

RX

Drug Name: **Magnesium Sulfate**  
Trade Name: **Mag, Mag Sulfate, MgSO<sub>4</sub>, Mg<sup>++</sup>**  
REVISED: **June 15, 2021**

**Class:**

- Antidysrhythmic
- Anticonvulsant
- CNS Depressant

**Mechanism of Action:**

- Anticonvulsant properties—reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction
- Antidysrhythmic properties—Physiological calcium channel blocker. Reduces SA node impulse formation, prolongs conduction time in myocardium

**Indications:**

- **Torsades de Points**/polymorphic Ventricular Tachycardia
- Refractory VF, VT (with or without a pulse) (*if hypomagnesemia is suspected*)
- Refractory ventricular ectopy (*if hypomagnesemia is suspected*)
- TDP (*treatment of choice*)
- Seizure prevention and control in preeclampsia and eclampsia (*treatment of choice*)
- Suspected hypomagnesemia
- Status asthmaticus not responsive to  $\beta$  agonists or anticholinergics.

**Contraindications:**

- Heart block
- Hypermagnesemia

**Precautions:**

Renal insufficiency

**Dosage:**

**Adults:**

**Refractory VT, VF, TDP:**

- IV/IO: 2 g every 5 minutes, 1<sup>st</sup> line for Torsades or refractory V-Fib/Pulseless V-Tach.
  - Do not give faster than 1 g/minute
  - **To Mix:** 2 g (4ml), dilute to a total of 20 ml to make 10% solution.

**Preeclampsia,**

- **Loading IV/IO infusion: 4 g over 20 minutes**
  - **To Mix:** 4 g /250 ml
    - Requires the use of an infusion pump.
    - If seizures occur, proceeded to Eclampsia dose.
  - Do not give faster than 1 g/minute
- **Maintenance IV/IO Infusion: 2 g an hour**
  - **To Mix:** 4 g/250ml NS,
    - Requires the use of an infusion pump.
  - To be completed *after* loading dose

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This document is for **reference only**. Please refer to SWO's for specific indications, dosages, and applications

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### Eclampsia (active seizures) —

- **Loading IV/IO infusion:** 4 g over **5** minutes repeat as needed to max of 8 grams.
  - **To Mix:** 4 g /250 ml
  - **Does not require an IV Infusion pump.** Use 15 gtt set. Run *wide open* at approx. 50 cc/minute.
  - Do not give faster than 1 g/minute.
- **Maintenance IV/IO Infusion:** 2 g an hour
  - **To Mix:** 4 g/250ml NS
  - Requires the use of an infusion pump.
  - To be completed *after* loading dose

### Refractory Broncheospasm —

- IV/IO: 2 g over 5 minutes
  - **To Mix:** 2 g /250 ml
  - **Does not require an IV Infusion pump.** Use 15 gtt set. Run *wide open* at approx. 50 cc/minute.
  - Do not give faster than 1 g/minute.

### Pediatrics:

### Refractory VT, VF, TDP, Severe/Refractory Bronchospasm

- IV/IO Infusion: 25-50 mg/kg in 250 ml over 5 minutes
- To Mix: 25-50 mg/kg in 250 ml , MAX 2 GM
- **Does not require an IV Infusion pump.** Use 15 gtt set. Run *wide open* at equivalent of 3000 ml/hour (approx. 50 cc/minute).
- Do not give faster than 1 g/minute.

### Onset:

IV—Immediate  
IM--3-4 hours

### Duration:

IV—30-60 minutes  
IM--3-4 hours

### Side Effects:

Flushing/Sweating  
Itching/Rash  
Hypothermia  
Drowsiness  
Respiratory depression  
Respiratory failure  
Bradycardia/AV block

Cardiac arrest  
Circulatory collapse  
Complete heart block  
Flaccid paralysis  
Absence of knee jerk  
Hypotension, Diaphoresis

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**Interactions:**

Incompatible--alcohol, salicylates, sodium bicarbonate  
Additive effects can occur with other CNS depressants  
Concurrent use with nifedepine in the treatment of maternal hypertension can cause increased hypotension or pronounced muscle weakness & may harm the fetus  
Can cause cardiac conduction abnormalities when used in conjunction with cardiac glycosides

**PEARLS**

- The 2010 (reaffirmed in 2015) ECC/AHA guidelines conclude that “...IV magnesium sulfate can facilitate termination of torsades de pointes (irregular/polymorphic VT associated with prolonged QT interval). Magnesium sulfate is not likely to be effective in terminating irregular/polymorphic VT in patients with a normal QT interval”.
- In some case of *Torsades de Pointes* 5-9 g have been required.
- As a smooth muscle relaxant, it is also a potentially effective 2nd line intervention in cases of severe, refractory bronchospasm secondary to Asthma.
- Use aggressively in the setting of eclampsia. If eclamptic seizures are refractory to Mag Sulfate, then proceed to benzodiazepines if not already administered.

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