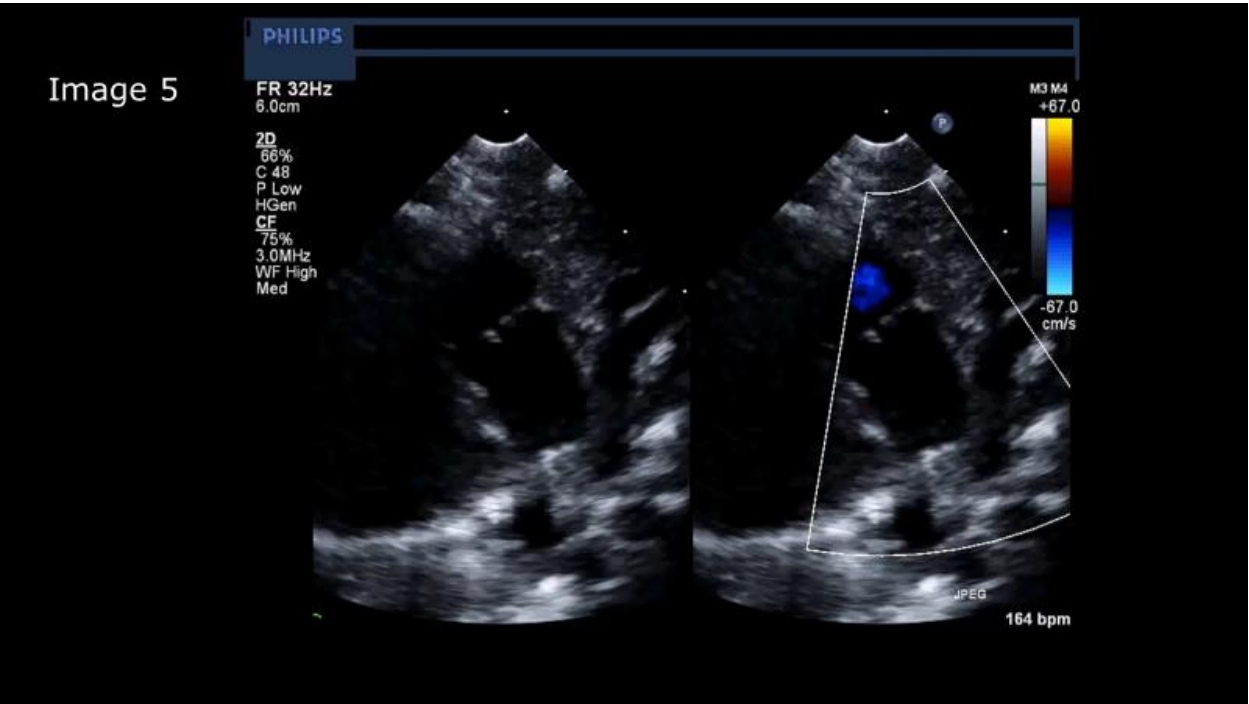
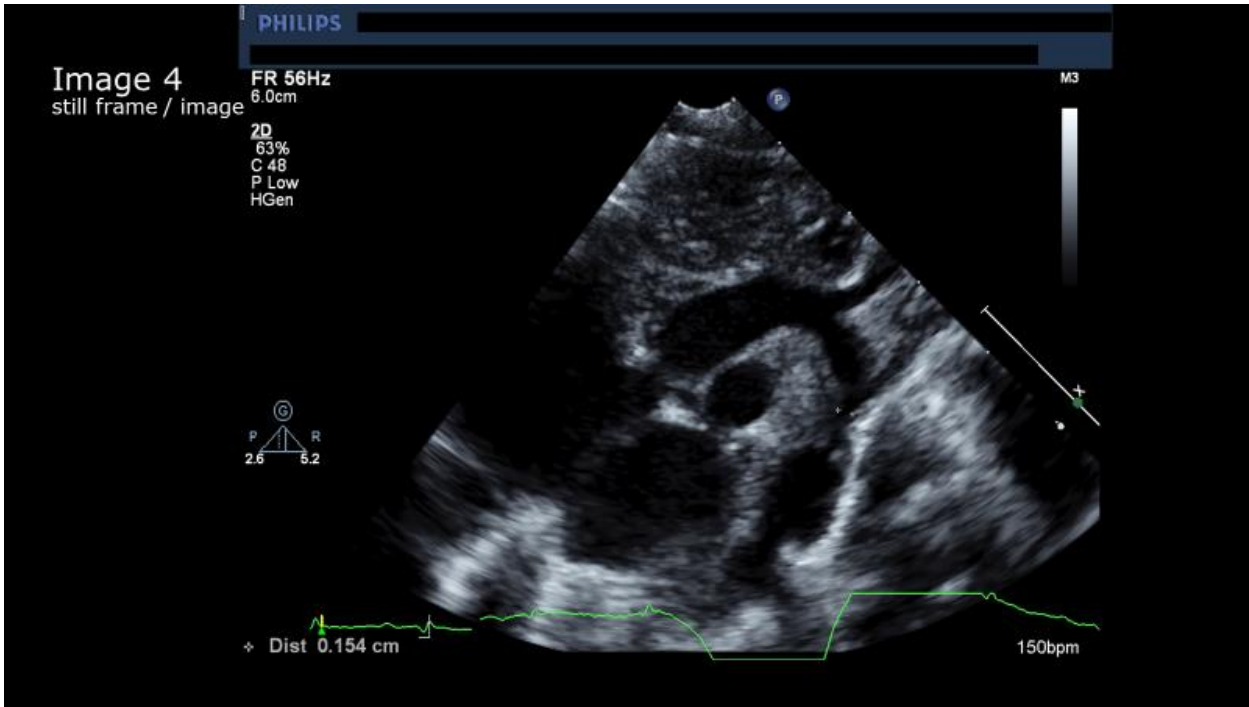
On examination, the saturation is 98% in room air, and there is good peripheral perfusion and an active precordium. Prior to transfer, it was reported that there were normal femoral pulses and no heart murmur. An echocardiogram was performed on arrival at your institution.

Question 1

Review the images below and describe what you see.









MODEL ANSWER

- Severe discrete coarctation
- Isthmus hypoplasia
- Closed PDA (possibly)
- Large VSD
- Reduced ventricular function
- Dilated RV
- Posterior malalignment VSD/crowded LVOT

Question 2

What are your immediate recommendations for the management of this infant?

MODEL ANSWER

- Complete examination (4 limb BPs, auscultation, perfusion, airway assessment)
- Monitor patient (BP, saturations)
- Investigations (gas, lactate, ECG, CXR)
- Start PGE1 – minimum 0.01mcg/kg/min if mention dose
- Inotropic support
- Reassess with 4 limb BPs, echocardiogram

Question 3

Given the size and age of the infant, what are the surgical options?

MODEL ANSWER

- Delay/medically manage until larger and/or closer to full term (maintain on PGE)
- Coarctation repair only
- Coarctation repair and PA band
- Full repair (arch and VSD)
- Prompt for additional options or if no mention of GA/size

Question 4

What factors may influence the decision regarding the timing of surgical intervention?

MODEL ANSWER

- Final assessment of anatomy
- Weight/post-gestational age at time of surgery
- Stability of child (function, systemic perfusion (kidneys, gut))
- Institutional comfort with surgical choices



Question 5

What are the possible immediate complications of prostaglandin infusion?

MODEL ANSWER

- Fever, flushing, apnea, convulsions, rash, hypotension, diarrhea

Question 6

What are the long-term complications of prostaglandin infusions in infants who have been treated for many weeks?

MODEL ANSWER

- Cortical hyperostosis, gastric outlet obstruction

Question 7

a) In general, what are the surgical techniques for the repairs of coarctation of the aorta?

MODEL ANSWER

- End-to-end anastomosis, extended end-to-end anastomosis, patch aortoplasty, left subclavian flap repair

b) What anatomical factors influence the type of repair?

MODEL ANSWER

- Overall aortic arch dimensions and presence/location/extent of any arch hypoplasia

At 6 weeks of age, the infant has a coarctation repair and ventricular septal defect closure. You are called to the intensive care unit six hours after surgery because the blood pressure in the right arm is 135/70 mm Hg.

Question 8

What is your approach to this situation?

MODEL ANSWER

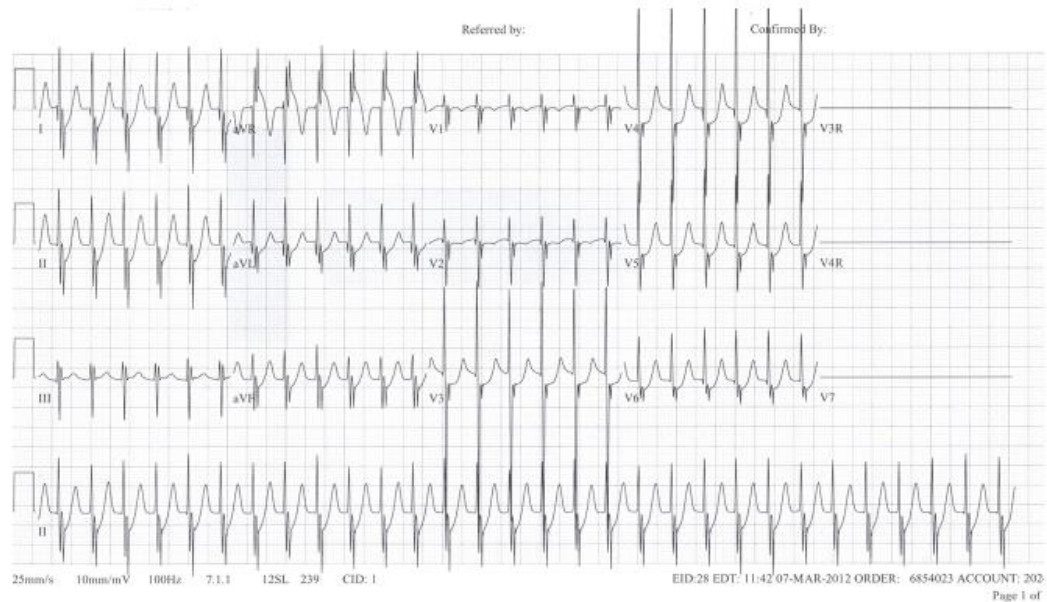
- Look at BP profile since arriving in PICU (sustained, increasing, isolated)
 - Is infant awake/agitated/look for other causes?
 - Presence of leg pulses
 - Take arm/leg BP gradient
 - Echocardiogram if any question about repair
 - Manage hypertension (anti-hypertensive meds, sedation etc.)
- (Goal BPs normal BP for age)



Question 9

SEE IMAGE 6 BELOW.

Image 6



Four hours later, you are informed that the heart rate has increased. The intensive care resident has performed an atrial wire electrocardiogram. What does it show?

MODEL ANSWER

- Narrow complex tachycardia with short RP interval

Question 10

What is the differential diagnosis?

MODEL ANSWER

- JET retrograde conduction
- SVT (AVRT or AVNRT)
- Atrial tachycardia with 1st degree AV block

Question 11

How would you clarify the diagnosis in this situation?

MODEL ANSWER

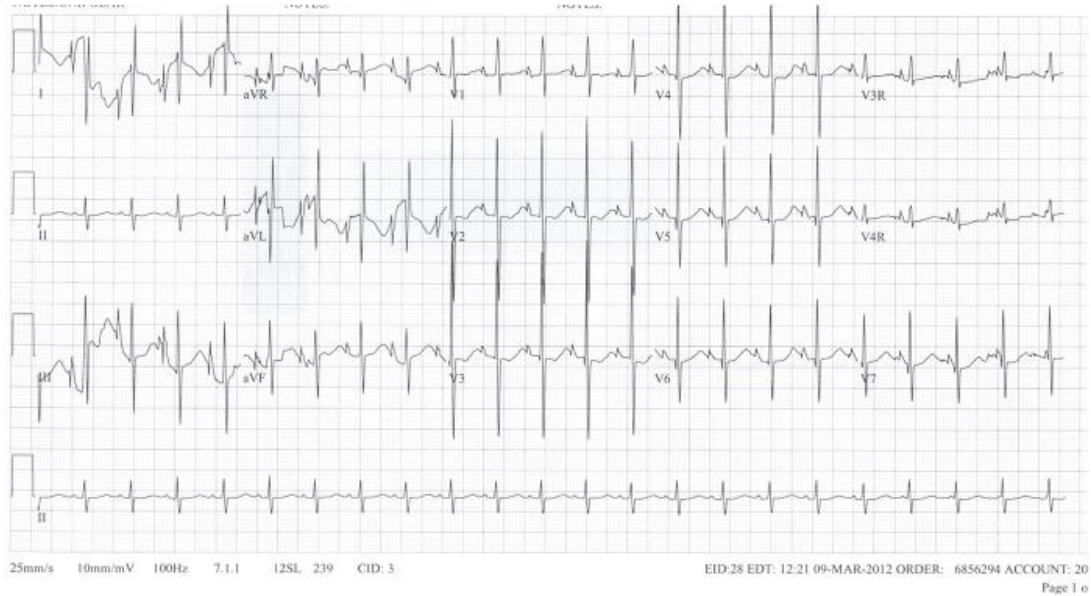
- Pacing wire studies including over drive pacing to further define mechanism and diagnosis
- Adenosine if mechanism remains unclear



Question 12

The next morning, the following atrial electrocardiogram was taken. What does it show?

Image 7



MODEL ANSWER

- Normal sinus rhythm, possible first degree block
- May notice AV dissociation in last few complexes OR isorhythmic AV dissociation