University of Basrah
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REPRODUCTIVE BLOCK

Lecture

Duration : 1 hour

Hypertension in Pregnancy

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GYNAECOLOGY 20th
EDITION by Ten Teachers

Learning Objectives (LO)

1- Introduction and classification of HT in pregnancy
2-Pre – Eclampsia
3- HELLP syndrome
4- Mg sulfate level monitoring , side effects and management of toxicity
5- Antihypertensive therapy
6- Termination of pregnancy

LO 1

Introduction

Hypertension is common in pregnancy. Approximately 1 in 10 women will have one or more episodes of raised blood pressure prior to delivery

Classification of hypertension in pregnancy

1. **Non-proteinuric pregnancy-induced hypertension.**
2. **Pre-eclampsia.**
3. **Chronic hypertension**

Non-proteinuric pregnancy-induced hypertension (otherwise known as gestational hypertension)

- Blood Pressure ≥ 140/90 on two or more occasions
  - in a previously normotensive Patient
    - after 20 weeks gestation
    - without proteinuria
  - returning to normal 12 weeks After delivery
- Almost half of these develop preeclampsia syndrome

Chronic hypertension

- Blood Pressure ≥ 140/90 before 20 weeks of gestation

Or

- Persistence of hypertension beyond 12 weeks after delivery.

superimposed pre-eclampsia

- New-onset proteinuria ≥ 300 mg/24 hours in hypertensive women but no proteinuria before 20 weeks' gestation
- More adverse outcome than preeclampsia alone

LO 2

Pre-eclampsia

- **defined as hypertension of at least 140/90 mmHg recorded on at least two separate occasions and at least 4 hours apart and in the presence of at least 300 mg protein in a 24-hour collection of urine, after the 20th week of pregnancy in a previously normotensive woman and resolving completely by the sixth postpartum week.**

Degrees of hypertension

- **<u>Mild:</u> diastolic blood pressure 90–99 mmHg, systolic blood pressure 140–149 mmHg.**
- **<u>Moderate:</u> diastolic blood pressure 100–109 mmHg, systolic blood pressure 150–159 mmHg.**
- **<u>Severe:</u> diastolic blood pressure ≥110 mmHg, systolic blood pressure ≥160 mmHg**

Risk factors for pre-eclampsia

- **First pregnancy.**
- **Multiparous with a previous history of pre-eclampsia.**
- **Pre-eclampsia in any previous pregnancy.**
- **10 years or more since last baby.**
- **Age 40 years or more.**
- **Body mass index (BMI) of 35 or more.**
- **Family history of pre-eclampsia (in mother or sister).**
- **Booking diastolic blood pressure of 80 mmHg or more.**
- **Booking proteinuria (of ≥1+ on more than one occasion or quantified at ≥0.3 g/24 h).**
- **Multiple pregnancy.**
- **Certain underlying medical conditions: pre-existing hypertension; pre-existing renal disease; pre-existing diabetes and antiphospholipid antibodies.**

Pathophysiology

- **The development of pre-eclampsia is a two-stage process, which originates in early pregnancy .**

- **In the first stage, trophoblast invasion is patchy and the spiral arteries retain their muscular walls. This is thought to prevent the development of a high-flow, low-impedance uteroplacental circulation and leads to uteroplacental ischaemia The reason why trophoblasts invade less effectively in these pregnancies is not known but may reflect an abnormal adaptation of the maternal immune system.**

- **In the second stage, uteroplacental ischaemia results in oxidative and inflammatory stress, with the involvement of secondary mediators leading to endothelial dysfunction, vasospasm and activation of the coagulation system .**

Cardiovascular system

- **Pre-eclampsia is characterized by marked peripheral vasoconstriction, resulting in hypertension. The intravascular high pressure and of endothelial cell integrity results in greater vascular permeability and contributes to the formation of generalized oedema.**

Renal system

- **In the kidney, a highly characteristic lesion called glomeruloendotheliosis is associated with impaired glomerular filtration and selective loss of intermediate weight proteins, such as albumin and transferrin, leading to proteinuria. This is turn causes a reduction in plasma oncotic pressure and exacerbates the development of oedema.**

Hematological system

- **Pre-eclampsia is association with increased fibrin deposition and a reduction in the platelet count**

The liver

- HELLP syndrome
- Periportal haemorrhage
- subcapsular bleeding
- hepatic rupture: 32% maternal mortality

LO 3
HELLP syndrome

- **is a particularly severe form of pre-eclampsia, occurring in just 2–4% of women with the disease. It is associated with a high fetal loss rate (of up to 60%) , HELLP syndrome is an acronym for haemolysis, elevation of liver enzymes and low platelets.**
- **Women with HELLP syndrome typically present with epigastric pain, nausea and vomiting.**
- **Hypertension may be mild or even absent.**
- **HELLP syndrome is associated with a range of serious complications including acute renal failure, placental abruption and stillbirth.**
- **The management of HELLP syndrome involves stabilizing the mother, correcting any coagulation deficits and assessing the fetus for delivery**

Neurological system

- **The development of convulsions in a woman with pre-eclampsia is defined as eclampsia. Vasospasm and cerebral oedema have both been implicated in the pathogenesis of eclampsia .**

Uteroplacental circulation

- Uteroplacental insufficiency
- Fetal complications:
  - hypoxia
    - IUGR
    - Prematurity
    - IUD
    - Placental abruption

Clinical presentation

- Edema of the face & hands.
- Headache
- Visual disturbance
- Epigastric pain
- ↑ BP
- Exaggerated reflexes
- Proteinuria

Screening and prevention

- Regular Antenatal checkup:
  - rapid gain in weight
  - rising blood pressure
  - edema
  - proteinuria/deranged liver or renal profile
- Low dose Aspirin in High risk group: ↑PGs and↓TXA2
- Calcium supplementation: no effects unless women are calcium deficient
- Antioxidants- Vitamin C and E
- Nutritional supplementation: zinc, magnesium, fish oil, low salt diet

Investigations

- **To monitor maternal complications:**

- **Full blood count (with particular emphasis on falling platelet count and rising haematocrit). If platelet values are normal, additional clotting studies are not indicated.**
- **Serum renal profile (including serum uric acid levels).**
- **Serum liver profile.**
- **Frequent repeat proteinuria quantification is probably unhelpful once a diagnosis of pre-eclampsia has been made**

- **To monitor fetal complications:**

- **Ultrasound assessment of:**

✓**fetal size;**

✓**amniotic fluid volume;**

- **maternal and fetal Dopplers.**
- **Antenatal cardiotocography, used in conjunction with ultrasound surveillance .**

Management and treatment

Degree of hypertension	Mild hypertension (140/90—149/99 mmHg)	Moderate hypertension (150/100—159/109 mmHg)	Severe hypertension (160/110 mmHg or higher)
Admit to hospital	Yes	Yes	Yes
Treat	No	With oral labetalol† as first-line treatment to keep: • diastolic blood pressure between 80 and 100 mmHg • systolic blood pressure less than 150 mmHg	With oral labetalol† as first-line treatment to keep: • diastolic blood pressure between 80 and 100 mmHg • systolic blood pressure less than 150 mmHg
Measure blood pressure	At least four times a day	At least four times a day	More than four times a day, depending on clinical circumstances
Test for proteinuria	Do not repeat quantification of proteinuria	Do not repeat quantification of proteinuria	Do not repeat quantification of proteinuria
Blood tests	Monitor using the following tests twice a week: kidney function, electrolytes, full blood count, transaminases, bilirubin	Monitor using the following tests three times a week: kidney function, electrolytes, full blood count, transaminases, bilirubin	Monitor using the following tests three times a week: kidney function, electrolytes, full blood count, transaminases, bilirubin

† Only offer women with pre-eclampsia antihypertensive treatment other than labetalol after considering side-effect profiles for the woman, fetus and newborn baby. Alternatives include methyldopa and nifedipine.
(Adapted from the National Institute for Health and Care Excellence (NICE) guideline, Hypertension Pregnancy.)

- Anticonvulsant therapy
- Antihypertensive therapy
- Termination of pregnancy

Seizure Prophylaxis

- *Routinely used* in severe PE
- Magnesium sulphate: most commonly used
- Initiated with onset of labor till 24h postpsrtum

LO 4
MG sulfate

level monitoring

- Normal Serum levels- 1.7- 2.4 mg/dl
- Therapeutic range- 5- 9mg/dl
- Patellar reflex lost- >12mg/dl
- Respiratory depression- 15-20 mg/dl
- Cardiac arrest- >25mg/dl

Mangment of toxicity

- Stop infusion
- Intravenous Calcium 10 ml 10% over 10 minutes
- Endotracheal intubation in respiratory depression

Side effects

- Maternal : flushing, headache,
  muscle weakness, pulmonary edema decrease patellar reflexes , respiratory depression , cardiac arrest
- Neonatal: lethargy, hypotonia, respiratory
  depression

LO 5

Antihypertensive therapy

acute antihypertensive:

- Hydralazine: 5-10 mg every 20 minutes
- Labetalol: 20mg, then 40, then 80 every 20 minutes, for a total of 220mg
- Nifedipine: 10 mg po, not sublingual

Antihypertensives used in the management of pre-eclampsia:

Methyldopa is a centrally acting antihypertensive agent. It has a long-established safety record in pregnancy. However, it can only be given orally, it takes upwards of 24 hours to take effect and has a range of unpleasant side-effects including sedation and depression.

- **Labetalol** is an alpha-blocking and beta-blocking agent. It has a good safety record in pregnancy and can be given orally and intravenously. It is the first drug of choice in most national guidelines including the current National Institute for Health and Care Excellence (NICE) guideline

- **Nifedipine** is a calcium-channel blocker with a rapid onset of action .

LO 6

Termination of pregnancy:

Indications :

- Term pregnancy with mild or severe PET
- Severe PET regardless of the gestational age

  Warning signs ➡ headache , visual disturbance, epigastric pain, oliguria
- Eclampsia ➡Pt must be stabilized & delivered immediately

Preterm with mild PET ➡ Assess fetal wellbeing by NST, Doppler

methods of termination:

- IOL with prostaglandines to ripen the Cx followed by IV oxytocin
- Elective CS ➡ Severe PET with unfavorable Cx

Eclampsia

- **Pre-eclampsia is a potentially life-threatening hypertensive disorder of pregnancy characterized by vascular dysfunction and systemic inflammation involving the brain, liver and kidneys of the mother Eclampsia refers to the occurrence of one or more generalized convulsions and/or coma in the setting of pre-eclampsia and in the absence of other neurological conditions.**

Eclampsia: prevention/risk factors/warning signs

- **Prevention:** **low threshold for administration of magnesium sulphate in women with preeclampsia who are thought to be unstable or suffering from severe preeclampsia. However, remember all patients with preeclampsia regardless of perceived severity are at risk of eclampsia.**

- **Risk factors:** **difficult to predict, uncontrolled hypertension, two or fewer prenatal care visits, primi gravidity, obesity, black ethnicity, history of diabetes and age <20 years.**

- **Warning signs:** **epigastric pain and right upper quadrant tenderness, headache, uncontrolled hypertension, agitation, hyper-reflexia and clonus, facial (especially periorbital) oedema, poor urine output, papilloedema**

Management

1. call for help
2. put the patient in a left lateral position remove the clothes and protect the tongue
3. artificial airway
4. blood should be taken for basal investigations
5. folley's catheter
6. $MgSO_4$
7. diazepam 10mg slowly and diluted which can repeated after 10 minutes
8. antihypertensive therapy
9. obstetrical examination to decide the mode of delivery then deliver the patient

THANK YOU