



Effect of cholecalciferol treatment on serum FGF-23, vitamin D-binding globulin and α -klotho levels in children with vitamin D deficiency



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INTRODUCTION

FGF-23 is a hormone that works by inhibiting Phosphorus reabsorption in kidneys, and systematic regulation of phosphate homeostasis by FGF23 depends on the activity of the membrane protein Klotho. It affects the active vitamin level according to the bioactive free vitamin hypothesis, which binds DVBP to vitamin D and prolongs its half-life. In this study, it was aimed to investigate 1.25 (OH) Vitamin D, Vitamin D Binding Protein, FGF-23 and α -Klotho levels and how these parameters changed with the treatment of cholecalciferol and to shed light on Vitamin D metabolism in vitamin D deficiency and deficiency.

MATERIAL and METHODS

Patients with rickets who applied to the general pediatrics clinic of Atatürk University Faculty of Medicine were included in the study. Vitamin D, parathormone (PTH), calcium (Ca), phosphorus (P), magnesium (Mg), alkalenphosphatase (ALP), Fibroblast Growth Factor 23 (FGF-23), α Klotho, vitamin D in blood samples taken at application and after treatment binding protein (DVBP) levels were examined. Groups were formed according to simultaneous socio-demographic data, history of taking vitamin D and vitamin D levels. Initial data and post-treatment data were compared.

RESULTS

16 children under the age of 2 were included in the study. The average age was 8.57 ± 6.16 months. While 68.8% (11) of our patients in our study did not take regular vitamin D supplements, 31.3% (5) were taking vitamin D supplements. Two of our patients (13%) applied to our outpatient clinic with the complaint of hypocalcemic seizures. Our cases were divided into two groups as $Ca < 8.5$ mg / dl (Ca low) and $Ca \geq 8.5$ mg / dl (Ca Normal) according to reference Ca values. Accordingly, in the evaluation made with the results of the application examination, the mean of Mg in the low group of Ca was 1.95 and 2.18 mg / dl in the high group of Ca. The difference was significant ($P=0.07$). While the mean Ca low vitamin D was 5.17, Ca was observed as 8.49 in the normal group.

The difference was significant ($p= 0.08$). After cholecalciferol treatment, Ca ($p= 0.001$), P ($p= 0.009$), vitamin D ($p= 0$), FGF-23 ($p= 0.04$), PTH ($p= 0$) and ALP ($p= 0$) levels statistically significant changes were observed.

Table 1. Comparison of Ca, P, Mg and Vitamin D levels before and after cholecalciferol treatment

Parameters	Pretreatment mean \pm SD	Posttreatment mean \pm SD	Sig. (2-tailed)
Ca (mg/dL)	8,38 \pm 1,54	9,80 \pm 0,49	0,001
P (mg/dL)	4,81 \pm 1,35	5,59 \pm 1,06	0,009
MG (mg/dL)	2,09 \pm 0,25	2,01 \pm 0,23	0,253
Vitamin D (ng/dL)	7,24 \pm 3,66	41,33 \pm 16,28	<0,01

Paired sample test

Table 2. Comparison of PTH, clotho, FGF-23 and VDBP levels before and after cholecalciferol treatment

Parameters	Pretreatment median	Posttreatment median	P
PTH	8.50	0.00	0.000
α -clotho	10.39	6.07	0.19
FGF-23	8.92	7.25	0.04
VDBP	8.18	9.20	0.26

Wilcoxon signed ranks test

DISCUSSION

Serum Ca, P, ALP and PTH levels reached normal levels with cholecalciferol treatment. In patients with Rickets, both FGF-23 and klotho levels are high and decrease with treatment. FGF-23 plays an important role not only in the regulation of phosphorus metabolism, but also in the regulation of PTH metabolism.

References

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