TESTING, TESTING 1 2 3 COMMON TESTS FOR CONGENITAL HEART PATIENTS

Dr. Tarun Sehgal

Adult congenital heart fellow

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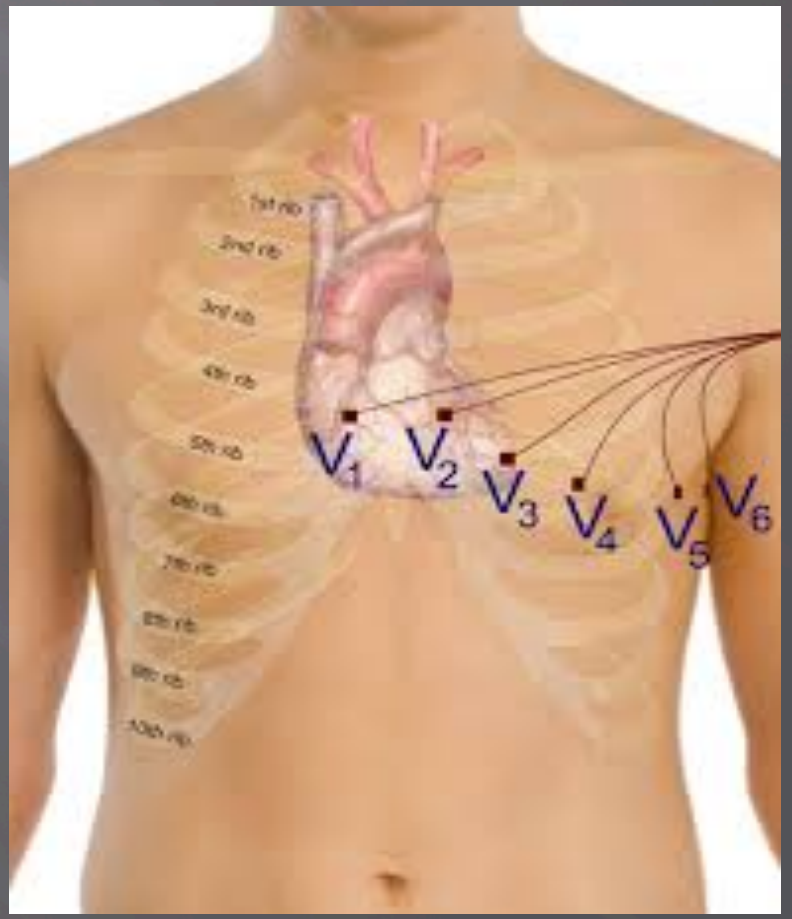
Objectives

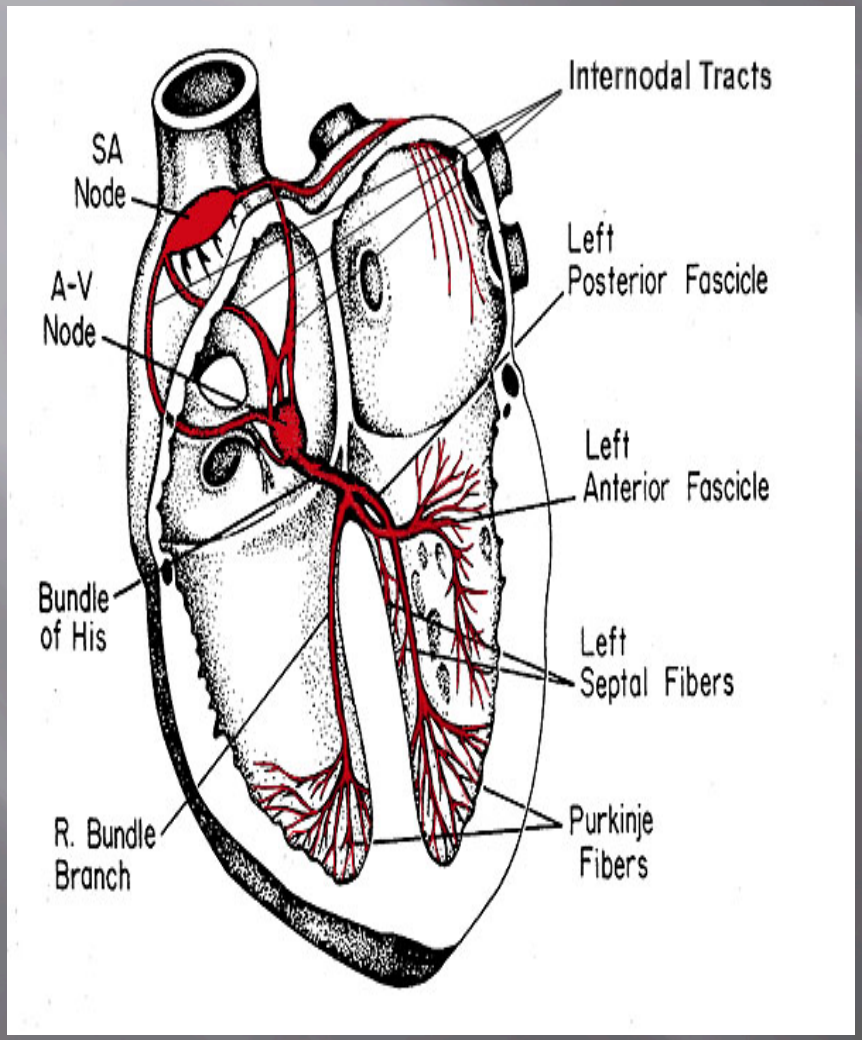
- Cardiac testing for the congenital patient.
  - ECG based test, Exercise based tests, Imaging based tests
  - What to expect
  - What does the test tell us
- Questions

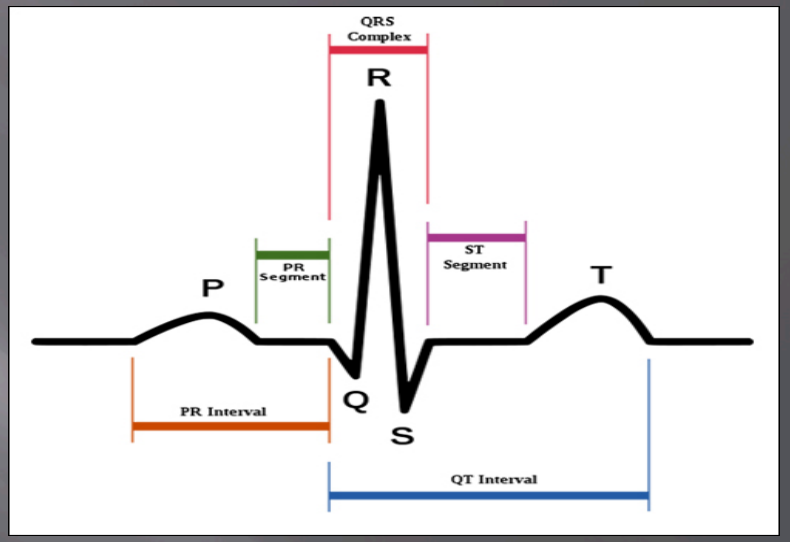
ECG
What to Expect

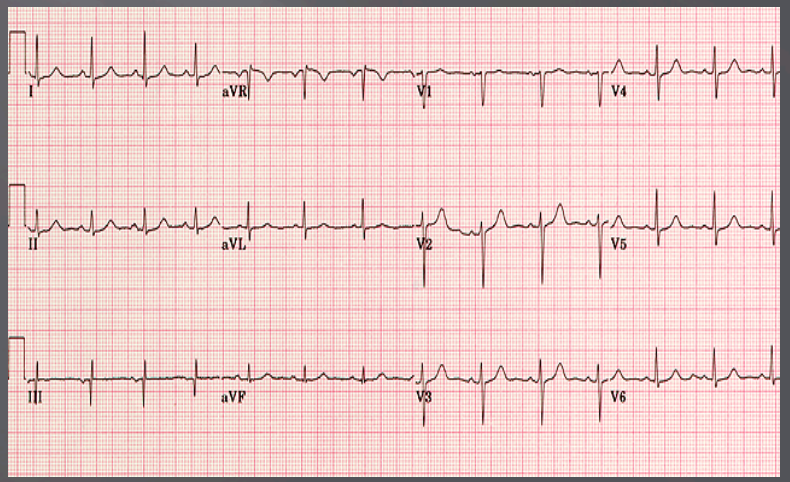
- Quick
  - 5-7 minutes
- Painless
- Tells us a lot

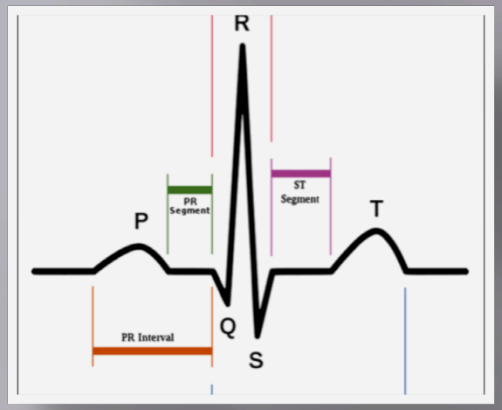


ECG (EKG)


Internodal Tracts
SA Node
Left Posterior Fascicle
A-V Node
Left Anterior Fascicle
Bundle of His
Left Septal Fibers
R. Bundle Branch
Purkinje Fibers


QRS Complex
R
P
PR Segment
ST Segment
T
PR Interval
Q
S
QT Interval


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6



- Snap shot of your heart rate and rhythm at the time the ECG is taken
- Congenital patients can have abnormalities in their conduction system. (arrhythmias, heart blocks) and may be a warning sign.
- Enlargement of the heart.
- Diagnosis (e.g. ASD)
- Signs of coronary heart disease.

Continuous ECG

- Holter Monitor
  - 24 to 48 hours
  - Continuous reordering
- Event recorder
  - 4-6 weeks
  - Patient triggers recording
- Implantable loop recorder
  - Implanted under the skin of the chest
  - Battery life up to 2 years
  - Triggered by patient and or programmed function.

Exercise Stress test

- Sticky electrodes are placed on your chest
- Start walking on treadmill, slow and relatively flat (there is also a exercise bike version)
  - At 3 minute increments, it will get faster and steeper
  - Modified programs available
  - Blood pressure will be taken prior, during every stage and after completion of the test. Heart rhythm will be monitored throughout.
- You can tell them to stop at any time, usual exercise time is 4-10 minutes.
- Wear comfortable shoes
- Not to eat or drink prior to test (usually 3-4 hours)and avoidance of caffeine products for up to 24 hours prior to the test.

Exercise stress test

- Why?
  - Assessment of the severity of heart valve narrowing.
  - Assess overall fitness.
  - Assess for heart rhythm changes with exercise.
  - Coronary artery disease detection or disease severity.

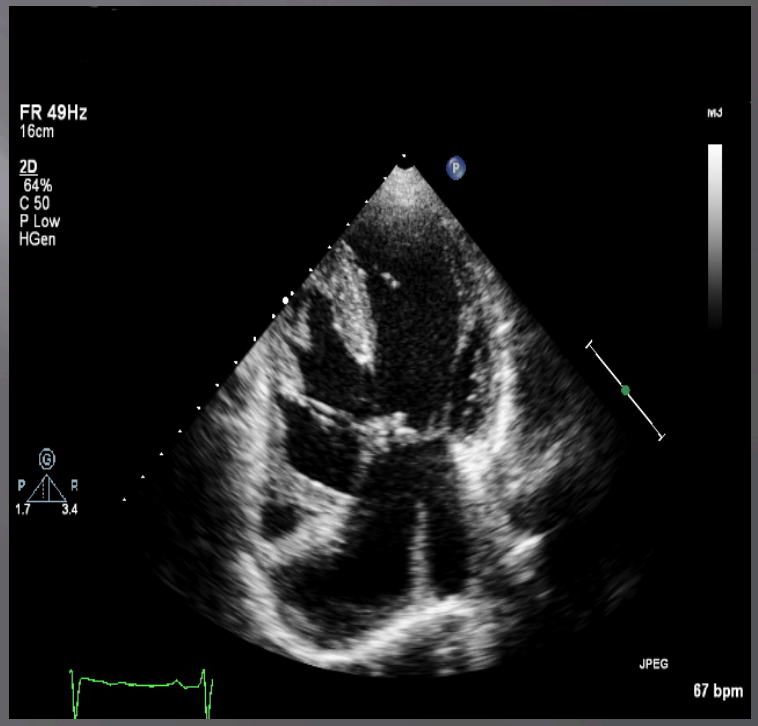
Cardiopulmonary Exercise Testing

- Similar to exercise stress test, but you get to wear a fancy face mask, which monitors oxygen consumption and carbon dioxide production.
- Test overall is 15 – 20 minutes, but max exercise is 3-4 minutes. The rest of the time is rest, warm up and recovery.
- Prior to test a lung testing will be done.

WHY CPET

- Patients underestimate their symptoms and unaware that they are significantly limited. CPET allows for us to objectively determine how fit you are.
- This can be compared on a serial basis as well compare you to others with similar congenital lesions as well as the general population.
- We can also assess how much the exercise capacity is affected by your heart function.

Echocardiography

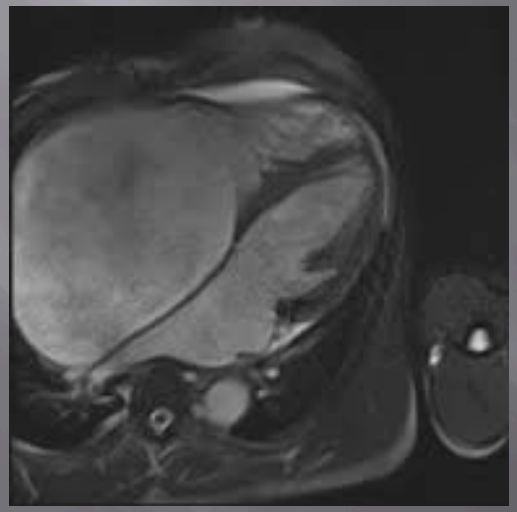


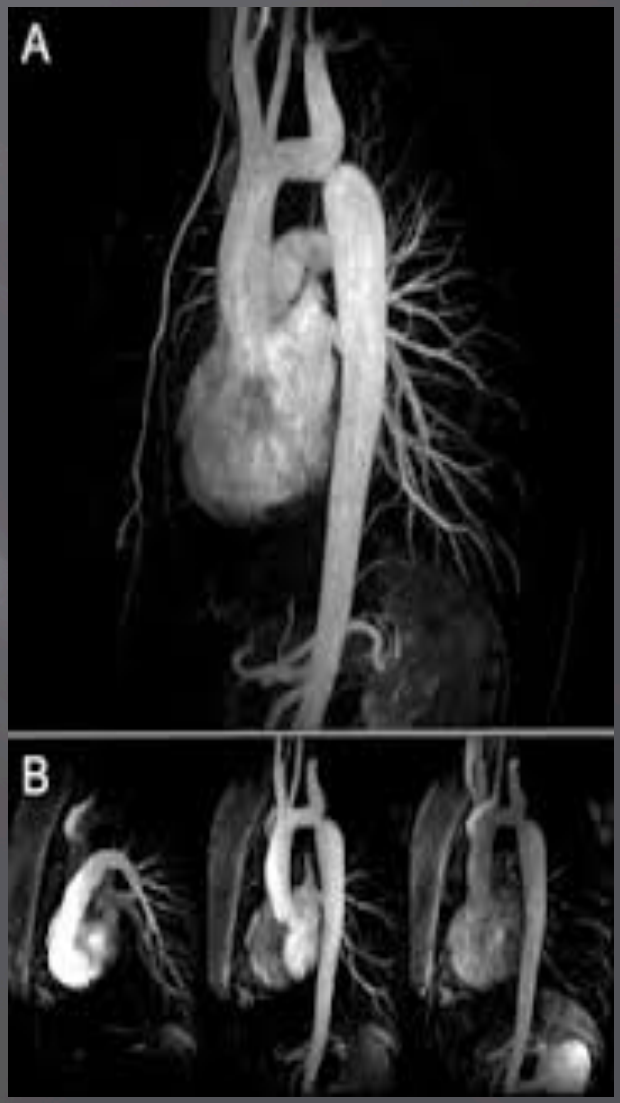
Echo and what it tells you.

- High frequency sound waves (not heard by you) is directed towards the heart, sounds waves that Echo (bounce back) to the probe are converted to an image.
  - Can see the structure of the heart, movement of heart structures and pumping function of the heart.
  - Colour assessment of flow, looking for leakiness of heart valves, “holes” in the heart
  - Velocity of blood which is used to assess for narrowing of heart valves

- Test is usually painless, probe can be irritating and gel can be cold.
- Takes 30-40 minutes, mostly you will be lying on left side.
- We may ask you to do some breathing manoeuvres to optimize the images.
- Occasionally will insert an IV line to add contrast (improve image quality) or for other special tests.

Cardiac MRI





- Cardiac MRI uses powerful magnets in conjunction with computer software to convert radio signals from water molecules into high quality pictures of your internal organs
- The tool of choice when detailed anatomy of complex structural heart disease is required.
- Can assess the flow of blood, very helpful when looking at tight and leaky valves, holes in the heart, and narrowing's of the aorta.
- Real time images, so we can watch your heart beat or watch the flow of blood
- No radiation exposure.

What to expect

- Test can take between 30-90 minutes to complete.
- Lie on table, that will slide into the machine
- During image acquisition
  - Will asked to remain still
  - Maybe asked to hold your breath
- May need to use injected contrast agent
  - Rare to have any adverse reactions

- Safe test.
- Loud noise from the coils of the MRI machine. Can you ear plugs to help
- Claustrophobia
- No reported cases of ill effects when used in pregnancy, but usually try not to do in first trimester
- Cannot use in patients with certain metallic implants like pacemakers, cochlear implants.

QUESTIONS?????