

HbA1C and IGF-1 Levels in Diabetic Children Treated with Vitamin D

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Background

Diabetes mellitus type 1 (T1DM) is the most common chronic diseases in children. There is epidemiologic evidence based on the association between vitamin D deficiency and T1DM. The studies have shown that vitamin D supplementation in children reduces the risk of developing T1DM. Reduction in glycated haemoglobin (HbA1c) by an increase in serum 25(OH) D levels may be one mechanism that leads to the decreasing the risk of diabetes-related complications. On the other hand, A large body of studies suggests a positive association between IGF-I and 25-hydroxyvitamin D. Abnormal fluctuations of IGF-I levels are significantly related to risk of T1DM. Therefore, the aim of this study was assessed the level of serum 25-hydroxyvitamin D and IGF-1 in children with T1DM that receiving vitamin D supplement.

Methods

A total of 30 insulin dependent diabetic children aged 5–15 years with 25(OH) D levels lower than 74 nmol/l (29 ng/ml) were selected. Level of serum 25-hydroxyvitamin D, IGF-1 as well as HbA1c was measured at baseline. Vitamin D supplement [50,000 units of cholecalciferol (vitamin D3)] was administrated to patients once a week for 8 weeks. Concentrations of serum 25-hydroxyvitamin D, IGF-1 and HbA1c were measured after 3 months of treatment. Concentrations of serum 25(OH) D, IGF-1 and HbA1c were compared between baseline and after treatment. All statistical analyses were performed using SPSS version 20.0 (SPSS, Inc., Chicago, IL, USA). T-test was used to compare differences before and after receiving vitamin D3. Partial correlation analysis adjusted for age, BMI, diabetes duration and baseline concentrations serum of 25-hydroxyvitamin D, IGF1 and HbA1c was used to reveal the relationship between variables.

Results

Demographic and General characteristics of study participants are presented in Table 1. The means of 25-hydroxyvitamin D, IGF1 and HbA1c at the baseline and end of 8 week intervention were presented in Table 2. Results of Partial correlation analysis of variable are presented in Table 3.

Table 1. Characteristics of study participants

Variable	p-value
Age(year)	10.85 ±3.24*
Diabetes duration (year)	3.05 ±1.32
BMI (kg/m ²)	17.92 ±3.49
Gender [n(%)]	
-Boys	30 (50%)
-Girls	30 (50%)

Table 2. IGF-I, 25(OH) D and glycated haemoglobin (HbA1c) level in the baseline and after 8 weeks of receiving Vitamin D3 supplement

Variables	Baseline (Mean ±SD)	End 8 weeks (Mean ±SD)	p-value
IGF1(ng/ml)	245.57±108.9*	264.46±104.30	0.018
25(OH) D(ng/ml)	16.27±6.56	40.80±1.17	0.000
HbA1c (%)	8.89±1.39	8.60±1.23	0.047

Table 3. Partial correlation between serum 25(OH) D(ng/ml), IGF-I and HbA1c after 8 weeks of receiving Vitamin D3 supplement

Variables	25(OH) D(ng/ml)		IGF1(ng/ml)	
	r	p-value	r	p-value
25(OH) D(ng/ml)	-	-	-	-
IGF1(ng/ml)	0.33	0.09	-	-
HbA1c (%)	-0.40	0.05*	-0.69	<0.000**

Variables Controlled for age, BMI, diabetes duration and serum of 25-hydroxyvitamin D, IGF1 and HbA1c at the baseline

Conclusion

The present study shows that vitamin D3 supplement increased serum level of 25(OH) D in diabetic patients with vitamin D deficiency, so that, the 25(OH) D levels after 8 weeks were increased over 100% compared with baseline values. In addition, vitamin D supplement increase the level of IGF-1 which was accompanied by decreased levels of HbA1c in patients with T1DM. It is suggested that, treatment with vitamin D could enhance glycemic control as well as serum IGF1 level in children with T1DM which consequently improve glucose homeostasis.

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