South Australian Neonatal Medication Guidelines

Magnesium Sulfate

2.465 g/5 mL or 2.5 g/5 mL injection*

Note:

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate, and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements, and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

This is a High-Risk Medication ⚠

An overdose can be fatal.

***There are two preparations available:**

- 2.465 g/5 mL (49.3%) magnesium sulfate contains 10 mmol/5 mL magnesium.
- 2.5 g/5 mL (50%) magnesium sulfate heptahydrate contains 10.3 mmol/ 5mL magnesium.

In dosing with neonates, the difference becomes immeasurable and for the purpose of these guidelines, they each contain elemental magnesium 10 mmol/5 mL or 2 mmol/mL.

Dose and Indications

All doses must be written as millimoles (mmol) of elemental magnesium (note 0.1 mmol = 25 mg)

Torsades de Pointes

Intravenous

0.1 to 0.2 mmol/kg/dose to be given over 10 to 20 minutes.

More rapid infusion (over several minutes) may be needed in pulseless torsades de pointes.

Hypomagnesaemia

Intravenous

0.1 to 0.2 mmol/kg/dose every 12 hours as required. Doses of up to 0.4 mmol/kg/dose have been used.

Give intravenous infusion over 30 to 60 minutes, or over at least 10 minutes in an emergency.

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Pulmonary Hypertension

Intravenous

Loading dose 0.8 mmol/kg given over 20 to 30 minutes. If clinical response, continue with maintenance.

Maintenance dose 0.1 to 0.3 mmol/kg/hour for 2 to 5 days.

Preparation and Administration

Intravenous: Hypomagnesaemia or Torsade De Pointes

Dilute 0.5 mL of either product (2 mmol/mL of elemental magnesium) with 9.5 mL of compatible fluid (to give a total volume of 10 mL).

The resulting solution contains 0.1 mmol/mL magnesium.

Dose	0.2 mmol	0.4 mmol	0.6 mmol	0.8 mmol	1 mmol	1.2 mmol
Volume	2 mL	4 mL	6 mL	8 mL	10 mL	12 mL

Intravenous: Loading Dose for Pulmonary Hypertension

Dilute 4 mL of either product (2 mmol/mL of elemental magnesium) with 6 mL of compatible fluid (to give a total volume of 10 mL).

The resulting solution contains 0.8 mmol/mL magnesium.

Dose	0.8 mmol	1.6 mmol	2.4 mmol	3.2 mmol
Volume	1 mL	2 mL	3 mL	4 mL

Intravenous Infusion: Maintenance Dose for Pulmonary Hypertension

Dilute 20 mL of either product (2 mmol/mL of elemental magnesium) with 30 mL of compatible fluid (to give a total volume of 50 mL). **The resulting solution contains 0.8 mmol/mL magnesium.**

Compatible Fluids

Glucose 5%, glucose/sodium solutions, sodium chloride 0.9%

Adverse Effects

Common

Flushing, vomiting.

Other adverse effects are often related to the development of hypermagnesaemia: important signs are loss of deep tendon reflexes and respiratory depression. More serious effects are hypotension, bradycardia, CNS depression, coma, circulatory collapse, cardiac arrest.

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Monitoring

- Magnesium levels regularly; usual blood level 0.75 to 1 mmol/L however if treating pulmonary hypertension aim for levels between 3.5 to 5.5 mmol/L.
- Renal function.
- Urine output.
- Electrolytes.
- Blood pressure, heart rate, respiratory rate, oxygen saturation, urine output, reflexes, and other signs of toxicity regularly during treatment is recommended.

Practice Points

- Magnesium may be given intramuscularly, however is painful and sometimes causes haematomas.
- All doses must be written as elemental magnesium.
- Anticipate changes in calcium and phosphorus balance.
- Calcium gluconate 10% injection should be available in case of hypermagnesaemia.
- Use **CAUTIOUSLY** in patients with renal impairment and/or electrolyte imbalance.
- **DO NOT USE** in patients with heart block or myocardial damage.
- When treating pulmonary hypertension consider other agents (nitric oxide and sildenafil) before using magnesium sulphate.
- **Interactions:**
  - may enhance neuromuscular blockade (e.g., suxamethonium, vecuronium, rocuronium)
  - use with aminoglycosides may cause neuromuscular weakness (e.g., respiratory arrest).

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Document Ownership & History

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If so, which Neonatal Medication Guideline (title)?

Approval Date	Version	Who approved New/Revised Version	Reason for Change
04/07/2024	V3.1	Domain Custodian, Clinical Governance, Safety and Quality	Change to IV preparation to standard concentrations
28/11/2023	V3	Domain Custodian, Clinical Governance, Safety and Quality	Formal review
09/03/2018	V2.1	SA Health Safety and Quality Strategic Governance Committee	Review date extended to 5 years following risk assessment. New template
03/2015	V2	SA Health Safety and Quality Strategic Governance Committee	High risk notification included
11/2012	V1	SA Maternal & Neonatal Clinical Network	Original SA Maternal & Neonatal Clinical Network approved version.

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