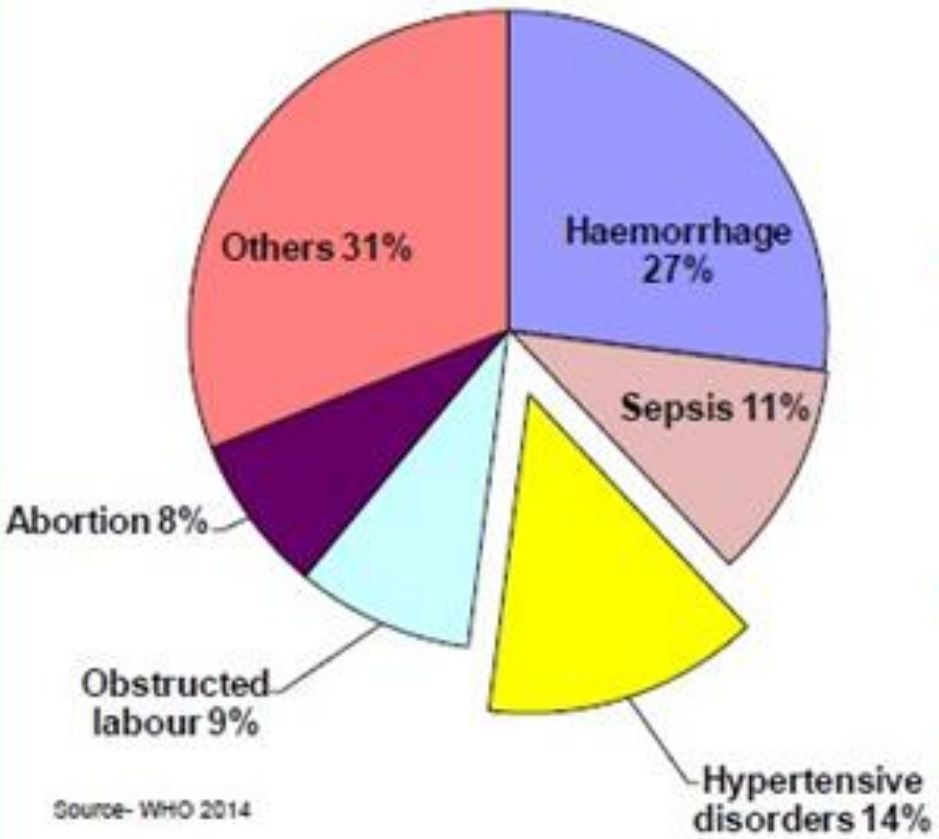
HYPERTENSIVE DISORDERS OF PREGNANCY

Pre-eclampsia/Eclampsia is the Second Leading Cause of Maternal Mortality – Globally and in India



Pre-eclampsia/Eclampsia can be prevented and managed by:

- Recording and monitoring of BP and urine protein examination of all labouring women
- Timely identification of danger signs
- Giving inj $MgSO_4$ in all mothers having Severe pre-eclampsia and Eclampsia

DEFINITION

- In pregnancy, the blood pressure is considered to be raised if:
  - The blood pressure is 140/90 mmHg or more
  - The systolic blood pressure has increased by 30mmHg
  - The diastolic blood pressure has increased by 15mmHg

MAGNITUDE AND IMPORTANCE

- Hypertension is the most common medical problem encountered during pregnancy, complicating up to 5% of pregnancies.
- Hypertensive disorders in pregnancy may cause maternal and fetal morbidity and remain an important cause of maternal deaths around the world.

CLASSIFICATION OF HYPERTENSIVE DISEASES OF THE PREGNANCY

1. Gestational hypertension (PIH)
2. Pre-eclampsia
3. Eclampsia
4. Pre-eclampsia superimposed on chronic hypertension
5. Chronic hypertension

1. GESTATIONAL HYPERTENSION (PIH)

- Diagnosis made when the blood pressure reaches 140/90mmHg or greater for the first time during pregnancy but in whom proteinuria has not developed.
- Gestational hypertension is called transient hypertension if pre-eclampsia doesn't develop and the blood pressure returns to normal by 12 weeks postpartum.
- Gestation hypertension is termed as chronic if blood pressure elevation persists beyond 12 weeks postpartum.

Diagnostic criteria for Gestational hypertension

- No protenuria
- BP returns to normal <12wks postpartum
- Final diagnosis made only postpartum

2. PRE-ECLAMPSIA

- **Hypertension** associated with **protenuria** and **oedema** occurring primarily in Nulliparous after 20th week's gestation and most frequently near term.
- It is a specific syndrome of reduced organ perfusion secondary to **vasospasm and endothelial activation**.
- **Protenuria is an important sign of pre-eclampsia** and that the diagnosis is questionable in its absence. (**significant protenuria is defined by urine protein of 0.3g/24 hrs**)

❖**Protenuria defined by excretion of 300mg protein in 24 hrs or persistence 30mg/dl (1+ dipstick in random urine sample).**

DIAGNOSTIC CRITERIA FOR PRE-ECLAMPSIA

Minimum criteria

-BP >140/90mmHg after 20wks

-Protenuria >300mg/24hrs or >1+ dipstick

CORRELATION ON BETWEEN DIP STICK AND 24HR URINE PROTEIN

•Trace	•0.1g/dl in 24 hrs
•+1	•0.3g/dl in 24 hours
•+2	•1g/dl in 24 hrs
•+3	•3g/dl
•+4	•10g/dl

Increased certainty of pre-eclampsia

-BP >160/110mmHg

-Protenuria 2.0g/24 or >2+dipstick

-Serum creatinine >1.2mg/dl

-Platelet <100,000/mm

-Increased LDH (Lactate dehydrogenase) Microangiopathic hemolysis

-Elevated SGOT AND SGPT

-Persistent headache, visual disturbance, giddiness, nausea &/ vomitting

-Persistent epigastric pain.

3. ECLAMPSIA

- Eclampsia is the occurrence of seizures that cannot be attributed to any other cause in a pre-eclampsia patient.
- The seizures are of grand-mal type and may appear during pregnancy, labor or Postpartum.

Diagnostic criteria for Eclampsia

- seizures that can not be attributed to any other cause in a pt with pre eclampsia.
- Pre-eclamptic patients may fit in the absence of protenuria because protenuria usually develops later in the course of the disease.

4. CHRONIC HYPERTENSION

- Hypertension that is present before conception, before 20wks gestation or that persists beyond 12wks postpartum.
- The diagnosis of chronic hypertension is suggested by;

1. Hypertension (140/90mmHg) antecedent to pregnancy.
2. Hypertension detected before 20wks unless there is GTD's.
3. Persistent hypertension long after delivery.

5. PRE-ECLAMPSIA SUPERIMPOSED ON CHRONIC HYPERTENSION.

- ❖Patient prognosis (both mother and the fetus) is grave than in either of the conditions.
- All chronic hypertensive disorders regardless of their cause predispose to the development of superimposed pre-eclampsia or eclampsia.

Diagnosis of superimposed eclampsia

- **Criteria for superimposed preeclampsia are:-**

➢ worsening Hypertension above average values before 20wks (30mmHg systolic, 15mmHg diastolic)

➢ Non-dependant oedema

➢ New onset protenuria of more than 300mg in 24hrs (+1 dip stick) in hypertensive women with no protenuria or a sudden increase in protenuria or BP a woman with hypertension

1. PRE-ECLAMPSIA

RISK FACTORS -

1. NULLIPARITY (PRIMI)
2. MULTIFETAL PREGNANCY
3. POLYHYDRAMNIOS
4. HISTORY OF CHRONIC HTN
5. MATERNAL AGE < 18 0R > 35 YRS
6. OBESITY
7. H/O DIABETES , PREECLAMSIA
8. FAMILY H/O PREELAMPSIA IN FIRST DEGREE RELATIVE

Pathophysiology -

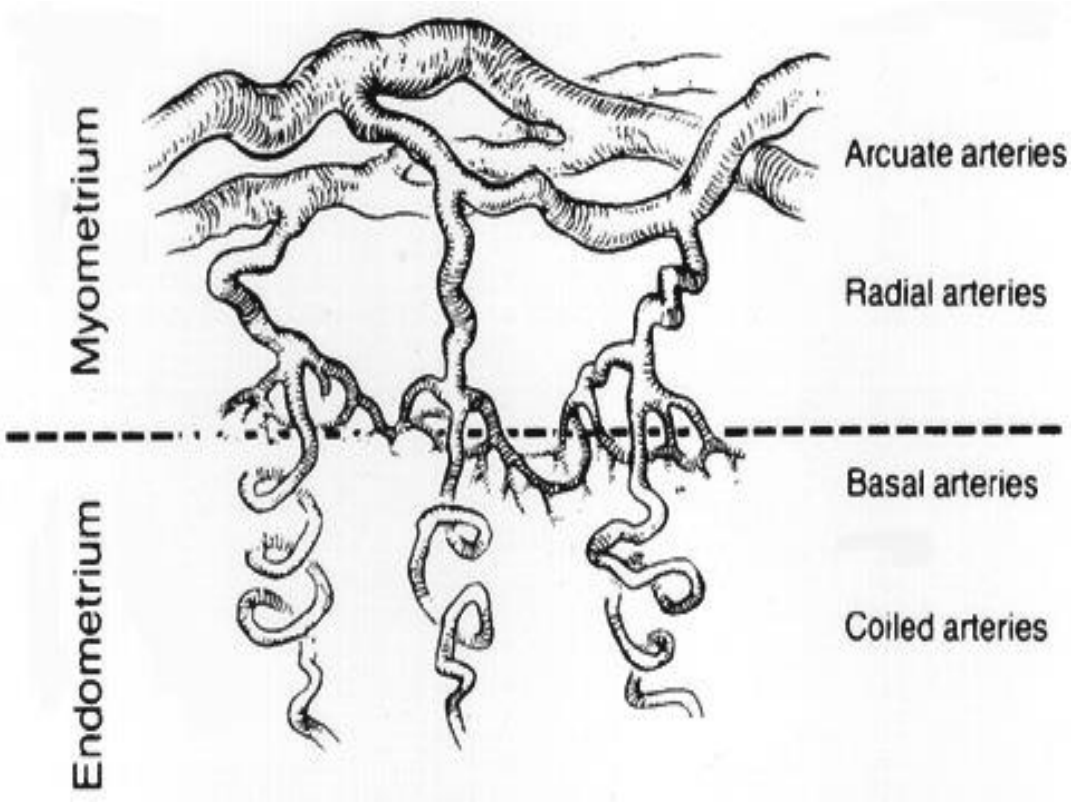
- The exact pathophysiologic mechanism is not clearly understood

➢ Disorder of **endothelial function with generalised vasospasm**.

❖ **Abnormal placental development or placental damage from diffuse microthrombosis may be central to the development of this disorder.**

TROPHOBLASTIC INVASION

Before invasion

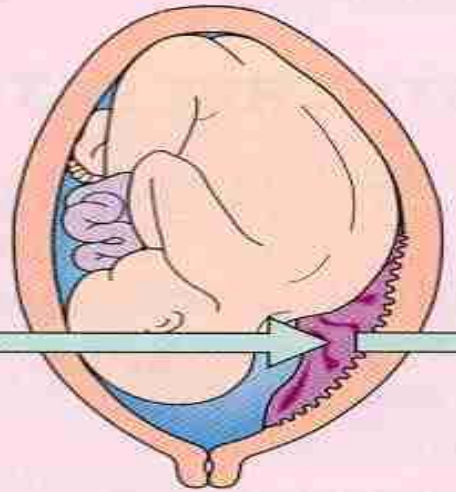


After invasion

Pathogenesis of preeclampsia

predisposition
diabetes
parity
hypertension

failure of conversion of spiral arteries to vascular sinuses



placental ischemia

placenta produces thromboplastins causing DIC, renin causing vasoconstriction

fetal growth retardation

poor renal perfusion
- hypertension
- proteinuria
- edema

preeclampsia

if untreated

- severe hypertension
- intravascular coagulation
- convulsions

eclampsia

Medical risk factors for preeclampsia

- Chronic hypertension
- Secondary causes of chronic hypertension such as hypercortisolism, hyperaldosteronism, pheochromocytoma, or renal artery stenosis
- Preexisting diabetes (type 1 or type 2), especially with microvascular disease
- Renal disease
- Systemic lupus erythematosus
- Obesity
- Thrombophilia

Placental/fetal risk factors for preeclampsia

- Multiple gestations
- Hydrops fetalis
- Gestational trophoblastic disease (GTD)
- Triploidy

CLASSIFICATION OF PE.

A.MILD PREECLAMPSIA

B.SEVERE PREECLAMPSIA

MILD PREECLAMPSIA

- BP 140/90 to <160/110mmHg.
- Protenuria <2g/24hrs
- Normal deep tendon reflex
- Pretibial edema nil/present

SEVERE PREECLAMPSIA

- systolic BP>160mmHg or diastolic 110mmHg on 2different occasions 6hrs apart
- protenuria >2g/24hrs or 2-4+dipstick.
- Serum creatinine >1.2mg/dl
- Oliguria <500ml/24hrs
- Cerebral or visual disturbance
- Epigastric pain
- Elevated liver enzymes
- Platelets <100,000/m3
- Retinal haemorrhage, exudates or pappiloedema
- Pulmonary edema.

PATHOLOGY SEEN IN PE.

PE is a multisystem disease i.e. **no system is spared in PE**

CNS

- Petechial haemorrhage or gross intercranial haemorrhage.
- Fibrinoid necrosis
- Thrombosis of arterioles
- Microinfacts
- Retinal haemorrhage and infarcts are less common
- cerebral oedema

❖The lesions are widely distributed throughout the brain where the cortex is much more affected

EYES

- Serous retinal detachments and cortical blindness

PULMONARY SYSTERM

- Pulmonary edema may be due to:
  - Protenuria or endothelial leakage
  - Fluid admin
  - Decreased plasma colloidal osmotic pressure
  - use of colloids to replace the volume
  - Aspiration

CARDIOVASCULAR

- Volume expansion doesn’t occur as in normal pregnancy
- Plasma volume is reduced etc.

LIVER

- Periportal hemorrhagic necrosis
- Hepatic rupture
- Sub capsular haematoma
- HELLP syndrome
- Hepatic infarction

KIDNEYS

- **Glomerulosclerosis** -swelling of the glomerular capillary endothelium that causes decreased glomerular perfusion and GFR
- Leakage of proteins through the glomeruli leading to proteinuria.
- Lesions are totally reversible after 6wks

BLOOD

- DIC
- Low fibrinogen
- HELLP syndrome diagnosis based on Schistocytes on peripheral blood smears, Lactic dehydrogenase >600U/l, total bilirubin of >1.2mg/dl, SGOT/ SGPT>70/ul and platelet counts of <100,000/mm.

CLINICAL FINDINGS

- HTN most important feature
- Protenuria last to develop due to glomeruloendotheliosis
- Oedema

Management of mild pre-eclampsia

MATERNAL

- Bed rest
- Antihypertensives
- Daily urine protein
- BP monitoring and antihypertensives
- Pt education on danger signs
- LFT, Uric acid, Electrolytes, serum proteins weekly
- Coagulation studies

FETAL

- Evaluated twice a wk by USS
- Biophysical profile
- FMC

SEVERE CASES

- **Prevent the occurrence of seizures by using magnesium sulphate**
- **Control BP**
- **Decision to deliver depends on GA and fetal/maternal conditions.**
- **Accelerate lung maturity by steroids**

INDICATIONS OF DELIVERY IN SEVERE CASES

- BP consistently higher than 100mmHg diastolic in 24hrs period or confirmed higher than 110mmHg
- Raising serum creatinine
- Persistent or severe headache
- Epigastric pain
- Abnormal liver function test
- Thrombocytopenia
- HELLP
- Pulmonary edema
- Eclampsia
- Abnormal fetal heart findings
- SGA or IUGR

2. ECLAMPSIA

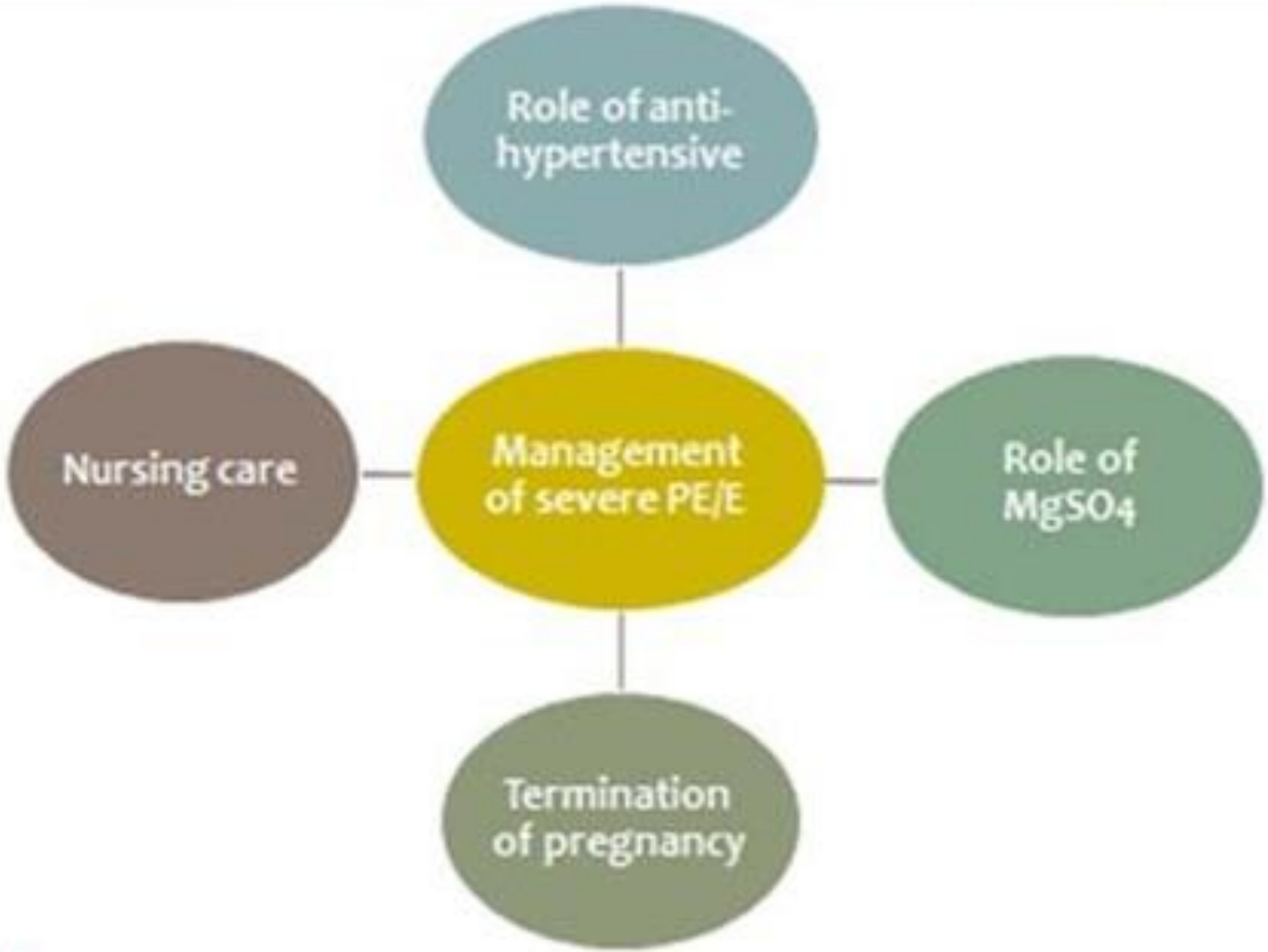
Physical signs:

- Eclamptic seizure
- The patient may have 1 or more seizures.
- Seizures generally last 60-75 seconds.
- The patient may begin foaming at the mouth.
- Respiration - BREATH HOLDING ceases for the duration of the seizure.

- **The seizure may be divided into 2 phases:**
  - **Phase 1 lasts 15-20 seconds and begins with facial twitching. The body becomes rigid, leading to generalized muscular contractions.**
  - **Phase 2 lasts approximately 60 seconds. It starts in the jaw, moves to the muscles of the face and eyelids, and then spreads throughout the body. The muscles begin alternating between contracting and relaxing in rapid sequence.**

- A coma or a period of unconsciousness follows phase 2.
  - Unconsciousness lasts for a variable period.
  - Following the coma phase, the patient may regain some consciousness.
  - The patient may become combative and very agitated.

Management of Severe PE/E



Principles of management

- Stabilise mother and then deliver foetus
- Treat and prevent fits
- Treat blood pressure
- Attention to fluid balance
- Be aware of and prevent complications

TREATMENT

- Control seizures with magnesium sulphate
- Control BP
- Delivery; The mode of delivery should be based on obstetric indications, with the understanding that vaginal delivery is preferable from a maternal standpoint

Magnesium sulphate

- The anticonvulsant of choice
- Given in two phases
  - Loading dose
  - Maintenance dose

Fitting or unconscious

- Call for help
- Recovery position
- Open and maintain airway
- iv access and give magnesium sulphate

Loading dose is given IV and IM

- 4g given IV slow over 10-15minutes

AND

- 10g IM (diluent 2% Lignocaine)
  - Give 5g to each buttock

Maintenance dose

- **IM route**
- After loading dose continue with 5 g IM every 4 hours to until 24 hours after birth or 24 hours after last convulsion
- After Loading dose if patient gets convulsions then REPEAT – 2gm Diluted in 6 ml NS = 10 ml – IV slowly over 10 minutes.

Magnesium caution!

- Do not give the next dose of magnesium if
  - Absent knee jerk
  - Urine output less than 100 mls in last 4 hours
  - Respiratory rate less than 16 breaths per minute
- If respiratory rate less than 16 breaths / minute stop magnesium and give calcium gluconate 1 g iv over 10 minutes

Blood pressure

- Uncontrolled blood pressure leads to intracranial haemorrhage and death
- Monitor
- Treat if BP diastolic >110 mm Hg or systolic >160 mmHg
- Nifedipine, hydralazine, labetalol according to local protocol

  - Nifedipine 10 – 20mg Orally to maintain BP
  - Hydralazine 10 – 20mg iv until diastolic is below 100
  - Tab Labetalol 100 to 200 mg TDS

To Terminate the Pregnancy or Not

If she is already in labour, let her progress in labour

DIAGNOSIS	Pregnancy of <23 Weeks	Pregnancy of 24-34 Weeks	Pregnancy of 35-36 Weeks	Pregnancy of >37 Weeks
GESTATIONAL HYPERTENSION	✗	✗	✗	✓
PRE-ECLAMPSIA	✗	✗	✗	✓
SEVERE PRE-ECLAMPSIA	✓	✓ If unstable, give antenatal corticosteroids and terminate within 24hrs	✓ If unstable, do not give antenatal corticosteroids and terminate within 24hrs	✓
		✗ If stable	✗ If stable	
ECLAMPSIA	✓	✓	✓	✓

In all cases of eclampsia terminate pregnancy within 12 hrs

Calcium Supplementation for Prevention of Pre-Eclampsia/Eclampsia (PE/E)

- WHO recommends calcium supplementation for prevention of PE/E in populations whose diets are deficient in calcium

GoI recommendations

- Every woman would be given calcium supplementation for 6 months during ANC period after 1st trimester and for 6 months during lactation.
- Two calcium tablets would be given daily
- Each tablet shall contain 500mg elemental Calcium and 250 IU Vitamin D3
- To be implemented at all levels of contact of the pregnant women with the health system.

Delivery

- Assess pregnancy and assess cervix

- Vaginal delivery or CS?
  - Vaginal if no maternal or fetal distress, no obstetric contraindication and cervix favourable
  - CS if repeated fits, fetal distress or unfavourable cervix

After delivery

- Monitor until diuresis occurs
- Remember (pre-)eclampsia get worse or first fit can occur in post partum period
- Continue magnesium for 24 hours after delivery or after last fit – no need to “tail off”

Key Messages

- Pre-eclampsia/Eclampsia is the major killer, deaths from which can be prevented through proper ANC and if this happens can be managed with timely administration of inj. $MgSO_4$
- Proper nursing care and timely inj. $MgSO_4$ administration is key in management of eclampsia case
- $MgSO_4$ is a safe drug for mother and can be given without hesitation. Toxicity of $MgSO_4$ is very rare.
- At sub Centre ANM can safely give first dose of 5-5 gms deep IM on each buttock and refer to higher facility for further management.

HELLP SYNDROME

HEMOLYSIS
ELEVATED LIVER ENZYMES
LOW PLATELETS

20% of women with severe preeclampsia
3 – 27% recurrence in subsequent pregnancies

जिल्हा रुग्णालय - औंध, पुणे

THANK YOU

- DR NEELAM DIXIT
HOD OBGY,
DH AUNDH