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PreEclampsia/Eclampsia/Gestational HTN

Objectives:

- Define the types of hypertension in pregnancy
- Describe the pathophysiology of preeclampsia-eclampsia
- List risk factors for preeclampsia
- Recognize the signs and symptoms to diagnose preeclampsia-eclampsia
- Explain the management of a patient with preeclampsia-eclampsia
- List the maternal and fetal complications associated with preeclampsia-eclampsia

References*:* team 433 - kaplan lecture note 2018

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Table 1: The hypertensive disorders in pregnancy	
1-Preeclampsia	*Onset of high blood pressure after 20 weeks gestation with proteinuria **or** end organ dysfunction **or** without proteinuria with presence of 1 or more in **table 3***
2-Eclampsia	*presence of new-onset grand mal seizures in a woman with preeclampsia*
3-chronic hypertension	*known hypertension before pregnancy **or** development of hypertension before 20 weeks' gestation.*
4-superimposed preeclampsia	*those women with chronic hypertension who develop new-onset proteinuria.*
5-gestational hypertension	*hypertension without proteinuria or other signs of organ dysfunction first appears after 20 weeks' gestation **or** within 48 to 72 hours of delivery and resolves by 12 weeks postpartum.*

The diagnosis of hypertension should be reserved for pregnant women with a systolic blood pressure ≥140 mm Hg and/or a diastolic blood pressure ≥90 mm Hg.

PREECLAMPSIA

❖ Risk factors:

1- History of preeclampsia in previous pregnancies.
2- Preeclampsia in a first degree relative
3- Multiple gestations
4- Primiparity
5- Age >40
6- Maternal past medical history:
• Hypertension • Renal disease • Hypercoagulability • DM • Obesity • SLE

In normal pregnancies:

fetal cytotrophoblast invade maternal uterine spiral artery → replace the endothelium → change the vessels from high resistance small diameter → high capacitance low resistance vessels → this will lead to more blood flow to the fetus.

❖ In preeclampsia:

thought to arise as:

1- inadequate cytotrophoblastic invasion of the spiral uterine arteries.
2- failure to establish the normal low resistance uteroplacental circulation.

This leads to:

1- placental ischemia.
2- endothelial dysfunction.
3- local and systemic vasospasm.
4- activation of the coagulation system.

Three major pathologic lesions are classically associated with preeclampsia and eclampsia:

1- lack of decidualization of the myometrial segments of the spiral arteries.
2- glomerular capillary endotheliosis.
3- ischemia, hemorrhage, and necrosis in many organs; secondary to arteriolar constriction.

Table 2: Preeclampsia is most easily recognized in pregnant women who present with the "classic triad" of
1- new-onset hypertension after 20 weeks' gestation (systolic blood pressure ≥140 mm Hg or diastolic blood pressure ≥90 mm Hg on two occasions 4 hours apart)
2- proteinuria after the 20th week of gestation (≥0.3 g of protein in a timed 24-hour urine collection or a protein/creatinine ratio ≥0.3)
3- edema in the latter half of pregnancy (not always)

or

Table3 : preeclampsia can be diagnosed if there is evidence of one or more of the following abnormalities:
1- thrombocytopenia.
2- disseminated intravascular coagulation (DIC).
3- elevated transaminases or other signs of hepatic injury.
4- CNS symptoms.
5- an elevated serum creatinine level.
6- pulmonary edema.

CRITERIA FOR SEVERE PREECLAMPSIA
Severe hypertension (systolic BP ≥160 mm Hg or diastolic BP ≥110 mm Hg) at rest on two occasions at least 4 hr apart*
Renal insufficiency (serum Cr >1.1 mg/dL or doubling of baseline values).
Cerebral or visual disturbances.
Pulmonary edema.
Epigastric or right upper quadrant pain.
Elevated liver enzymes (AST or ALT at least two times normal level).
Thrombocytopenia (platelet count <100,000/µL).

When preeclampsia arises in the early second trimester (14 to 20 weeks), a hydatidiform mole or choriocarcinoma should be considered.

Complications

1- Maternal:

• Eclampsia: seizures **before, during** or **after** delivery: Give IV magnesium sulfate.

• HELLP Syndrome: it can progress to DIC – Hemolysis – Elevated liver enzymes – Low platelets

• Placental abruption.

• Stroke.

• Liver damage.

• Kidney injury.

2- Fetal:

• Growth restriction.

• Prematurity.

• Perinatal death.

Management of Preeclampsia

A- Delivery is the only definitive cure for preeclampsia:

1- disease does not appear to be severe or progressing will generally not be delivered unless the gestational age is 37 weeks or older,

2- woman with severe preeclampsia or eclampsia whose disease presents at or beyond 34 weeks' gestation should usually be delivered after a brief period of stabilization

3- Severe preeclampsia presenting at less than 34 weeks' gestation may in certain situations be stabilized, and with careful monitoring of the mother and fetus, delivery may be delayed until the pregnancy reaches 34 weeks

B- seizure prophylaxis: magnesium sulfate IV, IM: need to monitor urine output.

C- control of hypertension;

Arterial blood pressure ≥160 mm Hg systolic or ≥110 mm Hg diastolic must be treated immediately:

1- Hydralazine: the best.

2- Labetalol Hydrochloride: Avoid if evidence of asthma or acute heart failure.

3- Nifedipine.

ECLAMPSIA

Eclampsia is the presence of **new-onset grand mal seizures** in a woman with preeclampsia that **cannot** be attributed to other causes.

38-53% eclamptic seizures occurred **before** labor.

18-36% eclamptic seizures occurred **during** labor.

11-44% eclamptic seizures occurred **after** delivery (usually within the first 24 to 48 h).

MANAGEMENT OF ECLAMPSIA

Eclampsia is a true obstetric **emergency**.

Eclamptic seizures often induce a fetal bradycardia that usually resolves after:

1- maternal stabilization.
2- correction of hypoxia.

As with any seizure condition, the initial requirement for stabilization is:

1- protect the patient from injury.
2- clear the airway.
3- give oxygen by face mask to relieve hypoxia.
4- Blood pressure and pulse oximetry should be recorded every 10 minutes.
5- A 16- to 18-gauge IV line should be placed for drawing blood and administering drugs and fluids.

Treatment for seizure is magnesium sulfate & delivery of baby.

CHRONIC HYPERTENSION

The diagnosis of chronic hypertension requires at least one of the following:

1- known hypertension before pregnancy.
2- development of hypertension before 20 weeks' gestation.

MANAGEMENT OF CHRONIC HYPERTENSION:

1- Methyldopa is the safest antihypertensive medication in pregnancy.
2- calcium channel blockers.
3- labetalol.

CHRONIC HYPERTENSION WITH SUPERIMPOSED PREECLAMPSIA

The diagnosis of superimposed preeclampsia should be reserved for those women with chronic hypertension who develop new-onset proteinuria (≥0.3 g in a 24-hour collection) after the 20th week of gestation)

GESTATIONAL HYPERTENSION

The diagnosis of gestational hypertension is made if hypertension **without proteinuria** or other signs of organ dysfunction first appears after 20 weeks' gestation or within 48 to 72 hours of delivery and resolves by 12 weeks postpartum.

Case

An 18 year old G1P0 currently at 38 0/7 weeks presents for her routine prenatal visit. She has had an uncomplicated pregnancy up to this point, with the exception of a late onset of prenatal care and obesity (BMI of 35 kg/m2). She reports that during the past week, she has noted some swelling of her hands and feet. She also has been feeling a bit more fatigued and has had a headache on and off. She reports good fetal movement. She has had some contractions on and off, but nothing persistent. Her blood pressure is 147/92 and her urine dip has 1+ protein/no ketones/no glucose. The fundal height measures 36 cm, the fetus is cephalic with a heart rate of 144 bpm. On physical exam you note that the patient has 3+ pretibial edema, and trace edema of her hands and face. She has 2+ deep tendon reflexes and 2 beats of clonus. You review her blood pressures up to this point and note that at the time of her first prenatal visit at 18 weeks, her blood pressure was 130/76 and she had no protein in her urine. However, since that visit, her blood pressures seem to have been climbing higher with each visit. Her last visit was one week ago, and she had a blood pressure of 138/88 with trace protein in the urine and she has gained 5 pounds.

Questions

1- What is considered a hypertensive blood pressure during pregnancy?

In pregnancy, hypertension is defined as either a systolic blood pressure ≥ 140 or diastolic blood pressure ≥ 90 or both.

2- What types of hypertensive syndromes can occur during pregnancy?

- **Chronic hypertension:**
  Requires that the patient have documented hypertension preceding 20 weeks gestation, or where hypertension is first noted during pregnancy and persists for longer than 12 weeks postpartum.
- **Preeclampsia-eclampsia:**
  Development of new onset hypertension and proteinuria after 20 weeks of pregnancy. Is stratified into mild and severe forms. There are atypical forms of preeclampsia as well.
- **Preeclampsia superimposed on chronic hypertension:**
  Superimposed preeclampsia should be reserved for those women with chronic hypertension who develop new-onset proteinuria (≥ 300 mg in a 24-hour collection) after the 20th week of pregnancy. In pregnant women with preexisting hypertension and proteinuria, the diagnosis of superimposed preeclampsia should be considered if the patient experiences sudden significant increases in blood pressure or proteinuria or any of the other signs and symptoms consistent with severe preeclampsia.
- **Gestational Hypertension:**
  Hypertension without proteinuria which first appears after 20 weeks gestation or within 48 to 72 hours after delivery and resolves by 12 weeks postpartum.

3- How does the physiology of preeclampsia lead to the clinical symptoms and findings?

- ➢ Hypoxia, hypoperfusion and ischemia lead to the clinical placental pathophysiology (with fetal compromise: IUGR, oligohydramios, placental abruption).
- ➢ Systemic endothelial dysfunction leads to central & peripheral edema, proteinuria, and hypertension (from disruption of vascular regulation). Endothelial dysfunction in target organs leads to headache, epigastric pain, and renal dysfunction. Microvascular endothelial destruction leads to release of procoagulants and DIC.

4- What are the laboratory findings that support a diagnosis of preeclampsia-eclampsia syndrome?

– Proteinuria (> 300 mg on a 24 hour urine collection).
– Elevated hematocrit.
– Hemolysis.
– Thrombocytopenia (< 100,000 cells/mm3).
– Elevated liver enzymes (ALT/AST twice normal).
– Elevated serum uric acid concentration.

5- What types of maternal and fetal complications are associated with preeclampsia-eclampsia syndrome?

- ❖ **Maternal:**
  - CNS: eclamptic seizure, stroke.
  - Cardiopulmonary: pulmonary edema .
  - Hepatic: Sub capsular hematoma or hepatic rupture.
  - Renal: renal failure or acute tubular necrosis.
  - Hematologic: hemorrhage, DIC.
- ❖ **Fetal:**
  - Preterm delivery
  - Placental abruption
  - Fetal growth restriction
  - Hypoxic ischemic encephalopathy
  - Fetal death