# Protocol for the Prevention and Management of Renal Osteodystrophy in the Adult Hemodialysis Patient using *Intravenous Calcitriol (Calcijex®) Therapy*

**Start Here**

Obtain baseline iPTH, calcium, phosphorus, albumin, aluminum, alkaline phosphatase and magnesium concentrations.

Determine corrected serum calcium
Step 1: Normal serum albumin (4.0 gm/dL) minus the most recent serum albumin measurement = X
Step 2: X times 0.8 = Y
Step 3: Measured serum calcium concentration + Y = "corrected" serum calcium
*Decisions to use calcium-based phosphate binders and vitamin D therapy should be based on corrected serum calcium and Ca x P results.*

Determine corrected serum (Ca x P)

Obtain baseline dietary history and evaluation of phosphorus intake. Initiate dietary phosphorus intake of 800 to 1000 mg/day.

If target phosphorus not achieved, initiate pharmacologic treatment with either calcium-based phosphate binders (calcium carbonate or calcium acetate) or sevelamer (Renagel®). Adjust phosphate binding drugs to maintain target phosphorus range.

Initiate calcitriol therapy if the following criteria are met:
- iPTH >300 pg/mL
- Corrected serum calcium <10.2 mg/dL
- Serum phosphorus < 6.0 mg/dL
- Corrected Ca x P <55
- Serum aluminum <60 mcg/L

Base the initial dose of calcitriol on iPTH level:
- iPTH 200-599 0.5-1.5 mcg calcitriol
- iPTH > 600 1.0-3.0 mcg calcitriol

Administer dose intravenously during or at completion of dialysis treatment three times weekly.

| Target Values | |
|---|---|
| Parameter | Target Range |
| Calcium* | 8.4 to 10.2 mg/dL |
| Phosphorus | 3.5 to 6.0 mg/dL |
| Ca x P* | <55 |
| iPTH | 150-300 pg/mL |

*corrected value

Note: The target values for patients receiving vitamin D therapy vary for calcium and phosphorus. Refer to Model Protocol for Management of Renal Osteodystrophy in Adult Patients for further details.

Monitoring calcitriol therapy:
- Monitor corrected serum calcium, phosphorus, Ca x P at least two times per month upon initiating therapy and during titration.
- Monitor iPTH within one month of initiation of treatment and during titration.

Corrected serum calcium >10.2 mg/dL?

Yes

*Calcitriol should be withheld.*
- Serum calcium is monitored at least weekly until corrected serum calcium <10.2 mg/dL
- Withdraw or decrease all calcium-based binders or supplements
- Consider a change to sevelamer if hypercalcemia persists
- Institute a low calcium diet
- Instruct patient on dietary and phosphate binder changes and importance of adherence to the prescription
- Consider low dialysate calcium concentration
- Consider alternate vitamin D product: paricalcitol or doxercalciferol
- calcitriol is then re-started at a dose reduced by 25-50%

If corrected serum Ca x P >55 or serum phosphorus >6.0 mg/dL also consider the following actions:

*Calcitriol should be withheld.*
- Serum calcium and phosphorus is monitored weekly until corrected Ca x P <55
- Evaluate patient adherence to diet and phosphate binder prescription
- Increase phosphate binder dosage
- Initiate sevelamer therapy or short-term treatment with an aluminum-based phosphate binder if corrected Ca x P >55
- Consider alternate vitamin D product: paricalcitol or doxercalciferol
- Calcitriol is then re-started at a dose reduced by 25-50%

No

Corrected serum Ca x P >55 or is serum phosphorus >6.0 mg/dL?

Yes

*Withhold calcitriol,* restart at reduced (25-50%) dose when iPTH>200 pg/mL

Yes

iPTH below 150 pg/mL?

No

No

The initial calcitriol dose should be adjusted after 2-8 weeks of treatment based on patient response.

iPTH decreased but above target range
- Maintain or increase by 25-50%

iPTH decreased and in target range
- Maintain dose

iPTH unchanged and above target range or iPTH increased from baseline
- Increase dose by 25-50%

iPTH between 150 to 300 pg/mL?

Yes

- iPTH should be monitored quarterly once iPTH concentrations are within this range and the calcitriol dose has been stable for 8 weeks
- Serum calcium, phosphorus, albumin, alkaline phosphatase and magnesium should be monitored monthly if within normal limits.

No

- Evaluate dietary phosphorus restriction and adherence to vitamin D prescription
- Increase calcitriol dose up to 5.0 mcg three times weekly (maximum recommended dose)
- Consider an alternate vitamin D product
- Evaluate patient for parathyroidectomy

2.10.04 Refer to the Product-Specific Protocol and Model Protocol for the Prevention and Management of Renal Osteodystrophy in the Adult Dialysis Patient for more detailed information.