Hypertensive Disorders in Pregnancy

Definitions

1. **Preeclampsia**
   a. New hypertension presenting after 20 weeks with significant proteinuria (>2+)

2. **Severe Preeclampsia**
   a. Pre-eclampsia with severe hypertension (systolic >170mmHg, diastolic >110mmHg) and/or with symptoms.
   b. And/or biochemical and/or haematological impairment

3. **Eclampsia**
   a. A convulsive condition characterized by tonic clonic seizure associated with pre-eclampsia

4. **Gestational Hypertension (Pregnancy Induced Hypertension)**
   a. New hypertension (>140/90mmHg) presenting after 20 weeks without significant proteinuria

5. **Chronic Hypertension (Hypertension in Pregnancy)**
   a. Hypertension that is present at the booking visit or before 20 weeks or if the woman is already taking antihypertensive medication when referred to maternity services.
   b. It can be primary or secondary in aetiology

6. **HELLP Syndrome**
   a. A type of syndrome characterized by haemolysis, elevated liver enzymes and low platelet count

**Types of Hypertension**

1. **Mild Hypertension**
   a. Systolic pressure → 140-149mmHg
   b. Diastolic pressure → 90-99mmHg

2. **Moderate Hypertension**
   a. Systolic pressure → 150-159mmHg
   b. Diastolic pressure → 100-109mmHg

3. **Severe Hypertension**
   a. Systolic pressure → >160mmHg
   b. Diastolic pressure → >110mmHg

**Preeclampsia**

**Risk Factors**

1. Nulliparity (never given birth)
2. Diabetes mellitus
3. Renal disease
4. Chronic hypertension
5. Prior history of preeclampsia
6. Family history of preeclampsia
7. Advanced maternal age (>35 years)
8. Obesity
9. Antiphospholipid antibody syndrome
10. Multiple gestation
Clinical Features

1. Symptoms of Preeclampsia
   a. Severe headache (usually frontal)
   b. Problems with vision, such as blurring or flashing before the eyes
   c. Right upper quadrant pain
   d. Nausea and vomiting
   e. Sudden swelling of the face, hands or feet.

2. Signs of Preeclampsia
   a. Agitated and restless
   b. High blood pressure (>140/90mmHg)
   c. Edema over hands, face or feet
   d. Peripheral loss of vision
   e. Fundoscopy
      i. Retinal artery occlusion
      ii. Papilledema due to cerebral edema
   f. Bibasal crepitation (pulmonary edema)
   g. Right upper quadrant tenderness
   h. Uterus can be smaller than date (IUGR, Oligohydramnious)
   i. Exaggerated tendon reflexes
   j. >3 clonus

Pathogenesis

1. Abnormalities in the development of placental vasculature early in pregnancy may result in relative placental underperfusion/hypoxia/ischemia, which then leads to release of antiangiogenic factors into the maternal circulation that alter maternal systemic endothelial function and cause hypertension and other manifestations of the disease.

2. However, the molecular basis for placental dysregulation of these pathogenic factors remains unknown, and the role of angiogenic proteins in early placental vascular development are under investigation.

Diagnosis Criteria

1. Blood pressure ≥140/90mmHg in 2 separate readings 4 hours apart in previously normotensive mother

2. Proteinuria
   a. ≥300mg in 24 urine collection
   b. ≥2+ in urine dipstick
Investigations

Laboratory Investigation

1. Preeclampsia Profile
   a. Full Blood Count
      i. Haemoglobin
      ii. Platelet (reduced in HELLP syndrome and DIVC)
      iii. White cell count (TRO urinary tract infection)
   b. Coagulation Profile
      i. Prothrombin Time
      ii. Partial Thromboplastin Time
      iii. INR
   c. Uric Acid level
      i. (POG x 10) – 50 (range according to POG)
   d. Renal Profile
      i. Urea
      ii. Creatinine

2. Urinalysis
   a. Urine albumin level
   b. White cell (TRO urinary infection)
   c. Nitrate (TRO urinary infection)
   d. Urine for culture and sensitivity (TRO urinary tract infection)

3. Protein/Creatinine Ratio
   a. <30mm/mmol \(\rightarrow\) NOT significant proteinuria
   b. ≥30mm/mmol \(\rightarrow\) doesn’t signify whether the proteinuria is significant

Imaging Studies

1. Abdominal Ultrasound
   a. Fetal well-being
   b. Fetal growth
   c. AFI
2. Doppler US of uterine artery
   a. Determine signs of placental hypoperfusion
3. Chest X-ray
   a. Signs of pulmonary edema and pleural effusion

Management

<table>
<thead>
<tr>
<th>Degree of Hypertension</th>
<th>Mild Hypertension</th>
<th>Moderate Hypertension</th>
<th>Severe Hypertension</th>
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</thead>
<tbody>
<tr>
<td>Admission</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Treatment</td>
<td>No</td>
<td>Labetolol as 1st line, aim pressure:</td>
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<tr>
<td></td>
<td></td>
<td>• Systolic &gt;150mmHg</td>
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<td></td>
<td></td>
<td>• Diastolic 80-100mmHg</td>
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<tr>
<td>Measure of Blood Pressure</td>
<td>At least four times a day</td>
<td>At least four times a day</td>
<td>More than four times a day</td>
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<tr>
<td>Fluid Input/Output Chart</td>
<td>Catheterization to monitor urine output</td>
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<tr>
<td>Steroids</td>
<td>24-34 weeks of gestation</td>
<td>12mg Dexamethasone BD in 24 hours</td>
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<tr>
<td>Neonatal Review</td>
<td>Neonatal support</td>
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<tr>
<td>Delivery</td>
<td>The only cure</td>
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</tbody>
</table>
Step by Step in Managing Severe Preeclampsia

Antenatal Management

1. Set up 2 IV lines (14/16G canulla)
2. Antihypertension
   a. Oral
      i. Nifedipine
   b. Parenteral
      i. Labetolol
      ii. Hydralazine
      iii. Sodium Nitroprusside
3. Catheterization for urine output monitoring
   a. 1ml/kg/hr (normal)
4. Do investigation

Intrapartum Management

1. Vaginal Delivery
   a. Consider induction in
      i. Bishops score >6
   ii. Stable mother
   iii. Fetal distress
   iv. Cephalic presentation
   v. No fit
2. Emergency LSCS
   a. Consider in
      i. POG >34 weeks
      ii. Not response towards induction
      iii. Labor doesn’t progress quickly

Postpartum Management

1. Put in dark room for 28 hours after delivery
2. Continue anti-hypertensive
3. Monitor
   a. Blood pressure every 30mins for the 1st hour, then hourly
   b. I/O chart
   c. Proteinuria

Management of Eclampsia

1. Initial
   a. Loading dose of MgSO4
      i. 4g (8ml) MgSO4 dilute in with 12ml normal saline (total 20ml) → infuse 32ml/hr
   b. Maintenance dose of MgSO4
      i. 10 ampoules (50ml) in 1 liter normal saline → infuse 1g/hr for 24 hours
2. Recurrent seizure whilst on MgSO4
   a. Bolus 2-4g
      i. 2g MgSO4 for those weight <70kg during booking
      1. 4ml of MgSO4 in 6ml normal saline (total 10ml)
      ii. 4g MgSO4 for those weight ≥70kg during booking
      1. 8ml of MgSO4 in 12ml normal saline (total 20ml)

Therapeutic Range of MgSO4: 2-4mmol/L or 4-8mg/dL
Complications of Preeclampsia

Maternal Complications

1. Eclampsia
2. Hemorrhagic stroke
3. Acute kidney injury
4. Liver necrosis
5. HELLP syndrome
6. DVC
7. Abruption placenta

Fetal Complications

1. IUGR
2. Oligohydromnious
3. Prematurity
4. Intrauterine death

Prevention of Preeclampsia

1. Low dose 75mg Aspirin given to high risk group before 20 weeks of gestation
2. High dose of Calcium Carbonate

HELLP Syndrome

Definition

- A life-threatening obstetrics emergency that is part of complication of preeclampsia
- It is abbreviated as
  - Hemolysis
  - Elevated Liver enzyme
  - Low Platelet

Diagnosis

Based on University of Tennessee Classifications

1. Hemolysis in peripheral blood film
2. Lactate Dehydrogenase >600IU/L
3. Aspartate Aminotranferase >70IU/L
4. Platelet <100,000/uL