

# Preeclampsia Hypertensive disorders

**Obstetrics and Gynecology**

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# DEFINITION

- **Pre-eclampsia is a multisystem disorder of unknown etiology characterized by development of hypertension with proteinuria after the 20th week in a previously normotensive and nonproteinuric woman.**

# DIAGNOSTIC CRITERIA OF PRE-ECLAMPSIA

- 1. Hypertension**
- 2. Edema**
- 3. Proteinuria**

# DIAGNOSTIC CRITERIA OF PRE-ECLAMPSIA

- ⦿ **Hypertension:**
- ⦿ **An absolute rise of blood pressure of at least 140/90 mm Hg, if the previous blood pressure is not known or a rise in systolic pressure of at least 30 mm Hg, or a rise in diastolic pressure of at least 15 mm.**



# DIAGNOSTIC CRITERIA OF PRE-ECLAMPSIA

- ◉ **Edema: Demonstration of pitting edema over the ankles after bed rest or rapid weight gain.**
- ◉ **However, some amount of edema is physiological in a normal pregnancy.**



# DIAGNOSTIC CRITERIA OF PRE-ECLAMPSIA

- ⊙ **Proteinuria:**
- ⊙ **Presence of total protein in 24 hours urine of more than 0.3 gm on at least two urine samples tested > 4 hours apart in the absence of urinary tract infection**



# DIAGNOSTIC CRITERIA OF PRE-ECLAMPSIA



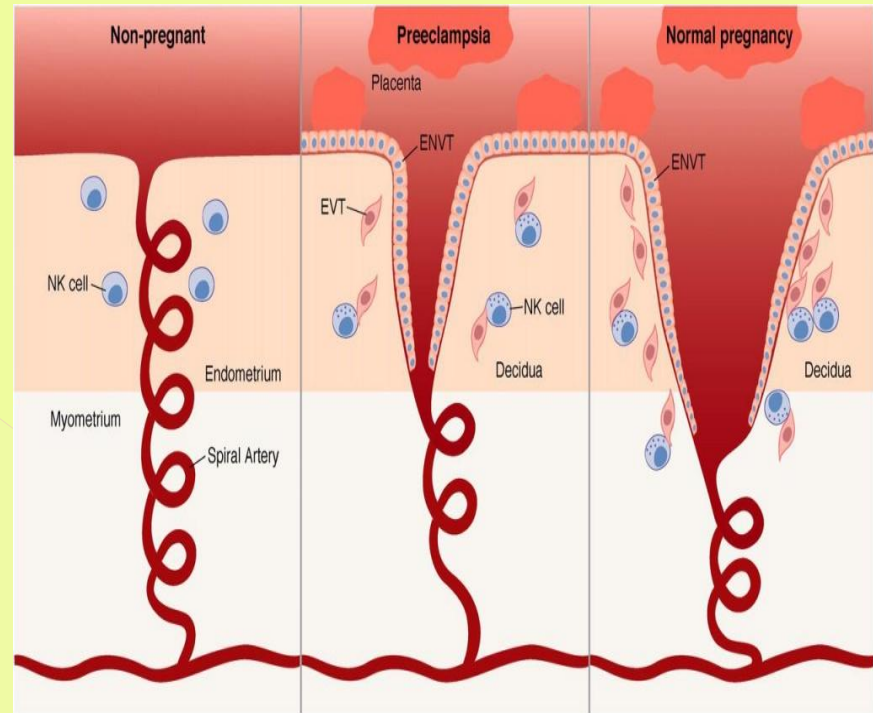
# RISK FACTORS FOR PRE-ECLAMPSIA

- **Primigravida: Young or elderly**
- **Family history: Hypertension, pre-eclampsia**
- **Placental abnormalities**
- **Obesity, Insulin resistance**
- **Vascular disease**
- **Thrombophilias (antiphospholipid syndrome, protein C, S deficiency, Factor V Leiden)**



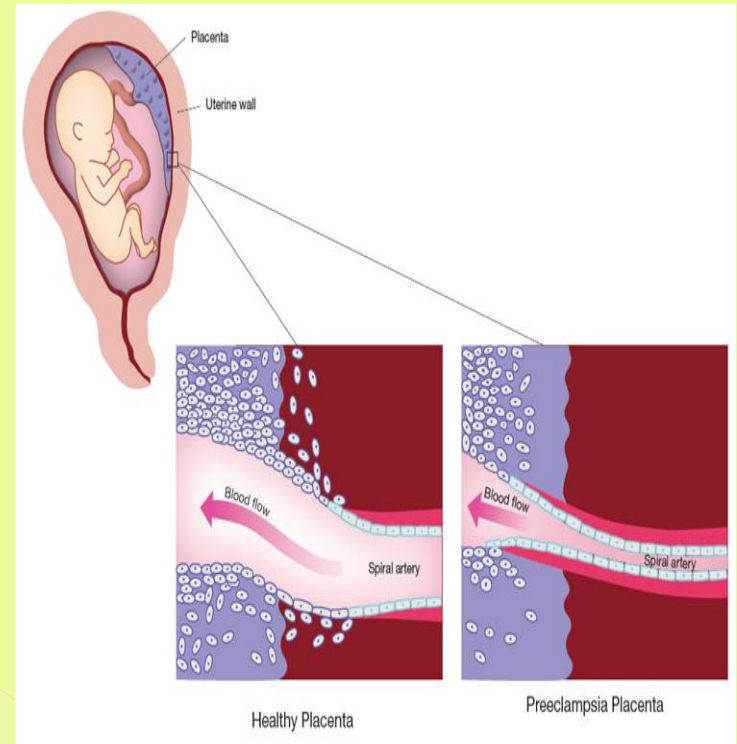
# ETIOPATHOGENESIS OF PRE-ECLAMPSIA

- The basic pathology is **endothelial dysfunction** and intense vasospasm, affecting almost all the vessels, particularly those of uterus, kidney, placental bed and brain.



# ETIOPATHOGENESIS OF PRE-ECLAMPSIA

- In pre-eclampsia, there are:
- failure of the second wave of endovascular trophoblast migration and there is reduction of blood supply to the fetoplacental unit.
- deficiency of vasodilators and increased synthesis of vasoconstrictors
- abnormal lipid metabolism—results in more oxidative stress, endothelial injury and dysfunction.



# CLINICAL CLASSIFICATION

- **Mild**

- **Severe**

# Mild preeclampsia

- ◎ **Mild:**
- ◎ **Systolic: rise of blood pressure of more than 140 mm Hg but less than 160 mm Hg**
- ◎ **Diastolic: < 110 mm Hg**
- ◎ **Proteinuria: < 5 g in 24 h**

# Severe preeclampsia

- ◉ **A persistent systolic blood pressure  $>160$  mm Hg or diastolic pressure  $>110$  mm Hg.**
- ◉ **Protein excretion of  $>5$  gm/24 hr.**
- ◉ **Oliguria ( $<400$  ml/24 hr).**
- ◉ **Platelet count  $< 100,000/\text{mm}^3$ .**
- ◉ **HELLP syndrome.**
- ◉ **Cerebral or visual disturbances.**
- ◉ **Persistent severe epigastric pain.**
- ◉ **Retinal hemorrhages.**
- ◉ **Intrauterine growth restriction of the fetus.**
- ◉ **Pulmonary edema.**

# HELLP Syndrome

- This is an acronym for
- **Hemolysis (H),**
- **Elevated Liver enzymes (EL)**
- **Low Platelet count (LP) ( $<100,000/\text{mm}^3$ ).**
- This is a rare complication of pre-eclampsia (10–15%).
- This syndrome is manifested by nausea, vomiting, epigastric or right upper quadrant pain, along with biochemical, and hematological changes.
- Parenchymal necrosis of liver causes elevation in hepatic enzymes (AST and ALT) and bilirubin.
- There may be subcapsular hematoma formation. Eventually liver may rupture to cause sudden hypotension, due to hemoperitoneum.

# SIGNS OF PREECLAMPSIA

- ⦿ **Abnormal weight gain:** Abnormal weight gain probably appears even before the visible edema.
- ⦿ **Rise of blood pressure:** The diastolic pressure usually tends to rise first followed by the systolic pressure.
- ⦿ **Edema:** Visible edema over the ankles on rising from the bed in the morning is pathological.
- ⦿ Abdominal examination may reveal evidences of chronic **placental insufficiency**, such as scanty liquor or growth retardation of the fetus.

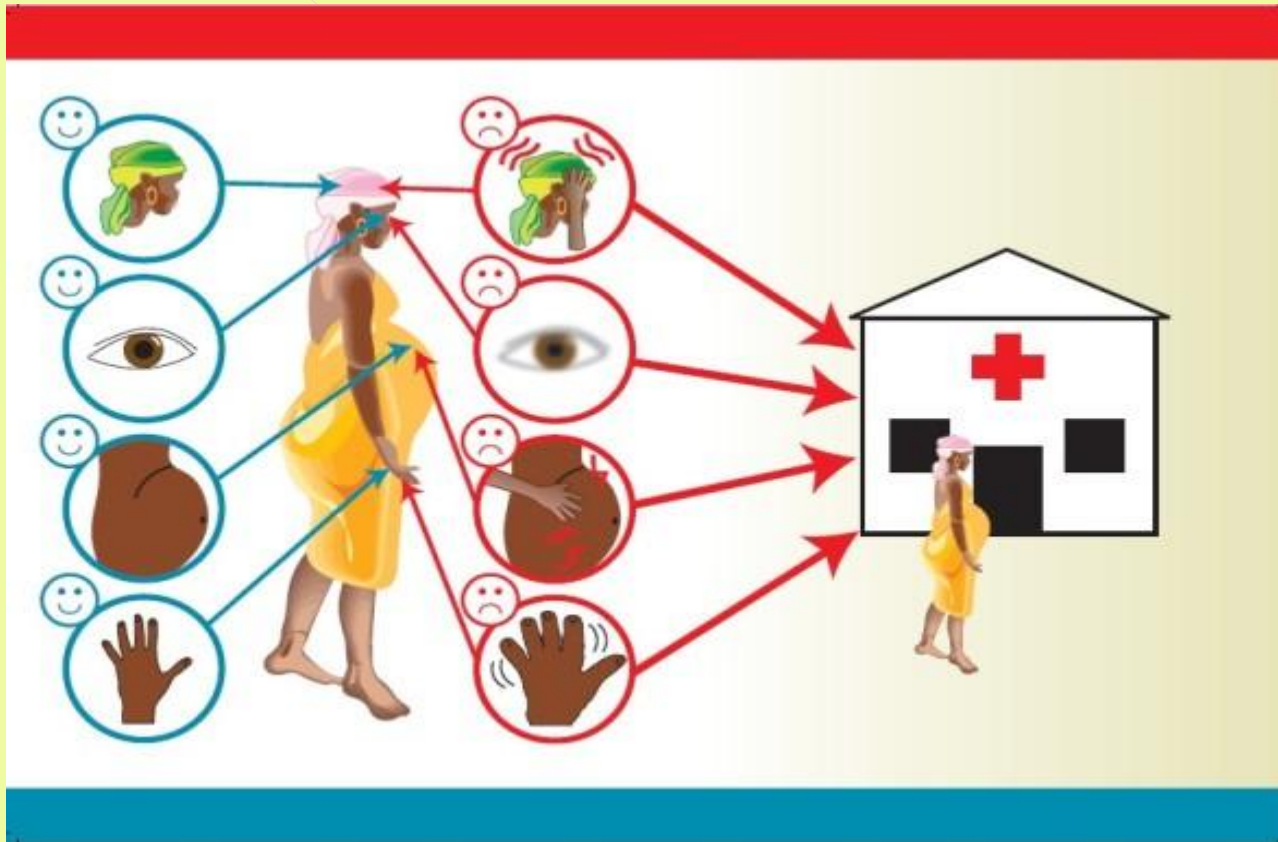
- ◎ **The manifestations of pre-eclampsia usually appear in the following order rapid gain in weight → visible edema and/or hypertension →proteinuria.**



# Alarming symptoms

- ⦿ **Headache**
- ⦿ **Disturbed sleep.**
- ⦿ **Diminished urinary output**—Urinary output of less than 400 ml in 24 hours.
- ⦿ **Epigastric pain**—acute pain in the epigastric region associated with vomiting.
- ⦿ **Eye symptoms**—there may be dimness of vision or at times complete blindness.

# Alarming symptoms



# INVESTIGATIONS

**Urine:** Proteinuria.

**Ophthalmoscopic examination:** retinal edema, hemorrhage.

**Blood values:** The blood changes are not specific: thrombocytopenia and abnormal coagulation profile of varying degrees. Hepatic enzyme levels may be increased.

**Antenatal fetal monitoring:** ultrasonography, cardiotocography.

# HOSPITAL MANAGEMENT

- ◉ **Rest:** Admission in hospital and rest is helpful for continued evaluation and treatment of the patient.
- ◉ **The diet** should contain adequate amount of daily protein (about 100 gm). Fluids need not be restricted.
- ◉ **Antihypertensives:**
  - ◉ **Methyl-dopa** (Central and peripheral anti-adrenergic action),
  - ◉ **Nifedipine** (Calcium channel blocker),
  - ◉ **Metoprolol** (Adrenoreceptor antagonist),
  - ◉ **Vascular smooth muscle relaxant** (Magnesium sulfate).

# DURATION OF TREATMENT

- ◎ **The definitive treatment of pre-eclampsia is termination of pregnancy (delivery).**
- ◎ As such, the aim of the treatment is to continue the pregnancy, if possible, until the fetus becomes mature enough to survive in extrauterine environment (>37 weeks).
- ◎ Thus, the duration of treatment depends on severity of pre-eclampsia, duration of pregnancy, and response to treatment, and condition of the cervix.

# METHODS OF DELIVERY

- **Induction of labor**
- **Cesarean section**

# MANAGEMENT DURING LABOR

- ⦿ Blood pressure tends to rise during labor and convulsions may occur (intrapartum eclampsia).
- ⦿ Antihypertensive drugs are given if the blood pressure becomes high.
- ⦿ Prophylactic MgSO<sub>4</sub> is started when systolic BP >160 diastolic >110, MAP >125 mm Hg.
- ⦿ Careful monitoring of the fetal well-being is mandatory.

# ECLAMPSIA

- ⦿ **Pre-eclampsia when complicated with generalized tonic–clonic convulsions and/or coma is called eclampsia.**





# ECLAMPSIA

- ⦿ **It may occur quite abruptly, without any warning manifestations.**
- ⦿ **In majority (over 80%); however, the disease is preceded by features of severe pre-eclampsia.**



# CLINICAL FEATURES OF ECLAMPSIA

- ◉ **Premonitory stage:** The patient becomes unconscious. There is twitching of the muscles of the face, tongue, and limbs (30 seconds).
- ◉ **Tonic stage:** The whole body goes into a tonic spasm (30 seconds).
- ◉ **Clonic stage:** All the voluntary muscles undergo alternate contraction and relaxation. This stage lasts for 1–4 minutes.
- ◉ **Stage of coma:** It may last for a brief period or in others deep coma persists till another convulsion. Rarely, the coma occurs without prior convulsion.

# FIRST AID TREATMENT OUTSIDE THE HOSPITAL

The patient, either at home or in the peripheral health centers should be shifted urgently to the hospital.



# SPECIFIC MANAGEMENT

- **Supportive care:** to prevent serious maternal injury from fall, prevent aspiration, to maintain airway and to ensure oxygenation.
- **Fluid balance:** Crystalloid solution (Ringer's solution) is started as a first choice
- **Anticonvulsant and sedative regime:** Magnesium sulfate is the drug of choice.
- **OBSTETRIC MANAGEMENT: During pregnancy:** In majority of cases with antepartum eclampsia, labor start soon after convulsions. But when labor fails to start, the delivery should be done.

# PROPHYLACTIC MEASURES FOR PREVENTION OF PRE-ECLAMPSIA

- ◉ **Regular antenatal check up for early detection of rapid gain in weight or a tendency of rising blood pressure specially the diastolic one**



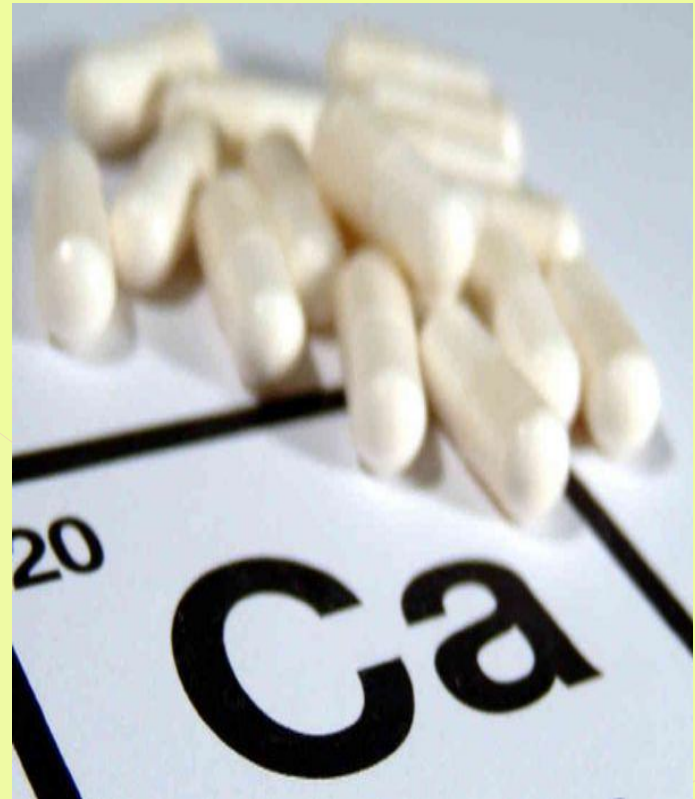
# PROPHYLACTIC MEASURES FOR PREVENTION OF PRE-ECLAMPSIA



- ◉ **Antithrombotic agents:**
- ◉ **Low dose aspirin 60 mg daily beginning early in pregnancy in potentially high risk patients is given.**
- ◉ **It selectively reduces platelet thromboxane production.**

# PROPHYLACTIC MEASURES FOR PREVENTION OF PRE-ECLAMPSIA

- ⦿ **Calcium supplementation (2 gm per day) reduces the risk of gestational hypertension.**



# Acute fatty liver of pregnancy

- ⦿ This is a rare condition affecting 1:10 000 pregnancies.
- ⦿ It typically presents in the third trimester and can occur at any parity.
- ⦿ It is associated with twin pregnancy (9–25%), a male fetus, and mild pre-eclampsia (30–60%).
- ⦿ Acute fatty liver of pregnancy (AFLP) has a maternal mortality of 18%, higher if diagnosis is delayed, and fetal mortality of 23%.



# Clinical features of AFLP

- ⦿ Abdominal pain
- ⦿ Nausea and vomiting
- ⦿ Headache
- ⦿ Fever
- ⦿ Confusion
- ⦿ Coma

# Criteria for diagnosing AFL (six or more are required in the absence of another cause)

- Vomiting.
- Abdominal pain.
- Polydipsia/ polyuria.
- Encephalopathy.
- Elevated bilirubin
- Hypoglycaemia
- Elevated urea
- Leucocytosis
- Ascites.
- Elevated transaminases aspartate aminotransferase (AAT) or alanine transaminase (ALT)
- Coagulopathy; prothrombin time >14s or APPT >34s.
- Microvesicular steatosis on liver biopsy.

# Management of AFLP

- ⦿ Correction of coagulopathy with fresh frozen plasma (FFP)
- ⦿ Strict control of BP and fluid balance
- ⦿ Delivery should follow stabilization (regional anaesthesia is contraindicated in presence of thrombocytopenia (<80)).
- ⦿ Bleeding complications are common.
- ⦿ Following delivery, care is supportive, and most women improve rapidly after delivery with no long-term liver damage.

# Blood pressure in pregnancy: physiology

- ⦿ BP is directly related to systemic vascular resistance and cardiac output, and follows a distinct course during pregnancy:
- ⦿ ↓ In early pregnancy until 24wks due to ↓ vascular resistance.
- ⦿ ↑ After 24wks until delivery via ↑ in stroke volume.
- ⦿ ↓ After delivery, but may peak again 3–4 days post-partum.

# Blood pressure in pregnancy: hypertension

- ◎ **Pregnancy-induced hypertension (PIH) defined as hypertension ( $\geq 140/90$ ) in the second half of pregnancy in the absence of proteinuria or other markers of pre-eclampsia.**

# Hypertension

- Hypertension is established in a pregnant woman if the blood pressure (BP) measurement is  $\geq 140/90$  mmHg for two or more occasions at least 4 hours apart using the same arm.
- If hypertension pre-dates pregnancy or is found **before 20 weeks**' gestation, the individual is considered to have **chronic hypertension**.
- Hypertension first detected after 20 weeks' gestation is **gestational hypertension** (GH) in the absence of significant proteinuria,
- pre-eclampsia in the presence of proteinuria.

# Pregnancy-induced hypertension

- ⦿ Affects 6–7% of pregnancies.
- ⦿ ↑ risk of going on to develop pre-eclampsia (15–26%).
- ⦿ The risk ↑ with earlier onset of hypertension.
- ⦿ BP usually returns to pre-pregnancy limits within 6wks of delivery

# Chronic hypertension

- ⦿ Pregnant women who have a high booking BP (130–140/80–90 or more) are likely to have chronic hypertension.
- ⦿ Increased risk of developing pre-eclampsia.
- ⦿ Now more common because of an older pregnant population.



# Clinical approach

- ⦿ **Blood pressure measurement**
- ⦿ **To differentiate between pre-eclampsia – urine examination, protein–creatinine ratio, 24-hour collection).**
- ⦿ **Serial monitoring is required to determine the progression of the condition.**

# Treatment

## Types of medications and regimens

- ◉ **Methyldopa**

- ◉ Dosage: 250–500 mg orally, maximum 3 g/day. •  
Remarks: loading dose has been suggested but not universally recommended.

- ◉ **Labetolol (RB-)**

- ◉ Dosage: Oral 100–400 mg, maximum 1200 mg/day. Similar effectiveness with methyldopa.

# Treatment

## Types of medications and regimens

- ⦿ **Nifedipine**
- ⦿ Dosage: 10–20 mg capsule orally
- ⦿ Remarks: can be used together with magnesium sulphate.
- ⦿ **Metoprolol**
- ⦿ Dosage: 25-50 mg orally

# topic for self-study

- ⦿ *MgSO<sub>4</sub> therapy of preeclampsia, eclampsia*

