

Hypophosphatemia

Evaluation:

- Serum phosphorus levels should be interpreted with concomitant evaluations of PTH, serum total and ionized calcium, urine phosphate and calcium and Vitamin D
- Medical history, physical examination and lab tests to determine etiology of hypophosphatemia (renal wasting, decreased intestinal absorption etc)
- Concomitant serum levels of Magnesium and Potassium should be checked as well and replaced per protocol

Causes:

- Hyperparathyroidism
- Vitamin D deficiency
- Malabsorption/emesis
- Increased urinary secretion
- Refeeding after malnutrition
- Hyperalimentation
- Recovery of DKA, effects of insulin/glucagon/androgens
- Hypothermia (recovering from hypothermia)
- Steatorrhea
- Medication (e.g. phosphate binders, salicylate poisoning, steroids, diuretics)

- Decreased intake
- Alcohol abuse, withdrawal
- Renal tubular defects (aldosteronism, SIADH)
- Sepsis
- Gout
- Burns
- Respiratory alkalosis
- Hypomagnesemia

Signs: Generally seen with serum phosphate levels below 1 mg/dl

- Numbness
- Weakness
- AMS / confusion
- stupor

- Seizures
- coma
- Muscle pain
- Rhabdomyolysis
- Resp. failure
- CHF
- Paresthesias
- Dysarthria
- Hemolysis
- Platelet dysfunction
- Metabolic acidosis

Therapy:

- Treat underlying cause, the phos levels will normalize automatically (DKA, diarrhea, chronic antacid therapy, or vitamin D deficiency)
 - Replete if serum phos levels are less than 2.0 mg/dl (0.64 mmol/L)
 - Keep phos levels over 1 mg/dl, above that, oral replacement is preferable to avoid hyperphosphatemia (which can cause subsequent hypocalcemia, ectopic calcifications, renal failure, or hypotension)
 - In Asymptomatic patients with serum levels below 2.0 mg/dl replete with oral phosphate
- Serum level of 1.5 mg/dl (0.48 mmol/L) → give 1 mmol/kg elemental phosphorus (minimum of 40 and maximum of 80 mmol can be given in 4 doses over 24h)
- Serum level less than 1.5 mg/dl → give 1.3 to 1.4 mmol/kg of elemental phosphorus (up to a maximum of 100 mmol given in 4 doses over 24h)
- In Symptomatic patients treatment varies with severity of the hypophosphatemia
- Serum level of 1.0 to 1.9 mg/dl (0.32 to 0.63 mmol/L) → treat with oral phosphate
- Serum level less than 1.0 mg/dl → treat with IV phosphate and switch to oral
- Stop replacement when serum levels is equal to or greater than 2.0 mg/dl
- IV preparations: IV phosphate is potentially dangerous. If IV phos is necessary, use dose depending on severity of hypophosphatemia and the weight of the patient.
- If the serum phosphate concentration is greater than or equal to 1.25 (0.40 mmol/L), → give 0.08 to 0.24 mmol/kg over six hours (up to a maximum total dose of 30 mmol).
- If the serum phosphate concentration is less than 1.25 mg/dL (0.40 mmol/L) → give 0.25 to 0.50 mmol/kg over 8 to 12 hours (up to a maximum total dose of 80 mmol).

→ measure serum phosphate levels Q6H and switch the oral replacement once serum levels have reached 1.5 mg/dl (0.48 mmol/L)

- Use either sodium phosphate or potassium phosphate depending on whether patient also needs potassium
- Follow Potassium and Magnesium as well and replete per protocol

https://www.uptodate.com/contents/hypophosphatemia-evaluation-and-treatment?search=hypophosphatemia&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H727383

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4324571/#:~:text=When%20evaluating%20a%20patient%20with,not%20reliable%20indicators%20of%20total>

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