

# Royal Hospital for Women (RHW)

## CLINICAL BUSINESS RULE

### Magnesium Sulphate for Eclampsia or Eclampsia Prophylaxis

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#### 1. AIM

- To safely administer magnesium sulphate for eclampsia or eclampsia prophylaxis

#### 2. PATIENT

- Pregnant or postpartum woman:
  - with eclampsia
  - who require eclampsia prophylaxis

#### 3. STAFF

- Medical, nursing and midwifery staff

#### 4. EQUIPMENT

- Infusion Pump
- Giving set for infusion pump Set
- 16 or 18-gauge intravenous (IV) cannula and insertion kit

#### 5. CLINICAL PRACTICE

##### Dosage and Administration:

- Check for any precautions or contraindications to use of magnesium sulphate as outlined below:-

##### **PRECAUTIONS:**

- Low blood pressure (secondary to vasodilation). The dose of any current antihypertensive medication may require adjustment
- Tocolysis
- Decreased fetal heart rate variability
- Use with caution in the presence of calcium antagonists or other respiratory depressants (e.g. diazepam)
- Enhances the effects of muscle relaxants

##### **CONTRAINDICATIONS:**

- Oliguria or renal failure, as magnesium elimination is predominantly renal
  - Hypocalcemia
  - Myasthenia gravis
  - Cardiac conditions, particularly conduction problems or myocardial damage
- Administer Magnesium Sulphate intravenously (IV) via either a central or peripheral line using an infusion pump and a premix bag of 4g/100mL. IV line **should not be used to inject any other drugs**
  - Use the following dosage regime:
    - **Loading Dose:**
      - Give 4g IV over 20 minutes (100mL premixed bag) irrespective of urine output (UO) or creatinine level
    - **Maintenance Dose:**
      - If UO > 20 mL/hour and creatinine < 200µmol/L, continue with 1g/hour IV i.e. 25mL/hr of the 100ml premix bag
        - Check magnesium level if any signs or symptoms of toxicity. Do not collect blood for serum levels from the limb receiving the infusion

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- Normal therapeutic levels are 1.5-3.5mmol/L
- Toxic range  $\geq$  4mmol/L
- Cease infusion if level above 4.0mmol/L and contact medical team for review
- If UO  $\leq$  20mL/hour or creatinine  $\geq$  200 $\mu$ mol/L **DO NOT** commence **MAINTENANCE** infusion. Consult with Obstetric physician regarding management
- Use Royal Hospital for Women Magnesium Observation Chart (see appendix 1) to document blood levels and observations Beware of all potential adverse effects and signs of toxicity as outlined below:-

#### ADVERSE EFFECTS:

- **Mild:** Flushing of the skin (hands, face, and neck), sensation of pain or warmth in arm, and nausea (common)
- **More Severe:** Respiratory depression, loss of reflexes, muscle paralysis, blurred or double vision, slurred speech/sleepy, cardiac conduction changes, cardiac arrest

#### TOXICITY:

- Clinical monitoring is the prime method of assessing for toxicity, blood levels are complimentary to clinical monitoring
- Symptoms include: respiratory depression, loss of reflexes, muscle paralysis, blurred or double vision, slurred speech/sleepy, cardiac conduction changes, cardiac arrest

**Treat significant toxicity with 10mL of 2.2mmol calcium gluconate OR calcium chloride 10% (1g in 10ml) via large bore PIVC or CVAD IV slowly over 10 minutes<sup>3</sup>**

#### CESSATION POSTPARTUM:

- Review continuation of magnesium sulphate infusion in the early postpartum period as there is no conclusive evidence to guide its continuation as prophylaxis in women with preeclampsia<sup>9,10</sup>. The obstetric physician or obstetrician should be consulted and a plan made for either ceasing the infusion at birth or continuing the infusion for up to 24 hours in high-risk women e.g. after an eclamptic seizure.

#### OBSERVATIONS

- Ensure close observation and assessment (maternal and fetal) is required for the duration of the infusion. When the woman's condition is unstable, the frequency of the observations will need to be increased. Perform:-
  - Initial observations, done at '0' hour include blood pressure, respiration rate, pulse, temperature and reflexes.
    - **Hourly blood pressure:** cease infusion if blood pressure  $<$ 110/70mmHg
    - **Hourly respirations:** cease infusion if respiratory rate  $<$ 10 breaths per minute
    - **Hourly pulse**
    - **Hourly tendon reflexes usually knee reflexes but upper limbs if epidural or spinal anaesthetic in place:** cease infusion if unable to elicit reflexes
    - **Hourly urine output:** cease infusion if urine output  $<$  30 mL per hour for three consecutive hours
    - Continuous fetal heart rate monitoring as clinically indicated
    - Measure temperature every four hours
    - Check magnesium level if there are any signs or symptoms of toxicity
    - Record infusion rate, UO and reflexes on attached chart (see appendix 1)

#### 6. DOCUMENTATION

- Medical record

#### 7. EDUCATIONAL NOTES

- Eclampsia is defined as the occurrence of de-novo convulsions in pregnancy. An Australian study demonstrated that eclampsia remains rare in Australia with an incidence of 8.6 per 10,000 pregnancies (equivalent to 0.1% of all births)<sup>7</sup>

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- Magnesium sulphate acts at the cellular level competing with calcium for entry into the cell at time of depolarization, therefore possibly reducing the excitability of cells and vasospasm of vessels. Its mode of action in eclampsia and pre-eclampsia is poorly understood<sup>2,4,7</sup>
- Magnesium sulphate is excreted by the kidneys; therefore, the therapeutic level will depend on the woman's renal function<sup>2,4,7</sup>
- The MAGPIE Trial demonstrated that magnesium sulphate compared to a placebo reduced the risk of fitting by half, among 10,000 women in 33 countries worldwide<sup>5</sup>
- There is no conclusive evidence to guide whether magnesium sulphate should be continued postpartum in women who have not been eclamptic. The clinical team could decide to stop magnesium sulphate with delivery, or to continue the maintenance infusion for 24 hours. A shortened postpartum magnesium protocol is associated with shorter time with an indwelling catheter, shorter duration to ambulation, and shorter time to start lactation<sup>9</sup>. Within the MAGPIE trial, the protocol was to continue magnesium sulphate for 24 hours, and this protocol led to a significant reduction in eclampsia<sup>5</sup>. However, a subset of women within the MAGPIE trial who had been commenced after birth showed no statistically significant difference in eclampsia rates. This may be due to a small sample size and the rarity of eclampsia, but it also may be that magnesium sulphate in the postpartum period has minimal effect in reducing eclampsia rates. A meta-analysis looking at duration of postpartum magnesium sulphate concluded that due to the rarity of eclampsia, a sample size of 9000 women would be required to study postpartum magnesium sulphate protocols<sup>10</sup>. There have been multiple studies on this topic, but none have had adequate sample size.
- A significant number of women who develop eclampsia may have normal blood pressure or mild-moderate hypertension immediately prior to the seizure<sup>8</sup>
- If calcium gluconate is available it is the preferred treatment for significant toxicity, as calcium chloride can cause significant local irritation. Calcium gluconate is available on the antenatal ward, acute care and birth unit. Calcium chloride vials are available in the cardiac arrest trolley in all areas

#### 8. RELATED POLICIES/ PROCEDURES

- Hypertension – Management in Pregnancy
- Severe and/or Urgent Hypertension in Pregnancy
- Eclampsia management
- NSW Ministry of Health, Maternity – Management of threatened Preterm Labour (Appendix 7 - Magnesium sulphate prior for fetal neuroprotection)
- NSW Ministry of Health, Fetal heart Rate Monitoring GL2018\_025
- NSW Ministry of Health Maternity-Management of Hypertensive Disorders of Pregnancy PD2011\_064
- Australian Commission on Safety and Quality in Health Care – Clinical Care Standard – Management of Peripheral Intravenous Catheters

#### 9. RISK RATING

- High

#### 10. NATIONAL STANDARD

- Standard 4 - Medication Safety

#### 11. REFERENCES

1. American Academy of Family Physicians. 2017. Medical Complications of Pregnancy. *Advanced Life Support in Obstetrics* - Course Syllabus: Part one, pp 5-11.
2. Lowe SA, Bowyer L, Lust K, McMahon LP, Morton MR, North RA, Paech MJ, Said JM, Guideline for the Management of Hypertensive Disorders of Pregnancy. Society of Obstetric Medicine of Australia and New Zealand, 2014.
3. NSW Health Procedure October 2011 Management of Hypertensive disorders of Pregnancy.
4. Brown MA, Magee LA, Kenny LC, et al. Hypertensive Disorders of Pregnancy: International Society for the Study of Hypertension in Pregnancy (ISSHP), Classification, Diagnosis, and Management Recommendations for International Practice. *Hypertension*. 2018;72(1):24-43

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6. Australian Injectable Drugs Handbook, 8th Edition, Society of Hospital Pharmacists of Australia 2020.
7. Thornton C, Dahlen H, Korda A, Hennessy A. The incidence of preeclampsia and eclampsia and associated maternal mortality in Australia from population-linked datasets: 2000-2008. *American Journal of Obstetrics & Gynaecology* 2013 vol 208 Iss 6, pp476
8. Berhan Y, Berhan A. Should magnesium sulfate be administered to women with mild pre-eclampsia? A systematic review of published reports on eclampsia. *Journal of Obstetrics and Gynaecology Research* 2015, 41:831
9. Vigil-DeGracia P, Ludmir J, Reyes-Tejada O, Nova C, Beitre A, Yuen-Chon V, et al. Is there benefit to continue magnesium sulphate postpartum in women receiving magnesium sulphate before delivery? A randomised controlled study. *BJOG*. 2018 Sep;125(10):1304-1311. DOI: 10.1111/1471-0528.15320
10. Sullivan M, Cunningham K, Angras K, Mackeen AD. Duration of postpartum magnesium sulfate for seizure prophylaxis in women with preeclampsia: a systematic review and meta-analysis. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2021 Jun 29:1-6. DOI: 10.1080/14767058.2021.1946505

#### 12. CULTURAL SUPPORT

- When clinical risks are identified for an Aboriginal woman, she may require additional supports. This may include Aboriginal health professionals such as Aboriginal liaison officers, health workers or other culturally specific services.
- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours
- If the woman is from a non-English speaking background, call the interpreter service: [NSW Ministry of Health Policy Directive PD2017\\_044-Interpreters Standard Procedures for Working with Health Care Interpreters](#).

#### REVISION & APPROVAL HISTORY

Amended April 2023

Reviewed and endorsed Therapeutic & Drug Utilisation Committee 11/4/18

Approved Quality & Patient Care Committee 4/2/16

Reviewed and endorsed Therapeutic & Drug Utilisation Committee 8/12/15

Approved Quality & Patient Safety Committee 20/6/13

Reviewed and endorsed Therapeutic & Drug Utilisation Committee 11/6/13

Previously two policies –

*Magnesium Sulphate:*

Approved Quality Council 16/10/06

Reviewed Therapeutic & Drug Utilisation Committee 15/8/06 (amended October 2009)

Amended July 2006

Amended October 2000 / Approved RHW Council 27/11/00

Approved RHW Council 28/2/00

*Eclampsia Prophylaxis with Magnesium Sulphate:*

Approved Quality Council 17/11/03

Endorsed Maternity Services Clinical Committee 11/11/03

FOR REVIEW: JUNE 2023

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Appendix 1

### ROYAL HOSPITAL FOR WOMEN MAGNESIUM OBSERVATION CHART

MRN  
NAME  
DOB  
Affix addressograph label

<b>Therapeutic range:</b> 1.5 – 3.5 mmol/L  <b>Toxic range:</b> ≥ 4.0mmol/L	<b>Toxicity may lead to:</b> <ul style="list-style-type: none"> <li>• Suppression of tendon reflexes</li> <li>• Respiratory depression</li> <li>• Neuromuscular paralysis</li> <li>• Cardiac arrest</li> </ul>
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Date and time Loading Dose given: \_\_\_\_\_

Time Infusion Commenced: \_\_\_\_\_

HOUR	TIME	INFUSION RATE	URINE OUTPUT	REFLEXES	Comments /Mg LEVEL/ FHR
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

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HOUR	TIME	INFUSION RATE	URINE OUTPUT	REFLEXES	Comments /Mg LEVEL/ FHR
14					
15					
16					
17					
18					
19					
20					
21					
22					
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25					
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