MAGNESIUM CHLORIDE INTRAVENOUS REPLACEMENT for ELECTROLYTE REPLACEMENT

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

INDICATIONS:
Intravenous treatment of hypomagnesaemia: For symptomatic treatment in those patients unable to take oral supplements, or allergic to the sulphate component of magnesium sulphate.

PRESENTATION:
Magnesium Chloride 480mg in 5 mL ampoules.
Each 5 mL ampoule contains 5 mmol of magnesium ions and 10 mmol of chloride ions.

DOSAGE & ADMINISTRATION:
Please note that the use of magnesium in the treatment of eclampsia, severe asthma or subarachnoid haemorrhage is not specifically covered here. Patients should be under specialised care, therefore refer to their appropriate guidelines/policy/protocols.

- Dilute 10 (10mL) or 20 mmol (20mL) of magnesium chloride in 250 mL of sodium chloride 0.9%, administer over 90 minutes. Repeat as required to reach target serum magnesium. *Rapid intravenous infusion may precipitate hypotension.

Compatible fluids: Glucose 5% and sodium chloride 0.9% solutions.

- Administered intravenously either centrally or peripherally via infusion pump.
- The intravenous line should not be used to inject any other drugs during the administration of magnesium chloride.
- 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.
- Normal therapeutic levels ranges are 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.

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

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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PRECAUTIONS:
Administration of magnesium chloride 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:

- Phosphates, bicarbonates, alkali carbonates, arsenates and tartrates.

OSERVATIONS:

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

REFERENCES:

- Magnesium Sulphate for eclampsia or eclampsia prophylaxis- Royal Hospital for Women Local Operating Policy
- Magnesium sulphate intravenous administration for treatment of hypomagnesemia- Royal Hospital for Women Local Operating Policy
- Australian Injectable Drug Handbook Online 7th Edition, 2017. Accessed 20/9/2019
- MIMSOnline. St Leonards, NSW: UBM Medica; 2019 Accessed 20/9/2019

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