POTASSIUM PHOSPHATES
(potassium phosphates)

monobasic potassium phosphate
K-Phos Original
potassium phosphates
Neutra-Phos-K
potassium phosphate

Classification
Therapeutic: antiurolithics, mineral and electrolyte replacements/supplements
Pregnancy Category C

Indications
Treatment and prevention of phosphate depletion in patients who are unable to ingest adequate dietary potassium. Adjunct therapy of urinary tract infections with monobasic potassium and sodium phosphates or monobasic potassium phosphate. Prevention of calcium urinary stones (potassium and sodium phosphates or monobasic potassium phosphate). Phosphate salts of potassium may be used in hypokalemic patients with metabolic acidosis or coexisting phosphorus deficiencies.

Action
Phosphate is present in bone and is involved in energy transfer and carbohydrate metabolism. Serves as a buffer for the excretion of hydrogen ions by the kidney. Dibasic potassium phosphate is converted in renal tubules to monobasic salt by hydrogen ions, resulting in urinary acidification. Acidification of urine is required for methenamine hippurate or mandelate to be active as a urinary anti-inflammatory. Acidification of urine increases solubility of calcium, decreasing calcium stone formation. Therapeutic Effects: Replacement of phosphorus in deficiency states. Urinary acidification. Increased efficacy of methenamine. Decreased formation of calcium urinary tract stones.

Pharmacokinetics
Absorption: Well absorbed following oral administration. Vitamin D promotes GI absorption of phosphates.

Distribution: Phosphates enter extracellular fluids and are thus actively transported in urine.

Metabolism and Excretion: Excreted mainly (90%) by the kidneys.

Half-Life: Unknown.

TIME/ACTION PROFILE (effects on serum phosphate levels)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>PO</td>
<td>unknown</td>
<td>unknown</td>
<td>unknown</td>
</tr>
<tr>
<td>IV</td>
<td>rapid (hr)</td>
<td>end of infusion</td>
<td>unknown</td>
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</tbody>
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Contraindications/Precautions
Contraindicated in: Hyperkalemia; Hyperphosphatemia; Hypocalcemia; Severe renal impairment; Untreated Addison’s disease; Severe tissue trauma; Hyperkalemic familial periodic paralysis.

Use Cautiously in: Hyperparathyroidism; Cardiac disease; Renal impairment.

Adverse Reactions/Side Effects
Related to hyperphosphatemia, unless otherwise indicated:

CNS:
Confusion, listlessness, weakness.

CV:
Arrhythmias, cardiac arrest, ECG changes (absent P waves, widening of the QRS complex with biphasic T waves), hypocalcemia (prolonged PR interval, ST segment depression, tall rounded T waves), GI: diarrhea, abdominal pain, nausea, vomiting. F and E: hyperkalemia, hyperphosphatemia, hypocalcemia. Local: irritation at IV site, phlebitis.

MS:
Hyperkalemia—muscle cramps; hypercalcemia—tremors.

Neuro: Flaccid paralysis, heaviness of legs, paresthesias.

Interactions
Drug-Drug: Concurrent use of potassium-sparing diuretics or ACE inhibitors may result in hyperkalemia. Concurrent administration of calcium- or aluminum-containing compounds decreases absorption of phosphates by formation of insoluble complexes. Vitamin D enhances the absorption of phosphates.

Drug-Food: Oxalates (in spinach and rhubarb) and phytates (in bran and whole grains) may decrease the absorption of phosphates by binding them in the GI tract.

Route/Dosage
Monobasic Potassium Phosphate
PO (Adults and Children ≥ 1 yr): 1 g (7.4 mmol) in water 4 times daily.

PO (Children 4–11 yr): 200 mg (6.4 mmol) in water 4 times daily.
Potassium Phosphates

PO (Adults and Children ≥ 4 yr): 1.45 g (8 mmol) 4 times daily.

PO (Children ≤ 4 yr): 200 mg (6.4 mmol) phosphorus 4 times daily.

IV (Adults): 10 mmol phosphorus/day as an infusion.

IV (Infants): 1.5–2 mmol phosphorus/day as an infusion.

NURSING IMPLICATIONS

Assessment

● Assess patient for signs and symptoms of hypokalemia (weakness, fatigue, arrhythmias, presence of U waves on ECG, polyuria, polydipsia) and hypophosphatemia (anorexia, weakness, decreased reflexes, bone pain, confusion, blood dyscrasias) throughout therapy.

● Monitor pulse, BP, and ECG prior to and periodically throughout IV therapy.

● Monitor intake and output ratios and daily weight. Report significant discrepancies.

● Lab Test Considerations: Monitor serum phosphate, potassium, and calcium levels prior to and periodically throughout therapy. Increased phosphate may cause hypocalcemia.

● Monitor renal function studies prior to and periodically throughout course of therapy.

● Monitor urinary pH in patients receiving potassium phosphate as a urinary acidifier.

Toxicity and Overdose:

Symptoms of toxicity are those of hyperkalemia (fatigue, muscle weakness, paresthesia, confusion, dyspnea, peaked T waves, depressed ST segments, prolonged QT segments, widened QRS complexes, loss of P waves, and cardiac arrhythmias) and hyperphosphatemia (parathesias, muscle twitching, laryngospasm, colic, cardiac arrhythmias, or Chvostek’s or Trousseau’s sign).

Treatment includes discontinuation of infusion, calcium replacement, and lowering serum potassium (intravenous calcium chloride, insulin and glucose, glucose and insulin, or sodium polystyrene as an exchange resin, and/or dialysis in patients with impaired renal function).

Potential Nursing Diagnoses

Imbalanced Nutrition: less than body requirements (Indications)

Implementation

High Alert: Too rapid or bolus IV administration of potassium has resulted in fatalities. See IV administration guidelines below.

PO: Tablets should be dissolved in a full glass of water. Capsules should be opened and mixed thoroughly in 1/3 cup water each. Allow mixture to stand for 2–5 min to ensure that it is fully dissolved.

Medication should be administered after meals to minimize gastric irritation and irritant effect.

Do not administer simultaneouly with aminos containing aluminum, magnesium, or calcium.

Do not administer IM.

IV Administration

pH: 6.2–6.8

High Alert: Administration only in dilute concentrations. Common component of total parenteral nutrition.

Continuous Infusion: Dextrose 5% W/V, 5% NaCl, D5W, D5W 0.45% NaCl, D5W 0.9% NaCl, or TPN solutions. Concentration: Maximum concentration should not exceed 160 mEq/L. Rate: High Alert: below as a continuous infusion at a slow rate.

Y-Site Compatibility: ciprofloxacin, diltiazem, enalaprilat, esmolol, famotidine, labetalol.

Additive Compatibility: magnesium sulfate.

Solution Incompatibility: Ringer’s or lactated Ringer’s injection, D10/0.9% NaCl, D5/0.9% NaCl.

Patient/Family Teaching

Explain to patient purpose of the medication and the need to take as directed. If a dose is missed, it should be taken as soon as remembered unless within 1–2 hr of the next dose. Explain that the tablets and capsules should not be swallowed whole. Tablets should be dissolved in water; capsules should be opened and the contents mixed in water.

Advise patient of the importance of maintaining a high fluid intake (drinking at least one 8-oz glass of water each hr) to prevent kidney stones.

Instruct the patient to report diarrhea, weakness, fatigue, muscle cramps, or tremors promptly.
CONTINUED

POTASSIUM PHOSPHATES

Evaluation/Desired Outcomes

- Prevention and correction of serum phosphate and potassium deficiencies.
- Maintenance of acidosis.
- Decrease in urine calcium, which prevents formation of renal calculi.

Why was this drug prescribed for your patient?