HYPERTENSION IN PREGNANCY

CLINICAL GUIDELINES

OBJECTIVE

- To establish hospital-wide guidelines for the management of hypertension in pregnancy

SIGNIFICANCE

- 12-18% of maternal deaths in U.S are hyertension related
- 50,000 deaths worldwide annually due to eclampsia
- 50% of abruptions severe enough to kill the fetus are hypertension related…50% from chronic hypertension and 50% from pregnancy -induced hypertension

DEFINITIONS

- Chronic hypertension
- Pregnancy-induced hypertension
  - gestational/transient
  - preeclampsia (mild/severe)
  -eclampsia
- Pregnancy-aggravated hypertension/Superimposed preeclampsia (mild/severe)

CHRONIC HYPERTENSION

- BP > 140/90 prior to 20 wga, after 6 weeks postpartum, or prior to pregnancy
- BP decreases 2nd trimester…dx difficult
- Obesity predisposes (7% risk if >200lbs)
- All chronic hypertension predisposes to preeclampsia (20% risk of superimposed)

PREGNANCY-INDUCED HYPERTENSION

- mild vs severe
- occurs after 20 wga except in GTD
- with proteinuria and/or pathologic edema
- eclampsia=proteinuria and pathologic edema + convulsions

PREGNANCY-AGGRAVATED HYPERTENSION

- underlying chronic hypertension worsened by pregnancy
- mild and severe category

PATHOPHYSIOLOGY OF PREECLAMPSIA

- arterial vasoconstrictive disease
- also with endothelial cell damage, local hypoxia, hemorrhage, necrosis = end-organ complications
- vasospasm … increased placental thromboxane A2/prostacyclin + prostaglandin E2 ratio
- activated coagulation system

PATHOPHYSIOLOGY OF ECLAMPSIA

- vasospasm and/or impaired autoregulation of cerebral arterioles…edema/hemorrhage
- most mortality due to cerebral hemorrhage
- extent of ischemia/hemorrhage + patient seizure threshold influences incidence
- grand mal/tonic-clonic
- h/a or visual changes usually precede

MATERNAL-FETAL CONSEQUENCES

- hematologic
- kidney
- liver
- CNS
- uteroplacental perfusion

HEMATOLOGIC

- reduced blood volume (3500 vs 5000)
  - very sensitive to fluid therapy/blood loss
- thrombocytopenia (<100k ominous with preeclampsia…seen w/wo HELLP)
  - -immune vs endothlial deposition
  - -reflects disease severity
- fragmentation hemolysis (w/wo HELLP)

KIDNEY

- decreased renal/glomerular perfusion
  - uric acid increases
- elevated creatnine
  - reflects renal injury/severity of disease
- proteinuria
  - develops late/indicates severity

- oliguria (<400ml/24 hr)

LIVER

- elevted liver function tests
  - periportal hemorrhagic necrosis
  - w/wo HELLP
  - indicator of severity
  - subcapsular hematoma…30%mortality
- HELLP Syndrome
  - in 20% with severe preeclampsia
  - 10-20% without increased BP

CNS

- eclamptic seizures
  - petechial hemorrhage/infarct/ischemia
  - preceded by severe h/a and/or visual changes
  - grand mal/tonic-clonic 60-75 seconds
- hyperreflexia
  - present in 80% prior to seizure

UTEROPLACENTAL PERFUSION

- may be decreased in severe disease
- often reflected in IUGR (<5-10% on growth curve)

CLINICAL ASPECTS OF PREECLAMPSIA- RISK FACTORS

- nulliparity (10-14%)
- +family history
- multiple fetuses
- diabetes
- chronic vasular disease (20%)
- renal disease
- molar pregnancy (before 20 wga)
- fetal hydrops
- race: black>hispanic>white

CLINICAL ASPECTS OF PREECLAMPSIA-EARLY DETECTION

- review risk factors
- early weight gain
  - more than 2lbs/week or 6lbs/month
  - usually present before nondependent edema

DIAGNOSIS-MILD PREECLAMPSIA

- BP =>140/90
  - sitting, proper cuff, 2 occasions 6 hrs apart
- proteinuria
  - 1+ on dip/cath u/a and/or =>300mg/24 hour urine
- no evidence of severe preeclampsia

DIAGNOSIS-SEVERE PREECLAMPSIA

- systolic BP =>160 or diastolic BP =>110
  on two occasions 6 hrs apart at bedrest
- proteinuria- =>4-5 grams/24 hours
- elevated serum creatnine
- oliguria (=<400-500ml/24 hours)
- headache/visual disturbances
- pulmonary edema

DIAGNOSIS-SEVERE PREECLAMPSIA (CONT)

- thrombocytopenia
- microangiopathic hemolysis
- epigastric or RUQ pain
- elevated liver transaminases
- IUGR (<5-10% on growth curve)
- HELLP Syndrome

MANAGEMENT OF MILD PREECLAMPSIA

- =>37 wga…favorable cervix
  - start MgSo4/deliver
  - check PIH labs q6-12 hrs + am ppd #1
  - IV analgesia vs cautious epidural
  - continue MgSo4 24 hrs or d/w OB staff
- => 37wga…unfavorable cervix
  - induce vs observe (inpt vs outpt) -
  - deliver not later than 40wga

OUTPATIENT MANAGEMENT

- ob consultation, u/s EFW/AFI, NST, labs
- appropriate only in early/mild disease
- BP stable with diastolic <100mmHg
- proteinuria < 500mg/24 hours
- no signs/symptoms of severe preeclampsia
- no deteriorating disease by lab/no IUGR
- reliable patient

FOLLOW-UP IN HOME MANAGEMENT

- bedrest left side - minimum 15 hrs/day
- daily fetal mvt record
- return ASAP for signs/symtoms worsening disease
- 2x/week NST/AFI
- qweek PIH labs
- review with OB staff weekly

MANAGEMENT OF MILD PREECLAMPSIA (CONT)

- <37 wga…stable maternal-fetal status
  - initial thorough evaluation
  - cautious observation (inpt vs outpt)
  - deliver =>37wga/favorable cervix
  - ob consultation -
  - reevaluate/hospitalize if condition worse

MANAGEMENT OF MILD PREECLAMPSIA (CONT)

- **<37 wga deteriorating status**
  - admit to L&D…u/s EFW/AFI, NST, labs
  - OB consultation
  - **=>34 wga**…start MgSo4/deliver
  - **<34 wga**…start MgSo4/give
  -betamethasone (12 mg IM)/transfer to tertiary center if stable
  - evaluate for autoimmune disease

MANAGEMENT OF SEVERE PREECLAMPSIA

- admit to L&D..us EFW/AFI, NST, labs
- OB consultation
- start MgSo4
- hydralazine 5-10mg IVP q 20 minutes to keep the diastolic BP <110 >100
- =>34wga…deliver
- <34 wga…transfer to tertiary ctr if stable

MANAGEMENT OF SEVERE PREECLAMPSIA (CONT)

- check PIH labs q6 hours in labor and am ppd#1
- IV analgesia vs cautious epidural
- if <34 wga give betamethasone (12mg IM q24 x 2 doses)…evaluate for autoimmune disorder
- if HELLP give postpartum dexamethasone 10mg IV q12 until clinical improvement

MANAGEMENT OF CHRONIC HYPERTENSION

- **Mild-Moderate (BP<150-160/100-110)**
- initially no antihypertensives
- baseline PIH labs/cr clear studies late 2nd or early 3rd trimester
- u/s EFW at 32/36 wga
- 2x/week NST/AFI starting at 32 wga
- OB consultation/deliver 38-40 wga

MANAGEMENT OF SEVERE CHRONIC HYPERTENSION

- **Severe (>150-160/100-110)**
- start aldomet 250mg tid-500mg q6
- baseline PIH labs/cr clear studies late 2nd or early 3rd trimester
- u/s EFW 32/36 wga
- 2x/week NST/AFI starting 32 wga
- bedrest

MANAGEMENT OF SEVERE CHRONIC HYPERTENSION (CONT)

- to be managed by OB staff
- evaluate for delivery 38-40 wga…sooner if BP increases rapidly to >110, significant proteinuria, renal function deteriorates, IUGR suspected, or confirmed oligo

MANAGEMENT OF ECLAMPSIA

- **Receiving MgSo4 therapy**
- call obstetrician stat
- protect airway/call anesthesia to assist
- give additional 4 gram bolus MgSo4 over 15-20 minutes if no oliguria
- continuous O2 sat monitoring

MANAGEMENT OF ECLAMPSIA (CONT)

- **Receiving MgSo4 (cont)**
- if seizures persist then give additional 2 gram bolus MgSo4 over 3-5 minutes
- check MgSo4 level 4 hours after infusion…watch for Mg toxicity
- if seizures persist use amobarbital 250mg IV over 3-5 minutes vs valium 10mg IVP or IM

MANAGEMENT OF ECLAMPSIA (CONT)

- **No prior tx with MgSo4**
- same as with except initially give 6 gram MgSo4 over 15-20 minutes
- **treatment of MgSo4 toxicity**
- calcium gluconate 1 amp (1000mg) IVP slowly over 3 minutes
- protect airway/ventilate as necessary

MgSO4 TOXICITY

- loss of patellar reflex 8-12 mg/dl
- feeling of warmth, flushing 9-12 mg/dl
- somnolence 10-12 mg/dl
- slurred speech 10-12 mg/dl
- muscular paralysis 15-17 mg/dl
- respiratory difficulty 15-17 mg/dl
- cardiac arrest 30-35 mg/dl

TREATMENT OF MgSO4 TOXICITY

- calcium gluconate 1 amp (1000mg) IVP slowly over 3 minutes
- protect airway/ventilate as necessary