Preeclampsia & Eclampsia

Hypertensive Disorders of Pregnancy

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Hypertensive Disorders of Pregnancy: 4 Classifications

1. Chronic Hypertension
2. Chronic Hypertension + Preeclampsia
3. Gestational Hypertension
4. Preeclampsia

Severe Preeclampsia
  • Eclampsia
  • HELLP syndrome
Definitions: 140/90 = Hypertension  
160/110 = Severe Hypertension

• **Chronic (preexisting) Hypertension**
  • Onset prior to 20th week gestation
  • May continue through 12 wks PP
  • BP ≥ 140 systolic  or  ≥ 90 diastolic
  • BP ≥ 160 systolic  or  ≥ 110 diastolic = **Severe**

• **Gestational Hypertension**
  • Occurring after 20 weeks gestation in a previously normotensive woman
  • Resolves by 12 wks PP
  • BP ≥ 140 systolic  or  ≥ 90 diastolic
  • BP ≥ 160 systolic  or  ≥ 110 diastolic = **Severe**

AHA & ACOG task force on hypertension in pregnancy, 2013
Preeclampsia

**Syndrome defined by hypertension & proteinuria**
(proteinuria is not a requirement for diagnosis)

**Gestational Hypertension**
(140/90)

+ Any of these symptoms

- Proteinuria
  - \( > 300 \text{mg/24 hr.} \)
  - Protein/Creatinine ratio \( > 0.3 \)
  - Dipstick \( > +1 \)

- Cerebral or visual symptoms
- Epigastric or right upper quadrant pain
- Oliguria < 500 ml. over 24 hours
- Thrombocytopenia < 100K plt.
- Elevated liver enzymes (twice normal)
- Development of Eclampsia
- Development of HELLP syndrome
- Pulmonary edema
Severe Preeclampsia

• Systolic BP $\geq 160$, or diastolic BP $\geq 110$

  *Elevated SBP is better indicator of stroke than DBP
  • (95.8%) women with systolic BP $> 160$ mm Hg $\rightarrow$ stroke
  • (12.5%) women with diastolic BP $> 110$ mm Hg $\rightarrow$ stroke

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• Development of Eclampsia
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* Martin JN et al. Stroke and Severe Preeclampsia and Eclampsia: A Paradigm Shift Focusing on Systolic Blood Pressure, Obstet Gynecol 2005
Risk Factors

❖ Personal history: Hypertension, Pregestational Diabetes, Preeclampsia, Renal Disease, Lupus (other autoimmune diseases)

❖ Multifetal pregnancy

• Maternal age > 40 years

• Nulliparous – first pregnancy

• Obesity BMI>30

• Mother or sister with preeclampsia
Maternal Complications

- Stroke from cerebral hemorrhage
- Placental abruption
- Eclamptic seizures
- Cerebral Edema
- Liver hematoma/rupture
- Pulmonary edema
- Acute renal failure
- Hemorrhage/DIC
- Cardiomyopathy
Fetal Complications

• IUGR
• Premature birth
• Fetal intolerance to labor
• Hypoxia
• Death
# Pathophysiology

## Failure of normal physiologic adaptations to pregnancy

<table>
<thead>
<tr>
<th>Normal Pregnancy</th>
<th>Preeclampsia</th>
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<tbody>
<tr>
<td>↑ plasma volume</td>
<td>↓ plasma volume</td>
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<tr>
<td>↓ vascular resistance</td>
<td>↑ vascular resistance</td>
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<tr>
<td>↑ renal blood flow</td>
<td>↓ renal blood flow</td>
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Probably multiple etiologies cause the syndrome
Pathophysiology

• **Stage 1: Poor placentation**
  - Incomplete invasion of spiral arterioles results in ↓uteroplacental blood flow

• **Stage 2: Inflammation**
  - The ischemic placenta induces widespread endothelial cell damage and maternal systemic inflammatory response
Alteration in Systems

Initiating event

Vasoconstriction

Which Causes

Leaky Vessels

Clotting dysfunction

Results in

Symptoms

Decreased renal blood flow and GFR

Proteinuria

Glomerular endotheliosis

Increased plasma creatinine, uric acid and urea

Oliguria

Tubular necrosis

Decreased hepatic blood flow

Liver tenderness and enlargement

Epigastric pain

Elevated ALT, AST, and LDH

Hemorrhagic necrosis

Retinal arteriolar spasm

Blurring

Scotoma

Decreased placental blood flow

Increased intrauterine activity

Intrauterine growth restriction

Infarctions and abruptions

Cerebral edema and CNS irritability

Headaches

Hyperreflexia and ankle clonus

Nausea and vomiting

Convulsions

Decreased intravascular volume

Increased hematocrit

Increased interstitial fluid in lungs

Dyspnea

Pulmonary edema

Intravascular fibrin and platelet deposition

Decreased platelet count

Increased clotting time

Disseminated intravascular coagulation

Increased intravascular space

Vascular damage

Arteriolar vasoconstriction and systemic vasospasm
Poor Management Outcomes

- Maternal Death: 16:100,000
- Near Misses: ICU
  - 50-100X death rate
  - (Serious Complications) (25,000/yr)

Critical symptoms not recognized
- Delayed diagnosis
- Delayed treatment
- Inadequate treatment
- Assumption that delivery cured preeclampsia
- Discharge without timely follow-up
Most Common Preventable Errors

See It!

- Failure to adequately control blood pressure in hypertensive women

Believe It!

- Failure to adequately diagnose and treat pulmonary edema in women with preeclampsia

Treat It!

- Failure to pay attention to vital signs following birth
- Hemorrhage following cesarean birth

The Joint Commission Sentinel Event Alert Issue 44
5 Management Objectives

1. **Recognize the situation (signs & symptoms)**
   1. 2 elevated BP within 15 min. → notify physician
   2. Initiate anti-hypertensive treatment ASAP

2. **Control BP with antihypertensive agents**
   - Arterial spasm to prevent vascular injury to brain, kidneys, and heart
   - Diastolic not below 90: placenta needs adequate profusion

3. **Prevent or control seizure activity**
   - Magnesium Sulfate infusion

4. **Delivery of fetus**
   - Consider GA and delivery route

5. **Postpartum surveillance**
   - 3-10 day follow-up in provider office
Delivery Timing Considerations

- 37 weeks – deliver
- 34 weeks – deliver after maternal stabilization
  
  AND
  
  - Antenatal steroids – Betamethasone
  - Deliver in 48 hours

- Deliver as soon as maternal stabilization with following complications:
  
  - Fetal reasons: concerning FHR pattern, poor Doppler studies...
  - Abruption
  - Pulmonary edema
  - Eclampsia – stabilized
  - DIC
  - Persistent/worsening symptoms
<table>
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<th>Initial Management Begins With</th>
<th>Initial Dose</th>
<th>Next Dose&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Next Dose&lt;sup&gt;a&lt;/sup&gt;</th>
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<td>dizziness</td>
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Management of Preeclampsia

• Magnesium Sulfate is drug of choice
  • Acts at neuromuscular junction to produce muscular relaxation
  • Small vessel vasodilation

• Loading dose of 4-6g over 15-30 min

• Followed by maintenance dose of 2 -3g per hr

  Magnesium Sulfate is **NOT** an antihypertensive medication
Magnesium Sulfate Therapy

• Monitor output: renal excretion
• Monitor deep tendon reflexes (DTRs)
• Monitor respirations
• Monitor LOC
• Crosses placenta – be prepared for lethargic infant – may require resuscitation

• ↑ Possibility of PP hemorrhage
  NO Methergine, Cytotec preferable
Magnesium Toxicity

- Therapeutic: 4-8mg/dl
- Loss of DTR’s: 9-12mg/dl
- Respiratory arrest/muscle paralysis: 12-18mg/dl
- Cardiac arrest: 25-30mg/dl

Renal excretion – *beware of DM and other renal function*
Magnesium Toxicity

**Antidote**

- Calcium Gluconate 10%
  - 1g/10 mL IV over 3 min.

- Airway & ventilatory support as needed

- O2 and suction set up and ready
HELLP Syndrome

• **H**emolysis
  - Abnormal peripheral blood smear - schistocytes & burr cells
  - ↑ bilirubin

• **E**levated **L**iver enzymes - 2X upper limits of normal
  - LDH > 600 IU/L
  - ALT > 70 IU/L

• **L**ow **P**latelets
  - Thrombocytopenia < 100,000 mm$^3$
  - Severe < 50,000 mm$^3$
HELLP Syndrome

• Frequently does not present with classic preeclamptic symptoms of hypertension & proteinuria

• Malaise  90%
• R ↑ quad. Pain  65%
• N/V  50%
• Worsening edema
• Abdominal, flank or shoulder pain
• Hematuria
• Hypoglycemia
Eclampsia

• New onset of convulsions and/or coma in a woman with signs of preeclampsia

  50% antepartum
  25% intrapartum
  25% postpartum

• Mechanism: cerebral edema, ischemia, hemorrhage or vasospasm
Complications of Eclampsia

- Placental abruption
- Pulmonary edema
- Aspiration pneumonia
- Cerebral hemorrhage
- Renal tubular necrosis
- Liver rupture
- Retinal detachment
- Disseminated intravascular coagulation (DIC)
Management of Eclamptic Convulsion

Life-threatening emergency requiring immediate action

- Prevent injury to woman
- Maintain airway
- Magnesium Sulfate to control convulsion
Management of Eclamptic Convulsion

Magnesium Sulfate Regime

• 4-6g loading dose given over 15 min followed by 2-3g/hr maintenance – onset of action is immediate

• If seizure reoccurs, may administer another 2g over 5 min

• If seizure continues or reoccurs may sedate, intubate and ventilate
Discharge Planning/Teaching

- Any patient treated for hypertension or preeclampsia f/u in 3-7 days
- Delivery is not a cure—Preeclampsia can occur up to 6 weeks PP
- Teach symptoms of Preeclampsia to all patients
SAVING YOUR LIFE:

Get Care for These POST-BIRTH Warning Signs

Most women who give birth recover without problems. But any woman can have complications after the birth of a baby. Learning to recognize these POST-BIRTH warning signs and knowing what to do can save your life.

Call 911 if you have:

- Pain in chest
- Obstructed breathing or shortness of breath
- Seizures
- Thoughts of hurting yourself or your baby

Call your healthcare provider if you have:

- Bleeding, soaking through one pad/hour, or blood clots, the size of an egg or bigger
- Incision that is not healing
- Red or swollen leg, that is painful or warm to touch
- Temperature of 100.4°F or higher
- Headache that does not get better, even after taking medicine, or bad headache with vision changes

Trust your instincts. ALWAYS CALL 911:

Tell 911 or your healthcare provider:

“I had a baby on ________ and I am having ________.”

These post-birth warning signs can become life-threatening if you don’t receive medical care right away because:

- Pain in chest, obstructed breathing or shortness of breath (possibly catching your breath may mean you have a blood clot in your lungs or a heart problem)
- Seizures may mean you have a condition called eclampsia
- Thoughts or feelings of wanting to hurt yourself or your baby may mean you have postpartum depression
- Bleeding (leaking), more than one pad in an hour or passing an egg-sized clot or bigger may mean you have an obstetric hemorrhage
- Incision that is not healing, redness, swelling, warmth, or pain in the incision area may mean you have an infection
- Temperature of 100.4°F or higher, red swollen leg, or discharge may mean you have an infection
- Headache (very painful), vision changes, or pain in the upper right area of your body may mean you have high blood pressure or your birth precipitants

GET HELP:

My Healthcare Provider/Client: ______________________
Hospital Closet: ______________________
Phone Number: ______________________

AWHONN Post Birth Warning Signs Handouts
Prognosis and Long Term Effects of Eclampsia

• Women with severe preeclampsia ↑ risk of developing cardiovascular disease later in life
  • Hypertension, Ischemic heart disease, Stroke

• Preeclampsia with preterm delivery is a strong risk factor for CV disease (AHA)

• Conclusion of all is that pregnancy may be a screening test for chronic hypertension and CV disease
Prevention of Preeclampsia

- ACOG supports the recommendation to consider the use of low-dose aspirin (81 mg/day), initiated between 12 and 28 weeks of gestation, for the prevention of preeclampsia, and recommends using for the high-risk factors listed below.

- History of preeclampsia, especially if accompanied by an adverse outcome
- Multifetal gestation
- Chronic hypertension
- Diabetes (Type 1 or Type 2)
- Renal disease
- Autoimmune disease (such as systematic lupus erythematosus, antiphospholipid syndrome)
Take Aways

➢ Uncontrolled hypertension can lead to stroke...death

➢ Time is Brain – give antihypertensive ASAP

➢ Severe hypertension (160 systolic OR 110 diastolic)
  • is always pathologic