

POLICY

The physician orders intravenous administration of magnesium sulfate for three indications:

- Seizure prevention
- Fetal Neuroprotection (WW.08.22)
- Magnesium Replacement (WW.08.23.)

Applicability: Administration of magnesium sulfate for seizure prevention and fetal neuroprotection occurs in the Birthing area of the Acute Perinatal Program. Administration of magnesium sulfate for magnesium replacement occurs throughout the Acute Perinatal Program.

PROCEDURE

1.1 Indication-Seizure Prevention

Preeclampsia is defined by new or worsening proteinuria with one or more adverse conditions (increase the risk of maternal and fetal complications). Severe Pre-eclampsia is defined as new onset proteinuria and one or more severe complications. Severe pre-eclampsia warrants delivery regardless of gestational age.

Adverse Conditions and Severe Complications of Pre-Eclampsia		
Organ System Affected	Adverse Conditions (increased risk of severe complications)	Severe Complications (indicated delivery)
CNS	• Headache • Visual Disturbances	• Eclampsia • Blindness or retinal detachment • GCS <13 • Stroke, transient ischemic attack (TIA)
Cardio-respiratory	• Chest pain • Dyspnea • SpO₂ <97%	• Uncontrolled severe hypertension • SpO₂ <90% • Need for 50% O₂ for >1 hour • Pulmonary edema • Inotropes • Myocardial ischemia or infarction
Hematological	• Leukocytosis (↑WBCs) • Abnormal coagulation • Thrombocytopenia (↓platelets)	• Thrombocytopenia (platelets <50) • Requirement for blood product transfusion
Renal	• ↑ creatinine • ↑ uric acid	• Acute kidney injury (creatinine >150) • Need for dialysis
Hepatic	• Nausea and vomiting • Right-upper quadrant (RUQ) or epigastric pain • ↑ liver enzymes (AST, ALT, LDH, bilirubin) • ↓ albumin	• Hepatic dysfunction (INR >2) • Hepatic hematoma or rupture
Feto-placental	• Abnormal FHR • IUGR • Oligohydramnios • Absent or reversed end-diastolic flow	• Abruptio with maternal or fetal compromise • Stillbirth

Note: For signs of impending seizures such as hyperreflexia, increased headache or epigastric pain see [Seizure Protocol: BC Women's Flow Diagram](#).

1.2 Gather Materials

Intravenous Mainline Infusion

- Infusion pump
- Intravenous (IV) catheter #18
- IV administration set
- Normal saline – 1000 millilitres (mL)

MgSO₄ Loading Dose and Infusion

- Automatic blood pressure (BP) machine
- Cassette for delivering IV medication
- IV infusion set
- Prefilled Magnesium sulfate 20 grams in Normal saline – 500 mL

Urine monitoring

- Foley catheter
- Urine meter drainage bag

1.3 Preparation

Check emergency equipment is ready for use:

- Call bell
- Maternal Emergency Drug Tray (General Kit 020)
- Oral airway
- Oxygen
- Reflex hammer
- Self-inflating resuscitation bag
- Suction

1.4 Assess the following as a baseline:

- Blood pressure
- Deep tendon reflexes/ presence of clonus
- Level of consciousness: Glasgow Coma Scale (GCS)
- Oxygen saturation
- Assess the fetal heart rate and uterine activity using electronic fetal monitoring (EFM)
- Insert foley catheter and assess urine for protein
- Pain (scale)
- Pulse
- Respirations
- Temperature

Note: If urine output is less than 40 mL hour - avoid nonsteroidal anti-inflammatory drugs (NSAIDs) for example (e.g.) ibuprofen, naproxen, diclofenac, ASA

1.5 Magnesium sulfate for loading dose and maintenance infusion

- Confirm Prescriber's Orders - Magnesium Sulfate Administration for Seizure Prevention
 - Initiate Mainline IV of normal saline infusion with a #18 catheter
- NOTE:** Drug compatibility: Nifedipine as an anti-hypertensive is compatible for use with magnesium sulfate
- Obtain a pre-mixed bag of magnesium sulfate from the Pyxis fridge as per physician's orders:
 - Magnesium sulfate 20 grams in 500 mL normal saline (dilution = 40 milligrams/ mL or 4 grams/ 100 mL)
 - Prime the secondary IV administration set

MAGNESIUM SULFATE (MgSO₄): ADMINISTRATION FOR SEIZURE PREVENTION

Medication	Dose	Route	Frequency
Magnesium sulfate	Loading dose 4 grams (100 mL), rate = 200 mL/ hour	IV	infuse over 30 minutes
THEN	Maintenance dose: 1 gram/ hour, rate = 25 mL/ hour	IV	maintenance infusion

- Prepare infusion pump settings:
 - Program the pump for the maintenance dose **first** using “Continuous” infusion option to run at 25 mL/hr
 - Then program the loading dose using the “Bolus” option for 4 grams to run at 200 mL/hr (to run over 30 minutes)
 - The maintenance dose will automatically begin when the loading dose is complete
- Label IV tubing at the connection to mainline using Medication Added label
- **Start Magnesium Sulfate Infusion**
 - **Loading Dose**
 - I. Piggyback the magnesium sulfate secondary administration set into the mainline IV.
 - II. Start the loading dose infusion 4 grams (100 mL) first
 - **Maintenance Dose**
 - I. When the loading dose is complete, start maintenance dose
 - II. Check the infusion pump delivers the maintenance infusion rate of 1 gram/ hour (25 mL/ hour) or as ordered for seizure prophylaxis
 - **Adjust mainline IV fluid to:** 55 mL/ hour to provide total 80 mL/ hour

1.6 Monitoring

During the loading dose infusion	
Monitor continuously: ▪ Oxygen saturation - target 95% or more ▪ Electronic fetal heart monitoring ▪ Uterine activity	Monitor every 5 minutes: ▪ Blood pressure ▪ Pulse ▪ Respirations
During maintenance dose infusion	
Monitor continuously ▪ EFM ▪ Uterine activity	
Monitor hourly : ▪ Blood pressure, pulse, respirations ▪ Maternal oxygen saturation ▪ Maternal intake and urine output (by foley catheter connected to urimeter bag)	Monitor and record every 4 hours: ▪ Level of consciousness (GCS) ▪ Temperature ▪ Biceps or patellar reflex

Notify the physician for any of the following :

- Oxygen saturation less than 94% for 15 minutes
- Respiratory rate is less than 12 per minute for 15 minutes
- Urine output is less than 100 mL in previous 4 hours
- Biceps or patellar reflex is absent

1.7 Magnesium sulfate side effects and toxicities:

Common side effects:	Magnesium toxicity* (hyper-magnesemia) signs include:
▪ Flushing of the skin ▪ Hypotension ▪ Metallic taste ▪ Nausea and vomiting ▪ Palpitations ▪ Sweating	▪ Absent deep tendon reflexes ▪ Cardiac arrhythmia (ECG changes) ▪ Central nervous system (CNS) depression ▪ Excessive drowsiness ▪ Muscle weakness, ataxia ▪ Respiratory depression less than 12/ minute ▪ Slurred speech ▪ Hypocalcemia with signs of tetany
Toxicity* is associated with serum blood magnesium levels greater than 3.5 mmol/ litre	

When signs of hyper-magnesemia or magnesium toxicity are present:

- Notify the physician
- Assess serum blood level of magnesium
- Calcium gluconate administration may be required to reverse the effects of magnesium

1.8 Administration of calcium gluconate (antidote)

Maternal Emergency Drug Tray

Medication	Dose	Route	Frequency	Indication
Calcium Gluconate 10% injection	1 gram (10 mL) (undiluted)	By Physician only IV push in peripheral line over 10 minutes	ONCE as needed	ANTIDOTE for hyper-magnesemia
	1 gram (10mL) diluted in 50 mL of normal saline (yields concentration of 20 mg/mL)	by RN IV intermittent infusion over 15 to 30 minutes via infusion control pump		

1.9 Postpartum Care

Seizure Prevention - Postpartum Care in First 24 hours

Physician's Orders Magnesium Sulfate Postpartum	- Continue magnesium sulfate infusion at 1 gram/ hour for a minimum of 24 hours or as ordered - Maintain total IV fluid at no more than 80 mL/hour - Monitor oxygen saturation hourly - maintain at 95% or more - Avoid NSAIDs
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Monitor and record following delivery:

In first hour: every 15 minutes	Blood pressure, pulse, and respirations as per routine care
Hourly:	- Maternal blood pressure, pulse, and respirations - Maternal oxygen saturation, - Urine output by a foley catheter connected to a urine meter drainage
Every 4 hours:	- Level of consciousness (GCS) - Temperature - Biceps or patellar reflex

Notify the physician for any of the following :

- Oxygen saturation less than 94% for 15 minutes
- Respiratory rate is less than 12 per minute for 15 minutes
- Urine output is less than 100 mL in previous 4 hours.
- Biceps or patellar reflex is absent

DOCUMENTATION

Critical Care Flow Sheet or
Detailed Fluid Balance Record and Special Clinical Record
Fetal Monitor Label
Interprofessional Progress Notes
Labour Partogram
Medication Added label
Physician's Orders – Magnesium Sulfate Administration for Fetal Neuroprotection
Physician's Orders – Magnesium Sulfate Administration for Postpartum
Physician's Orders – Magnesium Sulfate Administration for [Seizure Prevention](#)
Postpartum Clinical Path

REFERENCES

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APPENDIX

- Appendix A [Physician's Orders - Magnesium Sulfate Administration Seizure Prevention](#)
- Appendix B [Seizure Protocol: BC Women's Flow Diagram](#)
- Appendix C [Magnesium Sulfate Administration and Assessment Pocket Card](#)
- Appendix E [Physician's Orders Magnesium Sulfate Administration – Postpartum](#)