alfacalcidol (al-fak-sil-dol)  

**Classification**: Vitamin D analogues

**Indications**
Management of hypocalcemia, secondary hyperparathyroidism and osteodystrophy associated with chronic renal failure.

**Action**
Stimulates intestinal absorption of calcium and phosphorus, reabsorption of calcium from bone and renal reabsorption of calcium. Does not require renal activation.

**Therapeutic Effects**
Improved calcium and phosphorus homeostasis in patients with chronic kidney disease.

**Pharmacokinetics**

- **Absorption**: Completely absorbed following oral administration.
- **Distribution**: Unknown.
- **Protein Binding**: Extensively protein bound.
- **Metabolism and Excretion**: Following absorption, 50% is rapidly converted by liver to active metabolite (1.25–(OH)2D; 13% renally excreted.
- **Half-life**: 3 hr.

**TIME/ACTION PROFILE (levels of active metabolite)**

- **ROUTE ONSET† PEAK DURATION‡**
  - **PO**: 6 hr 12 hr few days-1 wk
  - **IV**: unknown 4 hr few days-1 wk

  †Effect on intestinal calcium absorption, bone pain and muscle weakness improve within 2-3 wk.

  ‡Effect on serum calcium levels following discontinuation.

**Contraindications/Precautions**

- **Contraindicated in**: Breast feeding should be avoided; Concurrent use of other Vitamin D analogues or magnesium-containing antacids.
- **Use Cautiously in**: OB: potential benefits should be weighed against hazards to fetus and mother; Pedi: safe and effective use in children has not been established.

**Adverse Reactions/Side Effects**

- **CNS**: headache, drowsiness, weakness.
- **CV**: ARRHYTHMIAS, hypertension.
- **EENT**: conjunctivitis, photophobia.
- **GI**: constipation, nausea, anorexia, dry mouth, metallic taste, pancreatitis, polydipsia, vomiting.
- **Derm**: pruritus.
- **F and E**: HYPERCALCEMIA, hyperphosphatemia, hyperthermia, q thirst.
- **GU**: albuminuria, hypercalcuria, libido, nocturia, polyuria.
- **Metab**: ectopic calcification, hypercholesterolemia.
- **MS**: bone pain, muscle pain.

**Drug Interactions**

- **Drug-Drug**: Hypercalcemia q risk of toxicity from digitalis glycosides, including digoxin. q risk of toxicity and adverse reactions with concurrent use of other vitamin D analogues. Concurrent use of bile acid sequestrants including cholestyramine or mineral oil, q absorption and effectiveness. Concurrent use of barbiturates and other anticonvulsants may q effectiveness, larger doses of alfalfacalcidol may be required.

**Route/Dosage**

- **PO (Adults)**: Pre-dialysis patients — 0.25 mcg/day for 2 mos initially; if necessary, dose increments of 0.25 mcg/day may be made at 2 mo intervals (usual range 0.5–1.0 mcg/day); dialysis patients — 1 mcg/day, if necessary dose increments of 0.5 mcg/day may be made at 2–4 wk intervals (usual range 1–2 mcg/day, up to 3 mcg/day). When normalization occurs, dose should be q to minimum amount required to maintain normal serum calcium levels.
**IV (Adults):** Dialysis patients—1 mcg during each dialysis (2–3 times weekly), if necessary dose may be increased weekly by 1 mcg per dialysis up to 12 mcg/week (range 1.5–12 mcg/week). When normalization occurs, dose should be the minimum amount required to maintain normal serum calcium levels.

**NURSING IMPLICATIONS**

**Assessment**
- Assess for signs of vitamin D deficiency prior to and during treatment.
- Assess patient for bone pain and weakness during therapy; usually decreases within 2 to 3 months.

**Lab Test Considerations:** For pre-dialysis patients: Monitor serum calcium and phosphate levels monthly and electrolytes periodically during treatment. Post-dialysis patients: Monitor serum calcium at least twice weekly during dose titration. If hypercalcemia occurs decrease dose of alfacalcidol by 50% and stop all calcium supplements until calcium levels return to normal. May cause 1.5–2 mmol/L decrease in phosphate levels. Maintain serum phosphate level ≤2.0 mmol/L. Monitor inorganic phosphorus, magnesium, alkaline phosphatase, creatinine, BUN, 24-hour urinary calcium and protein as needed.

**Toxicity and Overdose:** Toxicity is manifested as hypercalcemia, hypercalciuria, and hyperphosphatemia. Assess patient for appearance of nausea, vomiting, anorexia, weakness, constipation, headache, bone pain, and metallic taste. Later symptoms include polyuria, polydipsia, phosphaturia, rhinorrhea, pruritus, and hepatomegaly. Notify health care professional immediately if these signs of hypervitaminosis D occur. Treatment usually consists of discontinuation of alfacalcidol, a low-calcium diet, stepping calcium supplements. Persistent or markedly elevated serum calcium levels in hemodialysis patients may be corrected by dialysis against a calcium-free dialysate.

**Potential Nursing Diagnoses**
- Imbalanced nutrition: less than body requirements

**Implementation**
- **PO:** Administer with fruit juice. Use calibrated dropper with oral for accurate dose. Oral solution may be mixed with water or milk.
- **IV:** Administer IV during hemodialysis. Shake well before use. Keep refrigerated. Discard unused portion.

**Patient/Family Teaching**
- Advise patient to take medication as directed. Do not stop taking without consulting health care professional.
- Advise patient and family to notify health care professional if signs and symptoms of hypercalcemia occur.
- Review diet modifications with patient. Note that low-calcium diet alone can control hypercalcemia if other causes are identified. Consult health care professional before taking any other Rx, OTC, or herbal products.
- Advise female patient to notify health care professional if pregnancy is planned or suspected or if breast feeding.
- Explain the importance of follow-up exams to evaluate progress.

**Evaluation/Desired Outcomes**
- Improved levels of calcium and phosphorous in patients with kidney disease.

**Why was this drug prescribed for your patient?**