Formulary Guidance for the Prescribing and Administration of Phosphate

Phosphate for Hypophosphataemia (see also UKMi Q&A no. 371.1 for a referenced version of this guidance, which has been adapted for local use):

The reference range used locally for phosphate is 0.8 to 1.5mmol/l.

Phosphate deficiency can be caused by:
- Redistribution of phosphate into cells (respiratory alkalosis, drug therapy (e.g. insulin, catecholamines))
- Increased urinary excretion (e.g. metabolic or respiratory acidosis, hyperparathyroidism)
- Decreased intestinal absorption (e.g. antacid abuse, vitamin D deficiency, chronic diarrhoea)

Symptomatic hypophosphataemia is usually observed when plasma phosphate falls below 0.3mmol/l. Symptoms may include:
- Myopathy, rhabdomyolysis, weakness
- Respiratory failure
- Arrhythmias, cardiomyopathy
- Irritability, confusion, hallucinations, somnolence, convulsions, coma

For patients with moderate hypophosphataemia (serum phosphate between 0.3 and 0.6mmol/l), phosphate replacement can be considered if the patient is symptomatic of following consideration of the clinical risks and benefits.

Phosphate is renally excreted and should be used with caution in patients with severe renal impairment. Phosphate should be used with caution in patients with low serum calcium concentrations as these may further decrease as phosphate is replaced.

**Oral phosphate replacement**

In moderate hypophosphataemia, phosphate may be replaced by increasing the dietary intake of dairy product and other foods high in phosphate (on the advice of a dietician).

If dietary modifications are unsuitable, phosphate supplementation may be given using Phosphate Sandoz effervescent tablets (each containing 16.1mmol sodium 20.4mmol and potassium 3.1mmol). The standard dose for hypophosphataemia is 1 to 2 tablets three times daily. The need for therapy should be reviewed on a daily basis and initially a three day course should be prescribed. Tablets should not be taken with aluminium, calcium or magnesium salts as these will bind phosphate and reduce its absorption.
Parenteral phosphate replacement
Intravenous phosphate replacement is indicated if the patient has severe hypophosphataemia or is symptomatic. It may also be considered for patients who are unlikely to absorb oral agents.

Phosphates Polysor is a suitable intravenous preparation (unless the relatively high sodium content of this preparation is not appropriate). Each 500ml polysor contains phosphate 50mmol, potassium 9.5mmol and sodium 81mmol.

Suggested doses of Phosphates Polysor:

<table>
<thead>
<tr>
<th>Serum Phosphate Concentration</th>
<th>Weight 40 to 60kg</th>
<th>Weight 61 to 80kg</th>
<th>Weight 81 to 120kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount of Phosphate</td>
<td>Volume of Polysor</td>
<td>Amount of Phosphate</td>
</tr>
<tr>
<td>&lt; 0.3mmol/l</td>
<td>25mmol</td>
<td>250ml</td>
<td>35mmol</td>
</tr>
<tr>
<td>0.3 to 0.6mmol*</td>
<td>10mmol</td>
<td>100ml</td>
<td>15mmol</td>
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</tbody>
</table>

*where oral route unsuitable

The appropriate volume (see table above) should be administered over 24 hours. Repeated doses may be required on subsequent days after checking of serum phosphate levels.

Reduced doses may be necessary in patients with impaired renal function.

Where phosphate polysors are unavailable, glycophos can be used. Administer 20mmol of phosphate (i.e. one vial of glycophos) in 500ml of sodium chloride 0.9% or glucose 5%.

Where a lower content sodium preparation is required, Addiphos may be used. Each vial contains 40mmol phosphate, 30mmol potassium and 30mmol sodium in 20ml, using the same diluent.

Monitor serum phosphate concentration regularly – along with, for intravenous phosphate administration: calcium, magnesium, potassium and renal function.

Hypophosphataemia may be a symptom of refeeding syndrome. If occurring in the presence of other electrolyte deficiencies, consider this diagnosis and do not attempt to reintroduce nutrition without first obtaining guidance from a dietitian. See ‘A Practical Guide to Nutritional Support in Adults’ for more information.
Adverse effects include diarrhoea and gastrointestinal upset with the Phosphate Sandoz tablets, hyperkalaemia (although sodium phosphate can cause hypokalaemia), hypernatraemia and dehydration. Particularly after administration by the intravenous route, hyperphosphataemia accompanied by hypocalcaemia may occur. Patients with hypocalcaemia should have their calcium corrected before replacing phosphate to prevent further hypocalcaemia.


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