In the name of GOD

Hypertension During Pregnancy

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300
280
260
240
220
200
180
160
140
120
100
60

Introduction

- Leading cause of maternal morbidity and mortality worldwide
- Complicates 5-10% of pregnancies.
- Responsible for 16% of maternal deaths in developed countries
- Hypertension during pregnancy is a marker for cardiovascular morbidity and mortality later in life.

Hypertension in Pregnancy
Why worry?

Common: ~ 10% of pregnancies

Morbidity: fetus: 12% of preterm deliveries

mother: stroke, CHF, renal injury

Mortality: 12-13% of maternal mortality

Hypertension in Pregnancy

Classification
Diagnosis
Management
Prevention
Future Implications

Classification

1. Chronic hypertension
2. Gestational hypertension
3. Preeclampsia
   - without severe features
   - with severe features (severe preeclampsia)
4. Chronic hypertension with superimposed preeclampsia
   - without severe features
   - with severe features

Classification

"PIH" should not be used

Classification

Avoid use of term mild preeclampsia

replace with preeclampsia without severe features

Severe preeclampsia = preeclampsia with severe features

Diagnosis: Hypertension

Hypertension (either):

- **SBP $\geq$ 140**
- **DBP $\geq$ 90**

Severe hypertension (either):

- **SBP $\geq$ 160**
- **DBP $\geq$ 110**

BP > 4 hours apart

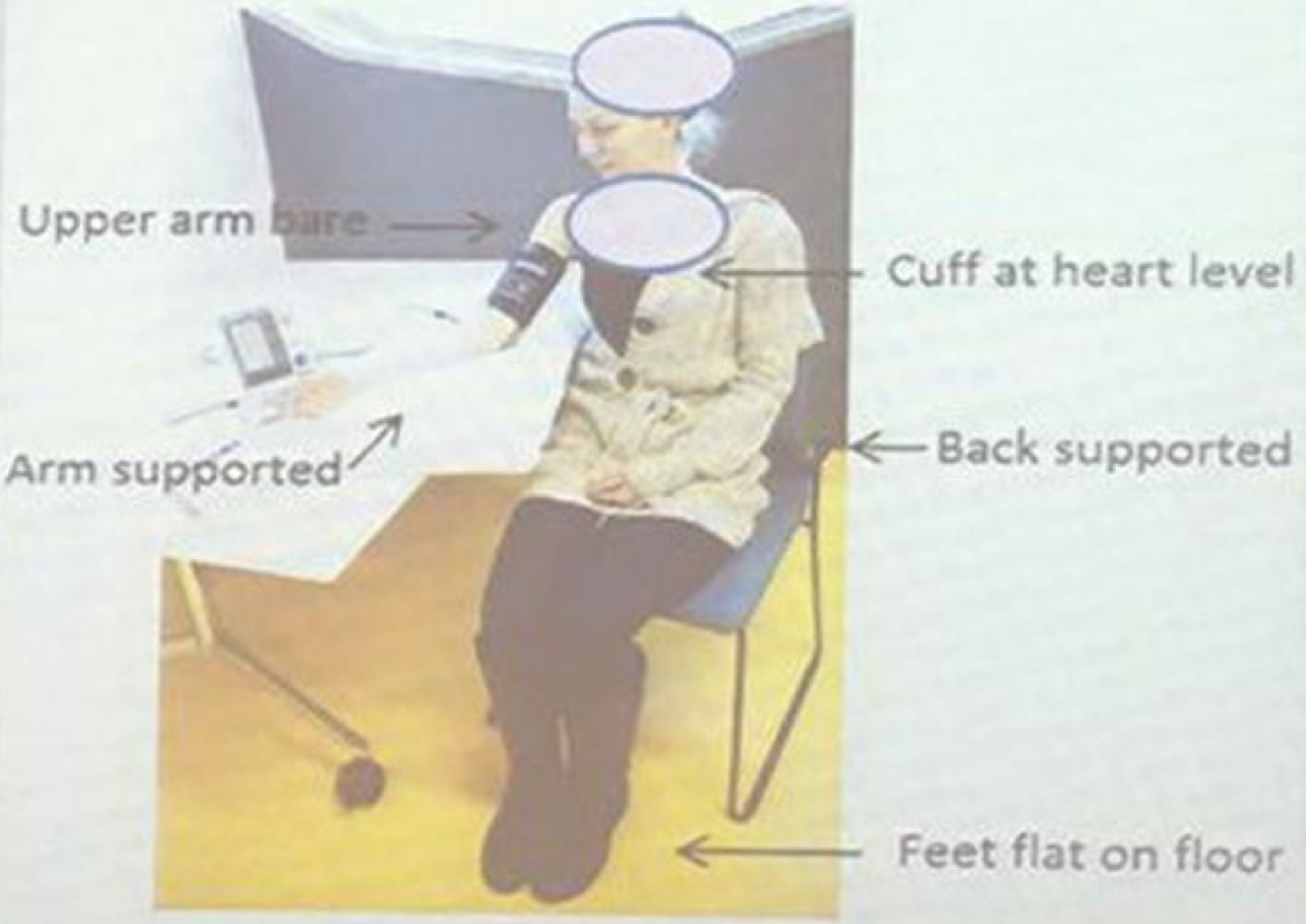
Diagnosis: Hypertension

"it is recommended that a diagnosis of hypertension require at least 2 determinations at least 4 hours apart, although on occasion, especially when faced with severe hypertension, *the diagnosis can be confirmed within a short interval (even minutes) to facilitate timely antihypertensive therapy."*

Blood Pressure: Technique

Assessing BP (ideal):

- seated, legs uncrossed, relaxed, quiet
- back and arm supported
- middle of cuff at level of right atrium
- wait 5 minutes before first reading


Upper arm bare
Cuff at heart level
Arm supported
Back supported
Feet flat on floor

Improper assessment:

- left lateral using upper arm
- gives falsely low values

Gestational Hypertension: Definition

Hypertension (onset > 20 weeks) and all of following:

- absence of proteinuria
- absence of severe features

What's Lab.Test is Needed ?

CBC

Hb

HCT

Platelet

UA

Proteinuria

- Random
- Dipstick
- ua (24 Hour)
- P/C Ratio

Diagnosis: Proteinuria

Definition:

- **24 hour*** **≥ 300 mg**
- **timed (i.e. 12hr) ≥ 300 mg (extrapolated)**
- **P/C ratio > 0.3**
- **urine dipstick** ≥ 1+**

*** 24 urine is preferred method**

**** urine dipstick used only if no other available**

Creatinine

LFTS, ALT, AST, LDH

PT

PTT

Uric ACID

NA

P

Reflex

Pulse

acquired

Thrombophilia

hereditary

Early.onfet.Pre

acquired

APS

Anti beta2 Glycoprotein g/m

Anti cardiolipin g/m

Anti phosphipid g/m

Lupus anti coagulant

ANA

hereditary

F 5 Leaden

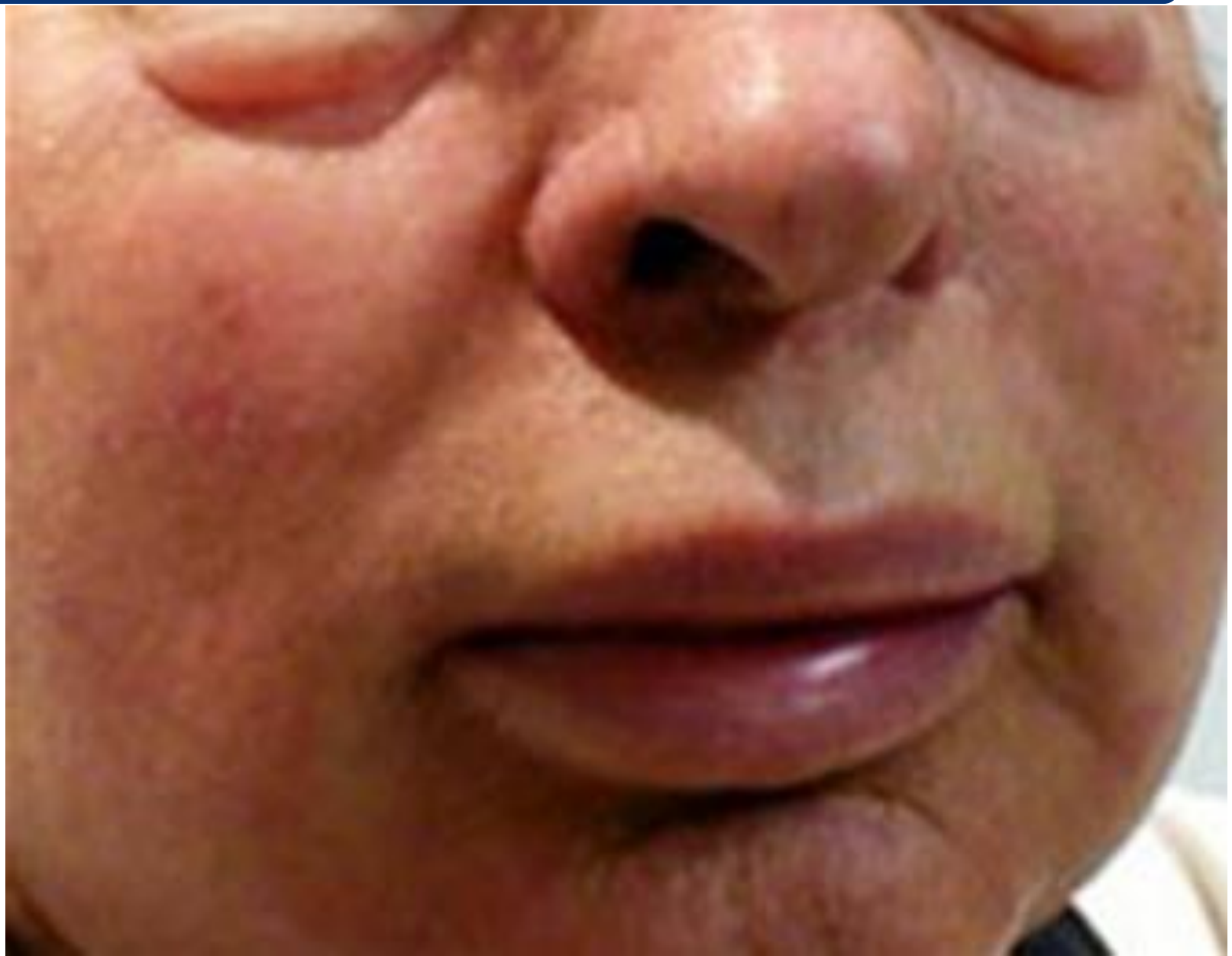
Protein s,c

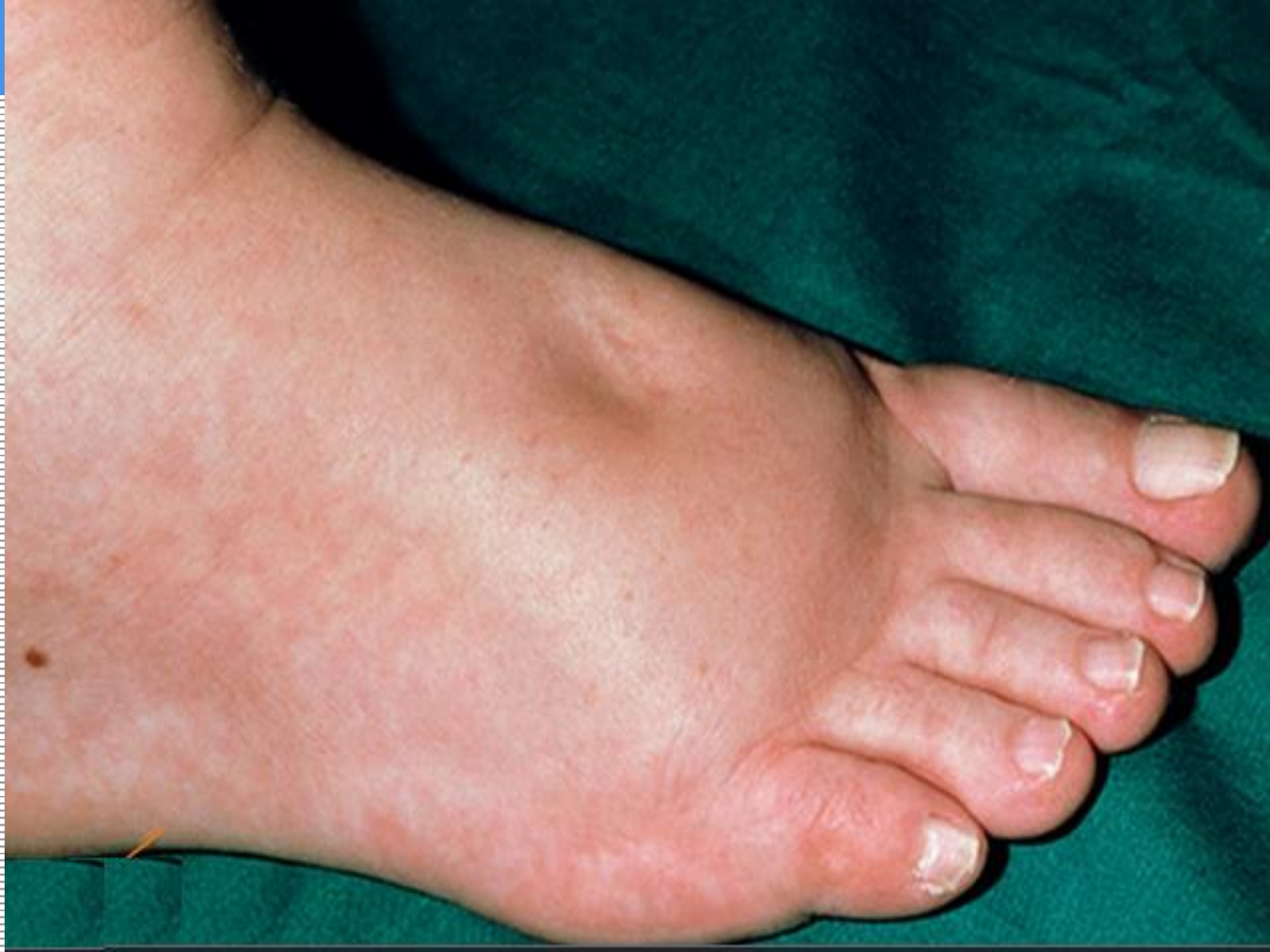
Antithrombin 3

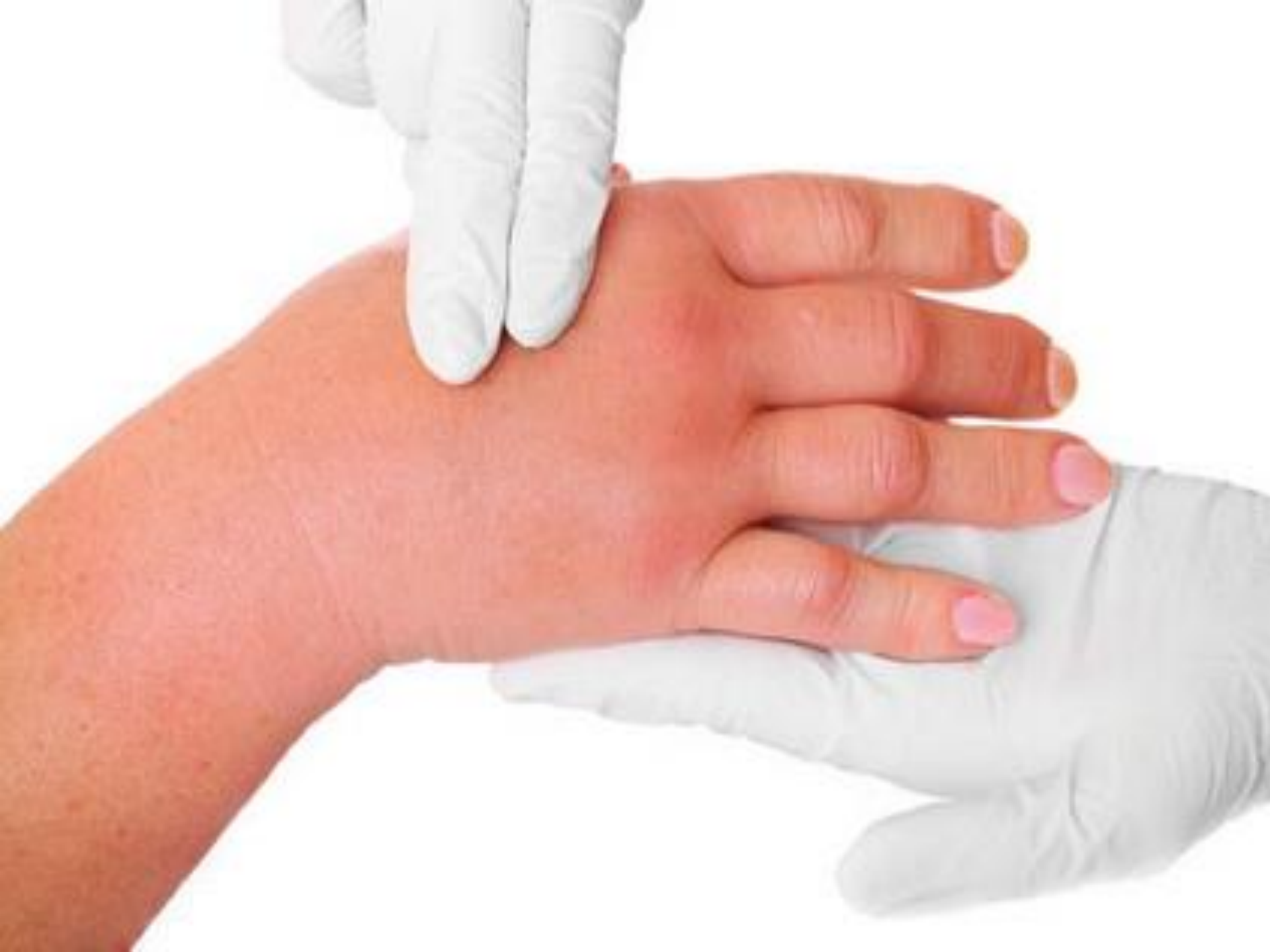
Homocistein

Edema

Vasospasm G







Preeclampsia (cont.)

- **Risk factors:**
  - Primiparous
  - Age > 40 years
  - Obesity
  - Diabetes mellitus
  - Chronic hypertension
  - Preexisting renal disease
  - Preeclampsia in previous pregnancy
  - Family history of preeclampsia
  - Multifetal gestation
  - *In vitro* fertilization
  - Thrombophilia
  - Systemic lupus erythematosus

Gestational Hypertension: Management

- serial assessment for symptoms (daily)
- serial assessment of fetal movement (daily)
- serial measurement of BP
    - 2x per week in office

  or - 1x per week in office and 1x at home
- serial assessment for proteinuria (weekly)
- platelets, LFTs, creatinine (weekly)

Gestational Hypertension: Fetal Assessment

- daily kick counts
- ultrasound: assess growth every 3 weeks
- NST once weekly with AFI

Gestational Hypertension: Seizure Prophylaxis

Gestational hypertension

- magnesium is NOT universally needed

If patients develops severe features → magnesium

Gestational Hypertension: Delivery

Gestational hypertension

Diagnosis made $\geq$ 37w0d

- deliver

Preeclampsia: Definition

1. HTN (new onset > 20 weeks) + proteinuria

   OR

2.* HTN (new onset > 20 wks) + multisystemic signs
   - CNS
   - pulmonary edema
   - renal dysfunction
   - liver impairment
   - thrombocytopenia

** Proteinuria is not required for diagnosis*

Preeclampsia without Severe Features: Definition

Hypertension (onset > 20 weeks) and all of following:

- proteinuria
- absence of severe features

Preeclampsia with Severe Features

Hypertension (onset > 20 weeks) and any of following:

- SBP ≥ 160 or DBP ≥ 110
- platelets < 100,000
- increased LFTs (2x normal)
- severe, persistent RUQ/epigastric pain
- new renal insufficiency
  - creatinine ≥ 1.1 mg/dL
  - doubling of creatinine
- pulmonary edema
- new onset cerebral or visual disturbances

Preeclampsia: Management

Without severe features:

- serial assessment for symptoms (daily)
- serial assessment of fetal movement (daily)
- serial measurement of BP (2x per week)
- platelets, LFTs, creatinine (weekly)

Preeclampsia: Fetal Assessment

Preeclampsia without severe features:

- daily fetal kick counts
- ultrasound to assess growth (q 3 weeks)
- antenatal testing twice weekly

Preeclampsia: Fetal Assessment

Preeclampsia with fetal growth restriction:

- antenatal testing
- umbilical artery Doppler

Preeclampsia: Delivery

Preeclampsia without severe features

Diagnosis at $\geq$ 37w0d

- deliver

Preeclampsia: Delivery

Deliver if any of following at any gestational age

- uncontrollable severe hypertension
- eclampsia
- pulmonary edema
- abruption
- DIC
- nonreassuring fetal status

Preeclampsia: Delivery

Deliver in 48 hours (after steroids) if stable:

- PROM
- platelets < 100,000
- elevated LFTs
- EFW < 5th percentile
- AFI < 5 cm
- abnormal umbilical artery Doppler
- new onset/worsening renal dysfunction

Preeclampsia: Delivery

Preeclampsia with severe features

< 34w0d and stable maternal/fetal status

- expectant management at tertiary center

Preeclampsia: Delivery

Preeclampsia with severe features

< 34w0d and stable maternal/fetal status

- expectant management at tertiary center

Preeclampsia: Expectant management*

Preeclampsia with severe features and 23w0d-33w6d

Expectant management candidates:

- **severe hypertension, if controllable**
- **transient lab abnormalities (LFTs, platelets)**

severe Preeclampsia: Expectant management

For women with severe preeclampsia at less than 34 0/7 weeks of gestation with stable maternal and fetal conditions, it is recommended that continued pregnancy be undertaken only at facilities with adequate maternal and neonatal intensive care resources.

Preeclampsia: Seizure Prophylaxis

Preeclampsia with severe features or eclampsia

- **magnesium sulfate**

If Cesarean → *<u>continue</u> magnesium intraoperatively*

Urgent advice from a Healthcare professional

- Severe headache
- Problems with vision,such as blurring or flashing before the eyes
- Severe pain just below the ribs
- Vomiting
- Sudden swelling of the face,hands or feet

Chronic Hypertension: Definition

Hypertension and either of the following:

- present prior to pregnancy
- present prior to 20 weeks

Diagnosis dilemmas:

- women with little care before pregnancy
- women presenting after 20 weeks

Chronic Hypertension: Anti-hypertensive Therapy

Recommended medications:

- labetalol
- nifedipine
- methyldopa

Anti-hypertensive Therapy

Medication	Dose	Comments
Labetalol	200-2400 mg/d (2-3 doses)	caution with asthma, CHF
Nifedipine	30-120 mg/d (XL)	avoid SL form
Methyldopa	500-3000 mg/d (2-3 doses)	may not be effective with severe HTN

Chronic Hypertension: Anti-hypertensive Therapy

Anti-hypertensive medication not needed:

- SBP < 160 and DBP < 105
- no evidence for end-organ damage

Chronic Hypertension: Fetal Assessment

The risk of fetal growth restriction is higher in pregnant
women with chronic hypertension. In patients
with mild chronic hypertension, the incidence of SGA
infants is 8–15.5%, but in women with severe chronic
hypertension, the incidence may be as high as 40%

Chronic Hypertension: Fetal Assessment

CHTN + fetal growth restriction:

- antenatal testing
- umbilical artery Doppler

Chronic Hypertension: Delivery

No other additional maternal/fetal complications

- delivery < 38w0d not recommended
  (i.e. wait until ≥ 38w0d)

Chronic Hypertension with Superimposed Preeclampsia

Hypertension (onset < 20 weeks) and new findings:

Without severe features:

- hypertension and proteinuria only
- proteinuria: new onset or worsening

CHTN with Superimposed Preeclampsia: Seizure Prophylaxis

Without severe features

- magnesium sulfate is not necessary

With severe features

- magnesium sulfate is recommended

CHTN with Superimposed Preeclampsia: Delivery

Without severe features

- stable maternal and fetal status
- delivery $\geq$ 37w0d

CHTN with Superimposed Preeclampsia: Delivery

Preeclampsia with severe features

> 34w0d

- deliver

CHTN with Superimposed Preeclampsia: Delivery

Deliver if any of following at any gestational age

- uncontrollable severe hypertension
- eclampsia
- pulmonary edema
- abruption
- DIC
- nonreassuring fetal status

Postpartum Preeclampsia: Seizure Prophylaxis

Postpartum diagnosis

- new onset hypertension with CNS symptoms
- or preeclampsia with severe hypertension
- magnesium sulfate (24 hr)

Management: Postpartum

Gestational hypertension or preeclampsia

- BP monitored for 72 hours
  - in hospital
  - equivalent outpatient surveillance
- Repeat BP assessment 7-10 days postpartum
- Repeat BP earlier in women with symptoms

Prevention

Not recommended:

- vitamin C
- vitamin E
- salt restriction
- bed rest
- physical activity restriction

Eclampsia

- New-onset grand mal seizures in a woman with preeclampsia
- Premonitory symptoms:
  - Persistent occipital or frontal headache
  - Blurred vision
  - Photophobia
  - Epigastric and/or RUQ abdominal pain
  - Altered mental status

Eclampsia (cont.)

- **Management:**
  - Intravenous magnesium sulfate to control convulsions
    - IV loading dose: 4 – 6 g
    - Maintenance infusion: 1 – 2 g/hr. for at least 24 hrs. after the last seizure
  - Antihypertensive medication to control blood pressure if it is dangerously high
  - Delivery of the fetus following maternal stabilization

Intensive care unit

The indications for transfer

- Renal failure not responding to guidelines and after discussion with renal physicians
- Need for ventilation
- Uncontrolled seizures after delivery
- Unconscious mother
- Pulmonary edema not responding to conservative measures

Post Elcampsia Management

- Mother is the priority
- Don’t try to listen to fetal heart while mother is unstable
- First stabilize then deliver , don’t rush to deliver
- Remember to keep the patient dry (1 ml/kg/hr) and control BP (The two killers of pre – eclampsia are pulmonary oedema and stroke)

Diet and lifestyle

- **Diet**
  - **Do not recommend salt restriction during pregnancy solely to prevent gestational hypertension or pre-eclampsia.**
- **Lifestyle**

-Advice on rest,exercise and work for women at risk of hypertensive disorders during pregnancy should bethe same as for healthy pregnant women

Atypical presentation

- Onset of signs/symptoms at<20 weeks of gestation
- Hypertension or proteinuria(but not both)with or without characteristic signs and symptoms of severe preeclampsia
- Delayed postpartum onest or exacerbation of disease (>2days postpartum)

Postpartum hypertension

Exact incidence of postpartum hypertension and preeclampsia is unknown.

Preeclampsia and eclampsia can develop up to four weeks postpartum.

In women with preeclampsia while pregnant, BP usually decreases within 48 hours of delivery, but the BP increases again 3 – 6 days postpartum.

Fluid balance and volume expansion

- Do not use volume expansion in women with severe pre-eclampsia unless hydralazine is the antenatal antihypertensive
- Inwomen with severe pre-eclampsia , limit maintenance fluids to 80 ml/hour unless there are other on-going fluid losses (for example , haemorrhage)

1 cc/kg/hour

Summary

- Hypertensive disorders of pregnancy are common.
- They are associated with significant morbidity and mortality (maternal and fetal).
- All women with hypertension during pregnancy should be followed closely.
- Hypertension during pregnancy is a marker for cardiovascular morbidity and mortality later in life.

Summary

Postpartum (GHTN and preeclampsia):

- **check BP for 72 hours**
- **follow-up at 7-10 days postpartum**

Prevention:

- **high-risk women**
- **daily low dose aspirin starting late 1st trimester**

Summary

magnesium sulfate recommended for:

- **preeclampsia with severe features**
- **eclampsia**

delivery:

- **CHTN:** **≥ 38w0d**
- **GHTN:** **≥ 37w0d**
- **Preeclampsia, w/o severe** **≥ 37w0d**
- **Preeclampsia, w/ severe** **varies; 34w0d latest**

Summary

- CHTN with superimposed preeclampsia
  - Management similar to preeclampsia
    - depends on presence of severe features

Summary

- preeclampsia with severe features
  - proteinuria not used to define severe
  - proteinuria not used to determine delivery timing
  - fetal growth restriction removed
  - oliguria removed
  - elevated creatinine defined

Summary

- preeclampsia vs. gestational HTN:
  - presence of proteinuria

- preeclampsia:
  - no longer use term “mild” preeclampsia
    - preeclampsia without severe features

Take home message

Pre-eclampsia = Think of

- **Pulmonary Oedema → Keep the patient**
- **Stroke → Keep the BP under 150/100**
- **HELLP → check blood**
- **IUGR → ultrasound for growth and doppler**
- **Eclampsia → be one step ahead and give Mgso4 when indicated , be prepared**

END