Definition(s)

LOW serum magnesium level

- **MILD hypomagnesaemia** - serum magnesium **0.5 to 0.7mmol/L** and no signs or symptoms of hypomagnesaemia
- **MODERATE hypomagnesaemia** - serum magnesium **0.4 to 0.49mmol/L** and no signs or symptoms of hypomagnesaemia
- **SEVERE hypomagnesaemia** - serum magnesium **less than 0.4mmol/L** or showing signs or symptoms of hypomagnesaemia

Care settings

This guideline is for the management of adults only

Potential Causes

**Note that this list is NOT exhaustive**

Common causes of hypomagnesaemia include:
- Gastrointestinal losses
  - Vomiting
  - Diarrhoea
  - Malabsorption
- Renal losses
- Blood transfusion
- Hypercalcaemia
- Hypokalaemia
- Dietary deficiency and Re-feeding syndrome
- Syndrome of inappropriate antidiuretic hormone secretion (ADHD)
- Acidosis

Common drugs causing hypomagnesaemia include:
- Cisplatin
- Ciclosporin
- Tacrolimus
- Pentamidine
- Foscarnet
- Aminoglycosides
- Gentamicin
- Amphotericin B
- Diuretics
- Proton Pump Inhibitors
**Signs and symptoms**

Hypomagnesaemia can cause a number of symptoms and signs, most of which are non-specific and rarely occur unless the magnesium level is less than 0.4mmol/L. They include:

- **Neuromuscular symptoms:**
  - Tremors
  - Tetany
  - Cramps
  - Seizures
  - Ataxia and muscle weakness.

- **Cardiovascular symptoms:**
  - Arrhythmias,
  - Enhanced digitalis toxicity,
  - Nonspecific electrocardiographic changes, including ST-segment depression, altered T waves, or loss of voltage. Severe magnesium deficiency may cause PR prolongation or widened QRS complexes.

- **Behavioural symptoms:**
  - Irritability
  - Confusion
  - Depression
  - Psychoses

**Initial actions**

- Identify and manage underlying cause if possible.
- Stop any offending drugs
- Determine serum Magnesium level and use flow diagram below to determine management option
Management

What is patient’s magnesium level?

Less than 0.4mmol/L

Is patient in critical care?

YES

INTRAVENOUS MAGNESIUM USING Magnesium Sulfate 50% ***dilute before use***

- Dilute 5g (20mmol) 10mL of magnesium sulfate 50% injection with sodium chloride 0.9% and make up to 50mL
- Infusion duration: FIVE hours
- Rate: 10mL per hour
- IV route: Central or Peripheral

NO

0.4 to 0.70mmol/L

Is patient experiencing symptoms of hypomagnesaemia?

NO

Is patient in critical care?

YES

ORAL MAGNESIUM SUPPLEMENTS

- Magnesium aspartate dehydrate 243mg sachet (Magnaspartate) 10mmol magnesium per sachet
  - ONE sachet in 200mL water TWICE a day
  - (in 50mL, if fluid restricted)

Or

- Co-magaldrox 7mmol in 10mL suspension (unlicensed indication but widely used)
  - 10mL FOUR times a day.

- Caution in Renal impairment,
  - Stage 4 - use half dose
  - Stage 5 – Avoid

Is oral access available?

NO

YES

ITU only

Add 5g (20mmol) 10mL of magnesium sulfate 50% injection to at least 100mL sodium chloride 0.9% administered over at least FOUR hours

Administration via a Peripheral line

5g (20mmol) added to at least 100mL sodium chloride 0.9% administered over at least FOUR hours

Author
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Trust Approval
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### Monitoring Requirements

- Monitor U&Es and Magnesium daily
- Monitor calcium levels if patient also has hypocalcaemia
- Monitor for signs of hypermagnesaemia (toxicity)
  - Mild symptoms include
    - Headaches, drowsiness
    - Flushing, thirst
    - Nausea & vomiting
    - Generalised weakness
  - More Severe symptoms include
    - Loss of deep tendon reflexes
    - Respiratory depression
    - Hypotension and bradycardia
    - ECG changes: flattened P waves and wide QRS complexes
    - Arrhythmias and cardiac arrest
- Monitor Blood Pressure
- Monitor Heart Rate
- Monitor Respiratory Rate
- Monitor for phlebitis

### ECG monitoring

- NONE required

### Other Information

Course lengths should be based on the clinical indication for use and stop dates or review dates specified on ePMA. If a patient is to be discharged before a course is completed then the GP must be given explicit information regarding monitoring and future management via the discharge summary.

### References

- British National Formulary [https://bnf.nice.org.uk/](https://bnf.nice.org.uk/)
- Summary of Product Characteristics [https://www.medicines.org.uk/emc/](https://www.medicines.org.uk/emc/)
- IV guide [https://medusa.wales.nhs.uk/](https://medusa.wales.nhs.uk/) user name – cddward password - ivguide