

# **Hypertension in Pregnancy**

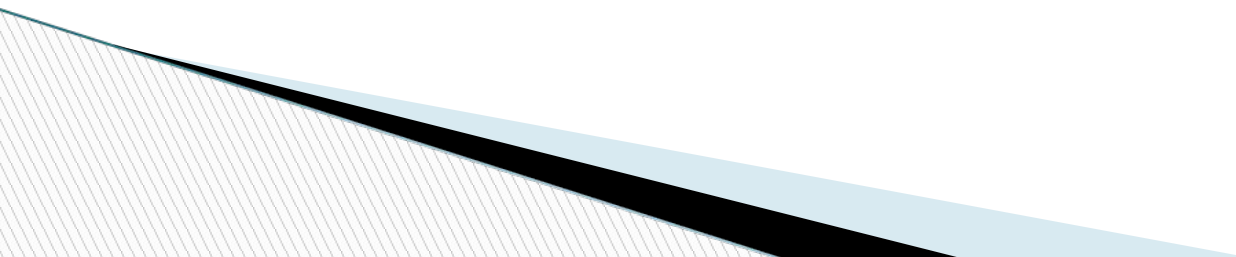
**Saduakassova Shynar Muratovna**



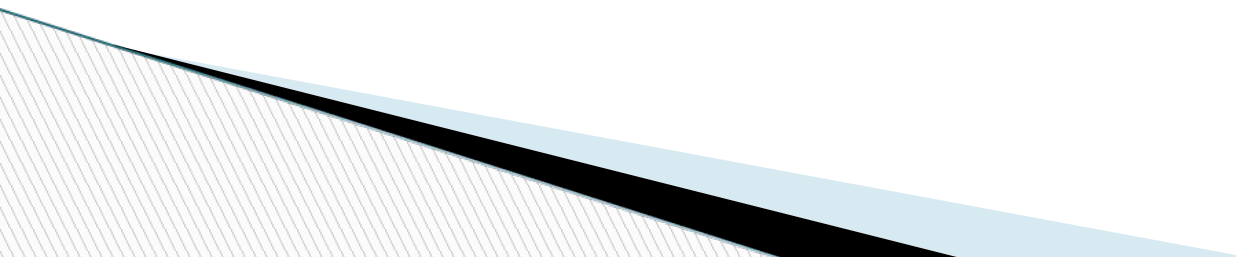
# Hypertension in Pregnancy

- High risk factors
  - Etiology and pathophysiology
  - Classification
  - Diagnosis
  - Treatment
  - Prevention
  - Future Implications
- 

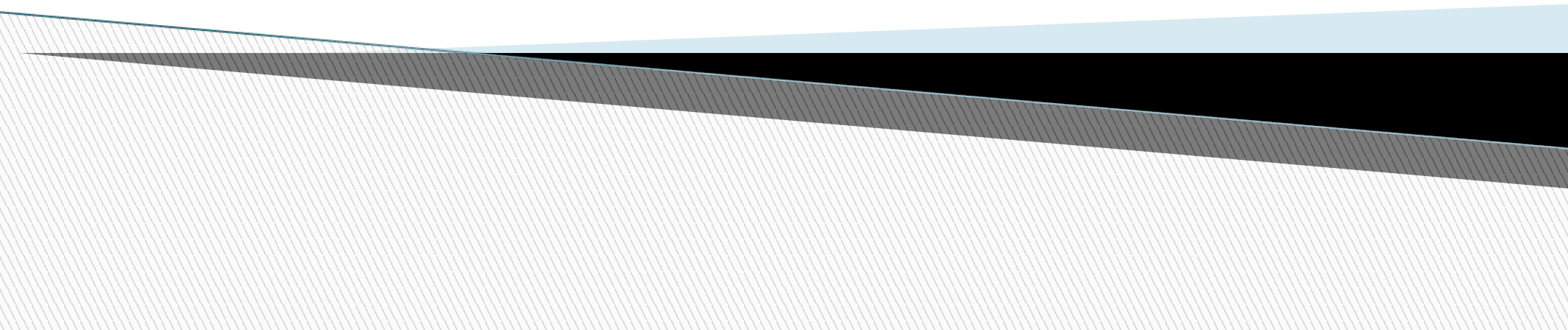
# High risk factors

- Age - younger than 18 or older than 40 years
  - Multiple pregnancy
  - Has previous gestational hypertensive disorders
  - Disease of the circulatory system
  - Chronic nephritis
  - Diabetic
  - Obesity
- 

# Etiology

- Immune mechanism
  - Injury of vascular endothelium-disruption of the equilibrium between vasoconstriction and vasodilatation, imbalance between PGI and TXA
  - Disequilibrium of prostacyclin/ thromboxane A2
  - Compromised placenta perfusion
  - Genetic factor
  - Dietary factors: nutrition deficiency
  - Insulin resistance
- 

# Classification

- Chronic hypertension
  - Gestational hypertension
  - Preeclampsia (gestational hypertension with proteinuria)
    - mild preeclampsia
    - severe preeclampsia
    - eclampsia
- 

# Классификация

- O10 Хроническая артериальная гипертензия, (существовавшая ранее гипертензия, диагностированная до 20 недель беременности или сохраняющаяся через 6 недель после родов)
- O13 Гестационная гипертензия (гипертензия, вызванная беременностью)
- O14 Преэклампсия (гестационная гипертензия с протеинурией)
- O14.0 Преэклампсия легкой степени
- O14.1 Тяжелая преэклампсия
- O15 Эклампсия

# Diagnosis: Hypertension

Mild hypertension (either):

SBP > 140

DBP > 90

Severe hypertension (either):

SBP > 160

DBP > 110

BP > 4 hours apart

# Predictive evaluation (1)

1. **Mean arterial pressure, MAP** =  $(\text{sys. BP} + 2 \times \text{dias. BP}) / 3$ 
  - MAP > 85 mmHg: suggestive of eclampsia
  - MAP > 140 mmHg: high likelihood of seizure and maternal mortality and morbidity



# Classification

**Chronic hypertension** proceeding pregnancy (essential or secondary to renal disease, endocrine disease or other causes)

Presents before 20 week gestation

Persists beyond 6 week postpartum

BP  $\geq$  140/90 mmHg

# Classification

## **Gestational hypertension**

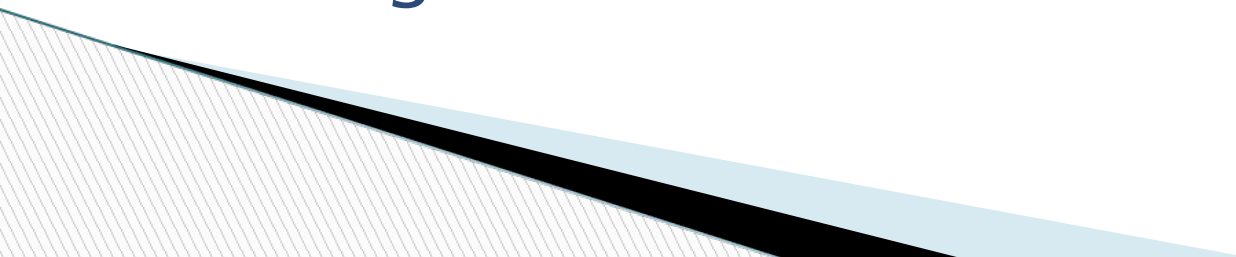
Presents after 20 week gestation

Persists before 6 week postpartum

BP  $\geq$  140/90 mmHg

- **Mild preeclampsia** – mild hypertension with proteinuria ± edema
- **Легкая преэклампсия** – легкая гипертензия в сочетании с протеинурией ± отёки

**Severe preeclampsia** – severe hypertension + proteinuria **or** hypertension of any severity + proteinuria + one of the next symptoms

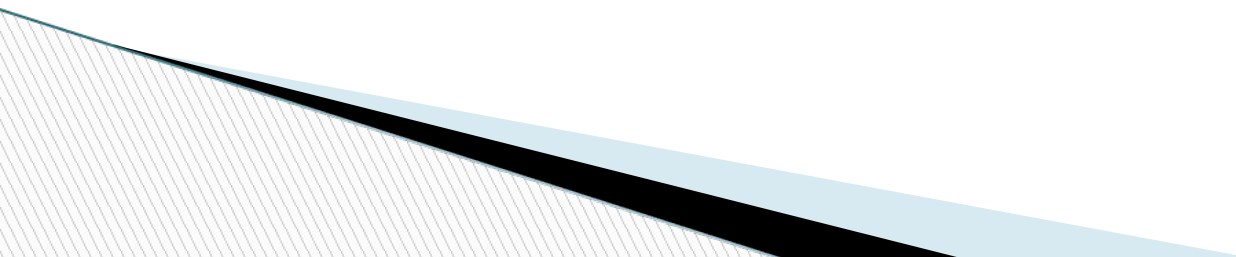
1. severe headache
  2. visual disturbances
  3. epigastric pain
  4. anasarca
  5. oliguria
  6. aspartate aminotransferase or ALT >70 U/L
  7. platelet count <100,000/mm<sup>3</sup>
  8. HELLP syndrome: hemolysis, elevated liver enzymes and low platelets
  9. fetal growth retardation
- 

# Тяжёлая преэклампсия–

тяжёлая гипертензия + протеинурия **или**  
гипертензия любой степени тяжести +  
протеинурия + один из следующих симптомов:

- сильная головная боль
- нарушение зрения
- боль в эпигастральной области и/или тошнота, рвота
- судорожная готовность
- генерализованные отёки
- олигоурия (менее 30 мл/час или менее 500 мл мочи за 24 часа)
- болезненность при пальпации печени
- количество тромбоцитов ниже  $100 \times 10^6/\text{л}$
- повышение уровня печёночных ферментов (АлАТ или АсАТ выше 70 МЕ/л)
- HELLP-синдром
- ВЗРП

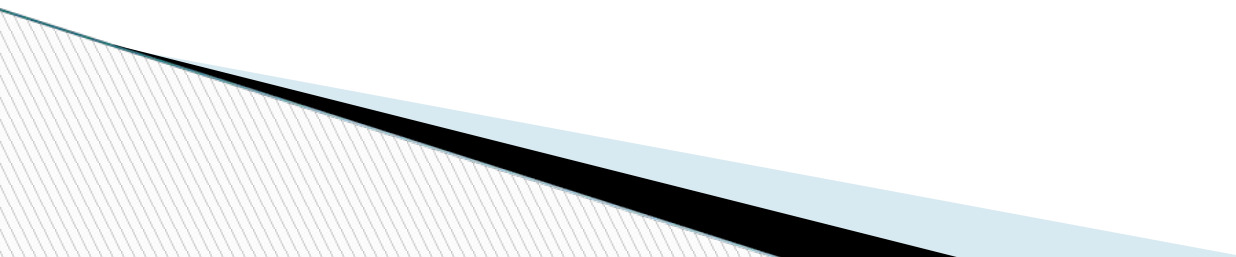
# Blood (1)

- Volume: reduced plasma volume
  - Normal physiologic volume expansion does not occur
  - Generalized vasoconstriction and capillary leak
  - Hematocrit
- 

# Blood (2): coagulation

- Isolated thrombocytopenia  $<150,000/\text{ml}$
- Microangiopathic hemolytic anemia
- HELLP syndrome: in severe preeclampsia
  - lactic dehydrogenase  $> 600 \text{ u/L}$
  - total bilirubin  $> 1.2 \text{ mg/dl}$
  - aspartate aminotransferase  $>70 \text{ U/L}$
  - platelet count  $<100,000/\text{mm}^3$

# Endocrine system

- Vascular sensitivity to catecholamines and other endogenous vasopressors such as antidiuretic hormone and angiotensin II is increased in preeclampsia
  - Disequilibrium of prostacyclin/ thromboxane A2
- 



# Clinical findings (1)

## Symptoms and signs

### 1. **Hypertension**

- Diastolic pressure  $\geq 90$  mmHg or
- Systolic pressure  $\geq 140$  mmHg or
- Increase of 30/15 mmHg

### 2. **Proteinuria**

- >300 mg/24-hr urine collection or
- + or more on dipstick of a random urine

# Clinical findings (2)

## 3. **Edema**

- Weight gain: 1-2 lb/wk or 5 lb/wk is considered worrisome
- Degree of edema
- Preeclampsia may occur in women with no edema

# Clinical findings (3)

## 4. Differing clinical picture in preeclampsia-eclampsia crises: patient may present with

- Eclamptic seizures
- Liver dysfunction
- Pulmonary edema
- Abruptio placenta
- Renal failure
- Ascites and anasarca

# Clinical findings (4)

## Laboratory findings (1)

**Blood test:** elevated Hb or HCT, in severe cases, anemia secondary to hemolysis, thrombocytopenia, decreased coagulation factors

**Urine analysis:** proteinuria and hyaline cast, specific gravity > 1.020

**Liver function:** ALT and AST increase, LDH increase, serum albumin

**Renal function:** uric acid: 6 mg/dl, serum creatinine may be elevated ↓

# Clinical findings (5)

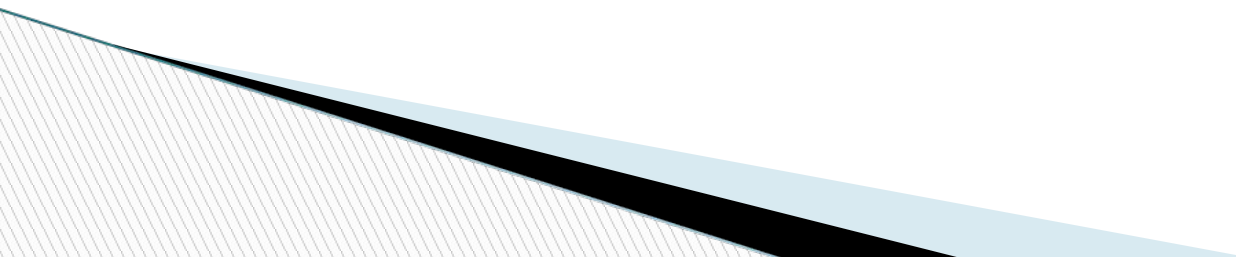
## Laboratory findings (2)

- Retinal check
- Other tests: placenta function (ultrasound, kardiotokography, doppler), fetal maturity, cerebral angiography etc.

# Differential diagnosis

- Pregnancy complicated with chronic nephritis
- Eclampsia should be distinguished from epilepsy, encephalitis, brain tumor, anomalies and rupture of cerebral vessel, hypoglycemia shock, diabetic hyperosmotic coma

# Complications

- Preterm delivery
  - Fetal risks: acute and chronic uteroplacental insufficiency
  - Intrapartum fetal distress or stillbirth
  - Oligohydramnios
- 

# Prevention

- ▣ **Calcium supplementation: 1 g/24-hr effective in high risk group, not effective in low risk women**
- ▣ **Aspirin (antithrombotic): 75-120 mg/24-hr**
- ▣ **Good prenatal care and regular visits**
- ▣ **Eclampsia cannot always be prevented, it may occur suddenly and without warning.**



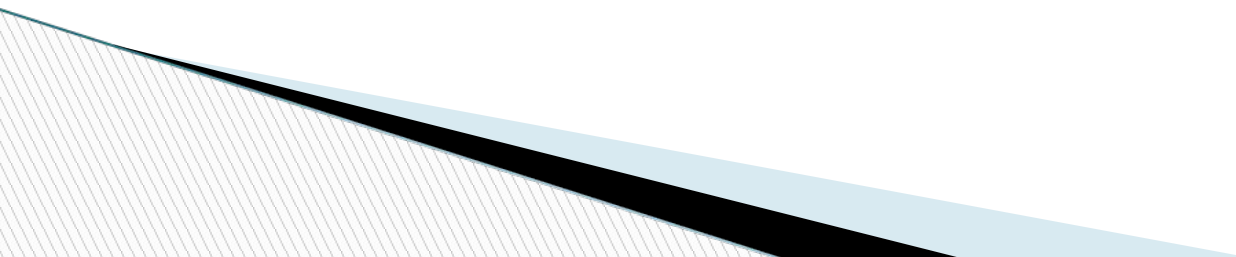
# Treatment

## Mild preeclampsia

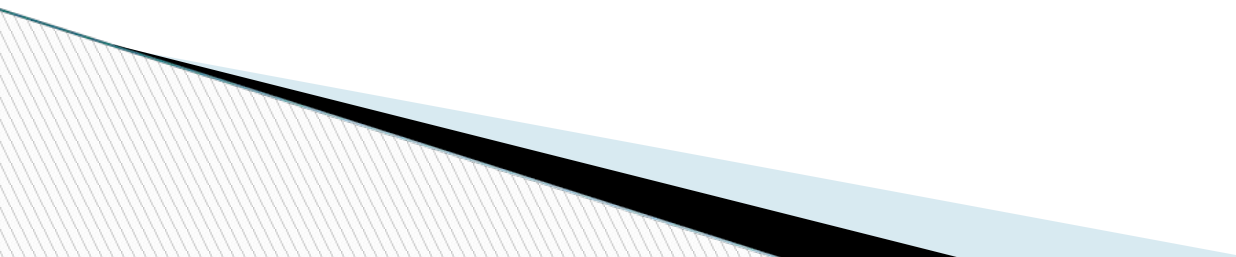
Hospitalization or home regimen

- Bed rest (position and why) and daily weighing
- Blood pressure monitoring
- Daily urine dipstick measurements of proteinuria
- Fetal heart rate testing
- Ultrasound
- Liver function, renal function, coagulation
- Observe for danger signals: severe headache, epigastric pain, visual disturbances

# Severe preeclampsia

- ▣ **Prevention of convulsion: magnesium sulfate or diazepam**
  - ▣ **Control of maternal blood pressure: antihypertensive therapy**
  - ▣ **Initiation of delivery**
- 

# Magnesium sulfate

- ▣ **Decreases the amount of acetylcholine released at the neuromuscular junction**
  - ▣ **Blocks calcium entry into neurons**
  - ▣ **Vasodilates the smaller-diameter intracranial vessels**
- 

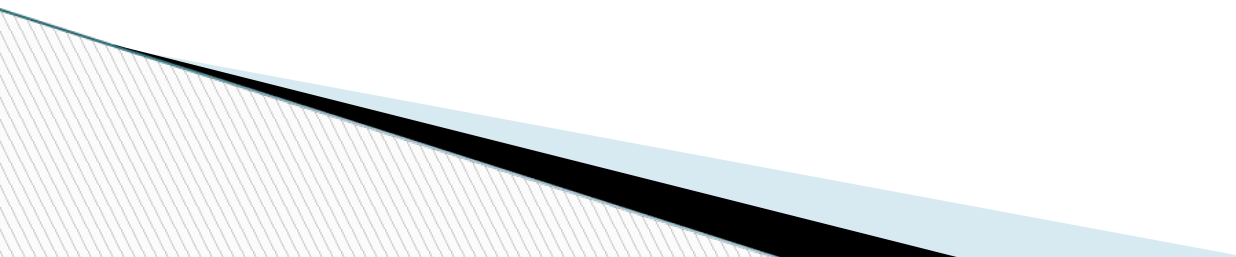
# Magnesium sulfate

1. **i.v. or i.m.**
  - **Starting dose - 5g dry matter (20 ml 25% ) during 10-15 min i.v.**
  - **Maintenance dose -1-2g/hr dry matter constant infusion during 12-24 hours**
  - **Total dose: 20-30 g/d**

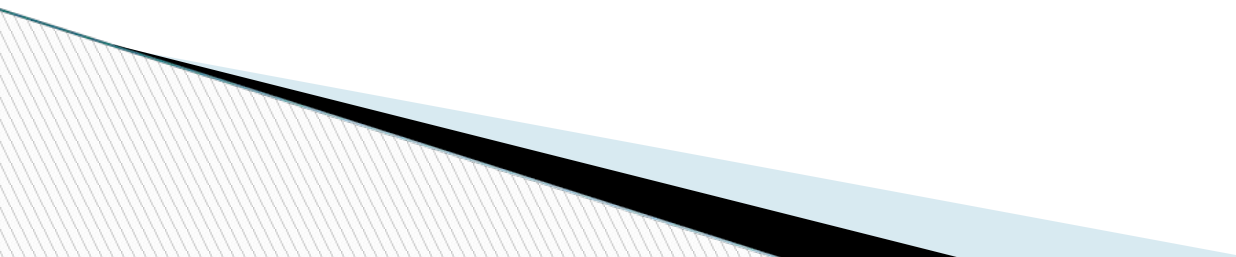
# Toxicity

- ▣ **Diminished or loss of patellar reflex**
  - ▣ **Diminished respiration <16 in minute**
  - ▣ **Muscle paralysis**
  - ▣ **Blurred speech**
  - ▣ **Cardiac arrest**
- 

# Reversal of toxicity:

- ▣ **Slow i.v. 10% 10,0 ml calcium gluconate**
  - ▣ **Oxygen supplementation**
  - ▣ **Cardiorespiratory support**
- 

# Antihypertensive therapy

- Medications:
  - Hydrolazine: initial choice
  - Labetolol
  - **Nifedipine**
  - Nimoldipine
  - **Methyldopa**
  - Sodium nitroprusside
- 

## Medication

## Mechanism of action

## Effects

hydralazine

Direct peripheral vasodilation

CO<sub>2</sub>↑, RBF↑ maternal flushing, headache, tachycardia

labetalol

α, β- adrenergic blocker

CO, RBF maternal flushing, headache, neonatal depressed respirations

nifedipine

Calcium channel blocker

CO, RBF maternal orthostatic hypotension Headache, no neonatal effects

methyldopa

Direct peripheral arteriolar vasodilation

CO, RBF maternal flushing, headache, tachycardia

sodium nitroprusside

Direct peripheral vasodilation

Metabolite (cyanide) toxic to fetus



# Delivery

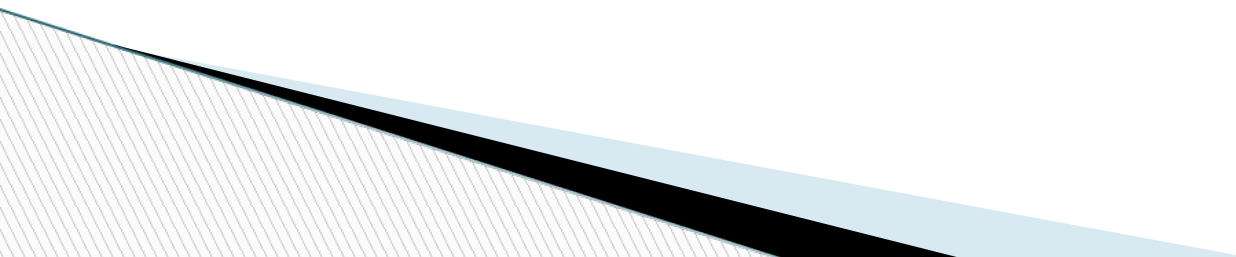
## □ Induction of labor

1. Immature cervix (<6 points on the scale Bishop) – cervical preparation by prostaglandins during 24-48 hours, amniotomia, oxytocin
2. Mature cervix (>6 points on the scale Bishop) – amniotomia, oxytocin

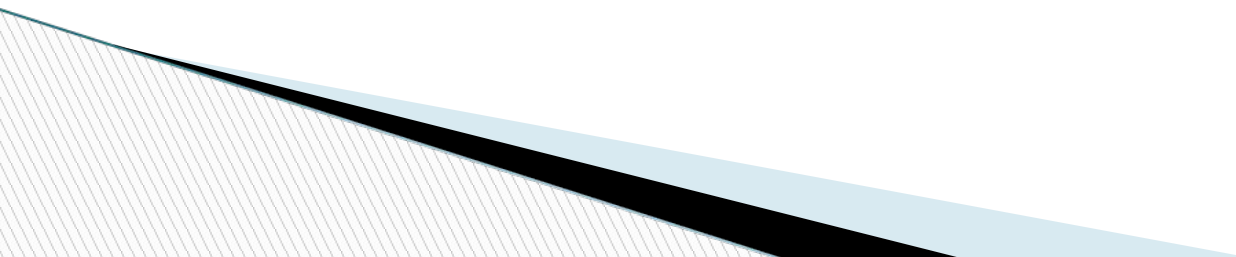
## □ Cesarean section

1. Induction of labor unsuccessful
2. Induction of labor not possible
3. Maternal or fetal status is worsening
4. Abruption placenta

# Eclampsia

- **No aura preceding seizure**
  - **Multiple tonic-clonic seizures**
  - **Unconsciousness**
  - **Hyperventilation after seizure**
  - **Tongue biting, broken bones, head trauma and aspiration, pulmonary edema and retinal detachment**
- 

# Delivery

- **Control of seizure**
  - **Control of hypertension: magnesium sulfate, diazepam, antihypertensive therapy**
  - **Delivery during 12 hours**
  - **Proper nursing care**
- 

**THANK YOU FOR  
YOUR  
ATTENTION!!!**

