SUBJECT: Preeclampsia and Other Hypertensive Disorders of Pregnancy

DEPARTMENTS: FBC, Emergency Department

PURPOSE:

To outline the nursing management of inpatients who have preeclampsia or other hypertensive disorders of pregnancy, including special considerations for management of patients on magnesium sulfate, patients on antihypertensive medications and management of eclampsia.

SUPPORTIVE DATA:

Hypertensive disorders of pregnancy are the leading cause of maternal mortality and one of the leading contributors to premature birth that leads to significant neonatal morbidity and mortality (ACOG, 2012). Preeclampsia is a hypertensive disorder of pregnancy characterized by vasospasm and endothelial damage, which may impact uteroplacental function as well as the cardiovascular, renal, hematological, neurologic, and hepatic systems. It is of unknown etiology.

POLICY:

PROCEDURE:

Admission Assessment

1. Assess for absence or presence of:
    a. Headache
    b. Visual changes
    c. Right upper quadrant (RUQ) or epigastric pain
    d. Nausea/vomiting
    e. General malaise.
    f. Urine protein.
2. Apply external fetal monitor per Fetal Monitoring Policy.
3. Assess maternal vital signs: temperature, heart rate, respiratory rate, oxygen saturation and blood pressure. Repeat blood pressures 15 minutes apart.
    a. Blood pressure is taken using appropriate sized blood pressure cuff
    b. Cuff is on the arm at the level of the heart
    c. Taken with patient in the upright position
    d. Repeat blood pressure taken in same position.
4. Assess for generalized edema and history of significant, recent weight gain.
5. Auscultate lung sounds, noting any presence of rales, rhonchi, wheezing, etc.
6. Assess upper or lower deep tendon reflexes.
7. Obtain IV access per provider order.
8. Obtain labwork and notify physician of results.
9. Administer medications, per physician order, to lower blood pressures for persistent blood pressure equal to or greater than 160 systolic OR equal to or greater than 110 diastolic.
10. Maintain activity as ordered by provider. If on bed rest, maintain lateral recumbent position as much as possible, and change position every two hours or more often as needed.
11. Assess intake and output (I&O) every 1 hour.
12. Ensure oxygen and suction equipment are present and functioning at bedside.
13. Implement measures to decrease stress level, such as provision of a quiet environment and low lighting.
14. Provide emotional support and opportunity for patient family to verbalize questions, concerns and/or fears.

Antepartum Ongoing Assessment

Goals of patient management are:

1. Early recognition of severe or worsening preeclampsia or development of eclampsia.
2. Prolongation of pregnancy to optimize fetal maturation must be weighed against risks of pregnancy continuation.

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Preeclampsia without severe features (formerly mild):

1. Every 4 hours obtain:
    1. blood pressure
    2. pulse
    3. respirations
    4. oxygen saturation
    5. lung sounds
2. Every 8 hours obtain:
    1. deep tendon reflexes (DTRs)
    2. clonus
    3. edema
    4. level of consciousness (LOC)
    5. headache
    6. visual disturbances
    7. epigastric pain
    8. urine output
3. Obtain Non Stress Test (NST) or monitor Fetal Heart Rate (FHR) with uterine activity for 30 min every shift or more frequently per physician order.
4. Assess fetal movement every shift.

Preeclampsia with Severe Features:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation hourly or per physician order.
2. Assess lung sounds every 2 hours or per physician order.
3. Every 4 hours obtain:
    1. deep tendon reflexes (DTRs)
    2. clonus
    3. edema
    4. level of consciousness (LOC)
    5. headache
    6. visual disturbances
    7. epigastric pain
    8. urine output
4. Monitor FHR and uterine activity continuously.

Intrapartum Ongoing Assessment

Preeclampsia without severe features:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation hourly.
2. Assess lung sounds and urine output every 4 hours.
3. Every 8 hours obtain:
    1. deep tendon reflexes (DTRs)
    2. clonus
    3. edema
    4. level of consciousness (LOC)
    5. headache
    6. visual disturbances
    7. epigastric pain
4. Monitor FHR and uterine activity continuously.

Preeclampsia with Severe Features:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 30 minutes.
2. Assess intake and output hourly.
3. Assess lung sounds every 2 hours.
4. Every 4 hours obtain:
    1. deep tendon reflexes (DTRs)
    2. clonus
    3. edema
    4. level of consciousness (LOC)
    5. headache

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6. visual disturbances
7. epigastric pain

5. Monitor FHR and uterine activity continuously or per physician order.

Postpartum to Discharge Ongoing Assessment

Preeclampsia without severe features:

1. Every 4 hours obtain:
    1. blood pressure
    2. pulse
    3. respirations
    4. oxygen saturation
    5. lung sounds
2. Every 8 hours obtain:
    1. deep tendon reflexes (DTRs)
    2. clonus
    3. edema
    4. level of consciousness (LOC)
    5. headache
    6. visual disturbances
    7. epigastric pain
    8. urine output

Preeclampsia with Severe Features:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 60 minutes for first 12 hours after delivery then every 2 hours for the next 12 hours, then every 4 hours.
2. Assess intake and output hourly for the first 24 hours after delivery and then every 4 hours.
3. Assess lung sounds every 2 hours for first 24 hours after delivery then every 4 hours.
4. Assess deep tendon reflexes (DTRs), clonus, edema, level of consciousness (LOC), headache, visual disturbances, epigastric pain every 4 hours.

REPORTABLE CONDITIONS:

Notify provider for:

1. Repeated blood pressure greater than or equal to 160 systolic OR greater than or equal to 105 diastolic (taken at least 15 minutes apart).
2. New or worsening complaint of any of the following:
    a. Headache
    b. Visual changes
    c. RUQ or epigastric pain
3. Abnormal lab values
4. Abnormal changes in lung sounds
5. Change in level of consciousness (LOC)
6. Urine output of less than 30ml/hr

MAGNESIUM SULFATE:

Background:

1. Magnesium sulfate is administered as a first line drug to prevent maternal eclamptic seizures.
2. Magnesium sulfate is listed as a high alert medication and requires a 2 RN independent double check. Loading dose is NOT administered from the maintenance solution.
3. Magnesium sulfate is recommended for patients diagnosed with preeclampsia with severe features. For patients with preeclampsia without severe features, the use of magnesium sulfate for seizure prophylaxis can be considered.

Administration:

1. Magnesium sulfate loading and maintenance dosing:
    a. Loading dose: 4 gm IV over 15-30 minutes
    b. Maintenance dose: 2 gm per hour
    c. Rate needs to be adjusted for patients with a creatinine level greater than or equal to 1.2 mg/dl. Serum magnesium levels are recommended in patients with renal insufficiency.

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2. If signs of magnesium toxicity are present, discontinue the infusion and obtain a STAT serum magnesium level. Signs of magnesium toxicity include the following:
    a. New onset loss of DTR's
    b. Respiratory depression / shortness of breath / respiratory arrest
    c. Decreased responsiveness
    d. Chest pain
    e. Electrocardiographic changes

Calcium gluconate is the antidote for magnesium toxicity and should be readily available during the administration of magnesium sulfate. Recommended administration dosage is 10% calcium gluconate 1 gram over 2-5 minutes.

3. Magnesium levels of 5 to 8 mg/dl are considered to be in therapeutic range. Obtain routine serum magnesium levels as ordered by the provider.
4. Magnesium sulfate should be administered upon diagnosis of eclampsia or preeclampsia with severe features, continued intrapartum and for at least 24 hours after delivery, depending on the patient's condition.
5. During eclamptic seizure:
    a. If patient is NOT receiving magnesium sulfate then give magnesium sulfate loading dose of 4 or 6 gms IV bolus over 15-30 min followed by a maintenance dose of 2 gm IV per hour.
    b. If the patient is receiving magnesium sulfate at the time of seizure, consider giving an additional 2 gm IV bolus of magnesium sulfate over 3-5 min followed by the maintenance dose and drawing a stat magnesium level.
    c. If the eclamptic seizure occurs postpartum it is recommended that magnesium sulfate be continued for 24 hours after the last seizure.

ANTIHYPERTENSIVE MEDICATION (see attached algorithm):
Background:

1. A sustained SBP greater than or equal to 160 mm Hg OR DBP greater than or equal to 110 mm Hg may be treated with IV antihypertensive medication to protect the patient from cerebral vascular accident.
2. Timely treatment (within 30 to 60 minutes) should be initiated for confirmed (sustained BP for 15 minutes) systolic blood pressure greater than or equal to 160 mm Hg OR diastolic blood pressure greater than or equal to 110 mm Hg.
3. The goal is a systolic pressure less than 155 mm Hg and diastolic pressure of 90-100 mm Hg.

Medication Administration:

1. Ensure presence of mainline IV infusion.
2. Monitor the FHR continuously.
3. Maintain bedrest during and for 3 hours following medication administration.
4. Assess for postural hypotension prior to ambulation.
5. If unable to control blood pressure, contact physician regarding consideration of other medications and/or transfer to a higher level of care.

Labetalol is a combined alpha and beta-blocker, resulting in decreased peripheral vascular resistance without altering heart rate or cardiac output. Its use is contraindicated in patients with bronchial asthma, heart block and severe bradycardia.
IV Push:

1. Administer initial dose IV push over 2 minutes (usual dose is 20 mg).
2. If hypertension persists after 10 minutes from initial dose, administer 40 mg IV over 2 minutes.
3. If hypertension persists after 10 minutes from second dose, administer 80 mg IV over 2 minutes.
4. If no appropriate blood pressure response, consider hydralazine and consider anesthesia consult.

5. Continuous maternal heart rate monitoring via pulse oximetry or cardiac monitor.

Continuous IV:

1. Consider collaborative care with intensive care unit.
2. Initiation of continuous cardiac monitoring.
3. Infuse a continuous labetalol infusion pump until diastolic pressure is 90-100 mm Hg.

Maximum dose is 300 mg/24 hours.

Hydralazine is a vasodilator and results in vasodilation of vascular smooth muscle.

1. Administer initial dose of 5 or 10 mg IV push over 1-2 minutes, per physician order.
2. May repeat dose at 20-minute intervals until desired blood pressure is achieved or a cumulative dose of 40 mg is reached.

Nifedipine is a calcium channel blocker and commonly prescribed for mild to moderate hypertension in pregnancy.

1. Administer initial dose 10 mg PO per physician order.
2. May repeat dose at 20-minute intervals until desired blood pressure is achieved or a maximum of 5 doses is given.
3. For persistent hypertension, consider IV hydralazine or IV labetalol and anesthesia consult.

Reportable Conditions:

Notify provider for:

1. DBP less than 70 or greater than 105 following medication administration.
2. Systolic blood pressure remains greater than 155 mm Hg.
3. Declining Category II tracing or Category III fetal heart rate tracing following antihypertensive administration.
4. Sustained maternal heart rate less than 50 bpm or greater than 110 bpm during or within 30 minutes of medication administration.

ECLAMPSIA MANAGEMENT (see attached algorithm):

Background:

1. Eclampsia is characterized by convulsions and loss of consciousness, which can occur without warning during the antepartum, intrapartum or postpartum period.
2. The eclamptic patient is at risk for aspiration and cerebral hemorrhage.
3. Fetal bradycardia frequently occurs during and following an eclamptic seizure.
4. Best treatment for baby is maternal stabilization.

Management:

1. Notify charge nurse, attending provider, and anesthesiologist/CRNA immediately.
2. Call rapid response team (RRT).
3. Position patient on side.
4. Protect patient from injury.
5. Administer magnesium sulfate IV with loading dose per physician order.
6. If patient is already receiving magnesium sulfate, an additional 2gm bolus dose should be given.
7. Anticipate obtaining lab tests (magnesium level, blood for liver enzymes, kidney function, etc.).
8. Following seizure:
    a. Suction mouth.
    b. Give 100% oxygen by non-rebreather mask at 10 liters per minute.
    c. Maintain open airway.
    d. Assess blood pressure, pulse, and respirations every 5 minutes.
    e. Assess oxygen saturation and level of consciousness every 15 minutes until stable for a minimum of one hour.
    f. Monitor fetal heart rate and uterine activity continuously.
    g. Observe for signs and symptoms of placental abruption or impending delivery.
    h. Obtain order for indwelling catheter.
    i. Assess for signs and symptoms of neurologic injury. If abnormal neurological exam or repeated seizures, imaging should be undertaken.

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CONSIDERATIONS FOR OTHER HOSPITAL DEPARTMENTS:

Emergency Department:

1. Ascertain from patient or family if patient is pregnant or has delivered within the past 6 weeks.
2. Obtain OB/GYN consult for patient presenting with new-onset severe hypertension (SBP 160 mmHg or greater and/or DBP 105 mmHg or greater) measured using standard techniques that persists for 15 minutes or more.
3. Notify Labor and Delivery staff.
4. Follow treatment guidelines in the management of the patient with acute-onset severe hypertension.

Intensive Care Unit (ICU) and Telemetry Care Unit (TCU):

1. Follow this policy along with the unit specific policies when caring for these patients whether as antepartum or postpartum.
2. Notify Labor and Delivery staff at time of admission or with any changes in patient condition.

PATIENT AND FAMILY EDUCATION:

Discuss the following using teachback methodology:

1. Nature of disorder
2. Treatment and reasons for treatment
3. Potential side effects of medication
4. Importance of quiet environment with limited visitors
5. Notification of nurse regarding presence of headache, visual changes, epigastric pain, chest pain, dyspnea, etc.

DISCHARGE GUIDELINES

1. Discharge instructions to include when to call doctor, warning signs of preeclampsia, follow-up appointments, use of medications, and home BP monitoring program (if ordered)
2. Provide written educational materials on preeclampsia and hypertension in pregnancy
3. Assure follow-up appointment is made per following criteria:
    a. Patients treated with antihypertensive medications during their hospital stay should have follow-up appointment scheduled within 3-7 days of discharge.
    b. All other patients diagnosed with hypertension during current hospitalization but not treated with antihypertensive medications during their hospital stay should have follow-up appointment scheduled within 7-14 days of discharge.

DEFINITIONS:

Hypertensive Disorders of Pregnancy:

1. **Preeclampsia:** Systolic Blood Pressure (SBP) of 140 mmHg or greater OR Diastolic Blood Pressure (DBP) of 90 mmHg or greater on two occasions at least 4 hours apart in a pregnant or postpartum woman with previously normal blood pressure AND presence of proteinuria with excretion of 300 mg or more protein in a 24 hour urine specimen. Preeclampsia may be diagnosed in the absence of proteinuria if patient exhibits other signs and symptoms. Preeclampsia may first present during the postpartum period.
2. **Preeclampsia with Severe Features:** one or more of the following :
    a. SBP of 160 mmHg or higher OR DBP of 105 mmHg or higher on two occasions at least 4 hours apart while patient is at rest (unless antihypertensive therapy is initiated before this time).
    b. Thrombocytopenia (platelet count less than 100,000) or evidence of hemolysis
    c. Impaired liver function (liver enzyme concentrations elevated greater than twice the normal limit)
    d. Epigastric or right upper quadrant pain
    e. Renal insufficiency (serum creatinine concentration greater than 1.1 mg/dl)
    f. Oliguria of less than 500 milliliters (mL) in 24 hours
    g. Pulmonary edema or cyanosis
    h. Visual or cerebral disturbances

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3. **HELLP (Hemolysis, Elevated Liver enzymes, Low Platelets) Syndrome:** Most often develops in women with severe preeclampsia and is indicative of progressive systemic and/or organ dysfunction.
4. **Eclampsia:** Seizure(s) in pregnant or postpartum patient with preeclampsia without a neurological cause or other medical condition as possible etiology.
5. **Chronic Hypertension (CHTN):** SBP 140 mmHg or greater OR DBP 90 mmHg or greater predating conception OR elevated blood pressures identified before 20 weeks gestation. Hypertension persists greater than 12 weeks postpartum.
6. **CHTN with Superimposed Preeclampsia**: New onset proteinuria after 20 weeks in a woman with hypertension, sudden increase in proteinuria, sudden increase in BP, thrombocytopenia or elevated AST or ALT.

ASSOCIATED POLICIES:
Fetal Monitoring
Medication Management: High Risk Medications
Rapid Response Team Leader - Standardized Procedure

REFERENCES:

- Maurice L. Druzin, MD; Laurence E. Shields, MD; Nancy L. Peterson, RNC, PNNP, MSN; Valerie Cape, BSBA (2013). *Preeclampsia Toolkit: Improving Health Care Response to Preeclampsia (California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care).* California Department of Public Health; Maternal, Child and Adolescent Health Division; Published by the California Maternal Quality Care Collaborative.
- American Congress of Obstetricians and Gynecologists (2012). *Diagnosis and Management of Preeclampsia and Eclampsia*. Practice Bulletin Number 33. 2002 (Reaffirmed 2012).
- American College of Obstetrics and Gynecologists (2013). *Hypertension in Pregnancy*. Washington DC.

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