

RX

Drug Name: Magnesium Sulfate
Trade Name: Mag, Mag Sulfate, MgSO₄, Mg⁺⁺
REVISED: NOVEMBER 01, 2019

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 β agonists or anticholinergics.

Contraindications:

- Heart block
- MI
- Hypermagnesemia

Precautions:

Renal insufficiency

Dosage:

Adults:

Refractory VT, VF, TDP:

- IV/IO: 2 g every 5 minutes, 1st 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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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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