MAGNESIUM SULPHATE INTRAVENOUS ADMINISTRATION FOR ELECTROLYTE DISTURBANCE

ACTION:
Magnesium sulphate acts at the cellular level competing with calcium for entry into the cell at time of depolarization, therefore possibly reducing the excitability of the cells and vasospasm of vessels. The normal physiologic range is 0.65-1.02mmol/L.

INDICATIONS:
Intravenous treatment of hypomagnesemia: For symptomatic or patients unable to take oral supplements.

PRESENTATION:
Magnesium sulphate 2.47g in 5 mL ampoules.
Each 5 mL ampoule contains 10 mmol (20 mEq) of magnesium ions and 10 mmol (20 mEq) of sulphate ions.

DOSAGE & ADMINISTRATION:
Please note that use of magnesium in the treatment of eclampsia, pre-eclampsia, severe asthma or subarachnoid haemorrhage is not specifically covered here. Patients should be under pecialized care, therefore refer to the appropriate protocol.

- Dilute 10 mmol (5mL) of magnesium sulphate in 100 mL of Sodium Chloride 0.9%, administer over 1 hour. Repeat as required to reach target serum magnesium.
  *Rapid intravenous administration may precipitate hypotension.

Compatible fluids: Glucose 5%, Sodium Chloride 0.9 %, Hartmann's, Sodium Chloride/Glucose solutions.

- Administer intravenously either centrally or peripherally via an infusion pump.
- The intravenous line should not be used to inject any other drugs during the administration of the magnesium sulphate.
- Blood for serum levels should not be collected from the limb receiving the infusion.
- Monitoring of magnesium levels can be performed 2 hours post completion of infusion.
- Target range is 0.65 –1.02mmol/L

ADVERSE EFFECTS
The following symptoms are common during administration but do not necessarily indicate an adverse response: nausea and vomiting, flushing of the skin, hypotension, sensation of pain or warmth in the arm.

At high serum levels, magnesium may cause respiratory depression, in-coordination & loss of reflexes, muscle paralysis, blurred or double vision, slurred speech/sleepy, cardiac conduction changes and cardiac arrest.

Significant clinical toxicity can be treated with 1 g Calcium Chloride or Calcium Gluconate (10 mls in 10% w/v solution) by slow intravenous injection over three minutes.
Calcium chloride vials are available in the cardiac arrest trolleys.

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TOXICITY:
Clinical monitoring is the prime method of assessing for toxicity. Blood levels are complimentary to this monitoring.

PRECAUTIONS:
Administration of Magnesium sulphate may have the following additional effects:

- Hypotension.
- Tocolysis
- May cause loss of reflexes prior to toxic serum levels being reached.
- Should be used with caution in the presence of calcium antagonists or other respiratory depressants such as diazepam.
- Enhance the effects of muscle relaxants.

CONTRAINDICATIONS:

- Oliguria or renal failure (magnesium concentration can reach toxic levels as elimination is predominantly renal).
- In association with hypocalcaemic states.
- Myasthenia gravis.
- Cardiac conditions, in particular conduction problems (eg heart block), or myocardial damage.
- Not advised in hyperkalaemic patients.

DRUG INCOMPATIBILITIES:

- Amphotericin, calcium chloride, ciprofloxacin, cyclosporin, phosphate salts, sodium bicarbonate.

OBSERVATIONS:

- Ensure respiratory rate $\geq$ 16 breaths per minute
- Ensure adequate urine output (over 30mL/hr) in the 4 hours preceding administration

RISK RATING
High

REFERENCES:

- Magnesium Sulphate for eclampsia or eclampsia prophylaxis- Royal Hospital for Women Local Operating Policy
- Australian Injectable Drug Handbook 7th edition 2017 Accessed online 20/09/2019
- MIMSOnline. St Leonards, NSW: UBM Medica; 2019 Accessed 20/09/2019

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