PURPOSE: To outline nursing responsibility in the safe administration of intravenous Magnesium Sulfate.

OBJECTIVES:
1. To safely and adequately provide care to patients receiving Magnesium Sulfate.
2. To promote fetal and maternal well-being during Magnesium Sulfate administration.
3. Magnesium Sulfate is contraindicated for patients with:
   a) Hypocalcemia;
   b) Myasthenia Gravis;
   c) Renal Failure.

DEFINITIONS:
1. Magnesium Sulfate is used in the pre-term labor patient to:
   a) Decrease smooth, skeletal and cardiac muscle activity.
   b) Depress the vasomotor center causing a slight vasodilation.
   c) Depress the central nervous system, decrease neuromuscular activity, and decrease CNS irritability.
2. Preterm labor can be defined as regular contractions that occur before 37 weeks of gestation and are associated with changes in the cervix.

NOTE: Emphasize to patients that uterine contractions are not necessarily painful. Encourage patients to seek care early, particularly if they even suspect preterm labor.

3. Risk Factors Associated with Preterm Labor:
   a) Previous preterm labor or delivery.
   b) Uterine anomalies.
   c) Multiple gestations (twins, triplets, etc.)
   d) Chorioamnionitis.
   e) Hydramnios.
   f) Placental hemorrhage.
   g) Premature rupture of the membranes.
   h) Smoking.
i) Hypertensive disease.  
j) Fetal anomalies.  
k) Poor nutrition.  
l) Drug or alcohol abuse.  
m) Low socioeconomic status.  
n) Extreme maternal age (< 16 or > 40).

4. **Signs and symptoms:**
   
a) Contractions.  
b) Menstrual-like cramps.  
c) Low backache.  
d) Abdominal cramps with or without diarrhea.  
e) Pelvic pressure (vaginal, rectal or perineal).  
f) Increase or change in vaginal discharge--any type of discharge, increased amount of discharge, change in consistency or feel of the discharge, change in the color, especially to a brown or pink.

**PATIENT EDUCATION:**

1. Explain rationale to patient and support persons with the use of tocolytics to treat contractions and to try to prevent preterm birth.

2. Explain all procedures, equipment, medications, and side effects and answer all questions.

3. Allow for expression of anxiety concerning infant’s prematurity. Arranging for the staff of the neonatal intensive care unit to visit the patient to answer questions may be helpful.


5. Begin patient education to increase knowledge and skills concerning preterm labor. Patient education is individualized but may include the following:
   
a) Medication administration, scheduling, and side effects.  
b) Abdominal palpation and timing of contractions.  
c) Importance of bed rest in lateral recumbent position.  
d) Subtle signs or symptoms of preterm labor and importance of immediately reporting symptoms.  
e) Adequate hydration.

**EQUIPMENT:**

Assemble the following from the nursing unit:  
1. IV administration set, IV start kit, non-sterile gloves, IV pump tubing,

1. Oxygen and suction ready for use.
2. Mainline intravenous solution as ordered.

3. 250 ml LR with 20 grams magnesium sulfate. To infuse at 1-4 grams/hour as ordered by provider. Bolus dose usually 4-6 gms magnesium sulfate in 50ml NS administered over 20-30 minutes.

4. Infusion pump.

5. Electronic fetal monitor.

6. Automated blood pressure monitor.

PROCEDURE:
BEFORE AND DURING MAGNESIUM SULFATE ADMINISTRATION:

1. Ensure proper patient identification

2. Assess physical and mental status of patient. Any change in alertness may be a very important finding indicating central nervous system irritability or depression.

3. Provide quiet environment when feasible.

4. Position patient on side as much as possible, discourage semi-fowler’s position for extended periods of time.

5. Obtain hourly intake/output (or as ordered by physician).

   a) If significant concern regarding intake/output, obtain order for an indwelling Foley catheter. Notify the physician for output less than 30ml/hour. If the physician does not want a Foley catheter inserted, have the patient void on the bedpan every one to two hours.

   b) Monitor intravenous fluids carefully via electronic infusion device to prevent overload.

   CAUTION NOTE: Magnesium Sulfate is excreted through the kidneys. If the patient’s output is high, an increase in Magnesium Sulfate may be indicated. If the output is low (<30 ml/hour) a lower dose may be needed. The patient with a low output is at an increased risk for Magnesium Sulfate toxicity.

5. Assess important physical parameters and document findings.

   a) Assess deep tendon reflexes utilizing patellar and/or biceps jerk bilaterally at least every hour and PRN (or per physician order). Responses are as follows:

   1) 0 = no response. Notify physician and DO
NOT administer Magnesium Sulfate.

2) +1 = low response.
3) +2 = normal response.
4) +3 = greater than normal response.
5) +4 = hyperactive response. Notify physician.

b) Vital signs
1) Antepartum and Intrapartum: Blood pressure, pulse and respirations at start of bolus and every 15 minutes for the first hour, then hourly x 2 then every 4 hours or as ordered by physician. Pulse oximetry with same frequency as vital signs. If patient progresses to active labor, VS per labor protocol.

c) Fetal Monitoring
1) Antepartum: External fetal monitor on continuously for two (2) hours after bolus started, then EFM as per physician order.
2) Intrapartum: Continuous fetal monitoring when patient moves into active labor.

CAUTION NOTE: Magnesium Sulfate may depress the central nervous system of the fetus and, therefore, may diminish variability. Be prepared at delivery to resuscitate any baby with a mother on Magnesium Sulfate regardless of FHR tracing. Babies may have normal pH values at delivery yet be unable to breathe independently.

d) Auscultate chest for any adventitious sounds, such as congestion, rales and rhonchi with vital signs.
e) Observe for signs of Magnesium Sulfate toxicity.
f) Observe for signs of impending labor and/or delivery.
   1) Increased abdominal pain, cramping, back pain.
   2) Present and/or increase in vaginal discharge or bleeding.
   3) Increased pelvic pressure.
   4) Spontaneous rupture of membranes.
   5) Signs of fetal stress/fetal distress.

6. Limit visitors to support person only when acceptable to patient.

7. Emergency care of a pre-term infant:
a) When patient is identified as having pre-term labor, have room prepared for delivery. Oxygen and suction checked and available.
b) Emergency delivery pack should be available at bedside or case cart set up for delivery in the LDR.
c) Initial NICU notification of patient and fetal status
with updates periodically. NICU staff and a neonatologist should be present at delivery of a pre-term infant less than 34 weeks gestation, or as appropriate.

d) When delivery occurs use NRP protocol for neonatal resuscitation.

8. Monitor fetal well-being by observing for:
   a) Uterine activity.
   b) Decreased baseline variability which may indicate depressed fetal CNS. Presence of fetal HR changes (i.e., late decelerations and/or accelerations and/or a rise in baseline FHR).
   c) Intrapartum complications, e.g., hemorrhage, abruption, shock, maternal respiratory distress.

9. Have blood bank clot drawn and current.

10. Provide psychological support. Keep patient and family informed

PREPARATION AND ADMINISTRATION OF MAGNESIUM SULFATE SOLUTION:

1. Start mainline intravenous access with #18 IV catheter.

2. Infuse magnesium sulfate as ordered by provider. Ensure compatibility of all other IV medications with magnesium sulfate.

3. Magnesium Sulfate solution will be premixed by Pharmacy as ordered and administered IVPB. Monitor closely with Infusion Pump.

4. Label IV with date and time of start, patient’s name.

5. Perform independent verification due to magnesium sulfate as a high alert medication at the initiation of the dose, change in dose and at any maintenance bag changes.

6. Common method of Magnesium Sulfate administrations is IV.
   a) IV-Bolus dose of 4-6 gm in 50 ml SW infused over 20 to 30 minutes, followed by a maintenance dose. Nurse must remain at bedside during bolus infusion.
   b) Maintenance dose of Magnesium Sulfate is 1 to 4 gm/hour by infusion pump.

CAUTION NOTES:

1. Prior to re-bolusing Magnesium Sulfate or increasing dosages, check to make sure:
   a) Deep tendon reflexes are present.
b) Respiratory rate is more than 12/minute.
c) Urine output is at least 30 ml /hour.

2. Patient response to rise in serum levels:
   a) Therapeutic: 5-7 mEq/L
   b) Loss of deep tendon reflexes: 10 mEq/L
   c) Respiratory failure: 12-15 mEq/L
   d) Cardiac arrest: 25 mEq/L

3. Calcium gluconate is the antidote for Magnesium Sulfate toxicity. If ordered, administer Calcium Gluconate 10%, IV Push, 10 ml over 3 minutes. The signs of Magnesium Sulfate toxicity include:
   a) Absent DTRs.
   b) Respirations less than 12/minute, shortness of breath, or respiratory arrest.
   c) Chest pain
   d) Urinary output less than 30 ml /hour.
   e) A significant drop in pulse or BP.
   f) Signs of fetal distress.
   g) Coma.

DOCUMENTATION:
1. Pertinent maternal and fetal assessments.
2. Initiation of protocols used in patient care.
3. All nursing and medical interventions and patient’s response.
4. Magnesium sulfate in grams per hour.
5. Initial and subsequent tocolytic dosages as well as times of dosage changes.
6. Physician notification, including indication and response.

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