ECHO Summary, 21/JUNE/2024
Session Title: Preeclampsia and other hypertensive disorders of pregnancy

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Definitions

- Classifications of Hypertensive Disorders of Pregnancy
    1. Chronic hypertension
        - Systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg
        - Pre-pregnancy or < 20 weeks gestation or that persists for at least 12 weeks post-delivery
    2. Gestational hypertension
        - Systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg
        - ≥ 20 weeks gestation
        - No features of preeclampsia and no systemic signs or symptoms
    3. Preeclampsia *without* severe features
        - Systolic BP 140-159 mmHg and/or diastolic BP 90-109 mmHg
        - ≥ 20 weeks gestation
        - Proteinuria ≥ 2+ on dipstick or ≥300 mg protein/24-hour urine collection or protein:creatinine ratio ≥0.3
        - No organ dysfunction
    4. Preeclampsia *with* severe features
        - Systolic BP ≥ 160 mmHg and/or diastolic BP ≥110 mmHg
        - ≥ 20 weeks gestation

    - Organ dysfunction such as headache, nausea, vomiting, blurred vision, oliguria, upper abdominal pain, pulmonary edema, abnormal labs (CBC, RFT, LFTs, U/S findings such as intrauterine growth restriction, i.e. IUGR), uteroplacental dysfunction
    - With or without proteinuria
5. Chronic Hypertension with superimposed preeclampsia
    - A sudden increase in BP that was previously well-controlled or an escalation of antihypertensive therapy to control BP
    - New onset of proteinuria or a sudden increase in proteinuria in a patient with known proteinuria before or early in pregnancy
6. Eclampsia
    - Systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg
    - Convulsions or coma (unconscious) with no other neurological cause of convulsions
7. HELLP syndrome
    - Hemolysis, Elevated Liver enzymes, Low Platelets
    - May or may not have hypertension

Epidemiology

- Affects 2-15% of pregnancies[1]
- Responsible for 70,000 maternal and 500,000 fetal deaths globally each year[3]

Risk Factors

- High risk factors:
    - Previous pregnancy with preeclampsia, especially early onset and with an adverse outcome
    - Multifetal gestation
    - Chronic hypertension
    - Type 1 or 2 diabetes mellitus
    - Chronic kidney disease
    - Autoimmune disease with potential vascular complications (e.g. antiphospholipid syndrome, systemic lupus erythematosus)
- Moderate risk factors:
    - Nulliparity
    - Obesity (BMI >30 kg/m^2)
    - Family history of preeclampsia in mother or sister
    - Previous adverse pregnancy outcome (e.g. stillbirth, IUGR, placental abruption)
    - Advanced maternal age (>35 years)
    - Interval >10 years between pregnancies
    - Change of partner
    - In vitro conception

Clinical features

- **AIRWAY**:

    - In the actively seizing patient, roll the patient on her left side and suction the mouth to minimize aspiration risk
    - Secure the airway via intubation if needed and if the resources are available[2]
- **BREATHING**:
    - Pulmonary edema can be a severe feature of preeclampsia. Check respiratory rate and SPO2, and give oxygen if needed
- **CIRCULATION**:
    - Blood pressures of systolic ≥160 and/or diastolic ≥110 mmHg are associated with organ dysfunction and should be treated with hydralazine or labetalol
- **DISABILITY:**
    - AVPU: Alert, Voice responsive, Pain responsive, or Unresponsive
    - In the actively seizing patient, administer magnesium sulfate (MgSO4)
        - Remember that MgSO4 can cause respiratory depression and monitor for this
        - If MgSO4 is unavailable, use diazepam and monitor respirations closely
- **EXPOSURE**:
    - In the seizing eclamptic patient, protect the patient from falls/injury[2]
    - Evaluate for physical signs of trauma (i.e. tongue biting with lacerations, injuries from associated falls, posterior shoulder dislocation)

Diagnostics

- Measuring blood pressure:
    - Make sure the patient is relaxed and seated in a chair with her feet on the ground and arm resting comfortably at heart level
    - Diagnosis of hypertension must be made from 2 different readings separated by at least 4 hours
- Key diagnostic tests for patients with preeclampsia (to evaluate for severe features) or eclampsia
    - Urine testing for protein
    - Blood tests
        - Complete blood count (CBC) for thrombocytopenia
        - Liver function tests (LFT)
        - Renal function testing
        - Clotting time if platelet count < 100 x 10^9
        - Fibrinogen
        - Malaria testing given concern for cerebral malaria in patients with eclampsia
        - Ultrasound scan for fetal GA and viability[4]

Treatment

- Prevention or control of seizures in the patient with preeclampsia OR eclampsia
    - Drug of choice: MgSO4
        - Loading dose:14 g total

- IV 4 g of 20% MgSO4 (draw 8 mL of 50% MgSO4 and add 12 mL of water or normal saline to make 4 g of 20% MgSO4) given as a slow IV bolus over 20 minutes
- Followed by IM 5 g of 50% with 1mL of 2% lidocaine in each buttock

■ Maintenance dose: IM 5 g of 50% with 1 mL of 2% lidocaine every 4 hours in alternate buttocks for 24 hours from delivery or convulsion, whichever occurred last
■ If the patient convulses again while receiving MgSO4, give IV 2 g of 20% MgSO4 and continue with maintenance dose as scheduled
■ Assess for Mg toxicity every 1-2 hours and continue maintenance dose only if:
- Patellar reflex is present
- Respiratory rate > 12 breaths/min
- Urine output > 100mL over 4 hours

○ If there is no MgSO4, you can use diazepam in a mother who is actively convulsing. This is a last resort, however, due to respiratory depression in both the mother and the fetus

- Control of hypertension
  - Non-severe: systolic BP 140-159 mmHg and/or diastolic BP 90-109 mmHg
    - Drugs of choice (all orals): labetalol, nifedipine, methyldopa, or a combination
    - Target BP: systolic BP 130-139 mmHg and diastolic BP 80-89 mmHg
    - Lower BP *gradually* over hours to days to avoid ischemic stroke
  - Severe: systolic BP ≥ 160 mmHg and/or diastolic BP ≥ 110 mmHg
    - Hydralazine:
      - 5 mg IV slowly over 10-15 min every 30 min until BP <160/<110 mmHg
      - Max dose 20 mg in 24 hours
      - Once BP is reduced, treatment should be considered with oral medications
    - Or labetalol:
      - 20 mg IV slowly over 1-2 min; double the dose every 20 min until diastolic BP < 110 mmHg
      - Max dose 300 mg in 24 hours

  NOTE: Avoid diuretics or ACE inhibitors![4]
- Delivery of the baby
  - Vaginally if possible unless other obstetric reason for C-section
  - Patients with preeclampsia *without* severe features should be promptly delivered once reaching term[1]
  - If the mother is preeclamptic with severe features and has any of the following features* → urgent vaginal or C-section delivery
    - Non-reassuring fetal heart

        - Ruptured membranes
        - Uncontrolled BP
        - Oligohydramnios
        - Features of IUGR
        - Oliguria of < 500 mL/24 hours
        - Pulmonary edema
        - Headache that is persistent and severe[4]

    *If patient is preterm at this point, discuss risks vs. benefits of pregnancy termination. If there is time, administer corticosteroids to the mother to encourage fetal lung maturation.[1]

- Post-delivery and long-term follow-up
    - Close monitoring of vital signs for at least 3 days
        - Complete MgSO4 course
        - Monitor BP every 15 minutes for 2 hours
            - If remains stable, continue to monitor BP and urine protein
        - Continue antihypertensive to maintain diastolic BP less than 90 mmHg
        - Send home when BP is stable and proteinuria has resolved
        - Will need ongoing monitoring of BP at home[4]
            - Follow up at 1 week, 2 weeks, 6 weeks, and 12 weeks postpartum with repeat labs and blood pressure checks at each visit

Complications

- IUGR, preterm delivery, or fetal loss
- Multiorgan failure or death for the mother
- Complication risk is higher in women > 35 years old[1]

Disposition

- With the exception of chronic hypertension, women with hypertensive disorders of pregnancy should be admitted to the hospital on bed rest
- Women with severe preeclampsia and eclampsia will need delivery and should therefore be cared for in a setting capable of C-section (if it is needed)[4]

Prevention

- Aspirin
    - The standard dosing in Uganda is 150 mg daily up to 36 weeks GA, then stop daily aspirin
    - Interesting fact for comparison: the U.S. Preventive Services Task Force recommends that women at high risk for preeclampsia take 81 mg aspirin daily after 12 weeks.[2] Global guidelines vary on the recommended dose - the range is typically 75-150 mg daily,[1] and the World Health Organization (WHO) guidelines (last updated in 2021) recommend 75 mg daily for women at moderate to high risk[5]

        - Moderate risk per WHO
            - 2 of the following risk factors:
                - Primiparity
                - Family history of pre-eclampsia
                - Age > 40 years
                - Multiple pregnancy
        - High risk per WHO
            - ≥1 of the following risk factors
                - Diabetes
                - Chronic or gestational hypertension
                - Renal disease
                - Autoimmune disease
                - Previous history of pre-eclampsia
                - Previous fetal or neonatal death associated with pre-eclampsia[5]
- Calcium supplementation
    - The WHO previously recommended daily supplementation with 1.5–2.0 g oral elemental calcium in pregnant women to decrease preeclampsia risk (2018 guidelines)
    - 2020 update: “Pre-pregnancy calcium supplementation for the prevention of pre-eclampsia and its complications is recommended only in the context of rigorous research”[6]
- Diet recommendations
    - Women should strive to increase dietary calcium intake
    - Avoiding caffeine and soda can help prevent calcium losses[6]
    - Other recommendations include controlling maternal weight, increasing fiber intake, and taking multivitamins/probiotics (if available)[1]
- Aerobic exercise decreases the risk of hypertensive disorders of pregnancy[1]

Special Notes

- Delivery is the definitive treatment for preeclampsia/eclampsia, but remember to resuscitate (i.e. control of seizures and blood pressure) before delivering![1]
- The case discussed at the beginning of the session involved a patient with postpartum eclampsia. *Remember that women can develop preeclampsia and eclampsia up to 6 weeks postpartum!*[7] The risk is greatest in the first 48 hours after delivery[2]
- Remember that women can develop eclampsia *even with a normal blood pressure*[2]

Collaborating Partners

1. Ministry of Health of the Republic of Uganda
2. Seed Global Health
3. Techies Without Borders

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