



Drug Therapy Protocols: Magnesium sulphate

Policy code	DTP_MAS_0223
Date	February, 2023
Purpose	To ensure a consistent procedural approach to magnesium sulphate administration.
Scope	Applies to all Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless specifically mentioned.
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Author	Clinical Quality & Patient Safety Unit, QAS
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Magnesium sulphate

February, 2023

Drug class

Electrolyte^[1]

Pharmacology

Magnesium is an important cofactor in multiple processes. It causes vasodilation and bronchodilation through inhibition of smooth muscle contraction. Magnesium ions also possess anticonvulsant and anti-dysrhythmic properties.^[1]

Metabolism

Magnesium is filtered in the kidneys and excreted predominantly in urine with small amounts in faeces and saliva.^[1]

Indications^[1-5]

- **Box jellyfish (*Chironex fleckeri*) envenomation** (unresponsive to antivenom therapy)^[4]
- **Eclampsia**
- **Irukandji syndrome** (with intractable pain unrelieved by narcotic analgesia AND/OR systolic BP > 160 mmHg)^[4]
- **Torsades de Pointes**
- **Severe life-threatening asthma** (only in patients who have required IM/IV adrenaline (epinephrine))

Contraindications

- Allergy AND/OR Adverse Drug Reaction
- Atrioventricular (AV) block
- Renal failure

Precautions

- Renal impairment

Side effects

- Pain at the cannulation site
- Magnesium toxicity
 - hypotension/respiratory depression
 - loss of deep tendon reflexes

Presentation

- Ampoule, 10 mmol (2.5 g)/5 mL, *magnesium sulphate heptahydrate*

Onset (IV)

Immediate

Duration (IV)

30 minutes

Half-life

Variable

Schedule

- Unscheduled.

Routes of administration

Intravenous injection (IV)



Intraosseous injection (IO)



Intravenous infusion (IV INF)



Special notes

- Ambulance officers must only administer medications for the listed indications and dosing range. Any consideration for treatment outside the listed scope of practice requires mandatory approval via the *QAS Clinical Consultation and Advice Line*.
- Magnesium sulphate for the purpose of treating marine envenomation is only to be administered and carried by appropriately trained QAS paramedics within coastal QAS stations from Rainbow Beach and north.
- Irukandji syndrome is described as a tropical sting (usually minimal discomfort) followed in 15–40 minutes by significant systemic symptoms of pain, agitation, restlessness, and clinically associated with signs of catecholamine excess.^[1]
- All cannulae and IV lines must be flushed thoroughly with sodium chloride 0.9% following each medication administration.

Adult dosages^[1-5]

Irukandji syndrome (with intractable pain unrelieved by narcotic analgesia AND/OR systolic BP > 160 mmHg)

IV



10 mmol over 20 minutes

Repeated once at **20 minutes**.

Total maximum dose 20 mmol.

Administer via SPRINGFUSOR® 30 mL

Syringe preparation: Mix 10 mmol (5 mL) of magnesium sulphate with 15 mL sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 10 mmol/20 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 20 mins).

IO



10 mmol over 20 minutes

Repeated once at **20 minutes**.

Total maximum dose 20 mmol.

Administer via SPRINGFUSOR® 30 mL

Syringe preparation: Mix 10 mmol (5 mL) of magnesium sulphate with 15 mL sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 10 mmol/20 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 20 mins).

Adult dosages (cont.)

Eclampsia

CCP

IV/IO

20 mmol over 20 minutes

Administer via SPRINGFUSOR® 30 mL

Syringe preparation: Mix 20 mmol (10 mL) of magnesium sulphate with 10 mL sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 20 mmol/20 mL.

Ensure syringe is appropriately labelled.

Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 20 mins).

Adult dosages (cont.)

Box jellyfish (*Chironex fleckeri*) envenomation

(unresponsive to antivenom therapy)

ACP2

CCP

IV

10 mmol over 20 minutesRepeated once at **20 minutes.****Total maximum dose 20 mmol.**

Administer via SPRINGFUSOR® 30 mL

Syringe preparation: Mix 10 mmol (5 mL) of magnesium sulphate with 15 mL sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 10 mmol/20 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 20 mins).

IO

10 mmol over 20 minutesRepeated once at **20 minutes.****Total maximum dose 20 mmol.**

Administer via SPRINGFUSOR® 30 mL

Syringe preparation: Mix 10 mmol (5 mL) of magnesium sulphate with 15 mL sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 10 mmol/20 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 20 mins).

Adult dosages (cont.)

Torsades de Pointes

CCP

IV/IO

10 mmol over 10 minutes
Repeated once at **10 minutes**.
Total maximum dose 20 mmol.

Administer via SPRINGFUSOR® 30 mL

Syringe preparation: Mix 10 mmol (5 mL) of magnesium sulphate with 5 mL sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 10 mmol/10 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 10 mins).

Severe life-threatening asthma (only in patients who have required IM/IV adrenaline (epinephrine))

CCP

IV/IO

10 mmol over 20 minutes
Administer via SPRINGFUSOR® 30 mL
Single dose only.

Syringe preparation: Mix 10 mmol (5 mL) of magnesium sulphate with 15 mL sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 10 mmol/20 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 20 mins).

Paediatric dosages^[1-3,5]

- **Irukandji syndrome** (with intractable pain unrelieved by narcotic analgesia AND/OR systolic BP > 160 mmHg)
- **Box jellyfish (Chironex fleckeri) envenomation** (unresponsive to antivenom therapy)

ACP2

CCP

IV

0.1 mmol/kg over 15 minutes
(rounded up to the nearest 0.5 mmol)
Administer via SPRINGFUSOR® 30 mL

Single dose not to exceed 5 mmol.
Repeated once at **15 minutes**.
Total maximum dose 10 mmol.

Syringe preparation: Mix 0.1 mmol/kg of magnesium sulphate with sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 0.1 mmol/kg in 15 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 15 mins)

CCP

IO

QAS Clinical Consultation and Advice Line consultation and approval required in all situations.

Paediatric dosages (cont.)

Torsades de Pointes

CCP

IV/IO

**0.1 mmol/kg over 10 minutes
(rounded up to the nearest 0.5 mmol)**

Administer via SPRINGFUSOR® 30 mL

Single dose not to exceed 5 mmol.

Repeated once at **10 minutes.**

Total maximum dose 10 mmol.

Syringe preparation: Mix 0.1 mmol/kg of magnesium sulphate with sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 0.1 mmol/kg in 10 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 10 mins).

Severe life-threatening asthma (only in patients who have required IM/IV adrenaline (epinephrine))

CCP

IV/IO

**0.1 mmol/kg over 10 minutes
(rounded up to the nearest 0.5 mmol)**

Administer via SPRINGFUSOR® 30 mL

Single dose not to exceed 5 mmol.

Syringe preparation: Mix 0.1 mmol/kg of magnesium sulphate with sodium chloride 0.9% in a 30 mL SPRINGFUSOR® syringe to achieve a final concentration of 0.1 mmol/kg in 10 mL. Ensure syringe is appropriately labelled. Administer infusion via the SPRINGFUSOR® at a rate of 60 mL/hour (over 10 mins)

