



Guidance on the management of acute hypomagnesaemia in adults

For the purpose of this document, the normal reference range used for serum magnesium is 0.7-1.0 mmol/L.

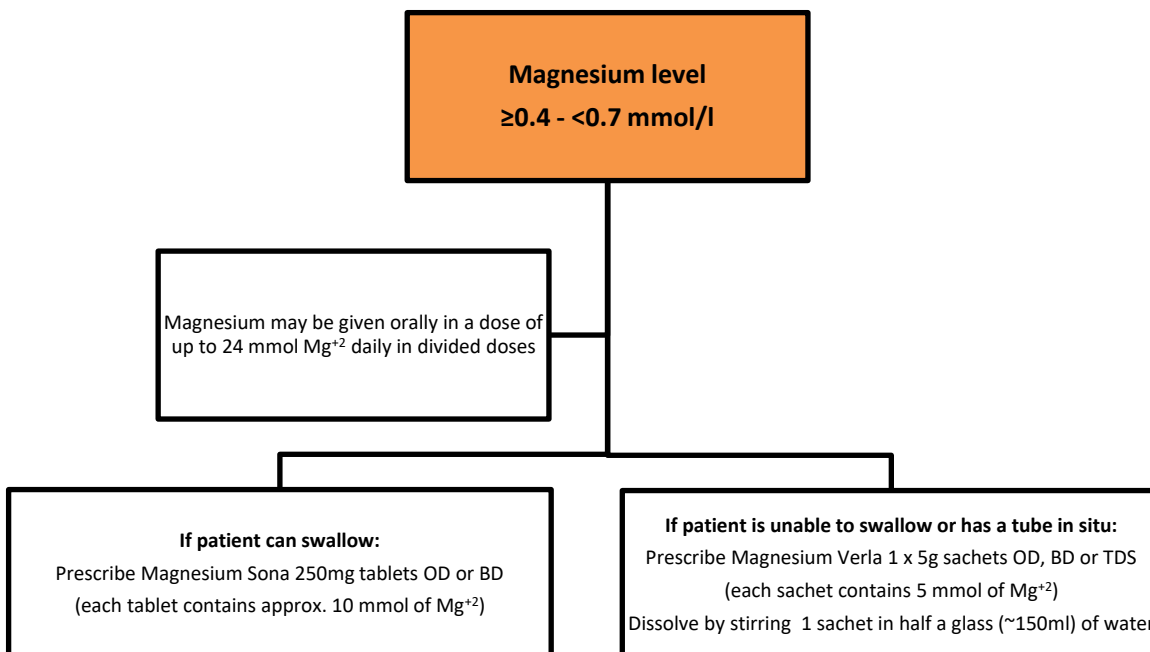
Signs and symptoms of low magnesium:

- Nausea, vomiting
- Lethargy, muscle weakness, drowsiness
- Tetany, tremor, twitching, agitation
- Vertigo
- Confusion
- Cardiac arrhythmias
- Seizures
- **Hypomagnesaemia may cause secondary hypocalcaemia and hypokalaemia**

Causes of low magnesium:

- Reduced intake e.g. anorexia, malabsorption due to short bowel, coeliac disease, Crohn's disease
- Excessive losses e.g. in diarrhoea, stoma or fistula output, NG losses, renal losses
- Chronic alcoholism
- Uncontrolled diabetes
- Ketoacidosis
- Disorders of the parathyroid gland
- Low vitamin D levels
- Acute pancreatitis
- Re-feeding syndrome
- Severe burns
- Drugs e.g. aminoglycosides, amphotericin B, ciclosporin, cisplatin, theophylline, proton pump inhibitors, digoxin and diuretics.

Oral treatment of low magnesium



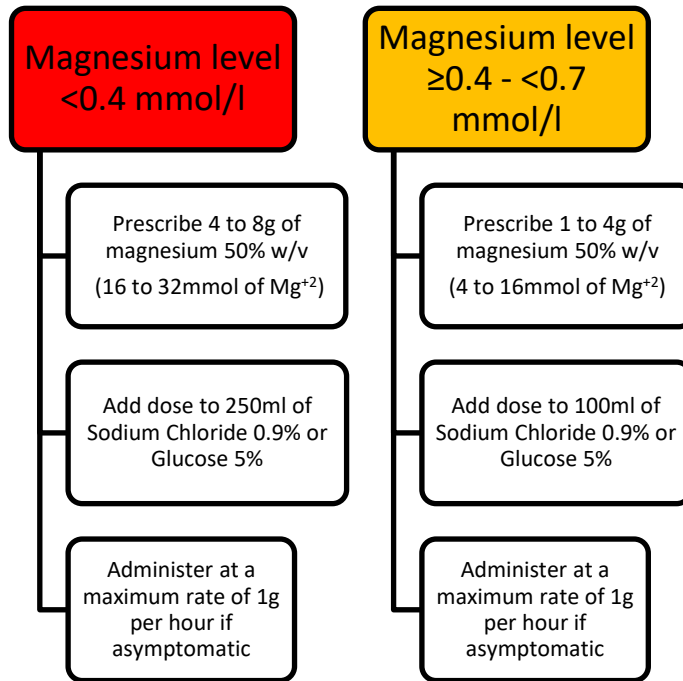
- Oral magnesium replacement should be considered first, as a sudden rise in serum magnesium concentration (as seen following intravenous replacement) partially removes the stimulus for magnesium retention, and up to 50% of the infused magnesium is excreted in the urine.
- Oral magnesium salts commonly cause diarrhoea (reduced by administration with/ after food).





IV treatment of low magnesium

- Product available for IV administration is Magnesium Sulfate 50% w/v concentrate (1g/2mL).
- Each 1g contains 4 mmol Mg^{+2} .
- The 50% solution MUST be further diluted before use - mix very thoroughly to avoid layering.
 - Refer to SIVUH IV administration guideline for magnesium.
 - Max concentration for peripheral administration = 5% (50mg/ml). Can use 10% (100mg/ml) if fluid restricted-monitor for phlebitis.
- Patients with severe signs and symptoms of hypomagnesaemia should receive IV magnesium with continuous cardiac monitoring. Continuous cardiac monitoring includes ECG, heart rate, blood pressure and respiratory rate monitoring.



- Up to 50% of an IV dose may be eliminated in the urine, therefore, slower administration may improve retention.
- If patient is symptomatic, a maximum administration rate of 2g per hour can be used.
- A maximum total dose of 40g of magnesium sulfate (160mmol of Mg^{+2}) may be required over a 5 day period to replace the deficit (allowing for urinary losses).
- After initial intravenous administration, it may be appropriate to give oral magnesium supplements to replenish the magnesium stores.
- In emergency situations, a maximum rate of 9g per hour can be used.
- Magnesium is renally cleared. Magnesium (especially via the intravenous route) should be used with caution in patients with renal impairment.

References

1. SIVUH IV guidelines monograph for magnesium, 2023
2. Galway University Hospital IV guidelines monograph for magnesium, 2019
3. Guideline for the Management of Hypomagnesaemia in Adults, Gloucester Hospitals NHS Foundation Trust, October 2021
4. Hypomagnesaemia - a guide for GPs, Royal United Hospitals Bath NHS Foundation Trust, January 2021
5. How is acute hypomagnesaemia treated in adults?, UK Medicines Information, November 2020
6. Hypomagnesaemia: Evaluation and treatment, UpToDate, October 2022, <https://www.uptodate.com/contents/hypomagnesaemia-evaluation-and-treatment>

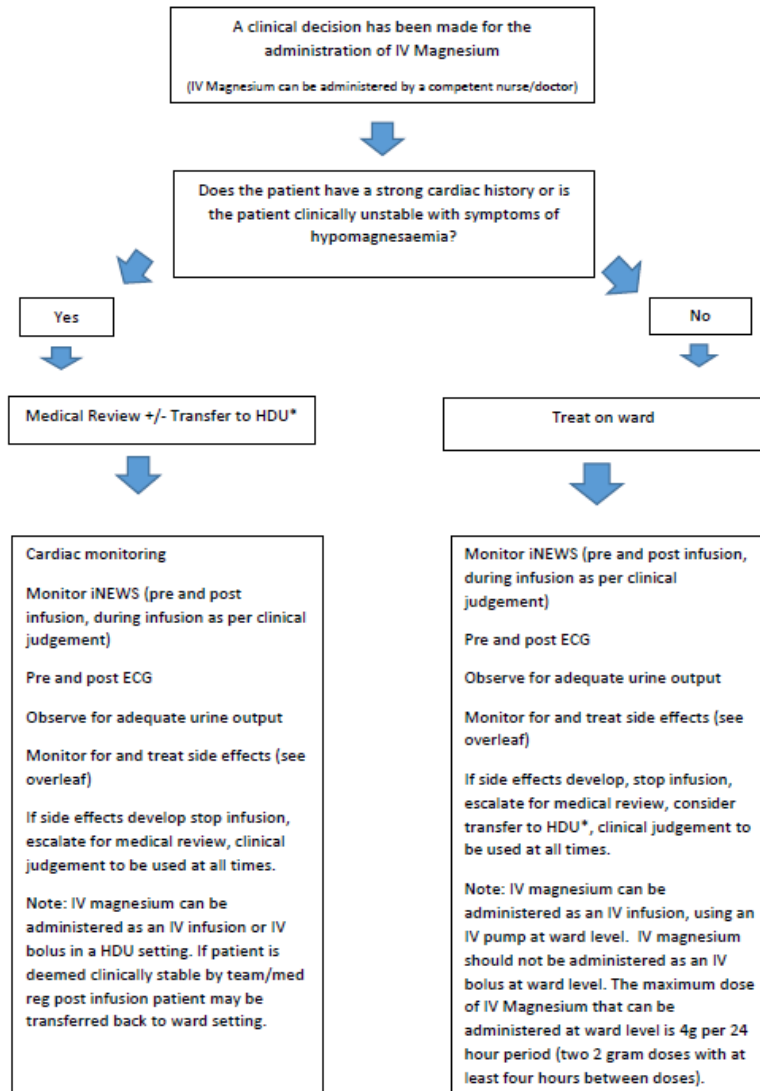




Appendix 1.

NURS0044: Policy for Medication Management for Nursing Staff in the SIVUH (Updated 10/2023), Page 32 & 33. Relevant for management of low magnesium at SIVUH.

Management Pathway for the Patient receiving IV Magnesium for electrolyte disturbance.



*HDU or equivalent setting with cardiac monitoring available





Management Pathway for the Patient receiving IV Magnesium for electrolyte disturbance.

Signs & Symptoms of hypomagnesaemia

Anorexia, Nausea

Confusion, Weakness, Ataxia, Paraesthesia, Tetany, Tremor,
Muscle Fasciculation

Cardiac Arrhythmias, Digitalis toxicity may be exacerbated

With very low levels seizures, drowsiness and coma

Cautions & Side Effects of Magnesium supplementation

Adverse effects

Hypocalcaemia, phlebitis, hypermagnesaemia

Rapid IV administration may cause hypotension and flushing

Renal impairment increases the risk of hypermagnesaemia
developing- consider dose alteration.

Caution should be taken with:

- patients with myasthenia gravis and hepatic failure
- patients with hyperkalaemia or hypocalcaemia
- parenteral magnesium in patients with heart block or myocardial damage

Magnesium toxicity can be treated with Calcium Chloride or
Calcium Gluconate (please ensure same is available on the unit).

References:

Medinfo Galway (2020) Magnesium sulphate Intravenous for Adults.

The Royal Hospital for Women (2017) Magnesium Sulphate Intravenous Administration for Electrolyte Disturbance.

De Havilland A, Hariharan G and Puvvadi R. (2022) Is intravenous magnesium sulphate safe to be administered outside the critical care setting? *Journal of Paediatrics and Child Health* 58 924–92

