Vitamin D insufficiency can be related to premature adrenarche

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Objectives:

Vitamin D, which is important in calcium phosphate homeostasis and bone health, has recently been suggested to be an important factor in the pathogenesis of numerous chronic conditions such as polycystic ovarian syndrome (PCOS). The aim of this study was to investigate the relationship between vitamin D status and premature adrenarche (PA), suggested as a predictor of PCOS.

Methods:

A total of 71 girls with PA and 52 healthy girls, as the control group, were consecutively recruited. Axiller and/or pubic hair development before the age of 8 years were defined as PA. Bone age and anthropometric measures including height, weight, and body mass index (BMI) were obtained. Levels of androgens, 25 hydroxyvitamin D, 1,25 dihydroxy vitamin D, fasting plasma glucose and insulin were measured. Vitamin D insufficiency was defined as <20 μg/mL.

Table 1. Laboratory and clinical findings of study groups according to PA existence

	Premature adrenarche (n=71)	Control group (n=52)	*p*
Age (yrs)	7.4 (7.0-7.9)	7.0 (6.0-8.0)	0.078
Bone age (yrs)	8.5 (7.7-9.5)	6,5 (7.0-7.5)	**0.001**
Birthweight (g)	3060 (2940-3200)	3120 (3000-3300)	0.403
BMI SDS	0.98 (0.39-1.60)	0.47 (-0.43-1.32)	**0.015**
Vitamin D insufficiency	38 (53.5%)	19 (36.5%)	0.061
25(OH)D (μg/l)	18.0 (13.5-24.1)	22.0 (16.0-27.8)	**0.014**
$1,25(OH)_2D$ (pg/ml)	28.6 (22.0-37.3)	32.1 (26.1-42.5)	0.102
Fasting Blood Glucose (mg/dl)	86.0 (82.0-90.0)	84.0 (78.0-88.0)	0.141
Fasting Plasma Insulin (mU/l)	7.6 (6.0-9.0)	5.4 (4.2-8.6)	0.094
HOMA-IR	1.65 (1.2-1.86)	1.17 (0.93-1.74)	**0.026**
Total Testosterone (ng/dl)	6.9 (4.1-8.8)	3.4 (2.8-4.6)	**0.001**
DHEAS (μg/dl)	78.0 (57.1-110.0)	24.0 (11.0-42.3)	**0.001**
Androstenedion (ng/ml)	0.50 (0.36-0.77)	0.21 (0.09-0.41)	**0.001**
17 OHP (ng/ml)	0.67 (0.44-0.90)	0.44 (0.31-0.69)	**0.002**
11-DOCA	1.1 (0.8-2.04)	0.8 (0.42-2.06)	0.570
LH (mIU/ml)	0.2 (0.01-0.03)	0.2 (0.1-0.35)	0.772
FSH (mIU/ml)	0.9 (0.8-1)	0.9 (0.8-1)	0.710

Table 2. Comparison of demographic and clinical features of study groups according to vitamin D insufficiency in patients with PA.

	25(OH)D <20μg/l (n=38)	25(OH)D ≥ 20μg/l (n=33)	*p*
Age (yrs)	7.5 (7.0-8.0)	7.3 (6.8-7.9)	0.329
Bone age (yrs)	8.3 (7.5-9.6)	9.0 (7.9-9.8)	0.594
Birthweight (g)	3100 (2900-3200)	3100 (3030-3210)	0.359
BMI SDS	0.89 (0.38-1.45)	1.10 (0.48-1.68)	0.496
Fasting Blood Glucose (mg/dl)	86 (82-90)	76 (84-90)	0.101
Fasting Plasma Insulin (mU/l)	7.8 (6.8-9.1)	6.2 (4.0-9.0)	0.068
HOMA-IR	1.65 (1.48-2.04)	1.40 (0.80-1.82)	**0.044**
Total Testosterone (ng/dl)	6.9 (4.1-8.8)	6.8 (4.1-8.9)	0.968
DHEAS (μg/dl)	78.5 (52.3-122.8)	72.6 (54.9-103.1)	0.336
Androstenedion (ng/ml)	0.48 (0.35-0.76)	0.53 (0.37-0.80)	0.457
17 OHP (ng/ml)	0.62 (0.46-0.90)	0.70 (0.43-1.00)	0.632
11-DOCA	1.04 (0.8-1.9)	1.2 (0.8-2.3)	0.309
LH (mIU/ml)	0.02 (0.01-0.03)	0.02 (0.01-0.03)	0.797
FSH (mIU/ml)	0.83 (0.8-1.0)	0.90 (0.8-1.0)	0.473

Results:

Bone age, BMI-SDS, HOMA-IR, and androgen levels were significantly higher and 25(OH)D levels were significantly lower in patients with PA. HOMA-IR was significantly higher in patients with vitamin D insufficiency compared to patients with normal vitamin D levels in the PA group. There was a significant correlation between 25(OH)D and HOMA-IR.

Conclusions:

Vitamin D is associated with PA and insulin resistance can be suggested as a factor in this association.

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