CREOG REVIEW

OBSTETRICS

Basic Sciences
A 21 yo nulligravida comes to you for preconceptual counseling because she has idiopathic dilated cardiomyopathy, with a current LV fraction of 30%. You counsel her that the physiologic change most likely to lead to decompensation of her cardiac status during pregnancy is:

A) Decrease in systemic vascular resistance
B) Increase in intravascular volume
C) Hypercoagulability
D) Decrease in pulmonary vascular resistance
ANSWER: B) increase in intravascular volume

Cardiovascular Changes of Pregnancy
- ↑ in intravascular volume (20% in RBC mass & 50% plasma volume)
- ↑ in maternal HR and CO
- 30% decrease in SVR
- Slight decrease in pulm vascular resistance

With decreased LV function, unable to accommodate the pregnancy-induced ↑ in intravascular volume.
A 23 year old primigravid woman has epilepsy that is controlled with phenytoin sodium (Dilantin). The established method to prevent hemorrhagic disease of the newborn is:

A) Oral vitamin K to mother in last month of pregnancy

B) Newborn parenteral vitamin K at birth

C) Lowered doses of phenytoin (Dilantin) in last month of pregnancy

D) Intrapartum parenteral vitamin K to the mother
Answer

B) Newborn parenteral vitamin K at birth
♦ Vitamin K --- protective effect, counters hemorrhagic disease

♦ Antiepileptic drugs - Phenytoin (Dilantin), Carbamazepine (Tegretol), Primidone (Mysoline) - cause Vit K deficiency
  - AEDs induce microsomal hepatic enzymes
  - Hepatic enzymes \( \bar{\text{v}} \) it K-dependent clotting factors
    Prolongs PT/PTT
  - Women taking AEDs have lower maternal Vit K

♦ Ingested Vit K crosses placenta poorly - A&C incorrect
  But, in studies antepartum maternal ingestion of Vit K alleviates the coag factor changes

♦ Proper Treatment:
  Administer parenteral Vit K to newborn
  +/- Oral Vit K 10 mg last month of pregnancy
A 19 yo primigravid woman comes to your office for prenatal care at 32 weeks of gestation with no physical complaints. Her past medical history is unremarkable. Of the following findings of physical exam, the one most likely associated with serious disease is:

A) Grade II/IV systolic murmur at LSB
B) Split second heart sound
C) Third heart sound
D) Mid-systolic click
E) Diastolic murmur at cardiac apex
Answer

E) Diastolic murmur at cardiac apex
Physiologic changes of pregnancy make CV evaluation difficult. Hard to distinguish pregnancy changes vs CHF. 1) Increasing fatigue 2) Dyspnea by placental progesterone 3) Dependent edema

Physiologic Changes in Heart Sounds:
- Systolic flow murmur 2/2 increased intravascular volume
- Prominent third heart sound
- Split second heart sound

MVP (click) in 17% of normal women
- Need to eval with ECHO for valve insufficiency
- In absense of valve insufficiency – no clinical significance

* NEVER IGNORE A DIASTOLIC MURMUR- may represent serious cardiac pathology—Need ECHO*
A 28 yo woman G1 comes to your office for her first prenatal visit at 5 weeks of gestation. She is taking a standard prenatal vitamin. However, because she is a strict vegetarian, she is concerned about inadequate vitamin A intake. You correctly counsel her to take:

A) An additional vitamin A supplement  
B) Only her prenatal vitamin  
C) A natural beta-carotene supplement  
D) An additional multivitamin
Answer: B- only prenatal vitamin

Excessive Vitamin A- Teratogen - >10,000 IU
- Assoc with birth defects: ear & eye malformations, cleft palate, less likely (cardiac, thymic, behavioral)
- Especially during first 7 weeks of pregnancy

Routine Supplementation of Vitamin A NOT recommended. Daily intake met with diet except if strict vegetarian. Vegetarians can supplement with prenatal vitamin. Recommended supplement- 5000 IU in prenatal vitamins
A 23 yo gravida 2, abortus 1, woman of African & Cambodian heritage initiated prenatal care at 18 weeks of gestation. Her platelet count was 110 and her Hct was 36%. Her prenatal course was recently complicated by a UTI which was treated with Keflex. Lab work was repeated at 34 weeks gestation. Her platelet count is now 104 and her Hct is 30%. Most likely the thrombocytopenia in this patient is:

A) drug induced
B) alloimmune
C) pregnancy associated
D) autoimmune
E) b-thalassemia induced
Answer: C- pregnancy associated
During the course of pregnancy, maternal plasma volume increases by 50%. In third trimester, Hct declines (physiological).

**Gestational thrombocytopenia**-mild to moderate decrease in plt. About 12% of pregnant women have plt count < 150. This condition is benign and requires no treatment.

**ITP**- autoimmune. Plt <70 most likely ITP  Plt <50—ITP

**Alloimmune thrombocytopenia (NAIT)**- rare condition characterized by maternal antibodies to fetal platelet antigens. Devastating to fetus, but does not effect maternal plt count.
A 20 yo woman G2 P0 comes to your office at 8 weeks for her first prenatal visit. She has a history of Eisenmenger’s syndrome secondary to a VSD and is adamant about continuing her pregnancy. You counsel her that the time of extreme risk is in the postpartum period, 30 minutes after delivery. The CV change immediately in the postpartum that is most responsible for the increase in maternal risk in this patient is the transient:

A) decrease in BP
B) increase in circulating volume
C) increase in CO
D) decrease in pulmonary artery resistance
E) decrease in circulating clotting factors
Answer: A
Hemodynamic changes of labor and postpartum CO increases an additional 10-30% during labor (- HR & SV)
Blood loss during delivery can lead to hypotension.

Immediately after delivery CO increases:
1) Blood shifts from uterus to intravascular space
2) IVC has reduced compression from uterus -- venous return
3) Extravascular fluid mobilization
Patient with Eisenmenger’s Syndrome
-Congenital Heart Defect (ASD, VSD or PDA) leads to L.to R. shunt and pulmonary HTN and eventual R. to L. shunt

-Grave prognosis during pregnancy b/c Pulm HTN, mortality 50%

-Hypotension is great risk b/c increases R. to L. Shunting, less pulm perfusion, hypoxia

AVOID HYPOTENSION
- Invasive hemodynamic monitoring during labor
- Keep PWP slightly > than nml to avoid hypotension
A 31 yo G1P0 has had a h/o epilepsy since childhood. Her grand mal seizures usually are well controlled by the antiepileptic drug Carbamazepine (Tegretol). Her last seizure was 2 yrs ago. She stopped her AED when she found out she was pregnant because she heard that it causes birth defects. You advise her that the risk of birth defects is:

A) not related to her antiepileptic drug (AED) use
B) related to her epilepsy alone
C) modified by maternal vitamin K supplementation
D) modified by fetal genetic susceptibility
Answer : D
AED teratogenic effects through free radical metabolites
-Oxidative metabolites are conjugated by radical-scavanger enzymes
-Fetuses that are homozygous for the recessive allele, which gives them low enzyme levels, are at greater risk for malformation.

-Birth defect from AEDs modified by fetal genetic susceptibility

AEDs--Risk of birth defects 6-8% (2-3 x normal)
A 28 yo woman G1P0 comes to you for preconceptual counseling. The fetus in her prior pregnancy had anencephaly. She would like to become pregnant in the next 6 months. The most appropriate recommendation regarding folic acid for this patient is to:

A) increase overall dietary intake  
B) take 400 mg of folic acid q day  
C) take 800 mg of folic acid q day  
D) take 4 mg of folic acid q day
Answer: D

Preconceptual supplementation of 400 mg and 4 mg for women with prior pregnancy affected by an NTD.
A 34 yo G1P0 at 27 weeks is seen in ED with complaints of SOB for past 5-6 weeks. She is comfortable at rest and has no orthopnea, chest pain, cough, fever nor chills. On exam, she is not in acute distress and has HR 92 and RR 16. Her chest is CTA B. An ABG is drawn while patient is breathing room air pH of 7.45 PCO2 30, PO2 102. The most likely diagnosis:

A) asthma
B) pneumonia
C) pneumothorax
D) pulmonary embolism
E) physiologic dyspnea
Answer: E
Respiratory system changes with Pregnancy
- Tidal volume increases, resid volume decreases
- Progesterone stimulates the respiratory centers, increasing minute ventilation, reducing PCO2 - respiratory alkalosis, PCO2 decreases and PO2 increases in pregnancy

- Dyspnea occurs in 60-70% of pregnant women

This is physiologic dyspnea b/c:
1. Early onset, nonprogressive nature
2. Lack of assoc symptoms
3. Normal findings on PE and labs
A 28 yo woman P2 reports daily consumption of alcohol during her current pregnancy. She is at increased risk for giving birth to a child with:

A) an omphalocele  
B) IUGR  
C) duodenal atresia  
D) hypertelorism
Answer: B
Fetal Alcohol Syndrome (FAS)
- Char pattern of facial features: short palp fissures, flat upper lip, flattened philtrum, flat midface

- Evidence of IUGR

- CNS neurodevelopment abnormalities
A 34 yo woman G3P2 comes to your office at 13 weeks of gestation for her first prenatal visit. At that visit, she informs you that she has Grave’s disease but that she stopped treatment when she found out she was pregnant. She currently c/o occasional palpitations. Her HR 105. Her TFTs show undetectable TSH and elevated T4. The next step in the treatment plan:

A) B-blocker
B) propylthiouracil
C) Lugol’s solution
D) methimazole
E) subtotal thyroidectomy
Answer: B

**Treatment of Hyperthyroidism/Grave’s Disease**
1. First-line is thioamide drug (PTU or methimazole)- both inhibit thyroid hormone synthesis. PTU is preferred b/c of lower rates of placental transfer and lower frequency of maternal complications.

2. PTU is ideal for treatment of thyroid storm
A 22 yo woman G2P1 at 11 weeks GA has a h/o chronic asthma. Currently she has symptoms of wheezing and difficulty breathing 2 or 3 times per month and has never required hospitalization. She does not have nocturnal symptoms and is free of symptoms between exacerbations. To control her asthma, you prescribe:

A) daily inhaled B2-agonist
B) inhaled B2-agonist as needed
C) daily inhaled corticosteroids
D) inhaled corticosteroid as needed
E) daily inhaled cromolyn sodium
### Asthma Treatment in Pregnancy

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<td>&lt;2x/week</td>
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A 30 yo primigravid patient has a past history of thyroidectomy for Grave’s disease and is taking Synthroid replacement 0.125 mg each morning. Her only other pregnancy complication is acid reflux, which she treats as needed with calcium carbonate tablets. Third trimester labs show a microcytic anemia that you plan to treat with iron sulfate 325 mg BID. Her TSH measured at the same time is 5.4 The most appropriate recommendation for medication is:

A) increase synthroid dose
B) no change
C) decrease synthroid dose
D) separate synthroid from iron sulfate by 4-6 hours
E) separate synthroid from calcium carbonate by 2-4 hours
Answer: D-Separate synthroid from iron sulfate by 4-6 hours

This woman’s synthroid is therapeutic b/c TSH in the normal range (0.5-5.5).

Medications that interfere with absorption of synthroid.
- Aluminum hydroxide antacids, ferrous sulfate, sulcralfate
- Need to counsel women to take synthroid 4-6 hours before or after other meds affecting its absorption

Medications can directly affect thyroid functioning
Example: Lithium can cause hypothyroidism
Medications (AEDs) can increase hepatic metabolism (P450) and speed clearance of thyroid hormone. Example: Phenytoin, Carbamazepine, phenobarbital.

During pregnancy, there are changes in serum volume and thyroid-binding globulin increases, therefore need to monitor and adjust doses of synthroid throughout pregnancy.
A healthy 25 yo woman G2P1 presents at 30 weeks GA c/o palpitations. On physical exam, her HR 86 bpm and BP 110/70. With auscultation, occasional skipped beats are heard. A 12 lead EKG reveals occasional PVCs. A 24-hr holter monitor reveals 2500 PVCs in 24 hours. The next step in management:

A) repeat 12 lead EKG  
B) repeat 24 hr Holter monitoring  
C) exercise stress test  
D) implement maternal ECHO
Answer: D- maternal ECHO

Differential Diagnosis of PVCs:
1) Idiopathic  2) structural disease  3) CAD  4) MVP  
5) myocarditis  6) cardiomyopathy  7) rheumatic heart disease  
8) electrolyte imbalance  9) substance abuse  10)PE  
11) thyroid disease

Sx: Palpitations, chest pain, lightheadedness -->
EKG identifies PVCs --> Holter monitor to quantify frequency of PVCs -->
ECHO to evaluate structural integrity of heart -->
Thyroid screen, check electrolytes

Treatment: isolated PVCs have no adverse outcomes
If excessive sx from PVCs can take β-blockers
A 30 yo woman G2P1 at 28 weeks GA had a random blood sugar of 122 mg/dL at her prenatal screening 2 wks ago. She gives a h/o insulin treatment for GDM 3 yrs ago. She has intermittently checked her fasting glucose at home and reports that it has never exceeded 100, not even before she became pregnant. Serum glucose 1 hour after glucose tolerance load was 119. The most appropriate management is:

A) treat with glyburide  
B) no hypoglycemic therapy  
C) treatment with insulin  
D) 1200 kcal/day diet developed by ADA
Answer: B- no therapy

Treatment with hypoglycemic agent
Fasting >100, 1hr PP >140, 2 hr PP>120

Recurrence of GDM is only 50%
A 28 yo woman G1 presents to the ED at 14 weeks of gestation. She complains of fever, chills, left flank pain and urinary urgency for the past 4 days. Physical findings include temp 38.5 C, HR 100, RR20, left flank pain. UA shows bacturiria, leukocytes, +nitrates, large ketones. IV fluids and ceftriaxone are initiated in the ED with plans for the patient to be discharged home in 18-24 hours. The laboratory finding that necessitates continued hospitalization is:

A) serum Cr 0.8  
B) serum K 3.4 
C) WBC 23,000 
D) urine culture + Klebsiella pneumonia 
E) Hct 35%
Answer: C- leukocytosis

Pregnant women should be screened for Asx bacteriuria Tx with macrobid (nitrofurantoin)

Acute Cystitis: hesitancy, urgency, frequency, dysuria

Acute pyelonephritis: Fever, chills, CVA tenderness, N/V
Management of Pyelonephritis
- Hospitalization
- IV fluids
- Antibiotics (ceftriaxone, ancef, amp+gent)
- Tx until afebrile for 48 hrs, then d/c on po ABx x10 days

Hospitalization for Pyelonephritis is Necessary if:
1) ARDS
2) Renal insufficiency
3) Leukocytes >20
4) Uterine activity
5) PTL
A 26 yo woman G2P1 presents at 23 weeks GA with fever, HA, muscle aches, malaise and a non-productive cough of 6 days duration. Her temp is 38.3 C and there are coarse rhonchi and fine rales throughout the left lung fields. CXR demonstrates patchy densities and interstitial infiltrates. You admit her to the hospital. The best initial antibiotic treatment option would be:

A) ampicillin  
B) Bactrim  
C) Cefotetan  
D) Doxycycline  
E) erythromycin
Answer: E- erythromycin
Patient has classic sx of atypical CAP. Empiric therapy is erythromycin 500 mg q 6 hrs.

Pneumonia (PNA) complicates 0.1-1% of pregnancies.

Risk factors for development of PNA in Pregnancy
1. Anemia
2. Prior lung disease
3. Substance abuse
4. Immunocompromise

Sx of PNA: cough, F/C, blood-tinged sputum

CAP Bugs: Strep pneumo, S. aureus, Kleb pneumo, H. influ
Atypical PNA: slow onset of sx, low-grade fever, HA, non-prod cough, malaise, muscle aches. CXR-diffuse bronchoPNA patterns. BUGs à Mycoplasma (titer IgM, IgG), chlam pneumo (PCR), Legionella (urine antigen)

Viral PNA: influenza A&B, varicella, measles. SX: cough, dyspnea, fever and tachypnea. Dx based on serologic testing.

Findings that require Hospitalization for CAP
1) Respiratory rate > 30 bpm
2) Temp >38.3
3) WBC <4 or > 30
4) ABG on RA with PaO2<60 PaCO2 >50
5) Serum Cr >1.2
6) Pleural effusion
7) Multilobe involvement on CXR
A 17 yo woman with uncomplicated pregnancy presents at 16 wks GA c/o a 3 day history of influenza-like symptoms that have progressed to HA, N,V for past 24 hours. Her past medical history is negative, she takes no medications and denies use of alcohol or drugs. She is slightly overweight and she breathes rapidly but she has as otherwise unremarkable physical examination. Her vital signs include oral temp of 38.2 C, BP 112/70, HR 120, RR 28. Lab findings: Hgb 13, WBC 18.6, Na 132, K 3.4, Cl 106, Bicarb 11, BUN 24, Cr 1.1, Glucose 280, UA 5-10 WBC/ mod bacteria/ sp grav 1.022, ketones >3, glucose >4, urine tox-pending.

The most likely diagnosis:
A) hyperemesis gravidarum
B) influenza
C) DKA
D) toxic ingestion
E) gastroenteritis
Answer: C) DKA

This patient has underlying DM and has developed DKA. A concurrent infection (pyelo) with inadequate insulin production has precipitated DKA. DKA affects 1-3% of pregnancies. It’s a medical emergency.

DKA’s consequences- Why it’s an emergency.
- Fetal distress, asphyxia and prematurity
- Up to 1/3 of patients will have a fetal demise on admission
Pathophysiology of DKA:
Inadequate circulating insulin --> decreased glucose uptake by tissues --> high levels of glucose & fatty acids --> with inability to use glucose, body makes keto-acids --> Acidemia from keto-acids --> Compensatory respir alkalosis

Unchecked hyperglycemia --> osmotic diuresis --> signif depletion of vascular volume and resultant tissue ischemia

With fall in pH --> shift of H+ into cells and K+ out of cells + osmotic diuresis --> total body deficit of K
Work-up:
- Document hyperglycemia, acidosis and ketonemia
- Glucose often >300
- ABG shows pH < 7.3, base deficit > -4
- Anion gap > 12 AG= Na – (Cl+HCO3)
- Serum bicarb < 15

Treatment:
1. Vigorous volume resuscitation - correct 75% of fluid deficit in 1st 24 hrs, replace 4-6 L in 1st 24 hours, NS 0.9%
2. Insulin- 0.1 U/kg bolus of regular insulin, followed by 0.1U/kg/hr of IV infusion of insulin, check glucose hourly, titrate drip as necessary, ADD D5 to IVF once glucose b/t 200-250 mg/dL. Also need to monitor K levels and supplement as necessary b/c acid and insulin decreases levels of K. SQ insulin and oral intake should NOT be started until glucose below 150 for more than 8 hrs and ketosis has resolved.
DKA and Fetal Monitoring:

- High maternal glucose/ acidemia promote fetal hypermetabolism and intrauterine hypoxemia—hard to get reassuring fetal status with FHT/BPP

- 1st priority is maternal metabolic corrections
- If patient has PTL from precipitators of DKA (infection) do NOT use β-mimetics- this will make the situation much worse!!