

CHOLECALCIFEROL SUPPLEMENTATION IN HEMODIALYSIS: NO RISKS AND POSSIBLE NUTRITIONAL BENEFIT

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OBJECTIVES

Vitamin D (VD) may play a crucial role in human health that goes beyond bone and mineral metabolism (1). VD deficiency is highly prevalent in dialysis patients (2). Correction of VD deficiency is suggested in stage 5D chronic kidney disease with no proposition of a specific treatment strategy (3). Serum 25-hydroxyvitamin D₃ (25OHD) levels and various biochemistry parameter values were investigated in chronic hemodialysis (HD) patients during and after cholecalciferol supplementation.

METHODS

Thirty-six patients [M/F: 24/12, 70(42-87) years old] on HD treatment since 44(3-222) months participated in a randomized controlled study. Group A (GA) included 19 patients treated with cholecalciferol orally, 2400 IU thrice weekly after each HD session, for 3 months. Group B (GB) included 17 controls - no treatment.

All patients were studied for 8 months (M) during both a 3-month treatment period (April-June) and a consecutive 5-month observational period with no cholecalciferol supplementation (July-November).

RESULTS

Table 1. Serum 25OH levels (ng/ml) during study period

	M ₀ (April)	M ₃ (July)	M ₈ (December)	p (for time point comparisons)
Group A	11,1 ± 5,7	27,4 ± 7,9 * #	19,1 ± 7,5 * + #	* p<0,001 vs M ₀ + p<0,001 vs M ₃
Group B	12,8 ± 5,9	17,2 ± 6,9 *	8,3±7,3 * x	* p=0,005 vs M ₀ x p<0,001 vs M ₃
p (for group comparisons)	NS	# p<0,001 vs group B	# p<0,001 vs group B	

Table 2. Various parameter values during study period in both groups

Parameter	Group A			Group B		
	M ₀	M ₃	M ₈	M ₀	M ₃	M ₈
PTH(pg/ml)	259±147	205±127	169±101	308±146	265±175	244±134
P(mg/dl)	4,4±1,1	4,6±1,5	4,9±1,7	5,1±1,4	4,8±1,2	4,8±1,6
Ca(mg/dl)	9,2±0,7	9,2±0,6	9,1±0,7	9±0,7	8,9±0,8	8,9±0,8
ALP(U/l)	85±42	80±35	76±22	90±18	95±38	76±39
Urea(mg/dl)	131±36	141±30	144±39	152±42	150±34	143±36
Creatinine(mg/dl)	7,8±2,2	8,5±2,1	8,6±1,9	8,9±2,6	9,5±2,9	9,4±2,9
Cholesterol(mg/dl)	169±30	158±37	164±36	181±41	171±44	177±44
Triglycerides(mg/dl)	121±55	123±58	123±54	192±119	182±117	156±63
T. Protein(g/dl)	6,9±0,4	7,1±0,4	7±0,4	7±0,6	7,2±0,6	7,2±0,5
Albumin(g/dl)	3,4±0,3	3,5±0,3*	3,5±0,3 ⁺	3,5±0,4	3,5±0,4	3,6±0,6
Dry body weight(kg)	66,6±10,5	67,2±10,6 [#]	67,2±10,5 [#]	73,6±16,2	73,3±16,6	73,5±16,5

* p=0,009 vs M₀ + p=0,04 vs M₀ # p=0,03 vs M₀

Baseline (M₀) serum 25OHD levels were low in all participants with no difference between groups. At the end of the 3rd month (M₃) serum 25OHD levels were increased in both groups (seasonal variation) but the increase was more significant in GA compared to GB. At the end of the 8th month (M₈) serum 25OHD levels were found decreased in both groups (seasonal variation) being extremely low in GB, even lower than baseline levels. In contrary, in GA serum 25OHD levels were higher than baseline levels and also significantly higher than those in GB at 3 months and at 8 months (table 1).

At 3 months the percentages of patients with serum 25OHD levels above 30ng/ml (threshold value for VD sufficiency) were higher in GA compared with GB (42,1% vs 5,9% - p=0,01). At 8 months the percentages of patients with serum 25OHD levels above 15ng/ml (borderline value between VD deficiency-insufficiency) were higher in GA compared with GB (73,7,1% vs 17,6% - p<0,001).

Serum PTH levels were similar between groups. There was no change in serum PTH, calcium corrected for albumin (Ca), phosphate (P), alkaline phosphatase activity, urea, creatinine, cholesterol and triglyceride levels in any group (table 2).

Incidences of hypercalcemia and hyperphosphatemia were similar between groups. There was no need for decreases in dialysate calcium concentration and paricalcitol dosage.

An elevation in serum albumin levels at 3 months was observed only in GA together with an increase in body weight (table 2) with no significant variations in blood pressure values and no need of antihypertensive treatment reinforcement. Serum albumin and body weight values did not change at 8 months remaining higher than baseline respective values (table 2).

CONCLUSIONS

- The optimal dose, duration and safety of vitamin D supplementation for 25(OH)D-deficient hemodialysis (HD) patients have not been determined.
- Oral VD supplementation in HD patients was performed for three months with cholecalciferol in relatively low doses of 7200 IU/week – equivalent to approximately 25µg daily. In a sunshine country the dosage used seems to be an easy and cost-effective strategy for an almost satisfactory correction of vitamin D deficiency (4).
- Serum 25OHD levels >15ng/ml were maintained over 5 months in treated patients, despite 25OHD discontinuation.
- No alterations of serum PTH, calcium and phosphate levels were observed .
- An increase in serum albumin levels was noted reflecting possible nutritional benefit.

The effects of a higher cholecalciferol supplementation dosage could also be investigated in order to achieve an optimal correction of vitamin D deficiency in HD.

References

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