paricalcitol (par-i-kal-sitol)

**Classification**
Therapeutic: vitamins
Pharmacologic: fat-soluble vitamins

**Pregnancy Category:** C

**Indications**
Prevention and treatment of secondary hyperparathyroidism in patients with Stage 3 or 4 (PO) or Stage 5 (PO and IV) chronic kidney disease.

**Action**
Paricalcitol is a synthetic analog of calcitriol (the active form of vitamin D). Promotes the absorption of calcium and decreases parathyroid hormone concentrations.

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

**Pharmacokinetics**
- **Absorption:** IV administration results in complete bioavailability; well absorbed following oral administration.
- **Distribution:** Crosses the placenta.
- **Protein Binding:** 99.9%.
- **Metabolism and Excretion:** Primarily metabolized by the liver and excreted via hepatobiliary elimination.
- **Half-life:** 14–20 hr.

**TIME/ACTION PROFILE**
- **ROUTE**
  - **ONSET**
  - **PEAK**
  - **DURATION**
  - **PO** unknown 2–4 wk unknown
  - **IV** unknown 2–4 wk unknown

**Contraindications/Precautions**
- **Contraindicated in:** Hypersensitivity; Hypercalcemia; Vitamin D toxicity; Lactation:
- **Use Cautiously in:** Concurrent use of digoxin; OB: Safety not established.

**Adverse Reactions/Side Effects**
- **Seen primarily as manifestations of toxicity (hypercalcemia):** CNS: dizziness, headache, somnolence, weakness. EENT: conjunctivitis, photophobia, rhinorrhea. CV: arthralgia, edema, hypotension, palpitations. GU: anuria, constipation, diarrhea, dry mouth. **I:** fever, flush, hypercalcemia, nausea, vomiting, weight loss. **M:** abdominal pain, anemia, ileus. **Derm:** pruritus, rash. **Endo:** gout. **F and E:** hypercalcemia. **MS:** bone pain, muscular calcification, muscle pain.

**Drug Interactions**
- **Drug-Drug:** Cholestyramine, colestipol, or mineral oil: absorption of vitamin D analogues. Use with thiazide diuretics may result in hypercalcemia. Corticosteroids: Decrease effectiveness of vitamin D analogues. Use with digoxin may increase risk of arrhythmias if hypercalcemia occurs. Concurrent use of magnesium-containing drugs may lead to hypercalcemia. Calcium-containing drugs may lead to hypercalcemia. Avoid use of other vitamin D supplements. Agents that induce CYP3A4 (rifampin, phenobarbital, saquinavir, terfenadine) may alter requirements for paricalcitol (monitoring of calcium and phosphorus recommended). Aluminum-containing drugs may increase aluminum levels and risk of aluminum bone toxicity; avoid concurrent use.
- **Drug-Food:** Ingestion of foods high in calcium content may lead to hypercalcemia.

**Route/Dosage**

**Stage 3 or 4 Chronic Kidney Disease**
- **PO (Adults):** Baseline intact PTH (iPTH) concentration ≥ 500 pg/mL—Initiate with 1 mcg/day or 2 mcg 3 times weekly; dose can be adjusted at 2–4 wk intervals based on iPTH, calcium, and phosphate concentrations.
- **Stage 5 Chronic Kidney Disease**
- **PO (Adults):** Initial dose (in mcg) is based on following equation: baseline iPTH concentration (pg/mL)/80; dose should be given 3 times weekly; dose can be adjusted at 2–4 wk intervals based on iPTH, calcium, and phosphate concentrations.

**Contraindicated in:** Hypersensitivity, Hypercalcemia, Vitamin D toxicity; Lactation: Lactation.

**Use Cautiously in:** Concurrent use of digoxin; OB: Safety not established.

- **G** = Generic Implication. **C** = Genomic Implication. **STRK** indicates STRIKING abnormalities; **indicates not frequent.**
IV (Adults and Children ≥ 5 yr): 0.04–0.1 mcg/kg 3 times weekly during dialysis; dose can be adjusted by 2–4 mcg at 2–4 wk intervals based on iPTH, calcium, and phosphate concentrations (doses up to 0.24 mcg/kg have been used).

NURSING IMPLICATIONS

Assessment

● Assess for symptoms of vitamin deficiency prior to and periodically during therapy.

● Assess patient for evidence of hypercalcemia (paresthesia, muscle twitching, laryngospasm, colic, cardiovascular arrhythmias, and Chvostek’s or Trousseau’s sign). Protect symptomatic patient by raising and padding side rails; keep bed in low position.

● Lab Test Considerations:
  + Oral—Serum calcium, phosphorus, and iPTH concentrations should be monitored at least every 2 wk for the first 3 mo of therapy or following any dose adjustment, then monthly for 3 mo, then every 3 mo.
  + IV—Serum calcium and phosphorus concentrations should be monitored twice weekly initially until dose stabilized and then at least monthly. Serum iPTH concentrations should be monitored every 3 mo.

● The serum calcium times phosphate product (Ca X P) should not exceed 70 mg²/dL² (patients may be at risk of calcification).

● 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 muscular cramps; later symptoms include polyuria, polydipsia, photophobia, rhinorrhea, pruritus, and cardiac arrhythmias. Notify health care professional immediately if these signs of hypervitaminosis D occur. Treatment usually consists of discontinuation of paricalcitol, a low-calcium dialysate in peritoneal dialysis patients, or use of a low-calcium dialysate in peritoneal dialysis patients. Gastrointestinal and loop diuretics may be ordered to increase urinary excretion of calcium. Hemodialysis may also be used.

Potential Nursing Diagnoses

Potential Nursing Diagnoses

Implementation

● Direct IV: Administer by rapid injection through the catheter at the end of a hemodialysis period.

Patient/Family Teaching

● Advise patient to take medication as directed. Take missed doses as soon as remembered that day, unless almost time for next dose; do not double up on doses.

● Review diet modifications with patient. Renal patients must still consider renal diet. Health care professional may order concurrent calcium supplement.

● Encourage patient to comply with dietary recommendations of health care professional. Explain that the best source of vitamins is a well-balanced diet with foods from the 4 basic food groups and the importance of multivitamins.

● Patients self medicating with vitamin supplements should be cautioned not to exceed RDA. The effectiveness of multivitamins for treatments of various medical conditions is unproved and may cause side effects.

● Advise patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to consult with health care professional before taking other medications.

● Advise patient to avoid concurrent use of antacids containing magnesium.

● Review symptoms of hypervitaminosis (feeling tired, difficulty thinking clearly, loss of appetite, nausea, vomiting, constipation, increased thirst, increased urination, and weight loss) and instruct patient to report these promptly to health care professional.

● Emphasize the importance of follow-up exams to evaluate progress.

Evaluation/Desired Outcomes

● Normalization of serum calcium and parathyroid hormone levels.

Why was this drug prescribed for your patient?