Hypertensive disorders of pregnancy

INTRODUCTION

-The most common medical disorder complicating pregnancy.

Includes wide spectrum of patients from mild elevation of BP or severe hypertension or various organ dysfunction.

-Incidence is 5 -10 percent.

CLINICAL FINDINGS	CHRONIC HYPERTENSION	GESTATIONAL HYPERTENSION	PREECLAMPSIA
TIME OF ONSET	< 20 weeks	usually in third trimester	>/= 20 weeks
DEGREE OF HYPERTENSION	mild or severe	mild	mild or severe
PROTEINURIA	absent	absent	usually present
SR. URATE LEVELS >5. 5 mg/dL.	rare	absent	present in almost all cases
HAEMOCONCENTRATION	absent	absent	severe disease
THROMBOCYTOPENIA	absent	absent	severe disease
HEPATIC DYSFUNCTION	absent	absent	severe disease

Recommendations for BP measurements

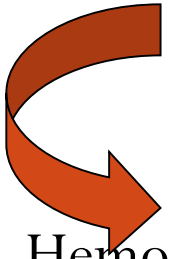
- BP should be measured with women in sitting position with arm at the level of heart.
- An appropriate size cuff i.e 1.5 times the circumference of arm should be used.
- Korotkoff phase V should be used to designate diastolic BP.
- If BP is higher in one arm, arm with higher BP should be used for all measurements.
- BP can be measured using a mercury sphygmomanometer or a automated calibrated device.
- However, automated device can underestimate BP.

Theories associated with the etiology of preeclampsia:

-Abnormal trophoblast invasion
- Coagulation abnormalities
- Vascular endothelial damage
- Cardiovascular maladaptation
- Immunologic phenomenon
- Genetic predisposition
-Dietary deficiencies or excesses

Pathophysiology- clinical implications

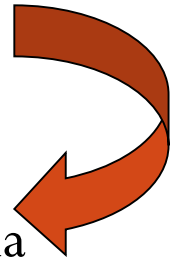
Vasospasm



Hemoconcentration

Hypertension

endothelial dysfunction



edema

thrombocytopenia

HELLP

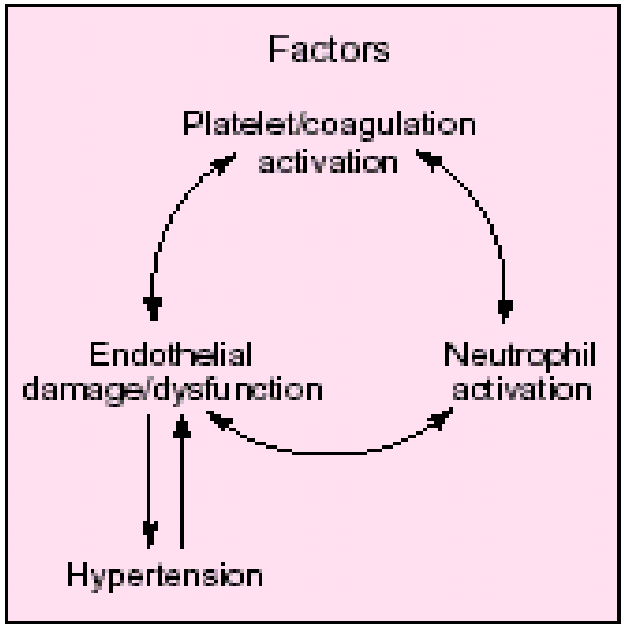
fragmentation hemolysis

- Unduly sensitive to vigorous fluid therapy
- They are quite sensitive to even normal blood loss at delivery

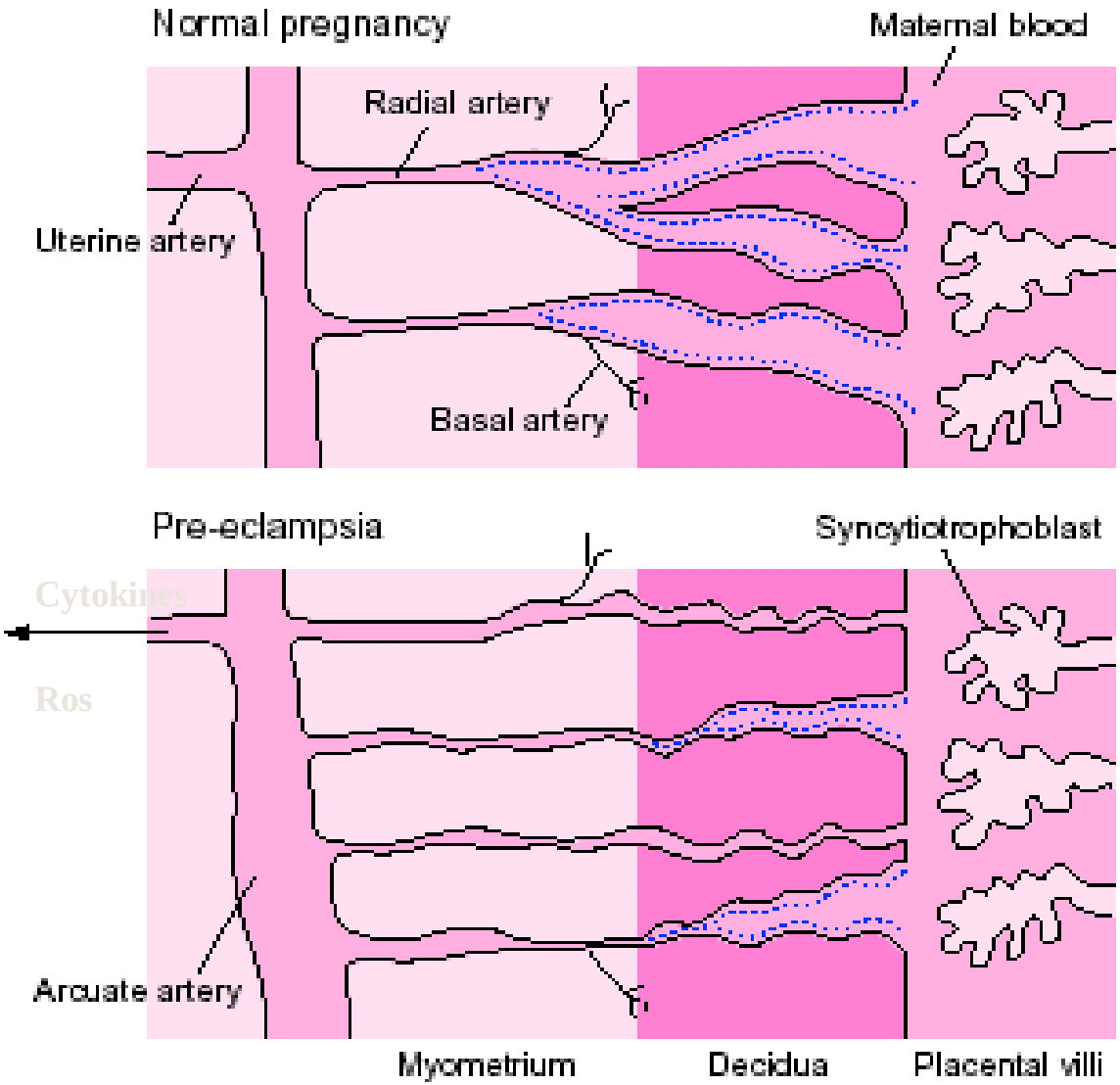
Triggers for PET

Genetic Modulators

Pre-existing Vascular Pathology



Central players



Gestational hypertension:

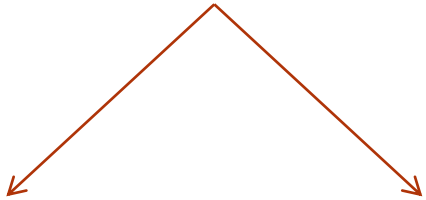
- Systolic >/= 140 or diastolic >/= 90 mm.of Hg.

- Diagnosed for first time during pregnancy or within 24 hrs. PP and returns to normal <12 weeks PP.

- No proteinuria.

- On at least 2 occasions 4 hours apart but within a maximum of a 1 week period.

Gestational hypertension



Mild gestational hypertension

Severe gestational hypertension

Likelihood of progresion to preeclampsia depends on gestational age. Higher rates with onset before 35 weeks.

Criteria for mild gestational hypertension:

- Systolic < 160 and diastolic < 110 mm. of Hg.

- Proteinuria < 300 mg/24 hour collection.

- Platelet > 1 lac/ mm3.

- Normal liver enzymes.

- Absent maternal symptoms.

Course of mild GHTN:

- Majority at or beyond 37 weeks.

- Both maternal and fetal outcome similar to normotensive women.

- But higher rates of induction of labor and LSCS.

Management of mild gestational hypertension:

-Twice weekly antenatal OPD visits.
-Education regarding s/s of IE.
-Weekly lab ivestigations .
-USG biometry/BPP and NST at the time of diagnosis and no further testing required if these are normal. If abnormal then weekly testing.

- Drugs – not recommended - not shown to improve pregnancy outcome.
-Reduces rate of progression to severe disease – but numbers not statistically significant.

Indications for hospitalization and termination of pregnancy

The objective of maternal surveillance to look for progression to severe hypertension or preeclampsia.

Hence onset of maternal symptoms,
Or a sudden increase in BP records
Or development of proteinuria requires prompt hospitalization for close evaluation.

-In the absence of progression to severe hypertension or preeclampsia can continue pregnancy up to term.

Severe gestational hypertension:

- Maternal and perinatal morbidities are substantially increased

-Rates of abruption, SGA infants, preterm deliveries are similar to severe preeclampsia.

- Therefore women should be managed as if they had severe preeclampsia!!

Preeclampsia:

-Embraces a wide spectrum of S/S that can develop alone or in combination.

-Elevated BP is the traditional hallmark

- May manifest either as maternal syndrome or fetal syndrome (IUGR, decreased liquor, abnormal oxygenation)

- However recent evidence suggests that the maternal syndrome may manifest only as capillary leak or spectrum of abnormal haemostasis with multiple organ dysfunction in the absence of hypertension.

Preeclampsia

Minimum criteria-

- BP≥140/90 after 20 weeks gestation
- **Increased certainty of preeclampsia-**
- BP≥160/110 mm Hg
- Proteinuria
- S. creatinine>1.2 mg/dl unless known to be previosly elevated
- Platelets < 100,000/mm^3
- Microangiopathic hemolysis (increased LDH)
- Elevated ALT or AST
- Persistent headache or other cerebral or visual disturbances
- Persistent epigastric pain

Risk factors for preeclampsia:

-Nulliparity
- Family history of preeclampsia
- Obesity
- Multifetal gestation
- Preeclampsia in previous pregnancy
- Poor outcome in previous pregnancy – IUGR, abruption, fetal death
- Pre existing medical – genetic conditions:
  - Chronic hypertension
  - Renal disease
  - Type 1 DM
  - Thrombophilias – APLA, Protein C,S, Antithrombin deficiency, Factor V leiden

Proteinuria is but one diagnostic criterion for preeclampsia. The end organ damage can occur even in the absence of proteinuria.

20% of eclampsias have only hypertension in the week preceding the seizures

Various methods for assessing proteinuria:

-Timed collections

- urinary protein : creatinine ratio

- urinary albumin : creatinine ratio

-But poor correlation between the tests!

24 hour collection is the gold standard. But it is inconvenient, time consuming and often not complete.

The urinary protein : creatinine ratio is an acceptable alternative.
Morning but not the first voided sample is used.
Cut off – 17 to 57 mg/mmol is used. Usually 30mg/mmol.
Sensitivity : 0.85 specificity : 0.76.
Dipstick or boiling method is inexpensive, easy and widely
used.
Cannot be used to diagnose severe preeclampsia.
12% false negative rate.

Lab abnormalities in preeclampsia:

Renal function: Vasospasm and glomerular endothelosis causes

- GFR to be 25% below the normal pregnancy.
- Sr. creatinine is rarely elevated – 0.9 mg/dl
- Sr. uric acid >6.0 mg/dl – 69% sensitive and 51% specific

Not to be used as an indication for delivery in preeclampsia

Hepatic function: Hepatic involvement in 10% of severe preeclampsia

- Fibrin deposition along walls of hepatic sinusoids
- Mild elevation of transaminases is seen

Bilirubin rarely rises - if at all the indirect fraction is predominant

Hematologic changes:

-Pl. Fibrinopeptide A, D-dimer levels, circulating thrombin antithrombin complexes – ↑

- Pl. Antithrombin III activity – ↓

- Pl. Fibrinogen levels are rarely reduced in the absence of abruption

- Thrombocytopenia <1.5 lacs is the most common hematologic finding

- Admission platelet count is an excellent predictor of subsequent thrombocytopenia.

Criteria to diagnose preeclampsia in women with pre existing medical disorders.

Condition	Criteria needed
Hypertension only	Proteinuria >/= 300 mg/ 24 hours or thrombocytopenia
Proteinuria only	New onset hypertension + symptoms or thrombocytopenia or elevated LFTs
Hypertension + proteinuria (renal disease or class F diabetes)	Worsening severe hypertension + either new onset of symptoms, thrombocytopenia, or elevated LFTs.

Criteria for severe preeclampsia:

-Blood pressure >/= 160 mm of Hg sys. Or >/= 110 mm of Hg.dias recorded on at least 2 occasions 6 hours apart with pt. at bed rest.
-Oliguria </= 400 ml. in 24 hours
- Cerebral visusal disturbances
- Epigastric pain, nausea, vomitting
- Pul. Oedema
- Impaired liver function of unclear etiology
- Thrombocytopenia

Superimposed preclampsia on chronic hypertension-

- New onset proteinuria ≥300 mg/24 hours in a hypertensive woman but no proteinuria before 20 weeks
- Any of the above maternal organ dysfunction consistent with pre eclampsia

Chronic hypertension

Criteria for diagnosis

- Hypertension(140/90 mm or greater)is documented antecedent to pregnancy
- Hypertension(140/90 mm or greater)detected before 20wks unless GTD
- Hypertension persists long after delivery(>12wks)

Causes of chronic HT

- Essential (familial)
- Obesity
- Arterial abnormalities
  - Renovascular
  - Coarctation of aorta
- Endocrine
  - Diabetes mellitus
  - Cushing syndrome
  - Aldosteronism
  - Phaeochromocytoma
  - thyrotoxicosis
- Renal
  - Ac & chr glomerulonephritis
  - Chr renal insufficiency
  - Diabetic nephropathy
  - Polycystic kidney disease
  - ARF
- Connective tissue disorders
  - Lupus erythematosus
  - Systemic sclerosis
  - Periarteritis nodosa

Chronic HT

- Difficulty in diagnosis if present after mid-trimester
- Look for evidence of end-organ damage from chronic HT, e.g.,
  - LVH
- Retinal changes
- Offer contraception until patient taking teratogenic anti hypertensives:
  - ACE inh
  - ARB's
  - renal function stabilises
- Switch to safer drugs prior to conception

PRECONCEPTIONAL CARE IN HYPERTENSION

- Lifestyle modifications:

1. Weight reduction
2. Dietary reduction of salt
3. Physical activity

- "TIGHT CONTROL" of blood pressure with safe antihypertensive
- Pregnancy contraindicated if:

1. Prior CVT/MI/cardiac failure
2. Diastolic pressure above >110 persistently in spite of therapy
3. Serum creatinine levels >2mg/dl

Source – Williams obstetrics 23rd

Prediction and prevention of preeclampsia:

-More than 100 clinical, biophysical, biochemical tests have been proposed to predict or identify the patient at risk for the future development of the disease.

-None of these tests is sufficiently reliable enough for use as a screening test in clinical practice.

Methods to Prevent Preeclampsia

- **Dietary manipulation—** **L**ow-salt diet,
  Calcium supplementation,
  Fish oil supplementation

  Antioxidants— Ascorbic acid (vitamin C),
  Tocopherol (vitamin E)
- **Antithrombotic drugs—** **L**ow-dose aspirin,
  Aspirin/Dipyridamole,
  Aspirin + Heparin,
  Aspirin + ketanserin

Aspirin and prevention of preeclampsia:

-Lot of trials – NICHD, CLASP, ECPPA etc. but no answers!

- Cochrane review 2003

– 19% risk reduction of preeclampsia

- 7% reduction in delivery before 37 weeks
- 16% reduction in perinatal death
- 8% reduction in SGA babies

Antithrombotic Agents

Low-Dose Aspirin

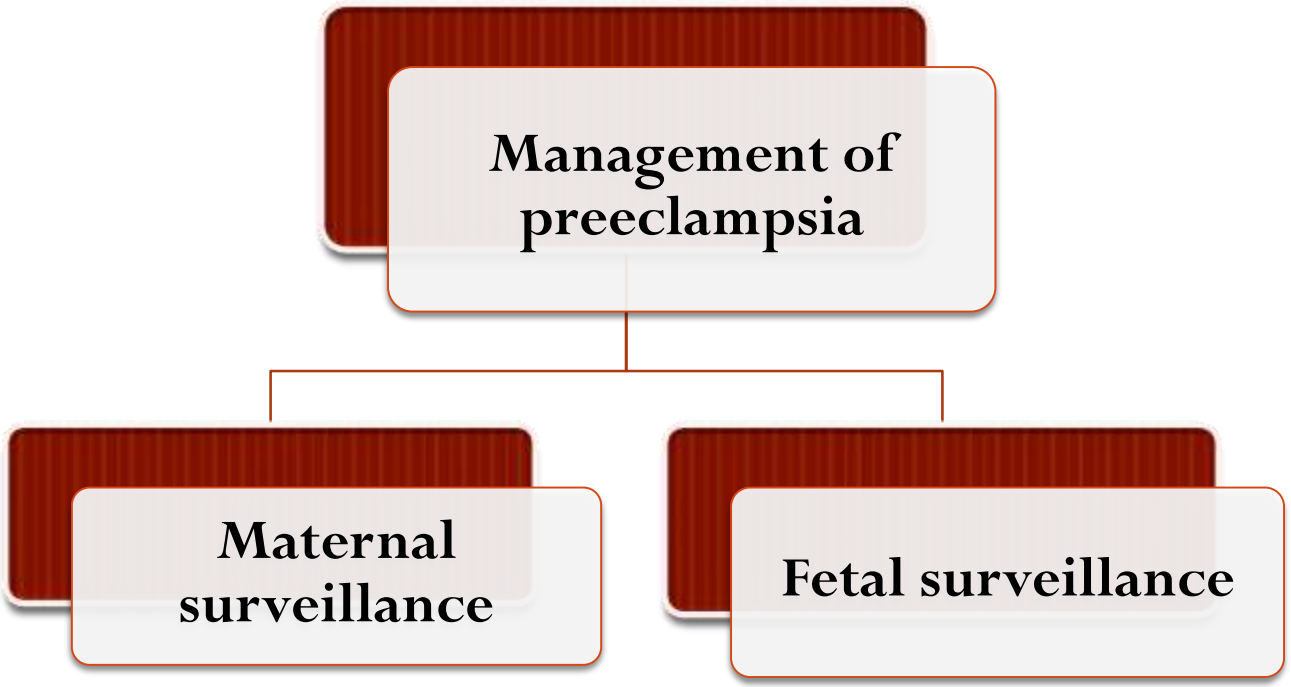
In oral doses of 50 to 150 mg daily, aspirin effectively inhibits platelet thromboxane A2 biosynthesis with minimal effects on vascular prostacyclin production

The Paris Collaborative Group performed a meta-analysis of the efficacy and safety of antiplatelet agents(predominantly aspirin)—the *relative risk of preeclampsia was decreased significantly by 10 percent for development of preeclampsia, superimposed preeclampsia, preterm delivery, or any pregnancy with an adverse outcome.*

Because of these marginal benefits, it seems reasonable to individualize use of low-dose aspirin to prevent recurrent preeclampsia (Sibai and Cunningham, 2009).

Low-Dose Aspirin Plus Heparin

- Because of the high prevalence of placental thrombotic lesions found with severe preeclampsia, there have been several observational trials to evaluate heparin treatment for affected women.
- Sergis and associates (2006) reviewed effects of prophylaxis with low-molecular-weight heparin plus low-dose aspirin on pregnancy outcomes in women with a history of severe early-onset preeclampsia and low-birthweight infants.
- They reported better pregnancy outcomes in women given low-molecular-weight heparin plus low-dose aspirin compared with those given low-dose aspirin alone.
- At this time, it is not possible to make recommendations from these observational data.


Management of preeclampsia
Maternal surveillance
Fetal surveillance

Maternal surveillance:

- Goal – mild GHTN - severe GHTN or preeclampsia
  mild preeclampsia – severe preeclampsia
  severe preeclampsia – organ dysfunction

-Monitored for S/S of IE, strict I/O charting

- lab investigations weekly or twice weekly depending on initial findings, severity of maternal condition and ensuing clinical progression.

- Coagulation studies to be monitored only if decreased platelets and elevated LFTs.

Fetal surveillance:

-Disagreement regarding which test is optimal and frequency of testing.

-DFMC , NST , BPP, biometry and doppler studies like S/D, MCA RI (particularly in the presence of IUGR).

- Frequency depends upon – severity, GA at the time of diagnosis, fetal growth findings.

-Usually – weekly in mild preeclampsia, twice weekly if suspected fetal growth delay, daily during expectant management of severe preeclampsia < 32 weeks.

THANKYOU