

Guidelines for the Management of HypoPHOSPHATAEMIA in Adults

Hypophosphataemia is defined as a phosphate level of $<0.7\text{mmol/L}$.

CAUSES

Reduction in Intestinal Absorption	Increase in urinary phosphate excretion	Movement of extracellular phosphate
➤ Prolonged malnutrition ➤ Refeeding syndrome ➤ Chronic diarrhoea ➤ Medication: • Antacids such as Maalox® • Phosphate binders e.g. Sevelamer, Lanthanum • Acetazolamide	➤ Hyperparathyroidism ➤ Vitamin D deficiency	➤ Alcoholism ➤ Chronic respiratory acidosis ➤ Diabetic ketoacidosis ➤ Hepatic failure ➤ Sepsis
	Removal by renal replacement therapies	

SYMPTOMS

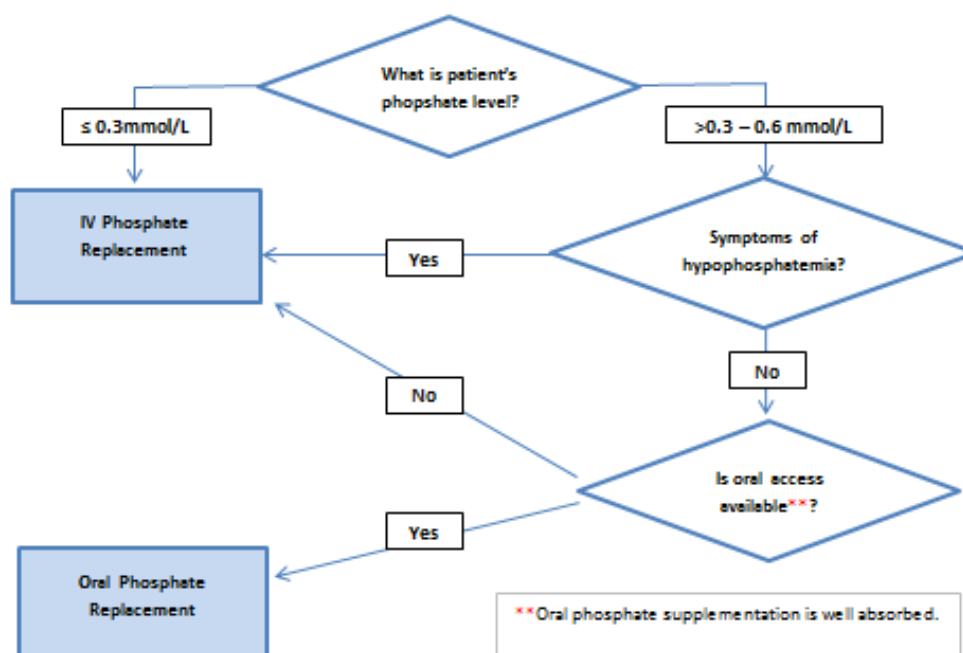
Hypophosphataemia is usually asymptomatic. Clinical symptoms may occur at levels $<0.3\text{mmol/L}$	
Musculoskeletal	Muscle weakness, paraesthesia, tremor. Prolonged hypophosphataemia may result in osteomalacia or rickets
CNS	Confusion
Cardiovascular	Arrhythmias
Biochemical*	Hypomagnesaemia often occurs in conjunction with hypophosphataemia. Correction of hypomagnesaemia should also be undertaken if detected.

TREATMENT

STEP 1

Identify the underlying cause of hypophosphataemia and correct this before phosphate supplementation. If the cause is not apparent, then measurement of urinary phosphate excretion may be helpful (e.g. Vitamin D supplementation if Vitamin D deficiency is determined). Discuss with Renal Team for further advice.

Choice of treatment will be determined by phosphate level, symptoms and availability of oral route.



STEP 2

Treat hypophosphatemia with phosphate supplementation, taking into account serum phosphate concentration, the presence or absence of symptoms, availability of oral route as well as the overall clinical picture.

ORAL Phosphate-Sandoz® tablets
Each effervescent tablet contains: ○ Phosphate – 16mmol ○ Sodium – 20.4mmol Prescribe 1–2 tablets three times a day Dissolve tablets in approximately 100mL of water. Diarrhoea is a common side effect of oral phosphate therapy and may necessitate a reduction in dose.

INTRAVENOUS			
Preparation	Sodium Phosphate (Unlicensed)	Potassium Phosphate	Addiphos®
Contents	Each 20mL ampoule of sodium phosphate contains: • Phosphate 12 mmol • Sodium 20 mmol	Each 20mL ampoule of potassium phosphate contains: • Phosphate 12 mmol • POTASSIUM 20 mmol	Each 20mL ampoule of Addiphos® contains: • Phosphate 40 mmol • POTASSIUM 30 mmol • Sodium 30 mmol
Typical Dose	One 20 mL ampoule	One 20 mL ampoule	10 to 20mL of one ampoule
Infusion Preparation	Dilute one ampoule in 250mL of sodium chloride 0.9% or glucose 5% Sodium phosphate is incompatible with magnesium and calcium salts thus making sodium lactate (Hartmann's solution) and Ringer's injection incompatible infusion fluid	Dilute one ampoule in at least 500mL of sodium chloride 0.9% or glucose 5%	• Dilute one 20mL ampoule in 750mL of glucose 5%
Infusion Duration & Max Rate	• Administer over 6 to 12 hours. • The maximum rate of phosphate administration peripherally is 20mmol/hour.	• Administer over at least 2 hours. • The maximum rate of POTASSIUM peripherally is 10mmol/hour. • Contains POTASSIUM – BOLUS INJECTION may be FATAL	• Administer over 3 to 12 hours. • The maximum rate of POTASSIUM peripherally is 10mmol/hour. • Contains POTASSIUM – BOLUS INJECTION may be FATAL

Notes:

- Choice of intravenous phosphate supplement should be based on the patient's complete electrolyte status. It may be necessary to correct concomitant electrolyte disturbances.

- Hypomagnesaemia often occurs in conjunction with hypophosphataemia. Correction of hypomagnesaemia should also be undertaken if detected.
- Intravenous phosphates are associated with serious adverse effects if hypophosphataemia is over-corrected and should be used cautiously to avoid hypocalcaemia and metastatic calcification. As the rise in serum phosphate levels cannot be predicted from a given dose it is advisable to use intravenous phosphate cautiously in the treatment of severe hypophosphataemia.
- During treatment of severe/symptomatic hypophosphataemia the serum phosphate level should be re-evaluated after the phosphate infusion is infused to guide further treatment. Switch to oral replacement when the serum phosphate > 0.48 mmol/L.
- When carrying out phosphate replacement in patients receiving parenteral nutrition, account should be taken of the fact that various solutions used for parenteral nutrition (including lipid emulsions) also contain phosphate.
- Stop phosphate replacement when the serum phosphate is ≥ 0.64 mmol/L unless there is an indication for chronic therapy such as persistent urinary phosphate wasting.

MONITORING

- Serum phosphate, calcium and potassium concentration.
- Renal function.
- If IV phosphate is given peripherally, veins should be monitored for irritation.

CAUTION

- Intravenous phosphate should be administered with caution to patients with cardiac failure, peripheral or pulmonary oedema, impaired renal function or conditions predisposing to hyperkalaemia due to the potassium and sodium content.
- 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.

REFERENCES

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