



**OBSTETRICS AND GYNAECOLOGY
CLINICAL PRACTICE GUIDELINE**

Magnesium Sulfate for Neuroprotection of the Fetus

Scope (Staff): WNHS obstetrics and midwifery staff

Scope (Area): Obstetrics and Midwifery clinical areas at KEMH and OPH

This document should be read in conjunction with the [Disclaimer](#).

Aim

To reduce the incidence of cerebral palsy as a complication of very preterm birth by the administration of magnesium sulfate (MgSO_4) in preterm labour.

Key points

1. MgSO_4 is given to women who are at imminent risk of early preterm birth, and are less than 30 weeks gestational age (i.e. 29^{+6} or less weeks), to achieve a degree of neuro protection of the fetus.
2. MgSO_4 should be given when early preterm birth (less than 30 weeks) is planned or definitely expected within 24 hours. In the planned birth, it is recommended MgSO_4 be commenced 4 hours prior to delivery.
3. In the unplanned delivery, MgSO_4 should only be given when the woman is in active preterm labour, with the patient in Labour and Birth Suite (L&BS).
4. MgSO_4 for neuroprotection should be given in pregnancies less than 29^{+6} , regardless of whether pregnancy is single or multiple, regardless of parity, regardless of anticipated mode of delivery and whether or not corticosteroids have been given.
5. Regimen for the administration of MgSO_4 is 4 g over a 20-minute period, continue at 1 g/hour for 4 hours then cease infusion – see algorithm over the page. To be read in conjunction with the [KEMH Magnesium Adult Medication Monograph](#). If the birth occurs before the 4-hour mark, discontinue the infusion at the time of birth.
6. Urgent delivery for fetal or maternal indications should not be delayed in order to achieve MgSO_4 administration.

Procedure to administer magnesium sulfate for neuroprotection

Prior to commencement of magnesium sulfate (MgSO₄)

- Provide information to the woman about the use of MgSO₄
- Obtain verbal consent
- Two registered midwives and/or medical practitioners must:
 1. Check the correct medication, dose and infusion rate
 2. Set up the infusion line and pump
- Baseline observations prior to MgSO₄ Loading Dose regime i.e. pulse, blood pressure (BP), respiratory rate (RR), SpO₂, and deep tendon/patella reflexes.
- Before commencing infusion, check and document:
 - the deep tendon/patella reflex is present
 - the respiration rate is greater than 12 respirations per minute
- Commence the infusion - **always use an infusion pump.**



MgSO₄ loading dose regimen

- Infuse 4 g of MgSO₄ over 20 minutes.
- This equates to an infusion rate of **150 mL per hour for 20 minutes/ the woman receives only 50 mL of the infusion.**
- A solution of 8 g of MgSO₄ in a 100 mL bag is used at KEMH.
- **Always use an infusion pump.**



MgSO₄ maintenance regimen

- The dose for maintenance infusion is 1 g of MgSO₄ per hour for **4 hours**.
- Although 4 hours is ideal, this should NOT delay delivery of a preterm baby.
- It is better to deliver the baby in-hours, so 1 hour of MgSO₄ will suffice in such circumstances
- This equates to an **infusion rate of 12.5 mL per hour** where the solution of 8 g of MgSO₄ in 100 mL bag is used at KEMH.
- **Always use an infusion pump.**

Maternal observations

- Monitor deep tendon/patella reflexes, RR and BP every **15 minutes** for the first **two** hours, then hourly.
- Monitor Oxygen saturations continuously with a pulse oximeter and record hourly
- Measure and record urine hourly- ensure output is over > 25 mL/ hr.



When to cease infusion and notify Medical Officer

- If deep tendon/patella reflexes are absent
- If respirations are less than 12 respirations per minute
- If urine output is less than 25 mL/ hr
- If a major side effect is witnessed, such as respiratory depression.

Additional information

1. MgSO₄ is only given to women who are at imminent risk of delivery of a preterm infant of less than 30 weeks gestation and birth is planned or definitely expected within 24 hours. Ideally it should be commenced **4 hours prior** to delivery.
2. Urgent delivery for fetal or maternal indications should not be delayed in order to achieve MgSO₄ administration.
3. Calcium gluconate 1 g in 10 mL must be available at all times for treatment of MgSO₄ toxicity. Resuscitation equipment should be readily available.
4. Apply continuous fetal monitoring.
5. Be aware nifedipine increases the effect of magnesium sulfate and the risk of hypotension.

Prescribing

How to prescribe LOADING dose:

Date	Type of Fluid	Volume (mL)	Rate (mL/hr)	Additive & Dose	To start	Prescriber	Started	Finished	Administered by:	Checked by:
Date	Water for injection	50 mL	150 mL/hr	Magnesium sulfate 4 g	Date: Date Time: Time	Name: A.Doctor Sign: AD	Date: Time:	Date: Time:	Name: Sign:	Name: Sign:

How to prescribe MAINTENANCE doses:

Date	Type of Fluid	Volume (mL)	Rate (mL/hr)	Additive & Dose	To start	Prescriber	Started	Finished	Administered by:	Checked by:
Date	Water for injection	50 mL	12.5 mL/hr	Magnesium sulfate 4 g	Date: Date Time: Time	Name: A.Doctor Sign: AD	Date: Time:	Date: Time:	Name: Sign:	Name: Sign:
Date	Water for injection	100 mL	12.5 mL/hr	Magnesium sulfate 4g	Date: Date Time: Time	Name: A.Doctor Sign: AD	Date: Time:	Date: Time:	Name: Sign:	Name: Sign:

See [Appendix 1 for WNHS Intravenous Fluid & Additive Order Form](#) example

Procedure

1. Prior to commencement of MgSO₄, assess the woman in threatened preterm labour or preterm labour. See [Clinical Guideline Preterm Labour](#).
2. Confirm gestational age from previous ultrasound scanning or if no early scan available, from LMP if this is felt to be accurate. In the unbooked patient, who has had no antenatal care, a late scan may be used to determine gestational age.
3. If the patient is less than 30 weeks, determine if delivery is considered to be imminent i.e. evidence of cervical dilatation, ongoing contractions which are not settling with tocolysis and / or there is evidence of progressive effacement and dilatation.
4. Discuss with Obstetric consultant for L&BS/senior registrar/level 4 registrar or above.
5. Transfer the patient to the Labour and Birth Suite (L&BS) as per the management of preterm labour and commence the administration of MgSO₄.
6. Clinical care of the woman and fetus as outlined below
7. In the case of a planned preterm (<30 weeks gestation) delivery, transfer the patient to Labour and Birth Suite or the Adult Special Care Unit (ASCU), whichever is most appropriate and commence MgSO₄ regime 4 hours prior to anticipated time of delivery.

Antenatal Magnesium sulfate infusion

- The solution used at KEMH is **8 g of MgSO₄ in a 100 mL pre-packaged solution. This must be given via an infusion device.**
- Administer intravenous loading bolus dose of 4 g of MgSO₄ over 20 minutes via a controlled infusion device. This equates to an infusion rate of 150 mL/hour for 20 minutes (i.e. the woman only receives 50 mL)
- See [Appendix 1 - IV Magnesium Sulphate order form](#) as example of how to prescribe.
- Be aware nifedipine increases the effect of magnesium sulfate and the risk of hypotension.
- The loading dose is followed by a maintenance infusion of 1 g of MgSO₄ per hour. When the rate is changed to the maintenance rate, the rate shall be checked and confirmed by two (2) registered midwives. This equates to an infusion rate of 12.5 mL per hour.
- Continue at 1 g/hour for 4 hours then cease MgSO₄ infusion. If the birth occurs before the 4-hour mark, discontinue the infusion at the time of birth.
- Prior to the commencement of MgSO₄ infusion:
 - Document a set of baseline observations i.e. pulse, blood pressure (BP), respiratory rate (RR), SpO₂, deep tendon/patella reflexes
 - Ensure deep tendon/patella reflexes are present
 - Ensure respirations are greater than 12 respirations per minute
 - The correct order, medication, dose, and infusion rate is checked by two (2) registered midwives.
- Calcium Gluconate 1 g in 10 mL (2.2 mmol calcium in 10 mL) must be available at all times for treatment of MgSO₄ toxicity.
 - Dose – administer ONE ampoule of Calcium gluconate 1 g in 10 mL (2.2 mmol calcium in 10 mL) intravenously (IV) slowly. Administration must be authorised by a medical officer.
 - ECG monitoring is recommended if Calcium gluconate is given
- Apply continuous fetal monitoring.

Maternal observations

Patella reflexes

- Perform every 15 minutes for the first 2 hours, then hourly thereafter.
- If patella reflexes are absent:
 - Cease the infusion
 - Notify the medical officer
 - Collect blood for serum Magnesium levels

Respiratory rate and oxygen saturation monitoring

- Monitor respirations 15 minutely during the first 2 hours, then hourly thereafter.
- If respirations are less than 12 /minute:
 - Notify the medical officer
 - Cease the infusion until medical review
 - Place the woman in the recovery position
 - Maintain the airway and administer O₂ at 6-8 L/minute

- Administer IV Calcium gluconate 1 g in 10 mL (2.2 mmol calcium in 10 mL) slowly.
 - Monitor heart rate with an ECG if available, or apply as soon as possible.
- Collect blood for serum magnesium levels
- Monitor maternal O₂ saturation levels continuously with a pulse oximeter.
 - Record O₂ saturation levels hourly.
 - If respiratory arrest occurs:
 - Stop infusion
 - Call a code blue medical
 - Initiate respiratory support until the woman is intubated and ventilated

Monitor urine output

- Measure and record urine output hourly.
- If urine output is <25 mL/hour:
 - Notify the medical staff

Blood pressure

- Monitor BP 15 minutely during the infusion for the first 2 hours, thereafter hourly.

Review of MgSO₄ infusion



- Report any side effects of MgSO₄ to the medical officer.

References

1. Shepherd, E. S., Goldsmith, S., Doyle, L.W., Middleton, P., Marret, S., Rouse, D.J., Pryde, P., Wolf, H.T., & Crowther, C.A. (2024). Magnesium Sulfate Before Preterm Birth for Neuroprotection: An Updated Cochrane Systematic Review. *Obstetrics & Gynecology* 144(2), 161-170. DOI: [10.1097/AOG.0000000000005644](https://doi.org/10.1097/AOG.0000000000005644)

Related WNHS procedures and guidelines

[WNHS Obstetrics and Gynaecology Clinical Practice Guideline: Preterm Labour](#)

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Version History

Version Number	Date	Summary
1.0	September 2010	First version
2.0 – 5.0	September 2014, May 2015, April 2016, September 2016	Revised versions
6.0	December 2024	<p>Updated to new template; Minor amendments to drug dosage values; Clarity to drug clinical indicators for Nifedipine administration and side effects; Emphasise a set timeline should NOT delay delivery of a preterm baby.</p> <p>Medicines and Therapeutics Committee (MTC) out of session review and endorsement – Reference section updated as requested by MTC member, Patricia Woods; Consumer stakeholder name changed, Julie Levin.</p> <p>MTC endorsed the Guidelines with two recommendations for MOCPOC to consider:</p> <ul style="list-style-type: none"> - IV Magnesium Sulphate order form added as appendix example. - Consider developing a flow chart to complement drug administration management. <p>MOCPOC approved Guideline once updated as per MTC recommendation:</p> <ul style="list-style-type: none"> - Flow chart reformatted, instead of being split between two pages, moved to one page. - Prepopulated intravenous additive form developed by Pharmacy and included within the Guideline and also as an appendix.

The health impact upon Aboriginal people has been considered, and where relevant incorporated and appropriately addressed in the development of this policy.

This document can be made available in alternative formats on request for a person with a disability.

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Appendix 1 – IV Magnesium Sulphate order form

KE011
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DO NOT WRITE IN BINDING MARGIN



EMR305620

Magnesium Sulfate for Neuroprotection

Women and Newborn Health Service INTRAVENOUS FLUID & ADDITIVE ORDER FORM Year: 20____ Chart ____ of ____ Site: KEMH <input type="checkbox"/> OPH <input type="checkbox"/>				ALLERGIES AND ADVERSE DRUG REACTIONS Nil known Unknown Yes – Refer to WA HMC Attached ADR Sticker			Med Rec. No: Surname: Forename: Gender: D.O.B.			
				Ward: _____		Weight: _____				
Date	Type of Fluid	Volume (mL)	Rate (mL/hr)	Additive & Dose	To start	Prescriber	Started	Finished	Administered by:	Checked by:
Date	Water for injection	50 mL	150 mL/hr	Magnesium sulfate 4 g	Date: Date	Name: A.Doctor	Date:	Date:	Name:	Name:
					Time: Time	Sign: AD	Time:	Time:	Sign:	Sign:
Date	Water for injection	50 mL	12.5 mL/hr	Magnesium sulfate 4 g	Date: Date	Name: A.Doctor	Date:	Date:	Name:	Name:
					Time: Time	Sign: AD	Time:	Time:	Sign:	Sign:
Date	Water for injection	100 mL	12.5 mL/hr	Magnesium sulfate 4g	Date: Date	Name: A.Doctor	Date:	Date:	Name:	Name:
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AFFIX LABEL HERE