Miscellaneous Cardiology Topics
pregnancy - congenital - myocarditis - pericardial disease

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No Conflicts of Interest

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Pregnancy and Cardiovascular Disease

MCQ

1. Which of the following findings is abnormal during pregnancy?

A. Mild dyspnea
B. Mild leg swelling
C. S3
D. S4
E. 2/6 systolic murmur heard at base.

Cardiovascular Changes of Pregnancy

↑ total blood volume and relative anemia.
↑ cardiac output until 32nd week.
Cardiac output ↑ 80% or more.

Normal during Pregnancy:
- Mild dyspnea on exertion
- 1/6 – 2/6 systolic murmur at the base (pulmonary flow murmur)
- S3 Gallop
- Mild peripheral edema

Abnormal during Pregnancy
- orthopnea
- PND
- cough,
- chest pain
- Arrhythmia
- loud systolic murmur or any diastolic murmur (soft diastolic rumble is normal)
- S4 Gallop

Pregnancy is Contraindicated

Pregnancy is contraindicated and conditions where cardiac output cannot be augmented.

1. Heart failure or peripartum cardiomyopathy.
2. Pulmonary hypertension
3. Mechanical valves (thrombosis risk)
4. Cyanotic congenital heart disease
5. Severe valvular disease (regurgitant lesions better tolerated than stenotic lesions)
6. Ascending aortic aneurysms (>4 cm in Marfan and 4.5 in non-Marfan)

Peripartum Cardiomyopathy

- Heart failure during last trimester or within 5 months postpartum.
- Incidence: depends on geography and varies between 1/15000 and 1/100
- Risk factors: multiparous, >30, black, hypertension, or preeclampsia.
- About 50% recover LV function.
- Subsequent pregnancy is not recommended
  Residual LV dysfunction = absolute contraindication.
Normalized LV function = relative contraindication.
- Treatment: heart failure therapy. No role for routine use of bromocriptine, IVIG, pentoxifylline, or immunosuppression.
2. A peripartum cardiomyopathy patient gets pregnant again. Euvolemic on exam and EF 40%. Which medicine do you start?

A. Metoprolol  
B. Hydralazine  
C. Lisinopril  
D. Furosemide  
E. Digoxin

Heart Failure Medications during pregnancy

- Metoprolol is the beta-blocker of choice. Class C and associated with IUGR (avoid atenolol)
- ACE inhibitors/ARB's not safe (Class D)
- Digoxin and Loop diuretics used when needed. (Class C)

Hypertension during Pregnancy

Preeclampsia (HTN + proteinuria):
- Mild to moderate HTN: avoid routine medical therapy.
- Severe hypertension (>150/100mmHg): labetalol or hydralazine for goal of SBP of 140 – 150 mmHg.

Preexistent hypertension:
- Mild to moderate hypertension: avoid routine medical therapy.
- Severe hypertension (>160/110mmHg): methyldopa, labetalol, or nifedipine for goal of SBP of 140 – 150 mmHg.

Adult congenital Heart Disease:

~ 1 to 2% of the population.

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3. Widely split S2 and 2/6 systolic murmur.
4. Continuous murmur.
5. Systolic click ↓ during inspiration and systolic murmur ↑ during inspiration.

A. ASD  
B. VSD  
C. RBBB  
D. PDA  
E. pulmonary stenosis

MCQ

6. Young patient with hypertension. Systolic click on exam

A. aortic coarctation  
B. mitral prolapse  
C. renal artery stenosis  
D. pheochromocytoma  
E. heavy alcohol
**Atrial Septal Defect (ASD)**

- Ostium secundum most common.
- Ostium Primum (cleft mitral valve and trisomy 21).
- Symptoms: Often asymptomatic. Dyspnea, fatigue, right-sided heart failure, and atrial fibrillation.
- Paradoxical embolus.
- Exam: fixed splitting of S2. Pulmonary mid systolic flow murmur.
- Treatment: indicated for symptomatic effects or enlarged RA and RV (RV volume overload).
- Small to moderate Secundum defects often closed percutaneously. All other defects closed surgically.

**Ventricular Septal defect (VSD)**

- Perimembranous most common. (often close spontaneously during childhood).
- Symptoms:
  - small: asymptomatic.
  - moderate to large: LV failure & pulm HTN
- Exam: Loud holosystolic murmur heard throughout the precordium
- Treatment: Observe if asymptomatic with normal pulmonary pressures and normal left ventricle size and function. Otherwise, surgical repair. (any aortic regurgitation warrants VSD closure)

**Coarctation of the Aorta**

- Associated with bicuspid aortic valve and aortic aneurysm formation (aortopathy)
- Small association with circle of Willis berry aneurysms (MRA brain).
- Strongly associated with hypertension and complications of hypertension, including, heart failure, and stroke.

**Coarctation of the Aorta (cont)**

- Exam:
  - hypertension usually present
  - Arm BP > leg BP (Radial-femoral pulse delay).
  - A systolic murmur is common. If severe coarctation is present, multiple collateral arteries in the intercostal vessels may be audible with the continuous or systolic murmur.
  - Rib notching maybe seen on chest x-ray.
  - Diagnosis: Echo, MRI, CT, or cath.
  - Treatment: Surgery or percutaneous dilation/stenting.

**Endocarditis Prophylaxis**

1. History of endocarditis
2. Cyanotic heart defects
3. Residual shunts (e.g. VSD patch leak)
4. any artificial valve (mechanical or tissue)
5. valve thickening after transplant.
6. for 1st 6 months after shunt repair.

*No longer recommended for bicuspid, VSD, or valvular disease.*
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7. Chest pain that improves with sitting.
   Exam: 2 (or 3) component rub.
   ECG: diffuse concave ST elevation.
   A. Acute MI
   B. Aortic dissection
   C. Pericarditis
   D. Myocarditis
   E. Costochondritis

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8. pericarditis 2 weeks after MI is treated with?
9. Viral or idiopathic pericarditis is treated with?
10. Recurrent pericarditis is treated with?
11. Viral or idiopathic myocarditis with reduced LV EF that is hemodynamically stable is treated with?
   A. corticosteroids
   B. colchicine
   C. NSAIDs
   D. High dose aspirin
   E. ACE inhibitor and/or Beta-blocker

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12. Electrical alternans
   A. Large pericardial effusion
   B. Small pericardial effusion
   C. Heart Failure
   D. Aortic regurgitation
   E. Constrictive pericarditis

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13. ↑ JVP during inspiration in a patient with prior TB
14. ↑ JVP during inspiration in a patient with enlarging tongue
   A. Restrictive cardiomyopathy
   B. Constrictive pericarditis
   C. Idiopathic cardiomyopathy
   D. Viral myocarditis
   E. Cardiac tamponade

Right Heart Failure
- Symptoms: ascites, tender hepatomegaly, peripheral edema, and shortness of breath.
- Most common cause is left heart failure.
- Other causes:
  - restrictive cardiomyopathy
  - constrictive pericarditis
    - right ventricle dysfunction (infarct)
    - tricuspid valve regurgitation (scarred)
    - pulmonic regurgitation (repaired tetralogy of Fallot)
    - ASD
    - partial anomalous pulmonary venous return (probably not tests on IM boards).

Constrictive pericarditis
- The heart is constricted within a hard shell of calcified and thickened pericardium.
- Causes: inflammation (prior heart surgery, XRT, or TB)
- Symptoms: right heart failure.
- Exam: pericardial knock (early diastolic sound), Kussmaul’s sign
- Diagnosis: Echo, MRI, CT, chest x-ray, catheterization.
- Labs: BNP mildly elevated.
- Treatments: pericardiectomy
Restrictive cardiomyopathy

- Stiff ventricle walls with decreased compliance and elevated filling pressures. (Severe diastolic dysfunction)
- Causes: idiopathic, radiation, eosinophilic cardiomyopathy, endomyocardial fibrosis, sarcoidosis, amyloidosis, scleroderma, and Fabry disease (X-linked alpha galactosidase deficiency).
- Treatment: underline condition. Enzyme replacement for Fabry. Palliative care or transplantation selected cases.

Acute Pericarditis

- Typically idiopathic or viral.
- Pleuritic chest pain that improves with leaning forward.
- Exam: two or three component friction rub.
- ECG: concave ST elevations and PR depression
- Troponin normal or minimally ↑.
- ↑ESR and CRP
  Echo: +/- small effusion

Pericarditis ECG

Concave ST elevations. Convex should vex you

Pericarditis Treatment

- Initial episode: aspirin, NSAIDs, +/- colchicine
- Recurrent episodes: colchicine
- Post MI (Dressler’s): aspirin. Avoid NSAIDs
- Avoid steroids. (↑ recurrence)

Cardiac Tamponade

- Pericardial pressure > cardiac filling pressure
- Prevents cardiac filling.
- Symptoms: dyspnea, tachycardia, JVD, and hypotension.
- Pulses paradoxus: drop in systolic BP > 10 mmHg with inspiration.
- Exam: muffled or distant heart sounds and JVD
- ECG: sinus tachycardia and electrical alternans
- Treatments: pericardiocentesis or surgery.

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