

Is the Glycaemic control in Type 1 Diabetes Mellitus affected by Vitamin D status ?

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Background

Evidence from animal studies show that there is a relationship between plasma Vitamin D concentration and glucose homeostasis. Studies have also examined the relationship between Vitamin D status and Type 2 Diabetes Mellitus in adult population. There is paucity of evidence examining the relationship between the glycaemic control in children and adolescents with Type I diabetes Mellitus (T1DM) and Vitamin D status.

Objective

To evaluate the relationship between glycaemic status (HbA1C and plasma 25(OH) Vitamin D levels in children and adolescents with Type I Diabetes Mellitus.

Methods

Retrospective data was collected from 348 children and adolescents with T1DM. The serum 25(OH) Vitamin D concentrations were measured at diagnosis and as part of the annual assessment. Patients were categorized as: Vitamin D deficient (<25nmol/L), insufficient (25-50nmol/L) or sufficient (>50nmol/L). Vitamin D deficiency was treated with 6000 units of cholecalciferol once a day or 20000 units once a week for 6-8 weeks. All patients had their HbA1C measured every 3 months. Plasma 25(OH) Vitamin D was measured after the completion of treatment.

Results

The mean 25 (OH) Vitamin D concentration was 54 nmol/L (± 22.9). 52.4% of patients had normal Vitamin D concentrations (94% white ethnicity, 2% somali), 39.1%were vitamin D insufficient (87% white ethnicity, 4% somali) and 8.4% were vitamin D deficient (79% white ethnicity, 7% Arabic, 7% mixed background)(Table1). The mean HbA1C (mmol/mol) for the groups with adequate, insufficient and deficient Vitamin D concentration(nmol/l) were 72.36, 72.18 and 69.41 respectively. The mean HbA1C (mmol/mol) prior to treatment with vitamin D supplements was 70.85(± 18.9) and post treatment was 69.85 (±15.95) [p=0.64].(Table 2). There was no significant correlation between Vitamin D concentration and HbA1C (r=0.05, p=0.2)

Table 1:HbA1c amongst Vitamin D deficient, insufficient and sufficient

Vit D (nmol/L)	% of children in each group				N	%
	HbA1c (mmol/mol)					
	≤ 60	60-80	81-100	>100		
≤25	36.4%	36.4%	18.2%	9.1%	22	8.40%
25-50	34.3%	37.3%	16.7%	11.8%	102	39.10%
>50	34.3%	36.5%	16.8%	12.4%	137	52.49%

Table 2: Paired T test

	N	Mean	SD	SEM
Pre treatment HbA1C	46	70.85	18.903	2.787
Post treatment HbA1C	46	69.85	15.948	2.351

P Value:0.64

Conclusions

Low vitamin D concentrations are fairly prevalent in children with T1DM.Glycaemic control does not seem to be influenced by the vitamin D status in our retrospective study. Long term prospective studies are essential.