



## Drug Therapy Protocols: Magnesium sulphate

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<b>Date</b>	July, 2021
<b>Purpose</b>	To ensure a consistent procedural approach to magnesium sulphate administration.
<b>Scope</b>	Applies to all Queensland Ambulance Service (QAS) clinical staff.
<b>Health care setting</b>	Pre-hospital assessment and treatment.
<b>Population</b>	Applies to all ages unless specifically mentioned.
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# Magnesium sulphate

July, 2021

## Drug class

Electrolyte

## 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.<sup>[1-3]</sup>

## Metabolism

Magnesium is filtered in the kidneys and excreted predominantly in urine with small amounts in faeces and saliva.<sup>[1]</sup>

## Indications

- **Box jellyfish (*Chironex fleckeri*) envenomation** (unresponsive to antivenom therapy)<sup>[4]</sup>
- **Eclampsia**
- **Irukandji syndrome** (with intractable pain unrelieved by narcotic analgesia AND/OR systolic BP > 160 mmHg)<sup>[4]</sup>
- **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.<sup>[1]</sup>
- All cannulae and IV lines must be flushed thoroughly with sodium chloride 0.9% following each medication administration.

## Adult dosages

**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 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.)

## 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

- **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 **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 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)*

