

### Hypertensive Disorders of Pregnancy

- 5-10% of pregnancies • ↑maternal-fetal morbidity & mortality worldwide • *Risk of maternal/fetal injury related to CNS irritability* • seizures • placental abruption • IUGR

### Preeclampsia

- after 20 weeks • BP > 140/90 x 2 • with or without proteinuria (**PCR > 0.3**)
- severe features:** • thrombocytopenia • liver failure (LFTs 2x normal) • new renal insufficiency (serum creatinine > 1.1 mg/dL) • pulmonary edema • new onset cerebral or visual disturbance

### Pathophysiology of Preeclampsia

- inadequate vascular remodeling → ↓ placental perfusion & hypoxia → endothelial cell dysfunction → vasospasm & ↓ tissue perfusion
- HTN • IUGR • h/a • hyperreflexia • seizures • scotoma • epigastric pain

### Preeclampsia RISK Factors

- Primipara < 19 yrs or > 40 yrs • Previous hx of PEC • Family hx of PEC • Multiples • Obesity • African descent
- Pregestational Diabetes • Chronic Hypertension • Renal disease • First pregnancy with new partner • Thrombophilia

### Assessment Preeclampsia

34yo G4P3 @ 34 weeks with BP 142/88, 145/90

- Labs? → CBC • platelets • ALT/AST • creatinine • uric acid • u/s • NST • 24hr urine • PCR
- Prenatal follow-up? → Weekly visits with AFI • BP 2x week • NST 2x week • platelets and LFTS weekly • FKC • Consider IOL @ 37 weeks
- Counseling? → **Risks of IUGR • abruption • oligohydramnios** † • **Warning signs:** • h/a • visual changes • epigastric pain → risk of seizure

### Preeclampsia with Severe Features

- BP > 160/>110 • Severe features
- Hospitalized until birth → Bedrest • Code cart nearby • Quiet calm low light • Padded side rails?
- Frequent assessment Vitals → q 10 Assess edema, clonus, DTRs • HA, visual changes • Epigastric pain (liver is getting involved) • Foley – strict I&O • Fetal well-being • Platelets, liver enzymes
- If < 34-37 weeks, steroids for lung maturity

### Magnesium Sulfate: Seizure Prophylaxis

- Decreases neuromuscular irritability • Decreases CNS irritability • Promotes maternal vasodilation
- Watch for magnesium toxicity** • Loss of knee-jerk reflexes • Respirations < 12 p/min • Urine output < 30ml/hr • Cardiac or respiratory arrest • Toxic serum levels > 9 mg/dL • Therapeutic range 5-9 mg/dL • Sign of fetal distress • **Calcium Gluconate is the antidote** • 10% Calcium gluconate 10cc, IV



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Page 1 of 6.

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### Management of Preeclampsia

- MAG: 4g loading dose, then 2g/hr to depress (not eliminate) reflexes •Strict I&O (consider Foley) q hour •BP check q 15-30 mins
- Pulse Ox, Lung Sounds •DTRs, Clonus, and hand grasps •FLUID RESTRICTION •Control hypertension •BP meds via IV meds if severe •Continue observations 24-48hrs PP •Symptoms usually resolve within 48 hours PP

### Practice Question

- You are caring for a 34yo G2P1 who was admitted for IOL at 36 weeks for PEC with severe features. After you administer the Mag Sulfate bolus, the patient reports that she feels "sleepy and a little nauseated." You also notice that the variability of the FHR tracing is now minimal. administer the Mag Sulfate bolus, the patient reports that she feels "sleepy and a little nauseated." You also notice that the variability of the FHR tracing is now minimal.
- What is your first action? •What would you assess? •What would you anticipate? •What monitoring is necessary for this patient?

### ECLAMPSIA

- Onset of seizure activity or coma in pregnancy **without** CNS lesion  •Treat with Magnesium Sulfate + PEC measures
- Assessment → ↑HTN precedes seizure followed by hypotension and collapse •Coma may occur •Labor may begin, putting fetus in great jeopardy
- Expect** postictal non-reassuring FHR tracing. Allow in utero resuscitation for 20-30 mins.  •C/S risk of maternal cerebrovascular hemorrhage!

### Eclampsia

- Patent airway & patient safety •ABCs •Side rails up •Call for help! <sup>Do not leave!</sup> •Suction •Prevent aspiration •Fetal Monitoring •Maternal VS
- Meds<sup>(O2)</sup>

### Chronic Hypertension in Pregnancy

- Diagnosis → •**Before** pregnancy or diagnosed **before** 20 weeks. •Use of anti-hypertensives before pregnancy
- Monitor → Labs, u/s, NST AFI, IOL (37-38 weeks) •Persists > 12 weeks postpartum
- Risk: IUGR, PTL, placental abruption, renal failure, CHF, CVA, and superimposed PEC •Low dose ASA (12-36wks)
- Mild-moderate: no evidence of improved outcomes with meds •CHTN with superimposed PEC

### Chronic HTN with superimposed Preeclampsia

- HTN **before** 20 weeks with new onset **proteinuria** •Worsening HTN plus one
- 1•New onset of sx  2•Thrombocytopenia  3•↑liver enzymes  4•Pulmonary Edema  5•New onset renal insufficiency •↑morbidity for mom & fetus



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Page 2 of 6.

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### Gestational Hypertension in Pregnancy

- Elevated BP > 20 weeks •> 140/>90 •No proteinuria •25% will develop PEC •If persists > 12 weeks PP → CHTN

### HELLP

- Hemolysis •Elevated •Liver Enzymes •Low •Platelets (<100K)
- Laboratory diagnosis with PEC •Non-specific clinical presentation •Prompt delivery on dx vs. wait 48hrs for steroids if < 37wks
- Life threatening •Pulmonary edema •Acute renal failure •DIC •Abruptio •Liver failure, hemorrhage •ARDS •Sepsis •Stroke

### PEC, Chronic HTN, Gestational HTN

- Preeclampsia •After 20 weeks •BP > 140/>90 x2 •Proteinuria and/or severe features
- Chronic Hypertension •Before 20 weeks •> 140/>90
- Gestational Hypertension •After 20 weeks •> 140/>90

### PEC with severe features, HELLP

- Preeclampsia with severe features •BP > 160/>110 x2 or severe features •Magnesium Sulfate\* •Seizure precautions
- HELLP •May not have s/s of PEC •High maternal and fetal mortality •Progresses rapidly

### Medications you need to know (table 27-5)

- Labetalol •Nifedipine •Methyldopa •Hydralazine •Magnesium Sulfate •Calcium Gluconate •No ACE inhibitors •Avoid Methergine for PPH

### HTN Disorders in Pregnancy

- Intrapartum Care → •Maternal-Fetal VS •Continuous EFM •Epidural? •Fluid restriction? •Quiet, dark, environment
- Emergency drugs, O2 @ 10L, suction ready •Magnesium Sulfate •Calcium gluconate
- Adverse Outcomes → •Restricted fetal growth •Placental abruption •Preterm birth •Early degeneration of placenta

### Case Study

Your client, Julie, is a G3 P2002 at 39 weeks of gestation. She presented to the high risk labor and delivery triage area an hour ago. Her blood pressure has been steadily increasing for the past 3 weeks. Today her blood pressure was 160/110, and she presents to the triage area with complaints of a severe headache and "spots in my vision." Her cervical exam is 2 cm/80%/-2 firm midposition.

- What type of pregnancy hypertensive disorder do you suspect Julie may have? •What other priority information is it important for the nurse to assess and gather?

### Case Study cont.

Julie is admitted to the labor and delivery unit for induction for preeclampsia. The provider orders magnesium sulfate: 4 gram IV loading dose and then 2 grams/hour maintenance dose. Julie asks, "What is this medication for? Will it affect my baby?"

- What is the nurse's best reply?



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Page 3 of 6.

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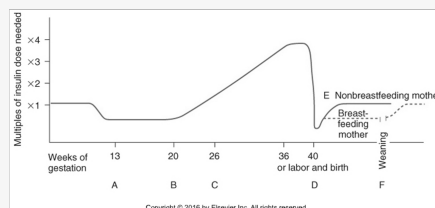
## Endocrine & Metabolic Disorders of Pregnancy

- Pre-existing DM type 1 & 2 •GDMA-1 •GDMA-2 •Hyperemesis gravidarum •Hyper & hypo thyroidism •PKU

## Maternal Insulin Resistance Pathophysiology

- Metabolic changes in pregnancy → □ Normal pregnancy alters maternal glucose metabolism, insulin production, and metabolic homeostasis
- Glucose is the primary fuel for the fetus □ Glucose crosses the placenta, insulin does not
- Insulin needs ↓ during the first trimester □ Risk of hypoglycemia for IDM patients
- Diabetogenic effect in second and third trimesters □ ↑ insulin resistance □ Placental hormones act as insulin antagonists
- Expulsion of the placenta drops insulin requirements

## Changing insulin needs during pregnancy.



## Gestational Diabetes (GDM)

- Gestational Diabetes → Common-Hispanic, Native American, Asian, African American •Diagnosed 2nd trimester with 1 and 3 hr. GTT •Screening algorithm •High risk should screen early
- GDMA1- well controlled with diet •GDMA2- need meds

## Gestational Diabetes (GDM)

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## Gestational DM



### Fetal Implications

- Glucose crosses the placenta •↑ fetal insulin production in response to high glucose from maternal circulation
- Fetal macrosomia •Labor risks •Maternal Risks •Fetal Risks •Newborn Risks

### GDM Nursing Plans and Interventions

- Patient Counseling •Pathology of disease •Low-glycemic diet •Exercise •Teach/Demonstrate •Glucose monitoring •Insulin Administration
- Signs of hypo- and hyperglycemia & immediate actions to be taken if signs noted •Fetal surveillance

### NCLEX HINT

- Glucose Screen** Gold standard is 3hr GTT.  •GDMA1 – Diet controlled GDMA2 – on medication (metformin, glyburide, insulin)

### Pregestational Diabetes

- Monitoring and TX** → •Blood Sugar Testing •Dietary Counseling •Exercise •Insulin •Oral hypoglycemic •Fetal monitoring •IOL →SVB or C/S
- Risks and Consequences** → •IUFD •Congenital malformations •Macrosomia •RDS •Infections •Polyhydramnios •PEC, CHTN •Hyperglycemia •DKA

### Pregestational Diabetes

- Intrapartum** → •Testing q hour •Fluids and insulin •(70-100 mg/dl) •Risks? •Polyhydramnios •Macrosomia
- Postpartum** → •First 24hrs: ↓ insulin demands •½ dosage of insulin •PPH •Infections •Breastfeeding •Family planning

### Hyperemesis Gravidarum

- Severe and persistent NVP •Weight loss, electrolyte imbalance, nutritional deficiencies and ketonuria.
- Idiopathic/Multifactorial •Can be a debilitating complex metabolic disorder •Linked to Hydatidiform mole

### Hyperemesis Gravidarum-Assessment

- Persistent vomiting before 9 weeks •Ketonuria •Dehydration > 5% weight loss •Altered nutritional status •Electrolyte imbalance (hypokalemia)

### Hyperemesis Gravidarum Dietary Modification

- Small frequent meals •Don't over eat •Eat what sounds good •Avoid triggers (odors) •Avoid spicy •Bland, low fat
- Cold may be more tolerable than warm •Drink from a cup with a lid and straw •Carbonated beverages- real ginger ale

### NCLEX HINT

- Research has found that infection by H. Pylori is a possible causative factor in hyperemesis.
- Other pregnancy and non-pregnancy risk factors for hyperemesis include:
  - first pregnancy •prior hx HG •hyperthyroid disorders •multiple gestation •trisomy 21 •triploidy •obesity •female fetus



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### Hyper or Hypo thyroid?

- |  |   |
|--|---|
| <input type="checkbox"/> HYPER•Rare in pregnancy   | <input type="checkbox"/> HYPER•Thyroid storm                              |
| <input type="checkbox"/> HYPER•Labs: elevated T4   | <input type="checkbox"/> HYPO•Labs: elevated TSH                          |
| <input type="checkbox"/> HYPO•Risks: PEC, miscarriage, GHTN, placental abruption, preterm birth, stillbirth      | <input type="checkbox"/> HYPO•SX: weight gain, lethargy, cold intolerance |
| <input type="checkbox"/> HYPO•Tx: Levothyroxine  | <input type="checkbox"/> HYPER•SX: weight loss goiter, tachycardia        |
| <input type="checkbox"/> HYPER•Miscarriage, preterm birth, stillborn, infants with goiter, hypo/hyper thyroidism | <input type="checkbox"/> HYPER•Tx: PTU/methimazole                        |
| <input type="checkbox"/> HYPO•Med interaction: Fe  | <input type="checkbox"/> HYPO•Risk: fetal neuropsych damage               |
|  | <input type="checkbox"/> HYPER•Breastfeeding issue                        |
|  | <input type="checkbox"/> HYPER•Med reaction: pruritus skin rash           |

### PKU

- Inborn error of metabolism caused by an autosomal recessive trait that creates a deficiency in the enzyme **phenylalanine hydrolase**, which impairs the body's ability to metabolize foods with protein
- If unrecognized, can cause cognitive impairment
- Prompt diagnosis and therapy with a phenylalanine-restricted diet significantly decreases the incidence of cognitive impairment.
- Women with PKU may be advised against breastfeeding because their milk contains a high concentration of phenylalanine.

### Question

You are counseling a woman with PKU who is planning to go off her birth control. Which statement indicates the need for further teaching?

- A. "I should eat like a vegan to avoid problems with my baby's brain."
- B. "I'll have to be monitored throughout the pregnancy."
- C. "I may not be able to breastfeed my baby."
- D. "The placenta will help protect my baby from phenylalanine."



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