Guideline: ADULT

NHS
County Durham and Darlington
NHS Foundation Trust

Guideline for the Management of HYPOPHOSPHATAEMIA in Adults

Definition(s)

LOW serum phosphate level

- MILD hypophosphataemia - serum phosphate **0.6 to 0.69mmol/L and** no signs or symptoms of hypophosphataemia
- MODERATE hypophosphataemia - serum phosphate **0.31 to 0.59mmol/L** or showing signs or symptoms of hypophosphataemia
- SEVERE hypophosphataemia - serum phosphate **less than 0.3mmol/L**

Care Settings

This guideline is for the management of adults only.

Potential Causes

Note that this list is NOT exhaustive

- Severe malnutrition or anorexia
- Excess alcohol intake
- Severe burns
- Diabetic ketoacidosis
- Hyperparathyroidism
- Chronic diarrhoea
- Vitamin D deficiency

Common drugs causing hypophosphataemia include:

- Aminophylline
- Diuretics
- Beta-agonists
- Insulin
- Phosphate binders
- Dopamine
- Corticosteroids
- Theophylline
- Antacids
- Bisphosphates

Signs and Symptoms

Hypophosphataemia may be asymptomatic. It can however cause a number of symptoms and signs, most of which are non-specific and rarely occur unless the phosphate level is less than 0.3mmol/L.

They include:

- Weakness
- Anorexia
- Malaise
- Tremor
- Paraesthesia
- Seizures
- Acute respiratory failure
- Arrhythmias
- Altered mental status
- Hypotension

Initial Actions

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

Monitoring Requirements

- Check serum phosphate concentration 2 to 12 hours after each dose to determine if repeat doses are required.
- Daily serum phosphate, calcium, magnesium, sodium and potassium levels. Rapid infusion may lead to rapid changes in electrolyte concentrations and/or precipitate arrhythmias.
- Daily renal function.
- Veins should be monitored for thrombophlebitis, especially if IV phosphate is given peripherally. Note that rapid infusion may lead to rapid changes in concentration of serum electrolytes and/or precipitate arrhythmias.
- Blood pressure.
- Nausea and vomiting may occur with oral.
- Excessive doses of phosphate may cause hyperkalaemia, hypocalcaemia and metastatic calcification. Patients with hypocalcaemia should have their calcium corrected before replacing phosphate to prevent further hypocalcaemia.

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Note that it is not usually necessary to treat patients with MILD hypophosphatemia, however if patient is symptomatic or the clinician feels treatment is appropriate follow the treatment recommendations for MODERATE

What is patient's phosphate level?

SEVERE Less than 0.3mmol/L

MODERATE 0.31 to 0.59mmol/L

Is oral access available?

NO

YES

Does patient have symptoms of hypophosphataemia?

YES

NO

Consider IV replacement (especially if serum phosphate is less than 0.48mmol/L.

If decided that IV not required

INTRAVENOUS (IV) REPLACEMENT (Two Options)

1. Polyfusor® Phosphate (500mL contains 50mmol of phosphate, 81mmol of sodium and 9.5mmol of potassium).
2. Sodium Glycerophosphate 21.6% concentrate solution for infusion (ONE 20mL ampoule contains 20mmol of phosphate and 40mmol of sodium).

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INTRAVENOUS (IV) REPLACEMENT

Dose: 10mmol to 50mmol of phosphate

1. **Polyfusor® Phosphate**
   Dose: 20mmol to 50mmol (200 to 500mL of Polyfusor Phosphate)
   Dilution: Administer UNDILUTED
   Administration: UNDILUTED via a CENTRAL or PERIPHERAL IV infusion over TEN hours (20 to 50 mL per hour)
   NOTE – must discard remaining polyfusor

2. **Sodium Glycerophosphate 21.6% ampoules**
   Dilution:
   - To make a solution containing 10mmol phosphate – Add 10mL sodium glycerophosphate 21.6% to 50mL of glucose 5%.
   - To make a solution containing 20mmol phosphate – add ONE ampoule (20mL) sodium glycerophosphate 21.6% to 50mL of glucose 5%.
   - To make a solution containing 40mmol phosphate – add TWO ampoules (40mL) sodium glycerophosphate 21.6% to 100mL of glucose 5%.

   Administration:
   The diluted solution should be administered via a CENTRAL line over TEN hours.

If sodium glycerophsphate is required via a PERIPHERAL line. Add ONE 20mL ampoule to 250mL of glucose 5% and administer over TEN hours

NOTE – maximum concentration via peripheral route is 0.1mmol per ml.

All Clinical Areas

INTRAVENOUS (IV) REPLACEMENT

Dose: 9mmol to 10mmol of phosphate

1. **Polyfusor® Phosphate**
   Dose: 9mmol (90mL of Polyfusor Phosphate)
   Dilution: Administer UNDILUTED
   Administration: UNDILUTED via a PERIPHERAL IV infusion over TEN hours
   NOTE – must discard remaining 410mL of polyfusor

2. **Sodium Glycerophosphate 21.6% ampoules**
   Dilution: To make a solution containing 10mmol phosphate – add 10mL sodium glycerophosphate 21.6% to 100mL to 250mL of glucose 5%.
   Administration: The DILUTED solution (containing phosphate) should be administered over TEN hours via a PERIPHERAL line.

NOTE – maximum concentration via peripheral route is 0.1mmol per ml

HIGH DOSE ORAL REPLACEMENT

30 to 32.2mmol **THREE times a day** using either
- **Phosphate Sandoz®**** - **TWO** tablets dissolved in at least 20mL water
- **Phosphate Phebra®** -TWO** tablets dissolved in at least 20mL water
- **Sodium acid phosphate 15.6% liquid**** 30mL

Monitor phosphate level and consider dose reduction, as appropriate

Monitor phosphate level and consider switch to oral when phosphate level is over 0.48mmol/L

LOW DOSE ORAL REPLACEMENT

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- **Phosphate Phebra® **-TWO** tablets dissolved in at least 20mL water
- **Sodium acid phosphate 15.6% liquid**** 30mL

**NOTE
- Phosphate Sandoz® - 16.1mmol per tablet
- Phosphate Phebra® – 16.1mmol per tablet (unlicensed import)
- **Sodium acid phosphate 15.6% liquid** 1mmol per mL (unlicensed special)

Adverse Drug Reactions

Nausea and Vomiting is common with oral replacement

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 the electronic prescribing system 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/
- Summary of Product Characteristics
  https://www.medicines.org.uk/emc/
- IV Guide
  https://www.medusaimg.nhs.uk/
  User Name: cddward - Password: ivguide
- GGC Medicines Adult Therapeutics Handbook
  https://handbook.ggcmedicines.org.uk/guidelines/electrolyte-disturbances/management-of-hypophosphataemia/