References :

1- the_washington_manual_of_critical_care [CRITICAL CARE SOURCES]
2- the icu book paul marino 2014 (4th ed.)
3- Oxford Handook of Nephrology and Hypertension 2nd Ed
4- Applied Therapeutics 2013 - The Clinical Use Of Drugs
5- Dipiro Pharmacotherapy Handbook 9th Edition
6- Fluids,_Electrolytes,_and_Nutrition_Workbook

Hypophosphatemia

Serum phosphate < 2.8 mg/dl [1]

Reference Range: 2.5–4.5 mg/dL or 0.80–1.45 mmol/L [4]

Check 24 hrs urine PO4 excretion and/or FE PO4 [1]

FE PO4 >5% OR Urine PO4 >100mg/d [1]

Renal losses

Causes :

- -Chronic Alcoholism[1]
- -Osmotic Diuresis[1]
- -Volume Expansion[1]
- -Corticosteroid or theophylline use[1]

Check PTH, Calcidiol and Calcium

- ↓ Calcidiol + ↓ → Vitamin D Deficiency[1]
- ↑ Ca++ + ↑PTH[1] → Primary Hyperparathyroidism[1]

FE PO4 <5% OR Urine PO4

Causes :

1- GI Losses : [1]
- *Phosphate Binders (Sucralfate[2] , CaCO3 [3])
- *Malnutrition/Diarrhea → Prevent hypophosphatemia by supplementing IV fluid with 10–30 mmol/L IV phosphorus [6]

2- Transcellular shifts : [1] *Insulin Administration - *Post parathyroidectomy

*Refeeding syndrome → prevent by giving nutrition gradually for the first few days to avoid ↓PO4. [2]

*Intensive continuous dialysis[1] (Patients on continuous venous hemodialysis (CVVHD) → check PO4 levels every 12 to 24 hours → if ↓PO4 → dialysate flow rate may need to be reduced[1]

Treatment

Symptomatic

OR intolerant to PO [1] **OR** patient suffers from hypophosphatemia of any degree & also have cardiac dysfunction, respiratory failure, muscle weakness, or impaired tissue oxygenation [2]

Begin IV replacement

PO_4 Replacement IV by Body Weight†

Serum PO_4 (mg/dL)	40–60 kg	61–80 kg	81–120 kg	
<1	30 mmol	40 mmol	50 mmol	Over 6 to 8 hrs
1–1.7	20 mmol	30 mmol	40 mmol	Over 6 to 8 hrs
1.8–2.5	10 mmol	15 mmol	20 mmol	Over 8 to 12 hrs

- Administer IV doses over 6 hr, if hypotension results, suspect ↓ Ca++ & discontinue infusion[1]
- Use K+ phosphate if normal renal function or [K+] <4 mEq/L[1]
- Use Na+ phosphate if renal function is impaired or [K+] >4 mEq/L. [1]
- In case of renal insufficiency, IV PO4 should be given at lower doses (33% of usual doses in severe renal failure) [1]
- Can switch to oral therapy when the PO4 is > 1.5 mg/dl but it may result in diarrhea & nausea. [1]

Asymptomatic

0.5–1 g elemental phosphorus PO bid-tid; this should correct most deficits by 1 week[1]