

Body Composition Analysis in Girls with Premature Adrenarche

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Background&Aim

Idiopathic premature adrenarche (PA) in girls refers to the presence of androgenic signs before the age of eight years in the absence of thelarche. Increased adrenal androgens lead to changes in body composition and transient growth acceleration without effecting final height. Although the association between PA and some components of the metabolic syndrome is well known, total body fat and body composition analysis are not widely studied. Our aim was to compare the anthropometric measurements and body composition of Turkish girls with PA at diagnosis with age matched controls to demonstrate the excess in growth and differences in body fat.

Subjects and Methods

We examined 38 girls with new-onset PA and 64 age-matched controls. For PA group the inclusion criteria were the appearance of pubic/axillary hair before 8 years of age, the absence of central puberty and absence of any long-term medication. Steroidogenic enzyme defects and virilizing tumors were excluded by hormonal studies and by adrenal ultrasonography. The control group was built from healthy female volunteers of first and second grades of an elementary school from the same district. The criteria for the entry into the control group included the absence of pubic/axillary hair and thelarche on physical examination and no history of any chronic disease. All patients and controls were examined by the same pediatric endocrinologist (ANC) and anthropometric measurements and pubertal stages were recorded. Body composition analysis was executed by bioelectrical impedance method Tanita (model MC-780MA; Tanita, Tokyo, Japan). This device calculates total body weight, BMI, body fat percentage (%), total body fat and muscle mass (kg), total body water, trunk (core) fat and muscle mass through the use of 8 electrodes (8-contacts; two on each hand and foot).

Results

The study group comprised 102 girls. The characteristics of the groups are demonstrated in Table 1. There were no differences regarding age and BMI, BMI-SDS between two groups. Girls with PA had advanced height and weight than controls, and height- and weight -SDS calculations were found higher than control group ($p < 0.001$ for both). Although both WC and HC were higher in girls with PA, interestingly waist-to-hip ratio was found to be higher in control group. Body composition analysis via bioelectrical impedance method revealed important results. Comparison of two groups was expressed in Table 2.

Table 1: Comparison of anthropometric measurements between girls with premature adrenarche and controls

	Girls with premature adrenarche (n: 38)	Controls (n:64)	p
Age [years, median (IQR)]	7.44 (1.34)	6.78 (1.23)	0.065
Height [cm, median (IQR)]	126.5 (9.3)	118.0 (7.5)	<0.001
Height-SDS [median (IQR)]	0.64 (1.32)	-0.33 (1.37)	<0.001
Weight [kg, median (IQR)]	26.4 (10.2)	22.2 (6.6)	0.002
Weight-SDS [median (IQR)]	0.65(1.9)	-0.15 (1.6)	<0.001
BMI [kg/m ² , median (IQR)]	17.0 (3.5)	15.8 (2.7)	0.046
BMI-SDS [median (IQR)]	0.49 (1.6)	0.05 (1.5)	0.065
Waist circumference [cm, median (IQR)]	60.5 (11.8)	57.0 (6.9)	0.101
Hip circumference [cm, median (IQR)]	69.0 (10.5)	64.0 (8.0)	0.003
WHR* [median (IQR)]	0.86 (0.1)	0.89 (0.1)	0.008

Table 2: Comparison of bioelectric impedance analysis values between girls with premature adrenarche and controls

	Girls with premature adrenarche (n: 38)	Controls (n:64)	p
Total body fat [kg, median (IQR)]	5.75 (4.7)	4.40 (2.6)	0.008
Total body fat percent [% , median (IQR)]	23.1 (7.3)	20.3 (5.1)	0.010
Total muscle mass [kg, median (IQR)]	19.1 (5.5)	16.8 (3.9)	<0.001
Total muscle mass percent [% , median (IQR)]	72.8 (9.0)	75.2 (5.0)	0.017
Total body water [kg, median (IQR)]	14.95 (4.2)	13.0 (3.0)	<0.001
Total body water percent [% , median (IQR)]	56.5 (5.0)	58.3 (4.0)	<0.012
Trunk fat [kg, median (IQR)]	2.60 (2.3)	1.75 (1.3)	0.010
Trunk muscle mass [kg, median (IQR)]	11.95 (3.3)	10.60 (2.3)	<0.001
Fat free mass [kg, median (IQR)]	20.45 (5.8)	17.70 (4.1)	<0.001
Fat free mass percent [% , median (IQR)]	77.0 (9.0)	79.5 (5.0)	0.017

Conclusions:

- Turkish girls with idiopathic PA have acceleration in body weight and longitudinal growth even at diagnosis.
- The increase in body weight is more prominent in total body fat percentage with a concomitant decrease in the percentages of fat free mass, muscle mass and total body water.
- The increase in total body fat was not accompanied with an increase in waist circumference in our study group, thus the contribution of PA to metabolic syndrome remains controversial.

References:

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