

South Australian Perinatal Practice Guidelines

Magnesium sulphate infusion regimen

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Magnesium sulphate

- > The drug of choice for treating eclampsia and pre-eclampsia
- > Magnesium sulphate readily crosses the placenta
- > Magnesium is readily antagonised by IV calcium gluconate in the event of magnesium toxicity (calcium gluconate should be available where magnesium sulphate is used)

Indications

- > Prophylaxis to minimise the risk of eclamptic seizures
- > Treatment of eclamptic seizures

Relative contraindications

The use of this drug can be hazardous in association with:

- > Dosing errors
- > Renal failure or severe renal compromise
- > Hypocalcaemic states
- > Other drugs, especially vasoactive drugs
- > Acute haemolytic states
- > Some forms of neurological disease

Drug interactions

- > Nifedipine increases the effects of magnesium sulphate and risk of hypotension; use cautiously, consider reducing magnesium sulphate dosage; monitor blood pressure, deep tendon reflexes and respiratory function (AMH 2004)

Dosage and administration

- > Magnesium sulphate is best administered intravenously
- > In some countries a pre-diluted magnesium sulphate 20 % solution is available
- > In Australia, each ampoule of magnesium sulphate contains a 50 % solution (i.e. Either 2.5 g in each 5 mL or 5 g in each 10 mL)
- > The product guidelines recommend that magnesium sulphate for intravenous use should be diluted with sodium chloride 0.9 % to a concentration of 20 % magnesium or less which implies that further dilution is necessary
- > Intravenous administration of magnesium sulphate may be via a syringe driver or a volumetric infusion pump

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Magnesium sulphate syringe driver infusion regimen

- > The total adult daily dose should not exceed 30 to 40 g of magnesium sulphate
- > The undiluted syringe driver infusion may be connected into a mainline of sodium chloride 0.9 % or Hartmann's 1,000 mL; however, no other drugs may be administered into this line
- > No more than 8 g of magnesium sulphate should be administered over 1 hour
- > Continue for up to 24 hours after the last seizure activity and for 24 hours after birth

Magnesium sulphate undiluted 50 %

Loading dose set up

- > Draw up 5 g (10 mL) magnesium sulphate
- > Discard 2 mL magnesium sulphate to give 4 g in 8 mL
- > Using medication added label write "magnesium sulphate 4 g in 8 mL" and attach label to syringe

Maintenance dose set up

- > **NB: To avoid mixing up the syringes, do not draw up the maintenance dose until after the loading dose has been commenced**
- > Draw up 10 g (20 mL) magnesium sulphate
- > Using medication added label write "magnesium sulphate 10 g in 20 mL" and attach label to syringe

Prevent eclampsia (prophylaxis)

- > Use loading dose syringe
- > Set syringe driver at 24 mL / hour to infuse 4 g (8 mL) over 20 minutes
- > After 20 minutes, use maintenance dose syringe to commence maintenance at 1 g / hour (2 mL / hour)

For eclamptic seizures

- > Use loading dose syringe
- > Set syringe driver at 48 mL / hour to infuse 4 g (8 mL) over 10 minutes
- > After 10 minutes, use maintenance dose syringe to commence maintenance at 1 g / hour (2 mL / hour)
- > **ECG monitoring and anaesthetist on site**

Recurrence of seizure during maintenance treatment

- > Set syringe driver at 24 mL / hour to infuse 2 g (4 mL) IV over 10 minutes
- > Once the condition is stable, reset syringe driver to maintenance dose of 1 g / hour (2 mL / hour)
- > Alternatively, increase the maintenance infusion rate to 2 g / hour (4 mL / hour)
- > Check for hyporeflexia and reduced respiration rate

Ensure calcium gluconate is available

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Magnesium sulphate volumetric infusion pump regimen

- > **A volumetric infusion pump should only be utilised for the administration of magnesium sulphate where there is no access to a syringe driver**
- > The total adult daily dose should not exceed 30 to 40 g of magnesium sulphate
- > No more than 8 g of magnesium sulphate should be administered over 1 hour
- > Continue for up to 24 hours after the last seizure activity and for 24 hours after birth

Magnesium sulphate diluted

Loading dose set up

- > Draw up 5 g (10 mL) magnesium sulphate
- > Discard 2 mL to give 4 g in 8 mL
- > Withdraw 8 mL from a 100 mL bag of sodium chloride 0.9 % and discard
- > Add the 8 mL magnesium sulphate (4 g) to the remaining 92 mL bag of sodium chloride 0.9 % to make 100 mL
- > Using medication added label write "magnesium sulphate 4 g (8 mL) in sodium chloride 0.9 % to a total volume of 100 mL" and attach label to bag

Maintenance dose set up

- > **NB: To avoid mixing up the infusion bags, do not draw up the maintenance dose until after the loading dose infusion has been commenced**
- > Draw up 20 g (40 mL) magnesium sulphate
- > Withdraw 40 mL from a 100 mL bag of sodium chloride 0.9 % and discard
- > Add the 40 mL magnesium sulphate (20 g) to the remaining 60 mL bag of sodium chloride 0.9 % to make 100 mL
- > Using medication added label write "magnesium sulphate 20 g (40 mL) in sodium chloride 0.9 % to a total volume of 100 mL" and attach label to bag

Prevent eclampsia (prophylaxis)

- > Use loading dose bag
- > 4 g (set at 300 mL / hour) over 20 minutes
- > After 20 minutes, use maintenance dose infusion bag to commence maintenance at 1 g / hour (5 mL / hour)

For eclamptic seizures

- > Use loading dose bag
- > 4 g (set at 600 mL / hour) over 10 minutes
- > After 10 minutes, use maintenance dose infusion bag to commence maintenance at 1 g / hour (5 mL / hour)
- > **ECG monitoring and anaesthetist on site**

Recurrence of seizure during maintenance treatment

- > 2 g (set at 60 mL / hour) IV over 10 minutes
- > Once the condition is stable, reset volumetric infusion pump to maintenance dose of 1 g / hour (5 mL / hour)
- > Alternatively, increase the maintenance infusion rate to 2 g / hour (i.e. 10 mL / hour)



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> Check for hyporeflexia and reduced respiration rate
Ensure calcium gluconate is available
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Administration precautions

- > Administration may cause pain and phlebitis. **Use a dedicated intravenous line for magnesium sulphate**
- > **Never inject other drugs into this line**

Care during intravenous infusion

- > Collect baseline observations (pulse, BP, RR, SpO₂ and patellar reflexes)
- > Ensure the woman is aware that a feeling of warm flushing may be evident during the infusion. Other side effects may include nausea, vomiting and headache
- > Recheck observations including patellar reflexes ten minutes after the loading dose was started and at the end of the loading dose (20 minutes)
- > ECG is warranted with high doses of magnesium sulphate (e.g. an infusion rate of 120 mL per hour)
- > Continuous fetal monitoring from 26⁺ weeks gestation until clinical review / discussion by medical staff. Between 24 to 26 weeks gestation, individualised management with regard to fetal monitoring will be considered

Maintenance

- > Monitor blood pressure, respiratory rate, pulse oximeter (SpO₂), patellar reflexes and urine output 4 hourly (insert urine catheter)
- > Patellar reflexes should be documented as one of the following:
 - > A = Absent
 - > N = Normal
 - > B = Brisk
- > Stop the infusion if:
 - > patellar reflexes are absent
 - > the respiratory rate is less than 12 per minute
 - > the diastolic BP drops more than 15 mm Hg below baseline
 - > or the urine output drops below 100 mL in 4 hours
- > Monitoring magnesium levels is usually not necessary. Where serum creatinine is > 100 mmol / L or urine output is < 100 mL over 4 hours, check serum magnesium levels and adjust infusion levels. In these circumstances check serum magnesium levels every 6 hours after commencing infusion
 - > Blood for magnesium estimation must NOT be taken from the arm receiving the infusion

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- > The therapeutic level is 1.7 - 3.5 mmol / L (4 – 8 mg / 100 mL).
- > Levels will vary according to serum albumin concentrations

- > If signs of toxicity occur (hypoventilation, arrhythmia, hypotonia):
 - > Call for medical assistance
 - > Administer oxygen at 8-12 litres
 - > Stop infusion
 - > Monitor vital signs
 - > Administer calcium gluconate (10 % solution), 10 mL, slowly intravenously
 - > Check electrolytes, creatinine, magnesium sulphate levels

Intramuscular dose (suitable for retrieval and transfer)

- > In situations where an infusion pump is not available, an intravenous bolus dose of magnesium sulphate 20 % in combination with intramuscular magnesium sulphate 50 % may be preferable for treating women in actual preterm labour before transferring to a tertiary centre
- > The preferred regimen in such circumstances is:
 - > Magnesium sulphate 20 % solution, 4 g by slow intravenous injection over a period of 5 minutes, followed by
 - > Two deep intramuscular injections of 4 to 5 g magnesium sulphate 50 % solution into each buttock (the total dose of up to 10 g injected into one site is highly irritating)
 - > If no infusion pumps are available, maintenance treatment is 5 g magnesium sulphate 50 %, given by deep intramuscular injection, every 4 hours. Alternate the buttocks in which the injection is administered (Duley et al. 2003)
 - > A maintenance infusion (see above) can be commenced at any time after the initial bolus dose

Neonatal considerations

- > For the neonate, hypermagnesaemia can lead to hyporeflexia, poor sucking, and, rarely, respiratory depression needing mechanical ventilation

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References

1. The Eclampsia Trial Collaborative Group. Which anticonvulsant for women with eclampsia. Evidence from the Collaborative Eclampsia Trial. *Lancet* 1995; 345: 1455-1463 (Level I).
2. The Magpie Trial Collaborative Group. Do women with pre-eclampsia, and their babies, benefit from magnesium sulphate? The Magpie trial: a randomised placebo-controlled trial. *Lancet* 2002; 359: 1877 – 91 (Level I).
3. Duley L, Gülmezoglu AM, Henderson-Smart DJ. Magnesium sulphate and other anticonvulsants for women with pre-eclampsia. *Cochrane Database of Systematic Reviews* 2003, Issue 2. Art. No.: CD000025. DOI: 10.1002/14651858.CD000025 (Level I). Available from URL: <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000025/pdf/fs.html>
4. Australian Medicines Handbook. Thebarton: Finsbury press 2004. Available at URL: www.amh.net.au
5. Royal College of Obstetricians and Gynaecologists (RCOG). The management of severe pre-eclampsia / eclampsia. RCOG green top guideline No. 10(A); March 2006. Available from URL: http://www.rcog.org.uk/resources/Public/pdf/management_pre_eclampsia_mar06.pdf
6. Grady K, Howell C, Cox C, editors. Managing Obstetric Emergencies and Trauma. The MOET Course Manual. 2nd edition. London: RCOG Press; 2007.

Abbreviations

IV	Intravenous
AMH	Australian Medicines Handbook
i.e.	That is
%	Percentage
g	Gram(s)
mL	Millilitre(s)
ECG	Electrocardiograph
SpO2	Pulse Oximetry Oxygen Saturation
BP	Blood pressure
mm	Millimetre(s)
Hg	Mercury
APH	Antepartum haemorrhage
<	Less than
mmol/L	Millimoles per litre
L	Litre(s)
RR	Respiratory rate
et al.	And others
URL	Uniform resource locator
RCOG	Royal College of Obstetricians and Gynaecologists

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Version control and change history

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3.0	29 Sept 09	26 Oct 10	Review
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