



Serum 25-OH Vitamin D Level and Lipid Changes in Type 1 Diabetic Young Armenians: Single Centre Data

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(Received 10 Oct 2020; accepted 21 Oct 2020)

Dear Editor-in-Chief

Recent years many important issues of vitamin D status from fast-moving basic medicine area emerge into clinical medicine (1, 2). Vitamin D supposed to be associated with cardiovascular disease and diabetes mellitus via its effect on lipids profile (3). Nowadays type 1 diabetes shows tendency to increase in prevalence and incidence in many countries (4). An increase in vitamin D deficiency in many countries is shown, particularly in young population (5). Armenia is known to be a country with sufficient sun exposure, where almost half of the year is warm and sunny. However, there is a lack of investigations showing the vitamin D status neither in the healthy population, nor in diabetic in Armenia.

The study was conducted in in "Muratsan" university hospital complex, Yerevan, Armenia In 2019. We investigated the 25-OH vitamin D status and lipid metabolism in a limited number of diabetic patients living in Armenia and having 5 yr and longer diabetes duration and its connection with diabetes compensation.

All participants signed a written inform consent. Ethics Committee of Yerevan State Medical University approved the study.

Overall, 48 type 1 diabetic patients with duration of diabetes >5 yr, aged 20-35 yr old were investigated. They were divided into two groups de-

pending on their 25-OH vitamin D levels: in 1st group it was insufficient (≤ 20 ng/mL), and in 2nd - sufficient (> 20 ng/mL). The mentioned age interval is the post-pubertal age of bone plateau, when the maximal bone mineral density is already achieved and is relatively stable period for the bone metabolism. Exclusion criteria included hypogonadism, pregnancy, lactation, chronic liver and/or kidney diseases, use of drugs affecting lipid profile and/or calcium and bone metabolism, primary hypo- and hyperparathyroidism, use of calcium and/or vitamin D supplementations, as well as insulin-resistance.

All analyses were performed using statistical software (IBM SPSS Statistics for Windows, Version 21.0; IBM Corp., USA). Values of $P < 0.05$ were considered statistically significant. After checking of equality of variances using Levene's test, appropriate t -test was performed. Overall 52.1% of all investigated patients showed insufficiency of vitamin D, regardless the season, and had significantly higher cholesterol and LDL in negative correlation with 25-OH vitamin D levels, compared with vitamin D sufficient group ($P < 0.05$), showing the impact of diabetes poor compensation on the lipids profile changes (Table 1).



Table 1: Pearson correlation coefficient and P value of some variables in all investigated type 1 diabetic patients (n=48)

<i>Pearson Correlation/ P value</i>	<i>25-OH vitamin D</i>	<i>HbA1c</i>	<i>Cholesterol</i>	<i>LDL</i>	<i>HDL</i>	<i>Season of the year</i>	<i>TG</i>	<i>Weight</i>	<i>BMI</i>
25-OH vitamin D	1	0.23/0.11	0.32/0.03*	0.42/0.003**	0.04/0.8	0.22/0.1	0.16/0.3	0.03/0.85	0.13/0.38
HbA1c	-	1	0.34/0.02*	0.22/0.14	0.04/0.8	0.12/0.4	0.03/0.8	0.08/0.61	0.01/0.97
Cholesterol	-	-	1	0.58/0.001**	0.24/0.1	0.27/0.07	0.23/0.1	0.02/0.92	0.12/0.42
LDL	-	-	-	1	0.01/0.9	0.3/0.06	0.25/0.1	0.16/0.28	0.21/0.15
HDL	-	-	-	-	1	0.21/0.2	0.1/0.49	0.43/0.003**	0.19/0.2
Season	-	-	-	-	-	1	0.05/0.7	0.23/0.11	0.05/0.77
TG	-	-	-	-	-	-	1	0.14/0.34	0.1/0.5
Weight	-	-	-	-	-	-	-	1	0.53/0.001**

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

In type 1 diabetic young patients’ insufficient 25-OH vitamin D correlates with poorer glucose

control and dyslipidemia, particularly with higher LDL, known as atherogenic (Table 2).

Table 2: Compared main characteristics of type 1 diabetic patients with 25-OH vitamin D ≤20ng/mL (1st group) and >20ng/mL (2nd group)

<i>Mean parameters</i>	<i>1st group (n=25)</i>	<i>2nd group (n=23)</i>	<i>P-value</i>
Vitamin D level (ng/mL)(mean±SE)	13.79±1.0	23.43±0.52	P<0.001*
Age at time of study (years)(mean±SE)	24.89±1.19	23.38±1.28	P=0.81 [#]
Duration of diabetes (years)(mean±SE)	12.6±1.08	10.56±0.91	P=0.16
Weight (kg) (mean±SE)	61.92±1.85	61.13±1.75	P=0.76
BMI (kg/m ²)(mean±SE)	23.32±0.47	21.96±0.46	P=0.04*
HbA1c (%) (mean±SE)	9.96±0.83	8.26±0.64	P=0.01**
Total cholesterol(mmol/l)(mean±SE)	4.42±0.21	3.96±0.15	P=0.081
TG (mmol/l)(mean±SE)	1.19±0.88	1.16±0.08	P=0.81
HDL (mmol/l)(mean±SE)	1.39±0.74	1.3±0.06	P=0.94
LDL (mmol/l)(mean±SE)	3.13±0.15	2.6±0.9	P=0.006*
TSH (mIU/l)(mean±SE)	3.29±0.66	2.54±0.36	P=0.32

[#]Nonparametric Man-Whitney test was performed due to non-equality of variances

Moreover, absolute value of 25-OH vitamin D did not exceed 25ng/ml, indicating low-sufficiency of vitamin D in type 1 diabetic young

patients in Armenia and requiring implementation of a structured supplementation-program. In this context, we supposed that in the lack of

studies, specifically targeting vitamin D status and its role in individuals with diabetes, treatment and preventive recommendations of vitamin D supplementation should follow other guidelines from those for the general population.

Conflict of interest

The authors declare that there is no conflict of interest.

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