Magnesium
Newborn use only

2018

Alert	1000 mg magnesium **sulfate** = 98 mg elemental Mg = 4.1 mmol (8 mEq) of elemental Mg. 500 mg magnesium **aspartate =** 37.4 mg elemental Mg = 1.5 mmol (3 mEq) of elemental Mg. Intravenous doses should be diluted to a concentration of Mg 20% or less. Calcium chloride/calcium gluconate should be available to reverse adverse effects.
Indication	Hypomagnesaemia (acute and chronic). Pulmonary hypertension when inhaled nitric oxide is not available. Perinatal asphyxia. Resuscitation of torsades de pointes. Neonatal tetany Daily maintenance in parenteral nutrition (beyond scope of this guideline).
Action	Magnesium is an intracellular cation. Calcium and NMDA receptor antagonist. Magnesium is necessary for several steps in glycolysis, the Krebs cycle and in protein and nucleic acid synthesis. It is vital for normal energy storage and transfer. Magnesium plays an important role in neurochemical transmission, and is essential for proper neurochemical functioning. Magnesium has an anticonvulsant effect.
Drug Type	Electrolyte
Trade Name	DBL Magnesium Sulfate Concentrated Injection (Hospira) MagMin Tablets (Blackmores) Mag-Sup Tablets (Petrus)
Presentation	**IV/IM:** IV: 4.93 g magnesium **sulfate** /10 mL ampoule (49.3% solution) OR 2.465 g magnesium sulfate /5 mL. Both preparations provide 10 mmol magnesium/5 mL **PO:** • MagMin 500 mg magnesium **aspartate** tablets. • Mag-Sup 500 mg magnesium **aspartate** tablets. 500 mg magnesium aspartate tablet contains 37.4 mg (1.5 mmol) of elemental Mg.
Dosage/Interval	**Hypomagnesaemia** 25–50 mg magnesium sulfate/kg IV infusion over 30–60 minutes. Repeat if necessary. **Chronic hypomagnesaemia** PO: 187 mg of elemental magnesium per m^2/day in divided doses. (Endocrine team, personal email communication) (=2500 mg magnesium aspartate per m^2/day) **Body Surface Area (BSA) calculation:** $$BSA\ (m^2) = \sqrt{\frac{height\ (cm) \times weight\ (kg)}{3600}}$$ **Pulmonary hypertension:** Loading dose of 200 mg magnesium sulfate/kg IV over 60 minutes followed by continuous IV infusion 20–50 mg/kg/hour (target serum magnesium between 3.5 and 5.5 mmol/L) **Perinatal asphyxia** 250 mg magnesium sulfate/kg/dose of over 1 hour to be commenced within 6 hours of birth. Total 3 doses at 24 hour intervals. **Torsades de pointes with pulse** 25-50 mg magnesium sulfate/kg IV over 15–20 minutes. **Pulseless torsades de pointes** 25–50 mg magnesium sulfate/kg IV/Intraosseous (IO) over several minutes. **Intramuscular Route (Emergency management of Neonatal tetany/convulsions/Hypocalcaemic convulsion when no IV access)** IM: 100 mg magnesium sulfate/kg (0.2 mL/kg of 50% magnesium sulfate). Can be repeated 12 hourly.
Route	IV, IM, oral, Intraosseous.

Preparation/Dilution	**Hypomagnesaemia/Torsades de pointes** Draw up 0.4 mL (200 mg of magnesium sulfate) of 50% solution and add 7.6 mL sodium chloride 0.9% or glucose 5% to make a final volume of 8 mL with a concentration of 25 mg/mL. **Pulmonary hypertension IV infusion** Loading dose: Draw up 2 mL (1000 mg of magnesium sulfate) of the 50% solution and add 8mL of sodium chloride 0.9% or glucose 5% to give a final volume of 10mL with a concentration of 100mg/mL. Maintenance infusion: Draw up 2 mL/kg (1000 mg/kg of magnesium sulfate) of 50% solution and add glucose 5% or sodium chloride 0.9% to make a final volume of 50mL. Infusing at a rate of 1 mL/hour = 20 mg/kg/hour. **Perinatal asphyxia** Draw up 2 mL (1000 mg of magnesium sulfate) of the 50% solution and add 8mL of sodium chloride 0.9% or glucose 5% to give a final volume of 10mL with a concentration of 100mg/mL.
Administration	IV bolus for hypomagnesaemia: Infused over 30–60 minutes. Loading dose for pulmonary hypertension: Administer over 60 minutes. IV dose for perinatal asphyxia: Administer over 60 minutes. Torsades de pointes: Administer the preparation over several minutes to 20 minutes.
Monitoring	ECG and continuous or frequent blood pressure. Monitor magnesium concentrations.
Contraindications	Heart block or myocardial damage.
Precautions	Use with caution in renal impairment.
Drug Interactions	Concurrent use with paralysing agents may enhance neuromuscular blockade (e.g. succinylcholine, vecuronium, rocuronium, etc). Concomitant use with aminoglycosides may cause neuromuscular weakness (respiratory arrest).
Adverse Reactions	Hypotension, bradycardia and circulatory collapse with rapid infusion. ECG changes (prolonged AV conduction time, sino-atrial block, AV block). Calcium chloride/calcium gluconate should be available to reverse adverse effects. Flushing, sweating, respiratory depression (particularly with higher plasma concentrations), abdominal distension, diarrhoea, urinary retention, CNS depression, muscle relaxation, hyporeflexia.
Compatibility	Sodium chloride 0.9%, sodium chloride 0.45%/glucose 4%, glucose 5%, parenteral nutrition glucose amino acid solution. Y site: Aciclovir, amifostine, amikacin, ampicillin, aztreonam, bivalirudin, caspofungin, cefotaxime, cefoxitin, cefazolin, chloramphenicol, cisatracurium, dexmedetomidine, doripenem, esmolol, gentamicin, granisetron, heparin sodium, hydrocortisone sodium succinate, labetalol, linezolid, metronidazole, milrinone, morphine sulfate, piperacillin-tazobactam (EDTA-free), potassium chloride, remifentanil, sodium nitroprusside, trimethoprim-sulfamethoxazole, vancomycin.
Incompatibility	Fat emulsion. Incompatible with soluble phosphates and with alkaline carbonates and bicarbonates. Y site: Aminophylline, amiodarone, anidulafungin, azathioprine, calcium chloride, calcium salts, cefepime, ceftriaxone, ciprofloxacin, clindamycin, cyclosporin, dexamethasone, ganciclovir, haloperidol lactate, indometacin, methylprednisolone sodium succinate, pentamidine, phosphate salts, sodium bicarbonate.
Stability	Change the IV preparation every 24 hours.
Storage	Store at room temperature and protect from light.
Special Comments	Serum Mg concentrations do not reflect with whole body stores. Renally excreted.
Evidence summary	Refer to full version.
References	Refer to fullversion.

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