Department of Obstetrics and Gynecology #1

Hypertension in Pregnancy

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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 profusion
- 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= (sys. BP + 2 x 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 ≥ 140/90 mmHg

Classification

Gestational hypertension

Presents after 20 week gestation

Persists before 6 week postpartum

BP ≥ 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^3
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 х 106г/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/ml
- Microangiopathic hemolytic anemia
- HELLP syndrome: in severe preeclampsia
  - lactic dehydrogenase > 600 u/L
  - total bilirubin > 1.2 mg/dl
  - aspartate aminotransferase >70 U/L
  - platelet count <100,000/mm3

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 ≥ 90 mmHg or
- Systolic pressure ≥ 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 hyperosmatic 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↕, 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. Abruptio 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!!!