Preeclampsia & Eclampsia

Hypertensive Disorders of Pregnancy

Barbara Koop MSN, RNC-OB

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

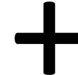
Preeclampsia

Syndrome defined by hypertension & proteinuria

(proteinuria is not a requirement for diagnosis)

Gestational Hypertension

(140/90)



Any of these symptoms

- Proteinuria
  - $\geq$ 300mg/24 hr. or
  - Protein/Creatinine ratio $\geq$ 0.3
  - Dipstick $\geq$ +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 > 160mm Hg → stroke
  - (12.5%) women with diastolic BP > 110mm Hg → stroke

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

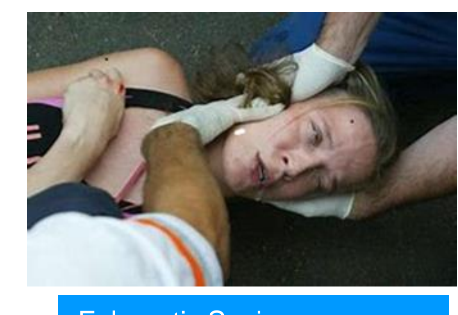
* Martin JN et al. Stroke and Severe Preeclampsia and Eclampsia: A Paradigm Shift Focusing on Systolic Blood Pressure, Obstet Gynecol 2005

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

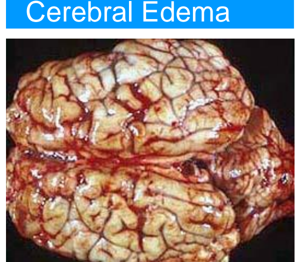
Maternal Complications

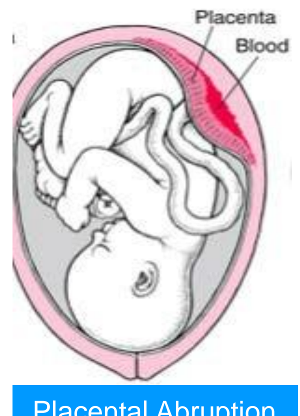
- Stroke from cerebral hemorrhage
- Placental abruption
- Eclamptic seizures
- Cerebral Edema
- Liver hematoma/rupture
- Pulmonary edema
- Acute renal failure
- Hemorrhage/DIC
- Cardiomyopathy



Eclamptic Seziure

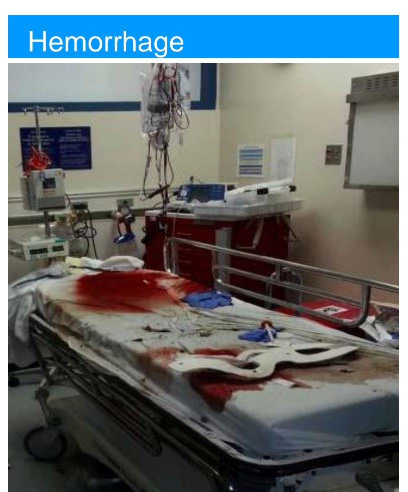
Cerebral Edema



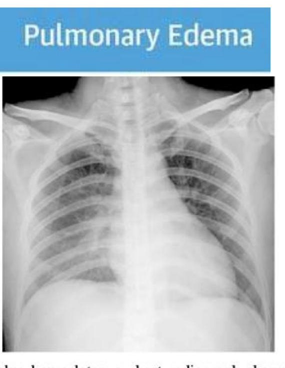


Placental Abruption

Hemorrhage

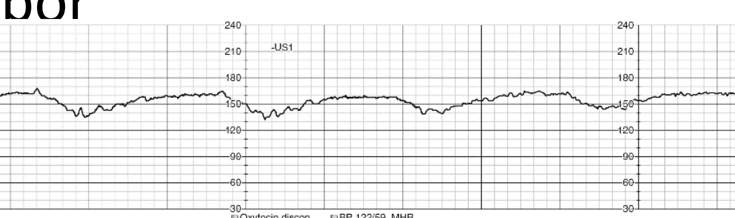


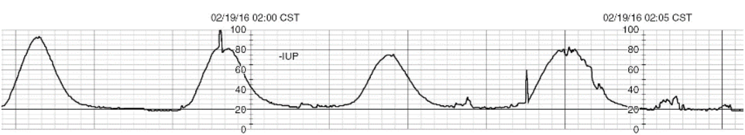
Pulmonary Edema



Fetal Complications

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





Pathophysiology

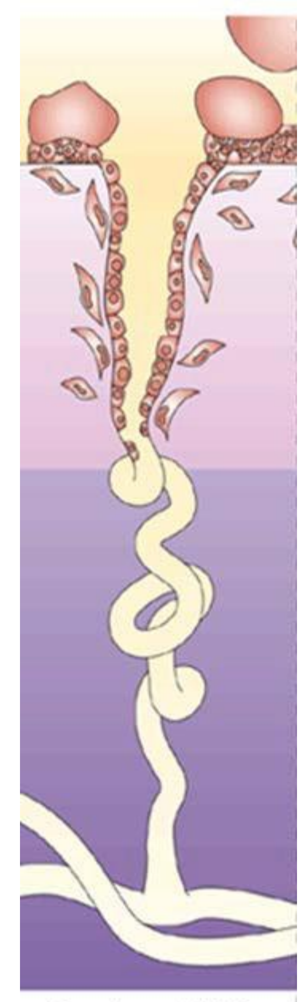
Failure of normal physiologic adaptations to pregnancy

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

Probably multiple etiologies cause the syndrome

Pathophysiology

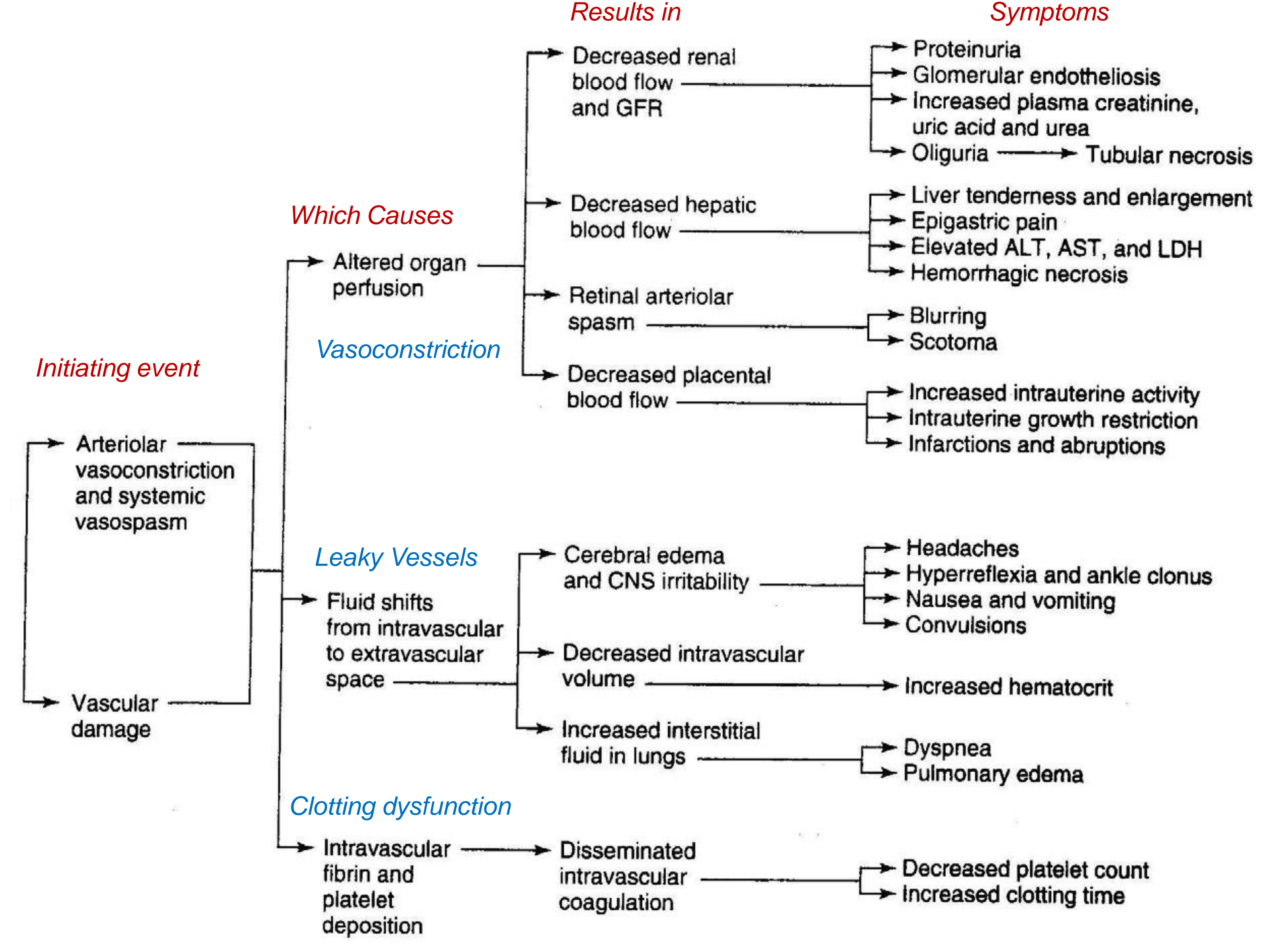
- Stage 1: Poor placentation
  - Incomplete invasion of spiral arterioles results in ↓uteroplacental blood flow
- Stage 2: Inflammation
  - The ischemic placenta induces widespread endothelial cell damage and maternal systemic inflammatory response



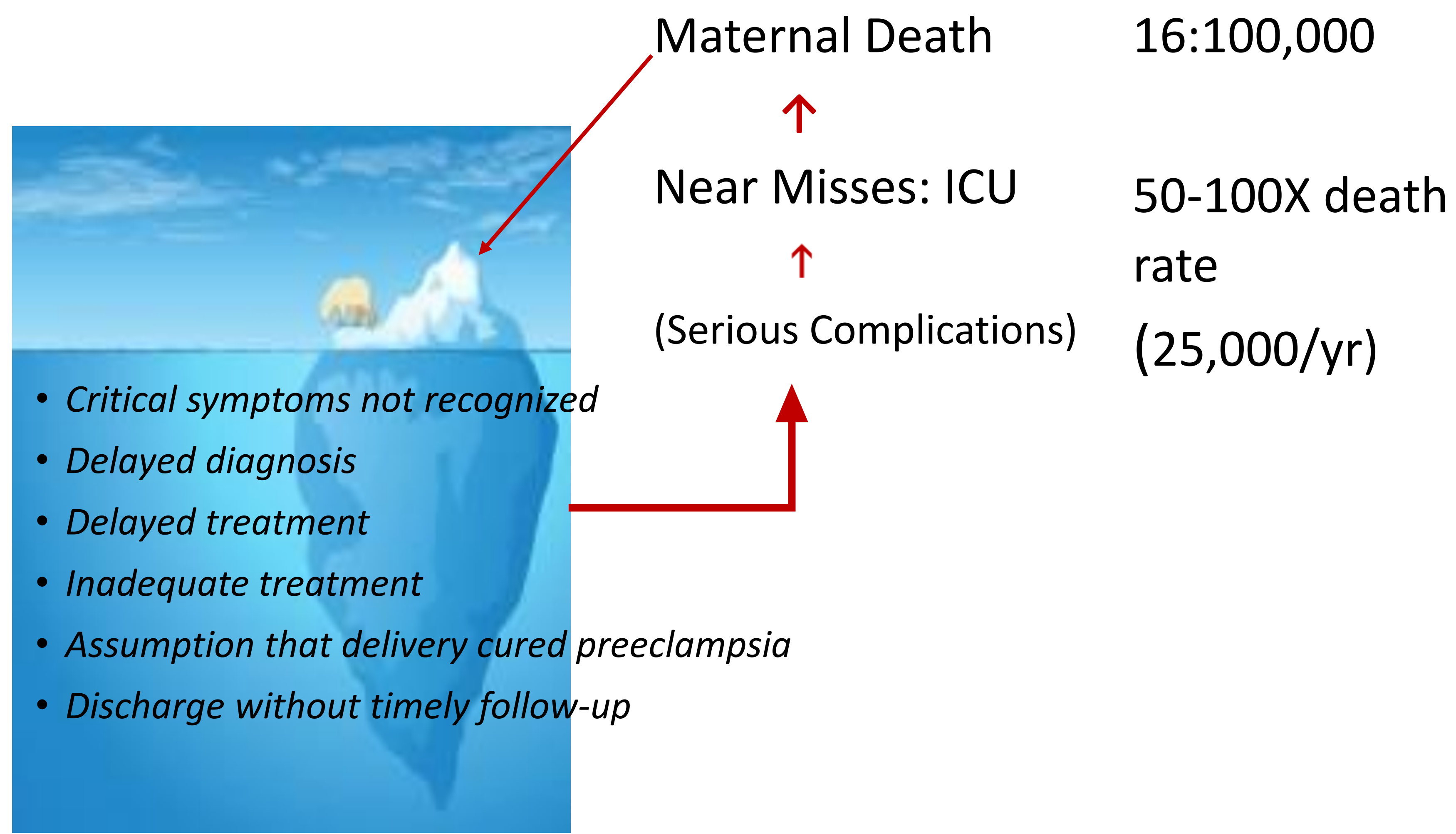
Spiral arteries
Normal pregnancy
Dilates →
increased bloodflow

Spiral arteries
Preeclampsia:
Fibrous→narrow
Less bloodflow

Alteration in Systems



Poor Management Outcomes



Most Common Preventable Errors

See It!

Preeclampsia related

- 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)**

   ❶ 2 elevated BP within 15 min. → notify physician

   ❷ Initiate anti-hypertensive treatment ASAP

2. **Control BP with antihypertensive agents**

   ↓ Arterial spasm to prevent vascular injury to brain, kidneys, and heart

   <u>Diastolic not below 90</u>: 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

Initial Management Begins With	Initial Dose	Next Dose[a]	Next Dose[a]
IV Labetalol	• Labetalol 20 mg IV for more than 2 min • Check BP in 10 min	• Labetalol 40 mg IV for more than 2 min • Check BP in 10 min	• Labetalol 80 mg IV for more than 2 min • Check BP in 10 min
IV Hydralazine	• Hydralazine 5 mg or 10 mg IV for more than 2 min • Check BP in 20 min	• Hydralazine 10 mg IV for more than 2 min • Check BP in 20 min	• Labetalol 20 mg IV for more than 2 min • Check BP in 10 min
Oral nifedipine	• Immediate release Nifedipine capsules (10 mg orally) • Check BP in 20 min	• Immediate relase Nifedipine capusles (20 mg orally) • Check BP in 20 min	• Immediate release Nifedipine capsules (20 mg orally) • Check BP in 20 min

(Beta blocker)

Side effects:
low heart rate
bronchoconstriction

Contraindicated In asthma

(Arteriolar

Side effects:
tachycardia,
hypotension,
flushing,
headache

(Ca Chanel blocker)

Side effects:
low BP
low HR+
dizziness

If poor results after 3 doses move on to another antihypertensive

Doctor should obtain consult

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 <u>NOT</u> 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

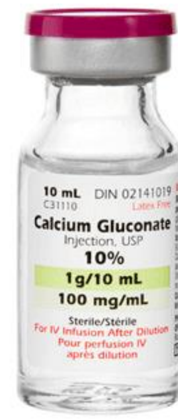
• Therapeutic	4-8mg/dl
• Loss of DTR’s	9-12mg/dl
• Respiratory arrest/ muscle paralysis	12-18mg/dl
• Cardiac arrest	25-30mg/dl

Renal excretion – *beware of DM and other ↓renal function*

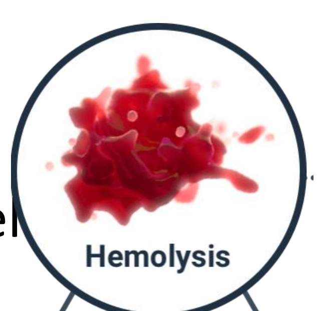
Magnesium Toxicity

<u>Antidote</u>

- 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 cel
  - ? bilirubin
- **E**levated **L**iver enzymes -2X upper limits of normal
  - LDH > 600 IU/L
  - ALT>70 IU/L
- **L**ow **P**latelets
  - Thrombocytopenia < 100,000mm^3
  - Severe <50,000mm^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**

Preeclampsia Foundation

AWHONN Post Birth Warning Signs Handouts

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.

POST-BIRTH WARNING SIGNS

Call 911 if you have:	❑ **P**ain in chest ❑ **O**bstructed breathing or shortness of breath ❑ **S**eizures ❑ **T**houghts of hurting yourself or your baby
Call your healthcare provider if you have: (If you can't reach your healthcare provider, call 911 or go to an emergency room)	❑ **B**leeding, soaking through one pad/hour, or blood clots, the size of an egg or bigger ❑ **I**ncision that is not healing ❑ **R**ed or swollen leg, that is painful or warm to touch ❑ **T**emperature of 100.4°F or higher ❑ **H**eadache that does not get better, even after taking medicine, or bad headache with vision changes

Trust your instincts. ALWAYS get medical care if you are not feeling well or have questions or concerns.

Tell 911 or your healthcare provider:

"I had a baby on ______________ (Date) and I am having ______________ (Specific warning signs)"

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** (trouble catching your breath) may mean you have a blood clot in your lung 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 (heavy)**, soaking 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, increased redness or any pus** from episiotomy or C-section site may mean you have an infection
- **Redness, swelling, warmth, or pain** in the calf area of your leg may mean you have a blood clot
- **Temperature of 100.4°F or higher, bad smelling vaginal blood or discharge** may mean you have an infection
- **Headache (very painful), vision changes, or pain in the upper right area of your belly** may mean you have high blood pressure or post birth preeclampsia

GET HELP

My Healthcare Provider/Clinic: ______________ Phone Number: ______________

Hospital Closest To Me: ______________

This program is supported by funding from Merck, through Merck for Mothers, the company's 10-year, $500 million initiative to help create a world where no woman dies giving life. Merck for Mothers is known as MSD for Mothers outside the United States and Canada.

16004
©2016 Association of Women's Health, Obstetric, and Neonatal Nurses. All rights reserved. Unlimited print copies permitted for patient education only. For all other requests to reproduce, please contact permissions@awhonn.org.

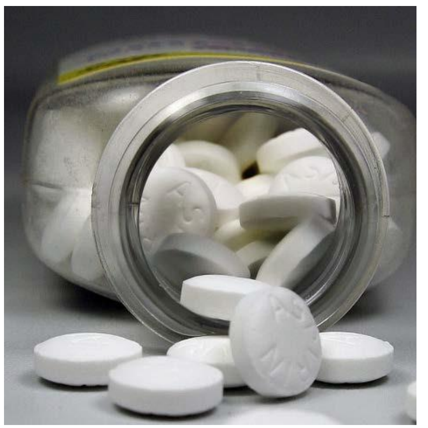
Prognosis and Long Term Effects of Eclampsia

- 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