

Preeclampsia & Eclampsia



Hypertensive Disorders of Pregnancy

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What we need to know about Hypertensive Disorders of Pregnancy

- Define clinical criteria for:
 - Gestational hypertension, preeclampsia, eclampsia, and HELLP syndrome
- Describe alterations in maternal systems in preeclampsia
- Prioritize care of the eclamptic patient during a convulsion

Hypertensive Disorders of Pregnancy 5 Classifications

- Gestational Hypertension
- Preeclampsia
- Severe Preeclampsia
 - Eclampsia
 - HELLP
- Chronic Hypertension
- Chronic Hypertension + Preeclampsia

Maternal Complications

- **Stroke from cerebral hemorrhage
 - **Placental abruption
 - Eclampsia
 - Cerebral Edema/PRES
 - Liver hematoma/rupture
 - Pulmonary edema
 - Acute renal failure
 - Hemorrhage/DIC
-

Fetal Complications

- IUGR
 - Premature birth
 - Fetal intolerance to labor
 - Hypoxia
 - Death
-

Definitions

- Chronic Hypertension
 - BP \geq 140 systolic or \geq 90 diastolic = Mild
 - BP \geq 160 systolic or \geq 110 diastolic = Severe
 - Onset prior to 20th week gestation
 - Gestational Hypertension
 - BP \geq 140 systolic or \geq 90 diastolic
 - Occurring after 20 weeks gestation in a previously normotensive woman
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Definitions

- Preeclampsia
 - Syndrome defined by hypertension & proteinuria (not a requirement for diagnosis)
 - Proteinuria defined as: 300mg/L in 24hr
 - Or in the absence of proteinuria: thrombocytopenia, renal insufficiency, pulmonary edema, ↓ liver function, or cerebral symptoms
- Eclampsia
 - Convulsions or coma in a woman with preeclampsia
- HELLP Syndrome
 - Multisystem disease

Preeclampsia

■ Gestational hypertension
+
■ New onset of **any** of the following:

- Proteinuria
 - $\geq 300\text{mg}/24\text{ hr.}$ or
 - Pro/creatinine ≥ 0.3
 - Dipstick $\geq +1$
- Thrombocytopenia
- Impaired liver function
- Renal insufficiency
- Pulmonary edema
- Cerebral symptoms
- Visual disturbances

Severe Preeclampsia

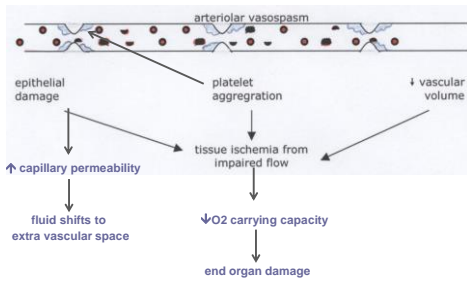
- Systolic BP ≥ 160 , or diastolic BP ≥ 110
- Oliguria $< 500\text{ ml.}$ over 24 hours
- Cerebral symptoms/visual disturbances
- Pulmonary edema
- Epigastric or right upper quadrant pain
- Elevated liver enzymes (twice normal)
- Thrombocytopenia (platelet $< 100,000$)
- Development of Eclampsia
- Development of HELLP syndrome

Pathophysiology

Failure of normal physiologic adaptations to pregnancy

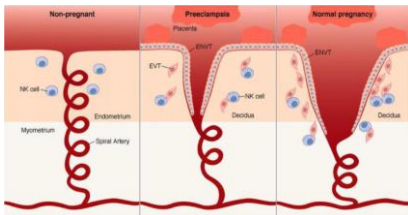
- Normal Pregnancy
 - ↑ plasma volume
 - ↓ vascular resistance
 - ↑ renal blood flow
- Preeclampsia
 - ↓ plasma volume
 - ↑ vascular resistance
 - ↓ renal blood flow

Vasospasm and endothelial damage are key



Pathophysiology

- Placenta is primary origin of pathology
 - Abnormal placentation
 - Spiral arteries retain non-pregnant state



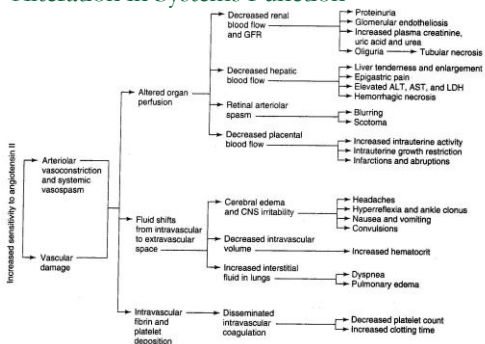
Risk Factors

- Personal history: hypertension, preeclampsia, renal disease, diabetes, thrombophilia, SLE
- Maternal age > 40 years
- Nulliparous – first pregnancy
- Multifetal pregnancy
- Obesity
- Mother or sister with preeclampsia

Symptoms

- **Kidney**
 - Proteinuria
 - ↑ plasma creatinine
 - oliguria
- **Cerebrum**
 - Hyperreflexia & clonus
 - Visual abnormalities
 - Nausea & vomiting
 - Headache
 - Altered consciousness
- **Uteroplacental unit**
 - IUGR
 - Non-reassuring FHR
- **Liver**
 - Epigastric pain
 - ↑ LFT

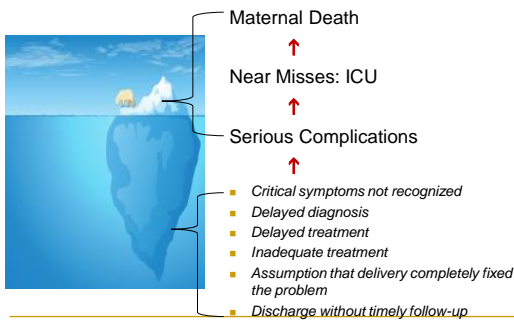
Alteration in Systems Function



5 Management Objectives

- Recognize symptoms
- Control BP
- Prevent seizure
- Delivery
 - 37 weeks
 - 34 weeks
 - <34 weeks
- Postpartum surveillance

Poor Management Outcomes



Management Objectives

- **↓ arterial spasm to prevent vascular injury to heart, brain and kidneys**
 - Antihypertensive agents
- **Prevent or control seizure activity**
 - Magnesium Sulfate infusion
- **Prompt delivery of fetus to begin resolution of disease**
 - Vaginal delivery vs. Cesarean section

Severe Hypertension Objectives

- Prevent cerebral hemorrhage or stroke (BP \geq 160/110)
 - Maintain cerebral autoregulation system
 - Decrease arterial vasospasm – organ damage
 - Prevent vascular injury – leaky vessels
 - Decrease BP – diastolic not below 90
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Medications for Severe Hypertension

- First line therapy: treatment of critically elevated BP with either IV labetalol or IV hydralazine.
 - Patients without IV access: oral nifedipine may be used (10 mg)
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Medications for Severe Hypertension

- **Labetalol IV**
 - 20mg IV
 - Onset 2-5 min.
 - Peak 5 min
 - May repeat 10 min. later with 40mg, then repeat 10 min. later with 80mg. Not to exceed 300mg.
 - Contraindicated in asthma, cardiac failure or heart block, prolonged hypotension
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Medications for Severe Hypertension

- **Hydralazine IV**
 - 5-10mg IV
 - Onset 5-20 min
 - Peak 15-30 min

 - May repeat every 20 min. Not to exceed 20-30mg total

 - Main side effects are tachycardia, hypotension, flushing, headache
-

Medications for Severe Hypertension

- **Nifedipine PO**
 - 10 mg po
 - Onset 5-20 min
 - Peak 30-60 min

 - Repeat in 30 min if needed
-

Management

- Magnesium Sulfate is drug of choice
 - Acts at neuromuscular junction to produce muscular relaxation
 - Small vessel vasodilation
 - Is NOT an antihypertensive medication

 - Loading dose of 4-6g over 15-30 min

 - Followed by maintenance dose of 2 -3g per hr
 - Dependent on renal function
-

Magnesium Toxicity

- | | |
|---|-------------|
| ■ Therapeutic | 4-8mg/dl |
| ■ Loss of DTR's | 9-12mg/dl |
| ■ Respiratory arrest/
muscle paralysis | >15mg/dl |
| ■ Cardiac arrest | >25-30mg/dl |

Magnesium Toxicity

Avoid

Treat

- | | |
|---|--|
| ■ Extreme caution in administering drug | ■ Calcium Gluconate
□ 1g IV over 3 min. |
| ■ Monitor output | □ Airway & ventilatory support as needed |
| ■ Monitor respirations | |

Magnesium Sulfate Therapy

- Renal excretion
- Increases Ca⁺ excretion
- Cerebral artery vasodilation
- ↓plasma endothelin

- Crosses placenta – be prepared for lethargic infant
- Possibility of PP hemorrhage

- NO Methergine, Cytotec preferable

Magnesium Sulfate Therapy

- Potentiates β -blockers
 - \uparrow potency and duration of nondepolarizing muscle relaxants

 - \downarrow platelet activity
 - \uparrow bleeding times

 - \downarrow Colloid Osmotic Pressure
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Nursing Management of Preeclampsia

- Know your institutions policy

 - Nurse/patient ratio 1:1 – intensive monitoring of critically ill patient

 - \downarrow stimulation from light and noise – limit visitors

 - Seizure precautions – ready O₂ and suction equipment

 - Strict bed rest in lateral position, bedrails up
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Nursing Management of Preeclampsia

- VS every 30min. to 1hr. – more often if indicated
 - Consistent BP method and position to track trends
 - Correct size cuff
 - Sitting or semi-reclining - do NOT reposition to either side to obtain lower BP (false reading)
 - Pulse oximetry
 - Respiratory rate is critical indicator



Nursing Management of Preeclampsia

- Magnesium Sulfate, Antihypertensives and IVF per physician orders
 - Strict I & O
 - Calcium gluconate in room

 - I&O every hour – foley with urometer
 - Oliguria: $\leq 30\text{ml./hr. over 2-3 hrs.}$
 - $\leq 100\text{ml./hr. in 4 hrs.}$
 - $\leq 500\text{ml. in 24 hrs.}$
-

Nursing Management of Preeclampsia

- DTR's, clonus and LOC- to assess for Magnesium toxicity

 - Assess breath sounds for signs of pulmonary edema

 - Assess headache, visual disturbances & epigastric pain

 - Continuous fetal monitoring
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HELLP Syndrome

- **H**emolysis
 - Abnormal peripheral blood smear- schistocytes & burr cells
 - \uparrow bilirubin

 - **E**levated **L**iver enzymes
 - LDH > 600 IU/L
 - ALT > 70 IU/L

 - **L**ow **P**latelets
 - Thrombocytopenia $< 100,000\text{mm}^3$
 - Severe $< 50,000\text{mm}^3$
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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
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HELLP Syndrome

- May be misdiagnosed as:
 - Gall bladder disease
 - Appendicitis
 - Pyelonephritis
 - Any pregnant women presenting with these symptoms should have:
 - CBC with peripheral smear
 - LFT
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Eclampsia

- Convulsions and/or coma in a woman with signs of preeclampsia
 - 50% occur antepartum
25% intrapartum
25% postpartum
 - Mechanism: cerebral edema, ischemia, hemorrhage or vasospasm
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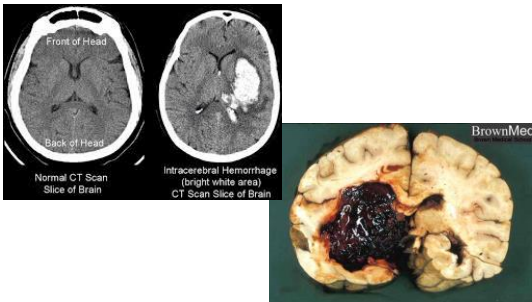
Complications of Eclampsia

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

Eclampsia Indicators of Seizure

- Headache
- Visual disturbances
- Epigastric Pain – RUQ pain
- No indicators

Cerebral Hemorrhage



Cerebral Pathology of Eclampsia

- Autoregulation – maintains constant cerebral blood flow during BP changes
 - Blood pressure does not correlate with autoregulation functionality
 - Cerebral hemorrhage is common autopsy finding
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Management of Eclamptic Convulsion

- Life-threatening emergency requiring immediate care
 - Prevent injury to woman
 - Maintain airway
 - Magnesium Sulfate to control convulsion
 - Avoid polytherapy if possible
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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, 2g over 5 min
 - If seizure continues or reoccurs may sedate, intubate and ventilate
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Hematoma following seizure



Post Seizure Care

- Do not leave patient alone
- Maintain quiet environment
- O₂ at 8-10L/min. per mask
- BP,P,R every 5 min. until stable
every 15 min. first hour
- Monitor SaO₂ : ≥95%

Post Seizure Care

- Maintain magnesium infusion as ordered
- Labs and chest x-ray
- If undelivered:
 - Monitor FHR and uterine activity
 - Consider route of delivery
- Designate someone to keep family informed

Post Seizure Care

- Observe for:
 - Abrupton
 - Pulmonary edema
 - Neurologic deterioration
 - Oliguria - output < 30cc/hr
 - Signs of magnesium toxicity:
 - ↓ DTR's, respirations < 12/min.

Eclampsia – Documentation of Occurrence

- Time seizure began
- Duration of seizure
- Care provided
- Maternal and fetal responses
- Duration of postictal phase
- Duration of unconsciousness (if uncons.)

Discharge Planning/Teaching

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



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
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TJC Sentinel Event Alert 44: Preventing Maternal Death

- According to TJC all institutions caring for pregnant women should:
 - Have process for recognizing worsening patient condition
 - Develop protocols for various emergencies
 - Provide joint training for physicians and nursing staff
 - Implement practice drills for emergency scenarios

 - Outcome depends on an organized plan of care implemented by an experienced obstetrical team
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TJC Sentinel Event Alert 44: Preventing Maternal Death

- Most common preventable errors
 - Failure to adequately control blood pressure in hypertensive women
 - Failure to adequately diagnose and treat pulmonary edema in women with preeclampsia
 - Failure to pay attention to vital signs following birth
 - Hemorrhage following cesarean birth
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24 yo G1P0 at 34 weeks

- Presented to hospital at 11pm
 - Reports decreased fetal movement and headache
 - BP 165/105
 - No proteinuria → No preeclampsia
 - Patient to left side → Inappropriate BP assessment
 - Reactive NST
 - BP now 155/100
 - Given vicodin for HA → better → Ignored symptoms
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- DC home

24 yo G1P0 at 34 weeks

- Presented to hospital with HA
- BP 175/105, 2+ protein → Has preeclampsia
- NST NR
- Labs sent: p/pts=55K, Cr=1.6, AST/ALT=320/150, Fibrinogen=175, INR=1.4
- No BP meds → Diastolic BP < 110 but Systolic BP 175
- Mag started, had seizure mid-dose → Too late
- C/S for fetal decels
- PP hemorrhage with DIC → Preventable



- Lost first pregnancy to severe preeclampsia & HELLP syndrome
- Again preeclampsia & HELLP with 2nd pregnancy (→)
- Delivered at 32 wks.
- Close observation & aggressive early management
- Good outcome
- Post script: 3rd pregnancy 35 week good outcome.