

Diagnosis and Management of Pre-eclampsia

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I. History

- A. Hippocrates noted "In pregnancy, the onset of drowsy headaches with heaviness is bad; such cases are liable to some sort of fits at the same time."
- B. 17th century - eclampsia differentiated from epilepsy
- C. Proteinuria - 1840's
- D. Hypertension - 1896
- E. Pre-eclampsia

II. Definitions

- A. 1912 - one of the toxemias of pregnancy
- B. 1955 - proteinuric vs. non-proteinuric pre-eclampsia
- C. 1986 - pregnancy-induced hypertension, PIH
- D. 2000 - National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy¹
 1. Chronic hypertension
Hypertension* before pregnancy; hypertension before the 20th week of gestation or occurring for the first time during pregnancy and persisting > 12 weeks postpartum.
 2. Pre-eclampsia
Hypertension* plus proteinuria**
 3. Pre-eclampsia superimposed on chronic hypertension highly suspect in women with:
 - a.. Women with hypertension and no proteinuria early in pregnancy (<20 weeks), new-onset proteinuria**
 - b. Women with hypertension and proteinuria before 20 weeks' gestation
 - c. Sudden increase in proteinuria
 - d. Sudden increase in blood pressure in a woman whose hypertension has previously been well-controlled
 - e. Platelets < 100,000
 - f. Increase in AST or ALT
 4. Gestational hypertension
Hypertension during pregnancy or first 24 hours postpartum without other signs of pre-eclampsia or pre-existing hypertension.
Transient: blood pressure returns to normal by 12 weeks postpartum
Chronic: blood pressure still elevation at 12 weeks postpartum.

* Definition of hypertension: $\geq 140/90$

** Definition of proteinuria: ≥ 300 mg/24 hours

E. Severe pre-eclampsia

1. BP ≥ 160 mm Hg systolic or ≥ 110 mm Hg diastolic.
2. Proteinuria of ≥ 2 gm in 24 hours which occurs for the first time in pregnancy and regresses after delivery

3. Creatinine > 1.2 (unless known to be elevated previously)
4. Platelets < 100,000 and/or evidence of microangiopathic hemolytic anemia (elevated LDH)
5. Elevated hepatic enzymes ALT or AST
6. Persistent headache or other cerebral or visual disturbances
7. Persistent epigastric pain

F. Eclampsia: occurrence of a grand mal seizure in the setting of pre-eclampsia

G. HELLP - hemolysis, elevated liver enzymes and low platelets - a form of severe pre-eclampsia

III. Factors involved in the pathophysiology of pre-eclampsia

A. Genetic component

B. Immune system

C. Decreased utero-placental blood flow

1. Increased risk with pre-existing vascular disease
 - a. Chronic hypertension
 - b. Diabetes
 - c. Collagen vascular disease
 - d. Renal disease

D. Endothelial cell damage

1. evidence for in pre-eclampsia

- a. Glomeruloendotheliosis
- b. Edema
- c. Biochemical - increased fibronectin, endothelin, factor VIIIIR:ag/FVIII:C
platelet activation and thrombocytopenia

2. cause of endothelial cell damage - unknown

E. Vasospasm results in organ ischemia which leads to the clinical features of pre-eclampsia

1. Hypertension - not the cause of the other findings in pre-eclampsia. Many signs and symptoms precede the onset of hypertension
2. Kidneys - dysfunction of proximal renal tubules results in increase in uric acid
- proteinuria secondary to glomerular damage and leaking of protein
3. Liver - elevated liver enzymes
- right upper quadrant pain, nausea and vomiting
4. CNS - seizures
- cortical blindness

IV. Diagnosis

A. Evaluate mother

1. BP taken with appropriate size cuff at level of heart *NOT* with mother on left side and BP taken in right arm
2. Proteinuria - 24 hour protein > 300 mg or persistent 1+ or greater on dip

3. Platelet count, BUN, creatinine, uric acid and AST
- B. Fetal evaluation
1. NST
 2. Ultrasound for growth, fluid volume

V. Treatment

The only treatment is delivery. All other therapies are palliative to protect mother and fetus until delivery can be accomplished. Pre-eclampsia at term is an indication for delivery.

VI. Management

A. If no proteinuria, rest at home; frequent BP and urine checks

B. If proteinuria present, hospitalize

1. 24 hour urine
2. BP every 4 hours
3. If diagnosis confirmed and >36 weeks, consider delivery
4. If pre-term, can follow closely in hospital with
 - BP q 4 hours
 - daily NST
 - labs once or twice a week or when some sign or symptom changes
 - serial ultrasound for growth
 - deliver for (threshold for delivery somewhat gestational age dependent)
 - a. maternal indications
 - I. BP > 170/110 not easily controlled with one or two drugs
 - ii. platelets < 100,000
 - iii. elevated liver enzymes
 - iv. symptoms - seizures, severe headache
 - b. fetal indications
 - I. documented IUGR
 - ii. abnormal antepartum testing

VII. Treatment of hypertension in pregnancy (chronic or pre-eclamptic)

A. Acute

1. Nifedipine 10 mg; po retake BP 30 minutes, if BP still >170 // 110, may repeat
2. Labetolol 20-40 mg IV
3. Hydralazine 5 mg IV

B. Chronic

1. Labetolol 200-400 mg po bid
2. Nifedipine 10 mg po q 6 hrs; long acting 30-60 mg /day
3. Other calcium channel blockers (amlodipine)
4. Methyl dopa 500-2000mg qid
5. *Angiotensin converting enzyme inhibitors are contraindicated in pregnancy; OK postpartum even in breast-feeding Moms*
6. Clonidine

VIII. Seizure prophylaxis

- A. Magnesium sulphate is the drug of choice to *treat* eclamptic seizures
- B. Magnesium sulphate is the drug of choice to *prevent* eclamptic seizures
- C. Unanswered question: which women require seizure prophylaxis? Only 4% of women with severe pre-eclampsia will seize
- D. Recommend that all women with a diagnosis of pre-eclampsia be given magnesium sulphate prophylaxis during labor and the first 24 hours postpartum, 4 gm loading dose over 20-30 minutes then 2 gm per hour unless renal function impaired.

References:

1. National High Blood Pressure Education Program Working Group Report on High Blood Pressure in Pregnancy, Consensus Report. Am J Obstet Gynecol July 2000.
2. ACOG Technical Bulletin, Number 219, January 1996, Hypertension in Pregnancy.
3. Roberts JM. "Pregnancy-related hypertension" in, eds, Creasy RK and Resnik R. Maternal-Fetal Medicine Principles and Practice, 3rd ed, WB Saunders Company, Philadelphia, 1994.
4. Lucas MJ, Leveno KJ, Cunningham FG. A comparison of magnesium sulphate with phenytoin for the prevention of eclampsia. NEJM 1995;333:201-5.
5. The Eclampsia Trial Collaborative Group. Which anticonvulsant for women with eclampsia? Evidence from the Collaborative Eclampsia Trial. Lancet 1995;345:1455-63.

Correlation of Urine Dipstick With 24 Hour Urine Protein

Dipstick Values	Neg	Tr	1+	2+	3+	4+
24 hr urine protein (mg)						
300	21	21	9	3	3	0
300-4999	37	44	42	38	22	24
<u>></u>5000	0	0	2	7	10	17

