

CHOLECALCIFEROL EFFECT ON PTH IN PERITONEAL DIALYSIS PATIENTS

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OBJECTIVES

Serum 25(OH) vitamin D is a functional indicator of vitamin D storage, and level <20 ng/ml has been associated with vitamin D deficiency. In general population the deficiency of vitamin D is a common problem that involves young and elderly people and its prevalence is about 50% in adults. In dialysis patients that problem has higher prevalence for different reasons, including limited exposure to sunlight for the presence of comorbidity, urinary or dialysis protein loss, and decreased food intake. Specifically, PD patients have specific peculiarities in terms of calcium and phosphorous metabolism, including long exposure to dialysis solution containing calcium, increased lost of vitamin D binding protein, and low efficient, continuous phosphorous elimination. The purpose of the study is to evaluate the long-term effect of 25(OH) Vitamin D supplementation on PTH in peritoneal dialysis patients.

METHODS

We performed a cohort study on 68 patients. The study had two different phases: non-interventional and interventional phase. During the first period lasting six months, all patients did not receive any supplementation of vitamin D, while in the subsequently six-month phase all patients received 25(OH) vitamin D supplementation with cholecalciferol. The cholecalciferol was administered once a week. We evaluated the following parameters before and after the treatment with vitamin D: urine output, calcium, phosphorus, PTH, alkaline phosphatase, and 25(OH) vitamin D. Moreover, in both periods we evaluated therapy with drugs such calcitriol, calcimimetics and calcium based binders to appreciate possible interference with cholecalciferol.

Wilcoxon test were used to compare continuous variables. Univariable and multivariable binary regression models were used to evaluate the variables related with hypercalcemia and hyperphosphatemia events and with PTH reduction event. All reported p-values were two sided, and statistical significance was set at $p < 0.05$. Statistical analysis were performed with SPSS.

RESULTS

Table 1: Blood examinations and therapeutic features in not interventional period and in interventional period.

	Not interventional period	Interventional period	P value
Calcium (mg/dl)	9.45 (9-9.9)	9.55 (9.3-10)	0.09
Phosphorous (mg/dl)	4.45 (3.82-5.3)	4.25 (3.7-5.55)	0.261
PTH (pg/ml)	226.5 (149.2-462.7)	205 (131.2-379)	0.028
Alkaline phosphatase (U/L)	73 (54-106)	72 (56.25-110.5)	0.081
25(OH) vitamin D (ng/ml)	7 (5.3-10.5)	16.8 (11.7-21.5)	<0.001
Cumulative dosage of calcitriol (mcg)	7.5 (0-45)	0 (0-38.4)	0.014
Cumulative dosage of cinaclet (mg)	0 (0-675)	0 (0-0)	0.5
Cumulative dosage of calcium based binder (g)	0 (0-180)	0 (0-90)	0.028
Calcium bath (mmol/l)	1.75 (1.75-1.75)	1.75 (1.75-1.75)	0.163
Exposure time to peritoneal dialysis (hours)	24 (16-24)	24 (9-24)	0.023

Table 2: Independent predictors of PTH levels

MULTIVARIABLE ANALYSIS			
	β -standardized	95% CI	P
Cholecalciferol dosage categorial	1.713	1.06-2.769	0.028
Change in calcitriol dosage categorial	2.168	1.049-4.481	0.037

A total of 68 patients were enrolled. 40 (58.8%) patients were male, 49 (72.1%) were on CAPD. Median age was 62.5 years (IQR 49-72); median duration of PD was 12 months (IQR 6-20.5) Fifty-six patients (82.4%) had urine output at the end of observational period, of these 9 patients (16%) lost urine output during the interventional period. The median cumulative dosage of cholecalciferol was 93125 U (81375-138750), corresponding to the median dosage of 550 U/day (450-800).

There were significant differences in the 25(OH) vitamin D and PTH values between the two periods; no other significant differences were found in blood examination, as reported in table 1. Furthermore, in the two periods there were significant differences between the dosage of calcitriol, the dosage of calcium based binder, and about the time of exposure to dialysis (table 1).

Analysis of PTH decrease event.

At the end of interventional periods we observed a reduction at least of 20% of PTH value in 29 patients (42,6%). In univariable and multivariable analysis, cholecalciferol and calcitriol dosage were significant associated with the reduction of PTH value (table 2).

CONCLUSIONS

In conclusion, our results demonstrate that the administration of cholecalciferol weekly at dosage of recommended dietary allowance in general population is safe and well tolerated in peritoneal dialysis patients and seems to reduce PTH level. .

