Pre-eclampsia

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Fact we should know before discuss PE

• *In normal pregnancy there is a well-recognised fall in both systolic and diastolic blood pressure (BP), which occurs most commonly early in the second trimester.*
During pregnancy:
- CO \( \uparrow \) from 4.5 – 6 l/min
- HR \( \uparrow \) from 70 – 85 bpm
- Reduce in pulmonary vascular resistance and 40% \( \uparrow \) pulmonary blood flow
- Renal blood flow \( \uparrow \) by 35%
- Blood to the uterus \( \uparrow \) by 25%
- interstitial fluid & blood vol is
(Con)

Plasma volume increase in a rate more than that of RBC which led to decrease viscosity of blood.

So that pregnancy is a condition of increase in flow & change in content of blood which is led to a major cardio-vascular complication.
(Con)

Pregnancy induce hypertension

- PE
- GHT
- ECLAMPSIA
- CHT
- PE & CHT
Gestational hypertension

- BP ≥ 140/90 mm Hg for the first time during pregnancy
- No proteinuria
- BP returns to N < 12 Wk postpartum
- Final Dx made only postpartum
- May have other signs of PE eg. Headache, epigastric discomfort or thrombocytopenia
CHRONIC HYPERTENSION

• BP ≥ 140/90 mm Hg before pregnancy or Dx before 20 Wk gestation.

• HT first Dx after 20 Wk gestation & persistent after 12 Wk postpartum
PE & CHT

• New onset proteinuria ≥ 300 mg/24 hrs in hypertensive women but no proteinuria before 20 Wk gestation.

• A sudden increase in proteinuria or BP or Plt count < 100 000/ mm³ in women with HT & proteinuria before 20 Wk gestation
What do you think that pictures means???
sudden increase in weight
Edema
Abdominal pain
Headache & visual disturbance
seizure
IT IS A PRE-ECLAMPSIA

• SO WHAT IS PE?????
Is a disorder of widespread vascular endothelial abnormality and vasospasm that occurs after 20 weeks' gestation and can present as late as 4-6 weeks postpartum.
So it is a clinical syndrome of:
1- hypertension.

2- protinuria.

3- with or without pathologic edema.
Or PE is ....

- New onset HT in pregnancy
- After 20 weeks of gestation, or
- Early post-partum, previously normotensive
- it is arise in ante ,post or intrapartum.
- Resolves within 48 hrs postpartum

- With the Renal or other systemic complications
Sign & symptoms

- ↑ BP
- Proteinuria
- Poor urine output
- Edema of the face & hands (but it has been dropped from the definition due to poor predictive value)
- Headache (frontal)
- Visual disturbance
- Epigastric pain.
- Exaggerated reflexes.
- Malaise & nausea.
- Agitation.
- Restlessness.
<table>
<thead>
<tr>
<th></th>
<th>Mild</th>
<th>Sever</th>
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<tbody>
<tr>
<td>Systolic arterial pressure</td>
<td>140 mm Hg – 160 mm Hg</td>
<td>≥160 mm Hg</td>
</tr>
<tr>
<td>Diastolic arterial pressure</td>
<td>90 mm Hg – 110 mm Hg</td>
<td>≥110 mm Hg</td>
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<tr>
<td>Urinary protein</td>
<td>&lt;5 g/24 hr</td>
<td>≥5 g/24 hr</td>
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<td>Dipstick + or 2 +</td>
<td>Dipstick 3 + or 4 +</td>
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<tr>
<td>Urine output</td>
<td>&gt;500 mL/24 hr</td>
<td>≤500 mL/24 hr</td>
</tr>
<tr>
<td>Headache</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Visual disturbances</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Epigastric pain</td>
<td>No</td>
<td>Yes</td>
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Incidence

• Up to 6-8% of living birth.
• While E 1/2000
• Antepartum 40%
• Postpartum 40%
• Intrapartum 20%
PATHOGENESIS

• Endothelial cell injury ➔↓↓ prostacyclin & ↑ thromboxaneA2
• Compromised placental perfusion
• Altered vascular reactivity ➔↑ sensitivity to vasopressin & angiotensin
• ↓ GFR with retention of salt & water
(con)

• ↓ intravascular volume ↑ CNS irritability
• DIC
• Uterine muscle stretch & ischemia
• Genetic factors
More simply

- Incomplete invasion of the trophoblast by the placenta
- Alteration of the immune response.
- Failure of the 2\textsuperscript{nd} invasion of the trophoblast at 14-16wk
- Involvement of vascular active protein such as PGS & endothelium.
(con)

• All these changes will lead to increased utero-placental resistance and cause ischemia.
pathophysiology

• It is a multisystemic condition that effect the flowing:

• 1-cardiovascular:

  volume of plasma is reduced, the cause is unknown
  ➡️ theories:
  • 1-Generalized vasoconstriction with ↑ vascular permeability
  • 2-1ry hypovolemia ➡️ hypoperfusion of the uterus
    ➡️ release of vasoconstrictor substances ➡️ HT
• High systemic vascular resistance & hyperdynamic ventricular function ➔ avoid aggressive fluid administration

• Loss of the normal inhibitors to angiotensin II

2-CNS:

• Similar to hypertensive encephalopathy

• Petechial Hg, Gross hemorrhages due to ruptured arteries

• Thrombosis of the arterioles

• Microinfarcts, Fibrinoid necrosis in the walls of blood vessels

• Cerebral edema ➔ confusion, blurred vision / coma

• Brain stem herniation is a serious complication of cerebral edema ➔ death

• And fit
(con)

- **3-Respiratory system:**
  - Pulmonary edema: May occur with severe PE or EC. Usually postpartum. May be due to excessive fluid administration with crystalloids + ↓ plasma colloid pressure due to proteinuria.
  - Aspiration of gastric content.

- **4-blood:**
  - Hemoconcentration
  - Thrombocytopenia < 150,000 ➞ 15-20% of PT
  - Fibrinogen ↑
  - Thrombin time ↑ in 1/3 of the Pt with EC
  - DIC ➞ 5%
  - Microangiopathic hemolytic anemia ➞ 5%
• **HEELP** ➔ hemolytic anemia, ↑↑ liver enzymes, low Plt
  - LDH > 600 U/L
  - Tbilirubin > 1.2 mg/dl
  - AST > 70 U/L
  - Plt < 100 000/mm³

  Found in 10% of the Pt with severe PE

• **5-Kidney:** Characteristic lesion glomeruloendotheliosis ➔ ↓↓ GFR
  • ↓↓ creatinine clearance/ ↑↑ plasma creatinine
  • ↑↑ uric acid
  • Proteinuria
  • Renal tubular necrosis & renal failure

• **6-Eyes:** visual disturbance & retinal detachment and may end with cortical blindness.
(con)

• **7-Endocrine:** ↓↓ plasma renin, angiotensin & aldosterone to the prepregnancy values
  - Atrial natriuretic peptide ↑↑
  - Expansion of the extracellular fluid volume (edema)
    - Proteinuria ➔↓↓ plasma oncotic pressure ➔ displacement of intravascular fluid to interstitium

• **8-utero-placental:** Vasospasm ➔ compromised placental perfusion ➔↑↑ perinatal morbidity & mortality
  - 15% N Umbilical / Abnormal uterine
  - 40% Both Abnormal
Diagnosis

• A clinical diagnosis of pre-eclampsia is made when the following criteria are fulfilled:
  – Hypertension arising after 20 weeks gestation, and
  – the new onset after 20 weeks gestation of one or more of:
    – proteinuria
    – renal insufficiency
    – liver disease
    – neurological problems
    – haematological disturbances
    – fetal growth restriction
Or

• History, physical examination & investigations

• Routine Studies
  • 1-cbc
  • 2-ALT, AST
  • 3-RFT

Laboratory values for PE & HELLP Syn

• 1-Proteinuria of >300 mg/24 h
• 2-Urine dipstick >1+
• 3-Protein/creatinine ratio >0.3
• 4-Serum uric acid >5.6 mg/dL
(con)

- Urine tests
- Congo red dye
- Histology
Risk factors

• Pregnancy-associated factors:
  • 1-Chromosomal abnormalities
  • 2-Hydatidiform mole
  • 3-Hydrops fetalis
  • 4-Multifetal pregnancy
  • 5-Oocyte donation
  • 6-Structural congenital anomalies

• Maternal-specific factors
  • 1-Age greater than 35 years
  • 2-Age less than 20 years
  • 3-Black race
(con

- 4-Family history of preeclampsia
- 5-Nulliparity
- 6-Preeclampsia in a previous pregnancy
- 7-Specific medical conditions: gestational diabetes, obesity, chronic hypertension, renal disease, thrombophilias, UTI.
- 8-Stress

- Paternal-specific factors
  - 1- First-time father.
  - 2-Previously fathered a preeclamptic pregnancy in another woman.
So that

- All pregnant women should be screened for preeclampsia at the first prenatal visit and periodically throughout the remainder of the pregnancy.
- Pregnant women with diastolic blood pressure of 105 to 110 mm Hg or higher should receive antihypertension medication.
- Women at increased risk for preeclampsia who have low calcium intake should increase their calcium intake.
Effect of pe

Fetal

• IUGR
• Oligohydramnios
• Placental infarcts
• Placental abruption
• Prematurity
• Uteroplacental insufficiency
• Perinatal death
Maternal

- CNS ➔ seizures & stroke
- DIC
- ↑↑ CS
- Renal failure
- Hepatic failure or rupture
- Death
- HELLP syndrom
Treatment of PE

OBJECTIVES

• Termination of pregnancy with the least possible trauma to the mother & fetus
• Birth of an infant who subsequently thrives
• Complete restoration of health to the mother

1- Hospitalization

• Women with new onset BP ≥ 140/90
• Worsening BP
• Development of proteinuria in addition to existing BP
(con)

- INITIAL HOSPITAL MANAGEMENT
- Observe for headache, visual disturbance, epigastric pain & rapid wt gain
- Wt daily
- Analysis for proteinuria every 2 days / daily
- BP in sitting position every 4 hrs except during sleep
- Blood investigations ➔ Plt, S creatinine, liver enzymes
- Frequent evaluation of fetal size & FHR
- Reduced physical activity but not absolute bed rest
- N diet & fluid intake
(con)

• FURTHER MANAGEMENT

  Depends on:
  • Severity of PET
  • Duration of gestation
  • Condition of the Cx
  • Complete resolution of the signs & symptoms does not occur till after delivery

Lines of management

• Termination of pregnancy
• Antihypertensive therapy
• Anticonvulsant therapy
• Home health care ➔ if BP improved within few days Pt can be managed as outpatient ➔ Home BP & urine protein monitoring. Instruction to come to hospital if she has waning symptoms. Rest at home
(con)

- Antihypertensive therapy

Mild PET
- There is no benefit of antihypertensive therapy
- Reduction in the maternal BP with labetalol or nifedipine ⇒ IUGR
- ACI ⇒ contraindicated ⇒ IUGR, boney malformations, limb contracture, PDA, pulmonary hypoplasia, RDS, hypotension & death

Severe PET
Antihypertensive therapy is used to control BP until the Pt delivers or in preterm for 48 hrs to allow time for glucocorticoid administration for fetal lung maturity then delivery
Emergency Rx

- It required when convulsion is occurring or just occur.
- 1-call for help.
- 2-ABC
- 3-5 gm magnesium sulphate IV
- In a case of severe PE also required help depending up on results of investigation
(con)

• Termination of pregnancy

  Indications
  • Term pregnancy with mild or severe PE
  • Severe PE regardless of the gestational age

  Warning signs ➔ headache, visual disturbance, epigastric pain, oliguria, anuria

  • Eclampsia ➔ Pt must be stabilized & delivered immediately
  • Low plt
  • Fetal distress
  • Bp persistent at 160/100 mm hg or more.

  Methods of termination
  • prostaglandines followed by IV oxytocin
  • Elective CS ➔ Severe PE with unfavorable Cx
• **Antihypertensive therapy for severe PE & E**
  
  • Hydralazine
    - IV infusion or IV 5-10 mg bolus at 15-20 min interval
    - when diastolic BP ≥100-110 mm Hg or systolic BP ≥ 160 mmHg
  
  • Nifedipine 10 mg po repeated in 30 min
  
  • Labetalol 10 mg IV / 20 mg after 10 min/ 40mg after 10min/80 mg (not to exceed 220 mg)
  
  • Nitroprusside ➔ used only in PT not responding to other drugs
  
  • Diuretics not recommended because intravascular volume depletion already exists in PET
(con)

- Fluid therapy
- Hyperosmotic agents not recommended because ➔ intravascular influx of fluid ➔ subsequent escape of fluid to vital organs ➔ pulmonary edema & cerebral edema

- Excessive fluid administration ➔ pulmonary edema & cerebral edema
(con)
Magnesium sulfate IV infusion ➔ 4 gm loading dose in
• 100 ml of IV fluid over 20 min ➔ 2 gm /hr
  maintenance
Measure serum MG level at 4-6hrs maintain at 4-7
  mEq /L
Avoid toxicity by :
  - monitoring patellar reflexes
  - respiratory rate
  - urine output
Antidote ➔ calcium gluconate 1gm IV
MgS ↓ myometrial contractility
Compared to phenytoin or diazepam ➔ 50% ↓ in
  maternal mortality ,67% ↓ in convulsions
Infants were less likely to be admitted to NICU/
  intubation
Prognosis

- Maternal death rare due to cerebral Hg, aspiration pneumonia, hypoxic encephalopathy, thromboembolism, hepatic rupture, renal failure, ansthesia

- Recurrence 25-33% primipara
  70% multipara

HEELP 5%
HELLP

- A cause for HELLP syndrome has not been found.
- misdiagnosed as:
  - 1- Flu or other viral illness
  - 2- Gallbladder disease
  - 3- hepatitis
  - 4- (ITP)

Symptoms
- Fatigue
- Fluid retention and excess weight gain
- Headache
- Nausea and vomiting that continues to get worse
HELLP

- Pain in the upper right part of the abdomen
- Blurry vision
- Nosebleed or other bleeding that won't stop easily
- Examination:
  - Abd tenderness
  - Hepatomegaly
  - Leg edema
  - Skin rash
  - And elevated liver enzymes
HELLP

- **Treatment**
  - The main treatment is to deliver the baby as soon as possible, even if the baby is premature.
  - A blood transfusion if bleeding problems become severe
  - Corticosteroid medications to help the baby's lungs develop faster
  - Medications to treat high blood pressure