Treatment of Hypophosphataemia in Adults

Reference range for serum phosphate at Gloucestershire Hospitals NHS Foundation Trust:

<table>
<thead>
<tr>
<th>Concentration (mmol/L)</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8 – 1.6</td>
<td>normal</td>
</tr>
<tr>
<td>0.5 – 0.8</td>
<td>mild hypophosphataemia</td>
</tr>
<tr>
<td>0.3 – 0.5</td>
<td>moderate hypophosphataemia</td>
</tr>
<tr>
<td>&lt; 0.3</td>
<td>severe hypophosphataemia</td>
</tr>
</tbody>
</table>

Phosphate is found primarily in the intracellular space, so it is difficult to assess the magnitude of phosphate deficit based on the serum concentration alone. Hypophosphataemia will rarely be corrected by a single administration of supplementary phosphate, and will often need 2-3 days treatment.

Oral phosphate supplements should be used for patients with mild to moderate asymptomatic hypophosphataemia. Oral phosphate may cause diarrhoea, and doses should be reduced if this occurs.

Intravenous phosphate is rarely necessary and is associated with serious adverse effects if hypophosphataemia is over-corrected. The rise in serum-phosphorus concentration cannot be predicted from a given dose and therefore intravenous phosphate should be used cautiously in patients for whom the oral route is not suitable.

### Treatment

**Oral:**

**Phosphate-Sandoz®** (One tablet = 16.1mmol phosphate, 20.4mmol sodium, 3.1mmol potassium)

Mild to moderate hypophosphataemia: 2 tablets bd – tds (dissolved in ½ glass of water)  
Adjust dose according to response

Contact Medicines Information for advice on oral alternatives to Phosphate-Sandoz®

**Intravenous infusion:**

**Phosphates Polyfusor®** (500ml = 50mmol phosphate, 81mmol sodium, 9.5mmol potassium)

Mild hypophosphataemia: 1 – 2 ml/kg  
Moderate / severe hypophosphataemia: 2 – 5 ml/kg  
Over 6 – 12 hours

Maximum dose = 500ml Polyfusor® per infusion  
Maximum infusion rate = 150ml Polyfusor® per hour

The Phosphates Polyfusor® is suitable for peripheral or central administration. Do not infuse with any other medications. For patients with renal impairment or hyperkalaemia consider giving the infusion over 12 hours.

### Precautions

- **Renal impairment** – Initial dose should be halved in patients with significant renal impairment, and serum levels must be monitored carefully (see below).
- **Low calcium levels and other pre-existing electrolyte disturbances** – Phosphate administration can cause hypocalcaemia.
- **Rapid IV infusion may cause metastatic soft tissue calcification.**
- **Patients requiring restricted sodium intake** – e.g. CCF, hypertension. The sodium content of Phosphate-Sandoz® and Phosphates Polyfusor® must be considered.
- **Oral magnesium, calcium or aluminium containing products** – may bind oral phosphate and prevent its absorption if given at the same time of day as Phosphate-Sandoz®.
Monitoring

- Electrolytes (particularly: phosphate, calcium and potassium) must be monitored at least daily.
  **Note:** Monitor 6 – 12 hourly during IV phosphate replacement.
- Renal function (daily).
- Blood pressure (during IV administration).

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Side Effects

Oral:
- Nausea.
- Vomiting.
- Abdominal pain.
- Diarrhoea - dose adjustment may be required.
- Electrolyte disturbance.

Intravenous infusion:
- Excessive doses may cause hyperphosphataemia, particularly in patients with renal failure. Hyperphosphataemia leads to hypocalcaemia, which may be severe, and to ectopic calcification, particularly in patients with initial hypercalcaemia. Tissue calcification may cause hypotension and organ damage and result in acute renal failure. Reducing the rate of infusion reduces the risk of adverse effects.
- Oedema.
- Pain and phlebitis at the injection site.

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Symptoms of hypophosphataemia

It is uncommon to see symptoms of hypophosphataemia, but they include:
- Anorexia.
- Generalised muscle weakness.
- Paraesthesia.
- Confusion.
- Seizures.
- Coma.
- Rhabdomyolysis – especially in acute alcoholism.
- Respiratory failure.
- Cardiac failure.
- Haemolytic anaemia.

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References

- Summary of product characteristics for Phosphates as Polyfusor®. Date of revision of the text August 2006. Received from Fresenius Kabi.