LEARNING OBJECTIVES

- Explain the management of a patient with preeclampsia
- List the maternal and fetal complications associated with preeclampsia

See also:

- FLAME 27 – CHRONIC HTN IN PREGNANCY
- FLAME 104 – DIAGNOSING PREECLAMPisia
- FLAME 106 – ECLAMPSIA
Preeclampsia management involves balancing the benefits of continuing the pregnancy for fetal development versus taking on risks of continued HTN and endothelial dysfunction to maternal/fetal health.

*Should be offered if no contraindications to BMZ (Gyamfi-Bannerman 2016)
PRE-E W/O SEVERE FEATURES
(Previously known as Mild Preeclampsia)

- Preeclampsia is only “cured” via delivery of placenta, but timing of delivery is balanced between risk of fetal prematurity with expedited delivery and risk to mother/fetus with waiting in the setting of continued preeclampsia.

- General overview (detailed slides to follow):
  - ≥37 weeks + no severe features = Delivery
    - Not a contraindication to labor induction and/or vaginal delivery
  - <37 weeks + no severe features = Expectant management
    - Evidence to support both inpatient and close outpatient mgmt; decision should be individualized and made with the patient.
    - Blood pressures: as long as BP <160/110, no anti-hypertensives rec’d
    - Seizure prophylaxis: no universal recommendation if BPs <160/110
    - Labs: LFTs and platelets weekly OR PRN worsening pressures/symptoms
      - Note, no need to recheck urine protein, because we do not make delivery decisions or escalate to a diagnosis of severe features based off this parameter
    - Antepartum measures: Twice weekly NSTs, BMZ given to promote fetal lung maturity

Navigate:
Overview | Antepartum | Antihypertensives | Seizure Prophylaxis | Postpartum | Complications | Eclampsia/HELLP
PRE-E W/ SEVERE FEATURES

(Previously known as Severe Preeclampsia)

- Preeclampsia with severe features is preeclampsia with signs of end organ damage, or if blood pressures escalate to >160/110
  - ≥34 weeks + severe features = Mag + Delivery
    - Not a contraindication to labor induction and/or vaginal delivery, UNLESS rapidly worsening status for which the risks of waiting for induction are deemed to outweigh the risks of outright cesarean section
  - <34 weeks + severe features = Expectant management
    - Inpatient until delivery
    - Blood pressures: Target 130-150 / 80-100; oral or IV meds to achieve this goal
    - Seizure prophylaxis: magnesium sulfate x 24 hours upon admission AND/OR during delivery and postpartum
    - Labs: LFTs and platelets daily OR PRN worsening pressures/symptoms
    - Antepartum measures: Daily NSTs, Betamethasone given to promote fetal lung maturity
    - If severe features develop before viability = Delivery
### PRE-E W/ SEVERE FEATURES

**Delivery planning**

<table>
<thead>
<tr>
<th>Give BMZ and deliver*:</th>
<th>Give BMZ and deliver IMMEDIATELY once stable if:</th>
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<tbody>
<tr>
<td>&gt; 34 weeks gestation</td>
<td>Eclampsia</td>
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<tr>
<td>Persistent symptoms of severe preeclampsia</td>
<td>Pulmonary Edema</td>
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<tr>
<td>HELLP syndrome present</td>
<td>DIC</td>
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<tr>
<td>IUGR (especially with reversed end-diastolic flow on umbilical artery Doppler)</td>
<td>Severe uncontrollable hypertension</td>
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<tr>
<td>Severe oligohydramnios</td>
<td>Nonviable fetus</td>
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<tr>
<td>Labor or PROM</td>
<td>Unstable fetal heart tracing</td>
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<td>Significant renal dysfunction</td>
<td>Placental abruption</td>
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<td>IUFD</td>
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</table>

*Can delay delivery by 48 hours to get BMZ on board if stable, however....

<table>
<thead>
<tr>
<th>Give BMZ and expectantly manage if:</th>
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<tbody>
<tr>
<td>&lt; 34 weeks gestation</td>
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<tr>
<td>Admit to hospital:</td>
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<tr>
<td>• MgSO4 x 24 hours upon admission and during labor</td>
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<tr>
<td>• Twice weekly NSTs</td>
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<tr>
<td>• Oral anti-hypertensives if BP &gt;150/100</td>
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<tr>
<td>• Deliver once &gt;34 weeks or PRN if worsening pressures, labs, or symptoms</td>
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*Can delay delivery by 48 hours to get BMZ on board if stable, however....
ANTEPARTUM MANAGEMENT

- In patients being expectantly managed:
  - Expectant management usually occurs in the hospital, even for patients without severe features, because severity can change rapidly.
  - Regular monitoring includes:

<table>
<thead>
<tr>
<th>Daily</th>
<th>Twice a week</th>
<th>Weekly</th>
<th>Every 3-4 weeks</th>
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<tbody>
<tr>
<td>Blood Pressure</td>
<td>Labs Q 3-4 d:</td>
<td>AFI</td>
<td>Fetal ultrasound</td>
</tr>
<tr>
<td></td>
<td>▪ CBC</td>
<td></td>
<td>to assess fetal</td>
</tr>
<tr>
<td></td>
<td>▪ Liver enzymes</td>
<td></td>
<td>growth</td>
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<td></td>
<td>▪ Creatinine</td>
<td></td>
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<tr>
<td>NST</td>
<td>Uterine Artery Doppler if IUGR</td>
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- Betamethasone given if patient is <37 weeks to accelerate fetal lung maturity.
BLOOD PRESSURE MANAGEMENT

- **No severe features**: No medication if BPs <160/110
  - Tight blood pressure control does not affect the progression of preeclampsia
- **Severe features**:
  - If > 160/110, initiate acute hypertensive control algorithm until < 160/110:
- **Initial first line management with Labetalol**:
  - 20mg IV over 2 mins
  - Check BP in 10-15 mins
  - 40mg IV over 2 mins
  - Check BP in 10-15 mins
  - 80mg IV over 2 mins
  - Check BP in 10-15 mins
  - *Consider switch to Hydralazine if still > 160/110*
- **Initial first line management with Hydralazine**:
  - 5-10mg IV over 2 mins
  - Check BP in 20 mins
  - 10mg IV over 2 mins
  - Check BP in 20 mins
  - 10mg IV over 2 mins
  - Check BP in 20 mins
  - *Consider switch to Labetalol if still > 160/110*
- **Max dose of IV Labetalol is 300mg (20 + 40 + 80 + 80 + 80mg) in one setting; Max dose of hydralazine is 30mg in one setting**
- Until IV is available, 10mg oral Nifedipine up to five doses can lower blood pressure as quickly as IV labetalol in hypertensive emergencies (Shekhar 2013)
**SEIZURE PROPHYLAXIS**

- **Magnesium sulfate** given for seizure prophylaxis as well as seizure control if eclampsia develops
  - **Expectant mgmt:** Give MgSO₄ x 24 hours upon admission + intrapartum through 24 hrs postpartum
  - **If admitting and delivering:** most pts will likely be on MgSO₄ from admission until 24 hrs postpartum
  - Exact mechanism of seizure prevention/treatment is unknown but MgSO₄ has been found superior to all other anticonvulsant medications for preeclampsia seizure mgmt

- MgSO₄ effects at varying serum concentration (mg/mL)
  - 4.8-8.4  Therapeutic dose
  - 7-10  Hyporeflexia
  - 10-13  Respiratory distress/paralysis
  - 15+  AV block
  - 17+  Coma
  - 25+  Cardiac arrest

- MgSO₄ toxicity treatment: Calcium Gluconate

- If patients are on magnesium, clinical examinations and/or labs should be checked serially to prevent magnesium toxicity
  - **If clinical:** check DTRs, auscultate lungs, and measure I&Os q1-2 hours
  - **If labs:** check serum magnesium level q6 hours
POSTPARTUM MANAGEMENT

- **Delivery of placenta is curative for preeclampsia/eclampsia**

- While more rare, pre-eclampsia can worsen (or even present) for up to 6 weeks postpartum
  - Continue MgSO₄ x 24 hours postpartum
  - Continue BP monitoring in the hospital (or that of equivalent surveillance as an outpatient) for at least 72 hours postpartum
    - If blood pressure remains elevated >160/110 x2 on either of these occasions, antihypertensive therapy should be started
  - Patient should have BP follow up again at 7-10 days after delivery or earlier in women with symptoms

- Be cautious with NSAIDs postpartum until hypertension, oliguria, and renal function improve or resolve
COMPLICATIONS

▶ Recurrence
  ▶ 20% of women have hypertension in subsequent pregnancy
  ▶ 16% have recurrent preeclampsia
    ▶ Risk increases with earlier preeclampsia onset or more severe symptoms

▶ Maternal Complications – more likely to later develop:
  ▶ Cardiovascular disease (Hypertension, Ischemic heart disease, Stroke, VTE)
    ▶ 17.8% absolute risk of developing one of the above events (8.3% without preeclampsia)
    ▶ 8-10x more likely to die of cardiovascular disease
  ▶ Diabetes mellitus
  ▶ ESRD – though renal function usually recovers fully initially after preeclampsia resolution

▶ Obstetric complications
  ▶ IUGR
  ▶ Placental abruption
  ▶ Labor induction, c-section delivery

▶ Fetal Complications
  ▶ Small for gestational age & preterm birth
  ▶ Respiratory distress, Brain hemorrhage
  ▶ 30% had below normal/abnormal IQ (Pre-eclampsia Eclampsia Trial Amsterdam)
Recall: HELLP Syndrome (Hemolysis, Elevated Liver, Low Platelets) is a complication of preeclampsia that can also occur independent of preeclampsia.

Managed similarly to preeclampsia with severe features:
- Closely monitor hemolytic status
- **Before viability or > 34 weeks:** delivery
- **Viability to 34 weeks:** expectant management for 24-48 hours to give time for betamethasone to take effect unless worsening maternal/fetal status
- **Mother or fetus in unstable condition:** delivery
- Give MgSO₄ from diagnosis until 24 hrs postpartum
- Manage hypertension
FUTURE CONSIDERATIONS

- With future pregnancies
  - Recommend preconception counseling and assessment for all women with a history of preeclampsia
  - For women with a history of early-onset pre-e <34 weeks, or pre-e at any gestation in more than one pregnancy, recommend starting 81mg ASA in late first trimester

- Future surveillance
  - In women who have had pre-e <37 weeks or recurrent pre-e, recommend annual BP checks, lipids, fasting blood glucose, and BMI
REFERENCES & RESOURCES


- UpToDate:
  - Preeclampsia: Management and Prognosis
  - Eclampsia
  - Expectant management of preeclampsia with severe features
  - Management of hypertension in pregnant and postpartum women

