Obstetrics & Gynecology
TEAM

Hypertensive disorders in Pregnancy

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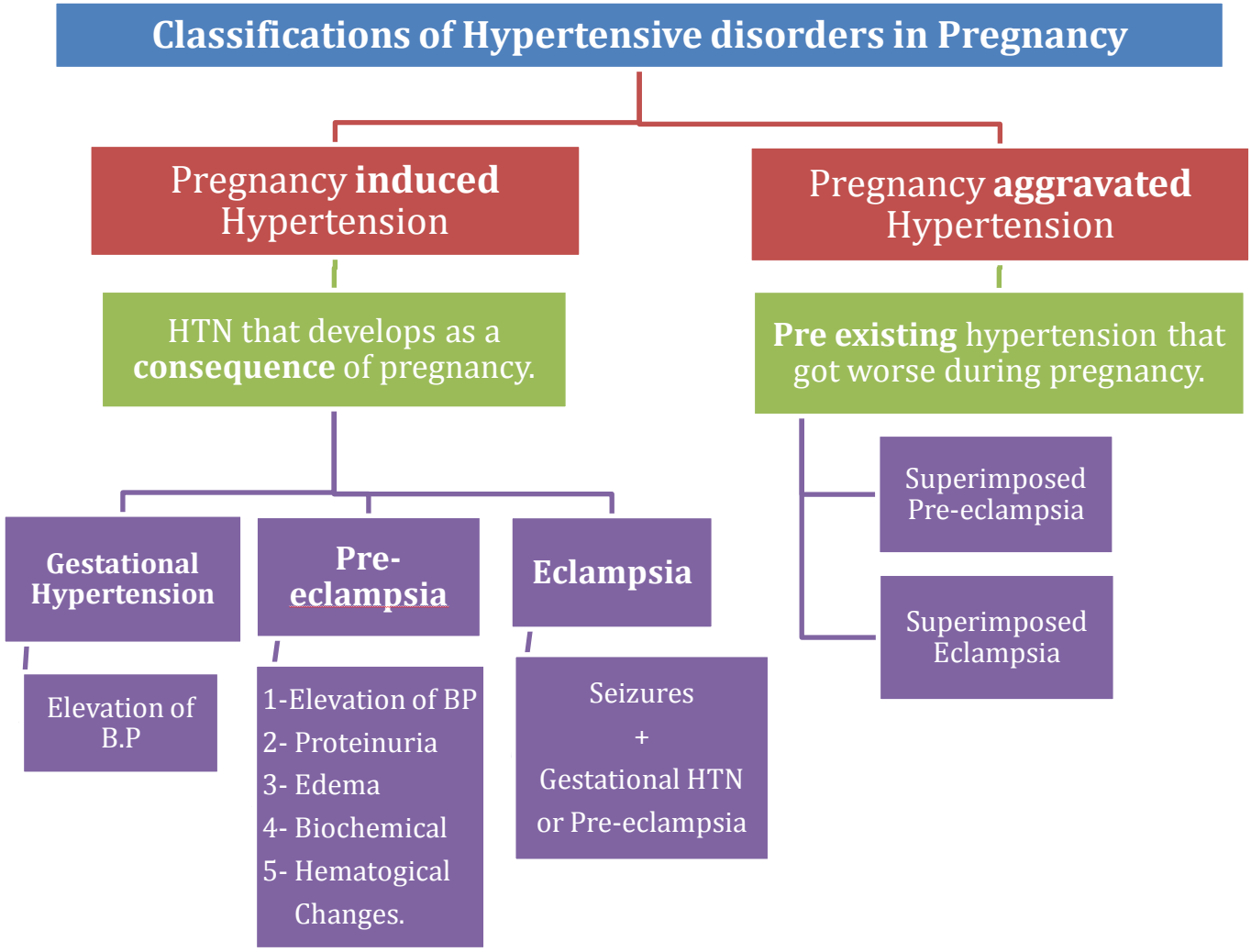
◆very important ◆mentioned by doctor ◆team notes ◆not important

Classifications of Hypertensive disorders in Pregnancy



If uncontrolled the patient may undergo:

HELLP Syndrome: Severe form of HTN in pregnancy.

- Hemolysis
- Low platelets
- Elevated liver enzyme

1. **Pregnancy induced Hypertension :**
   HTN that develops as a consequence of pregnancy. Include 3 types:

a. **Gestational hypertension:**
   Elevation of B.P
   without Pathological edema, proteinuria, hematological or biochemical changes.
   with or without fetal implication of HTN

b. **Pre-eclampsia:**
   Elevation of BP with proteinuria and or pathological edema, biochemical and or hematogical changes.

   - edema may not be present
   - Edema here ➔ swelling of the face & upper extremities **not** the lower extremities!

   - Pre eclampsia is further subdivided into :

     1. Mild
     2. Severe

     } further explanation is coming!

     ➔ No moderate category in pre-eclampsia.

c. **Eclampsia:** Convulsions
   A complication of Gestational hypertension or Pre-eclampsia with clinical seizure!

2. **Pregnancy aggravated HTN.**
   Pre existing hypertension that got worse during pregnancy. (already on hypertensive medication)

a. **Superimposed pre-eclampsia**
   Patient with HTN getting worse during pregnancy + develop Pre eclampsia symptoms: (elevation of BP + proteinuria + pathological edema + biochemical changes and or hematogical changes)

   Ex: Patient who has pre existing HTN getting worse by pregnancy & complicated by hematogical + biochemical changes ➔ super imposed pre eclampsia.

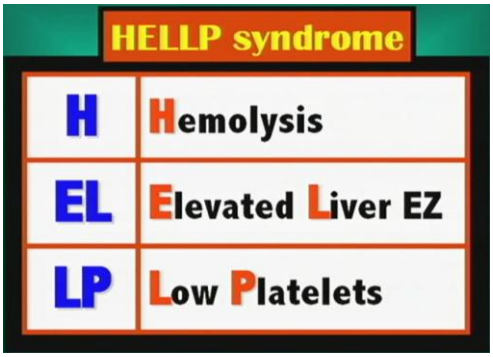
b. **Superimposed eclampsia**
   Ex: Patient with pre existing HTN getting worse by pregnancy & complicated by hematogical + biochemical changes with seizure ➔ super imposed eclampsia.

3. **HELLP Syndrome:**

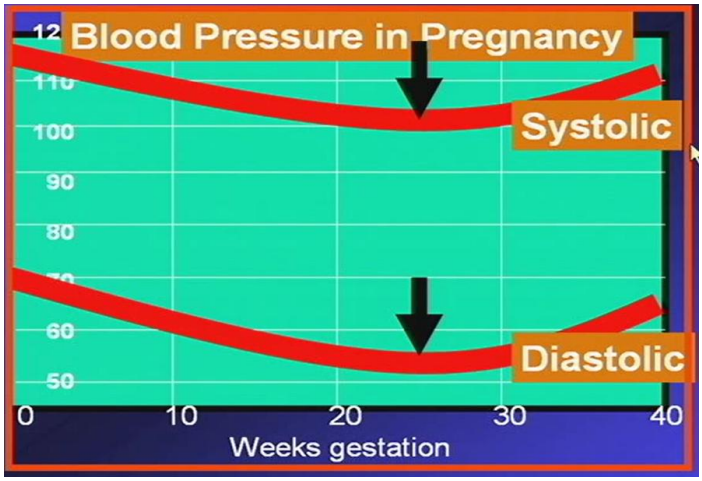
   Sever form of HTN in pregnancy.

   - **Hemolysis**
   - **Low platelets**
   - **Elevated liver enzyme**

   Common MCQ's: components of HELLP syndrome



- **Physiological Changes in Blood pressure during pregnancy:**



- Slight drop in 1st trimester
- continuous through the 2nd trimester
- gradual rise to pre-pregnancy level in the 3rd trimester.

- HTN is never normal in pregnancy.

- Elevation of BP above pre-pregnancy level is always abnormal.

- The curve shows the systolic & diastolic BP changes , between 20 & 30 weeks there is a drop & continuous in the 2nd trimester & then rise again in the 3r trimester but to the pre pregnancy reading not more than that never.

- Patient with BP 120/70 in the booking appointment then she comes again in the second trimester with BP of 140/90 → this is abnormal, she has HTN.

- **Definition of Hypertension in Pregnancy:**

- **BP > 140/90 after 20 weeks gestation in the sitting position.**

Why after 20 weeks?
HTN before 20w ➔ this is a pre-pregnancy HTN not a pregnancy induce HTN.

Why sitting?
BP drop in lying down ➔ false reading.

- Old definition : if there is an increase of 30 mmHg systolic, 15 mmHg diastolic ➔ diagnostic for pregnancy induce HTN➔ this is no longer used.

- Read BP twice, readings 6 hours apart, patient is well rested.

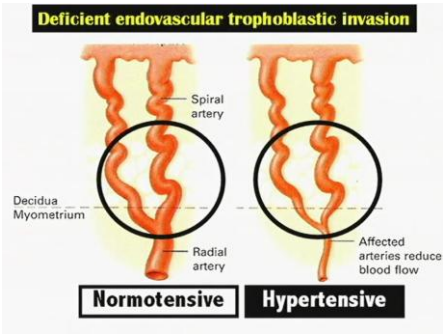
- **Risk factors for HTN in pregnancy :**

- Nulliparity (HTN in pregnancy is called the disease of Primigravida)
- Extremes of age (teenager or old age)
- Multifetal pregnancy (twins, triplet)
- Hydrops fetalis (Rh Disease)
- Diabetes
- Renal disease
- Auto immune disorders (SLE, Thrombophilia, Antiphospholipid syndrome, Rheumatoid)

➔ first pregnancy, or if she has a 2nd or 3rd pregnancy but from a new husband ➔ first exposure to sperms)

* Molar pregnancy also a risk factor for the development of fulminating pre eclampsia but the doctor said I didn't include it here cause it usually diagnosed before 20 weeks of gestation .

- **<u>Pathophysiology</u>:**



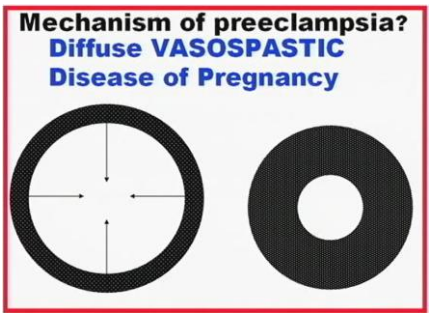
Vasospasms: Vascular constriction causes resistance to blood flow and accounts for the development of arterial HTN.

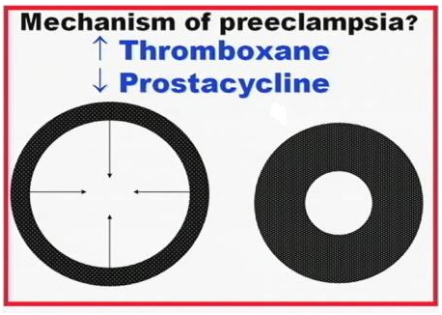
- Start at level of <u>spiral vessel</u> where the invasion of the trophoblasts to the endometrium take place at the time of implantation, this process <u>start very early in pregnancy</u>.

- Vasospasm is due to ↑production of Thromboxane ➔ (vasoconstriction)
  ↓ production of Prostocycline ➔ (vasodilatation)

➔ Management: <u>Aspirin prophylaxis</u> (thromboxane inhibitor)
given early in pregnancy to protect from pre eclampsia & HTN.

- Dietary deficiency of Ca. ➔ not proven to be the cause but give Ca supplement.





- **<u>Different scopes of the disease have maternal and fetal manifestations to different extents.</u>**
  Depending on the **<u>severity</u>** of the disease & **<u>duration</u>** of the disease

A. Gestational HTN:

- May be asymptomatic ➔ (detected only by measuring BP)
- No edema
- No protein urea
- No hematological abnormalities
- No biochemical abnormalities
-/+ **Fetal involvement**
  e.g. IUGR, oligohydramios Δ changes in fetal heart tracing and BPP depending on the duration of the diseases. placental abruption, fetal death

- mechanism of fetal involvement :

1. **Intra uterine growth restriction:**
   (vasospasm & reduction in placental blood flow➔ reduction in O2 & nutrition➔ IUGR)

2. **Oligohydramios** ➔ reduction in placental blood flow ➔ the first organ affected is the fetal Kidney (no adequate volume from the circulation ➔ making less urine ➔ less amniotic fluid production (the amniotic fluid is mainly the fetal urine) ➔ oligohydramios

3. **placental abruption** ➔ because of severe forms of pre-eclampsia ➔ **fetal death**

4. **Changes in fetal heart tracing** ➔due to reduce circulation & O2 ➔ asphyxia = hypoxia ➔ Changes in fetal heart rate : deceleration or reduce variability or others.

5. **Changes in Biophysical profile**:

- BPP = Biophysical profile ➔ **test to assess fetal well being**, composed of 4 component :

1- Fetal breathing
2- Fetal movement
3- Fetal tone
4- Amniotic fluid volume

Score of 2 for each of these component, Total score out of 8.
The baby get 2 or 0 for each component ➔ never get 1 ➔ this is a common mistake in exam

In exam : they will gave us finding & ask to calculate the total score of BPP
➔ if they mention the tone is weak ➔ the baby get 0 not 1 !!

Modified BPP :
Same score together with ➔ **Non Stress Test**

we do it to improve the score if baby is missing any of the 4 items above.
score out of 2 also (Reactive=2, non reactive=0)

Ex: if the baby is missing the breathing ➔ we do NST & the score will be out of 10

BPP used a lots in hypertensive pregnant mothers to assess the fetal wellbeing

pay attention : Fetal Heart Rate is **not** a component of BPP ➔ common mistake in exam

B. Pre-eclampsia:

1. Mild :
    - BP < 160/110.
    - Edema of the face and upper extremities.
    - Proteinuria > 300 mg /24 hours urine collection ➔ ("trace" up to "+1" in urine dipstick)

2. Severe :
    - BP > 160/110
    - Proteinuria 4-5 gm /24 hours (+ 2 or more urine dipstick)
    - Headache
    - Visual disturbance ➔ spots, lightning
    - Epigastric pain ➔ (usually pregnant have heart burn but if sudden severe this is an alarm) ➔ Epigastric pain is due to tension & edema in the liver capsule.
    - Oliguria ➔ because of intra vascular volume depletion ➔ important in administration of drugs➔ if the drug is not excreted through urine adequately she may become toxic.
    - Pulmonary edema
    - ↓ Platelets count ➔ coagulopathy + consumption of factors ➔ patient present with DIC specially if she has abruption of placenta➔ platelet is first indicator of ongoing process.
    - ↑ LFTS Liver Function Test
    - ↑ KFTS kidney function test
    - Fetal Involvement as previously mentioned. Depend on duration & severity of the illness

C. Eclampsia:

- Generalized tonic, clonic seizures
- You must Roll out epilepsy

➔ The patient may have epilepsy before & the first presentation is now during pregnancy!
➔ Hx, gestational age, lab test, no proteinuria, no edema ➔ this may not eclampsia but epilepsy!

- Eclampsia is considered as a severe form ➔ indication of terminating the pregnancy!

D. Pregnancy aggravated HTN with:

➔ you have to worn the pt. about the symptoms of pre eclampsia & eclampsia

* Super-imposed pre-eclampsia
* Super-imposed eclampsia with fetal involvement

E. HELLP syndrome:

• Severe form with rapid deterioration.
• Active aggressive management regardless of gestation age.
forget about the fetal age you have no time you must save the mother life!

Management:

• Prevention : ANC antenatal care
• Aspirin (reverse the process of thromboxane)
• Diet (Ca supplement)
• BP control in HTN patients
• Eclampsia & HELLP ➔ need admission

Investigations:

• **CBC** :
➔ platelet count ➔ indicate severity of the disease
➔ Hg ➔ if drop from 12 to 10 after 2 hour ➔ Hemolysis
➔ Hematocrit ➔ hemoconcentrated & intravascular volume depleted

• **U/A urine analysis**, 24 hour urine collection ➔ proteinuria
• **LFTS** ➔ elevated in severe disease (alkaline phosphatase normally rise in pregnancy)
• **KFTS** ➔ Na, K, creatinine, uric acid (uric acid normally elevated but to certain limit)
• **Coagulation profile**
  - PTT + PT ➔ Prolonged
  - D dimmer (fibrinogen + fibrinogen degradation products) ➔
  - fibrinogen is low
  - fibrinogen degradation products is high
  - Coagulation factors ➔ being consumed
  - micro-emboli & micro-thrombi.

Treatment depends on:
• Severity of the condition
• Fetal maturity

➔ Use them in combination if :
• Disease is mild & fetal is immature ➔ you have time to wait
• Disease is mild & fetal mature ➔ deliver
• Disease is severe & fetal is immature ➔ terminate the pregnancy (get the baby out not abortion) regardless of the fetal age because you are exposing the mother to dangers.

- Treatment in mild cases with prematurity :
  - conservative management is recommended
  - close fetal and maternal monitoring
  - administration of steroids.

- In severe cases:

Stabilization and delivery regardless of the fetal age is indicated

➔ Anti hypertensive + fluid + Magnesium sulfate + deliver

- Mode of delivery depends on how much time you have:

➔ cervix, parity, head fetus, rapture membrane, gestational age, deceleration

➔ Induction of labour or C.S.

* depending on factors above our decisions in clinical exam scenarios *

- **BASIC RULES in management:**
  - **A.** Use antihypertensive drugs to prevent maternal CVA cerebrovascular accident
  - **B.** Use Mg SO4 for seizure prevention
  - **C.** Continuous fetal monitoring
  - **D.** Measure Input & output

➔ **Use Antihypertensive to prevent maternal CVA cerebrovascular accident**

- If Diastolic BP of 105 ➔ start antihypertensive to save the mother from CVA

1. commonly used is I.V. **hydralazine** ➔ drug of choice
2. **Aldomet** is used in cases of **chronic HTN**
3. Lasix should **not** be used ➔ they cause intravascular depletion ➔ renal failure
4. ACE inhibitors are contraindicated ➔ fetal problem

➔ **Use Mg SO4 for seizure prevention** ➔ Intrapartum + 24 hours postpartum

❖ **Dosage :** ➔ (this is the only dose you need to memorize it)

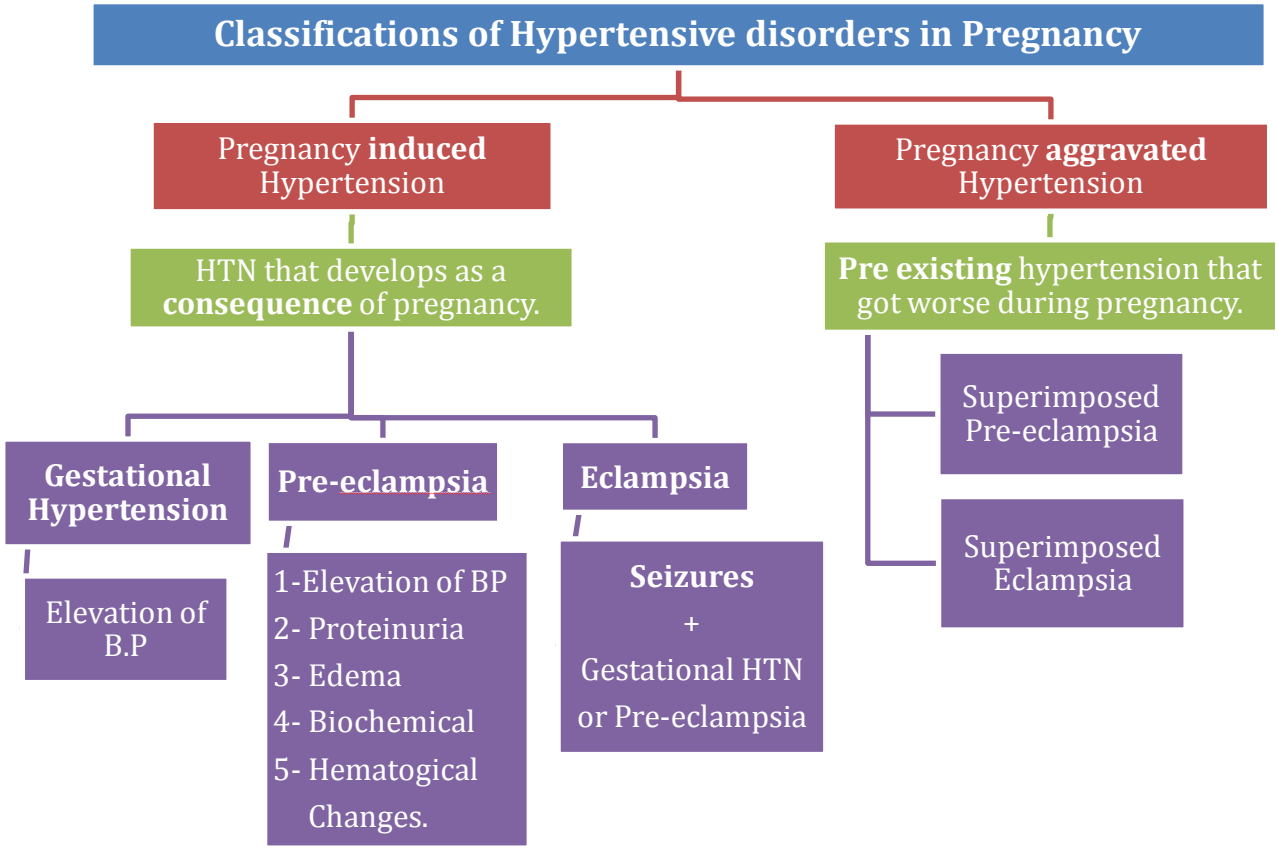
- 4 gm IV load over 30 minutes (prophylactic)
- followed by 2 gm/ hour Intrapartum infusion (maintenance) until the patient delivers.
- once she deliver reduce the dose to 1 g/hour for a period of 24 hours
- intramuscular injection is painful + with different doses.

❖ **Monitoring of patients on Mg SO4 :**

- Mg levels ➔ draw blood level every 4-6 hours to prevent toxicity
- U/O volume ➔ Urine output Less than 30-40 cc/ hour ➔ Mg level are high➔ check your infusion rate
- Reflexes ➔ CNS Depression ➔ over-dose
- Respiratory rate ➔ respiratory arrest

❖ **Anti dote of Mg SO4** ➔ **Calcium gluconate** injection.

- **Summery :**



Hypertension in Pregnancy:
BP > 140/90 after 20 weeks gestation in the sitting position.

HELLP Syndrome:
Hemolysis
Low platelets
Elevated liver enzyme

Investigations:
- CBC (platelet, Hg, Hematocrit)
- Urine analysis
- LFTS
- KFTS
- Coagulation profile

Fetal involvement :
IUGR, oligohydramios, changes in FHR and BPP, placental abruption, fetal death.

Basic rules in management:
1. Antihypertensive drugs to prevent maternal CVA ➔ I.V. **hydralazine** is a drug of choice

2. Mg SO4 for Seizure prevention
   - dose : 4 gm IV over 30 min ➔ 2 gm/h until delivery ➔ 1 g/hour for 24 hours postpartum.
   - antidote: **Calcium gluconate**

3. Continuous fetal monitoring.
4. Measure Input & output.

Treatment depends on:
- Severity of the condition + Fetal maturity

Physiological changes in BP in pregnancy:
- Slight drop in 1st trimester ➔ continuous through the 2nd trimester
- Gradual rise to pre-pregnancy level in the 3rd trimester.

Risk factors for HTN in pregnancy
Nulliparity, Extremes of age, Multifetal pregnancy, Hydrops fetalis, DM, Renal disease

Pathophysiology :
- Increase production of Thromboxane + Dietary deficiency of Ca