

# Vitamin D Status in Pre-pubertal Children with Isolated Growth Hormone Deficiency: Effect of Growth Hormone Therapy

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## Background

Some studies suggested a correlation between vitamin D (VD) and growth hormone -insulin-like growth factor 1 (GH-IGF1); but few studies, and with controversial results, have prospectively analyzed the VD status in children before and after GH treatment.

## Aims

To assess VD status in pre-pubertal children with isolated growth hormone deficiency (GHD); and to evaluate the effect of GHD and GH treatment on VD levels.

## Methods

Fifty pre-pubertal children with isolated GHD were subjected to history, anthropometric assessment and measurement of 25 hydroxy vitamin D (25-OHD), serum calcium, phosphorous, alkaline phosphatase and parathyroid hormone at diagnosis and 1 year after GH therapy (0.025 mg/kg/day). Patients were compared to 50 age-, sex-, and pubertal stage-matched controls. VD deficiency was defined as a 25-OHD level <20 ng/ml, VD insufficiency between 20 and 30 ng/ml and VD sufficiency > 30 ng/ml.

## Results

25-OHD levels were lower in cases than controls (23.42 ± 12.4 vs 44.21 ± 8.5 ng/ml). Twenty two GHD children (44%) were VD deficient and 20(40%) insufficient; while 8(16%) were VD sufficient at baseline. There was a positive correlation between 25OH-D and baseline GH levels (r=+0.98, p<0.0001). After 12 months of GH therapy, 25OH-D increased (23.42 ± 12.4 ng/ml at baseline vs 34.5 ± 10.1 ng/ml after therapy; p=0.001). Accordingly, the frequency of GHD children with VD deficiency and insufficiency decreased while that of VD sufficient children increased (Table 1). Anthropometric and laboratory data of cases before and after GH therapy is presented in Table 2.

Table 1. Vitamin D status in GHD cases (n=50) before and 1 year after GH therapy

	Before GH therapy N(%)	After GH therapy N(%)	x <sup>2</sup>	p
VD deficient (<20 ng/ml)	22(44)	11(22)	9.22	<0.001***
VD insufficient (20-30 ng/ml)	20(40)	13(26)	8.12	<0.001***
VD sufficient (>30 ng/ml)	8(16)	26(52)	11.15	<0.001***

Results are expressed as frequency and percentage , \*\*\*p<0.001, GHD: Growth hormone deficiency, VD: vitamin D.

Table 2. Anthropometric and laboratory data of GHD cases (n=50) before and 12 months after GH therapy

	Before GH therapy	After GH therapy	z	p
Height SDS	-3.12±0.2	-1.87±0.1	9.22	0.001**
BMI SDS	19.55±0.56	20.08±0.81	1.83	0.21
Total calcium (mg/dl)	8.75±0.99	9.60±0.45	6.51	0.021*
Total phosphorous (mg/dl)	4.65±0.81	5.20±0.61	2.11	0.55
ALP (IU/L)	221.76±135.22	320.11±115.42	7.23	0.01*
PTH (pg/ml)	40.83±15.11	38.76±12.32	5.98	0.08
25-OHD (ng/ml)	23.42 ± 12.4	34.58 ± 10.1	8.29	0.001**

Results are expressed as mean±SD , \*p<0.05, \*\*p<0.01, GHD: Growth hormone deficiency, SDS: Standard deviation score, BMI: Body mass index, ALP: alkaline phosphatase, PTH: parathyroid hormone, 25-OHD: 25 hydroxy vitamin D.

## Conclusions

Hypovitaminosis D is prevalent in GHD children and significantly improved 1 year after GH therapy. VD should be assessed in GHD children both at diagnosis and during the follow-up. The relatively high prevalence of low VD levels remaining after 1 year of GH treatment, would suggest the idea that GHD children could also profit from VD supplementation.