Adrenal function in children born small for gestational age

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BACKGROUD AND AIM

Background: Subjects born small for gestational age (SGA) were shown to be at higher risk to metabolic consequences later in life and this might be related to changes in hypothalamic–pituitary–adrenal axis.

Objective and hypotheses: We aimed to investigate DHEAS and cortisol levels in adolescents born SGA or appropriate for gestational age (AGA) and their relationship with perinatal and postnatal factors.

METHODS

A prospective cohort of 46 SGA and 94 AGA children was followed-up from birth to adolescence (75 boys and 71 girls). At the time of investigation, study subjects were 11-14 years old (median 13.2±2.1 years). Comparisons of DHEAS concentration were adjusted for sex, age and pubertal stage, and that of Cortisol concentration – for sex and BMI SDS. Data are presented as mean and standard deviation if not indicated otherwise.

Table 1. Demographic and anthropometric characteristics of study children

	SGA	AGA	P value
Gender, boys/girls (%)	50/50	51.7/48.3	0.907*
Age (years)	12.3±1.06	13.5±1.37	0.001
Height SDS	-0.49±1.38	0.41±1.04	0.001
Weight SDS	-0.37±1.37	0.38±1.25	0.001
BMI SDS	-0.18±1.34	0.22±1.28	0.079
Tanner pubertal stage, median (interquartile range)	2.5 [2-3]	3 [2-4]	0.001*
Birth weight (g)	2391±409	3543±455	0.001
Birth length (cm)	46.4±3.19	50.9±1.79	0.001
Gestational age (weeks)	38.7±1.75	39.2±1.50	0.062
Birth BMI (kg/m^2)	10.98±1.1	13.64±1.28	0.001
Ponderal index at birth (kg/m^3)	2.37±0.22	2.68±0.24	0.001
Mothers age at delivery (years)	26.3±4.98	28.3±5.3	0.042

* P value of $\chi 2$ test was used for comparisons between SGA and AGA children.

RESULTS

SGA children had higher DHEAS levels than those born AGA (Table 2). Analysing boys and girls separately, the difference was significant only in SGA boys.

There was no difference in cortisol levels between SGA and AGA groups (Table 3). Analysing by gender, SGA girls had significantly lower cortisol concentration than AGA.

DHEAS levels were inversely associated with birth weight, birth length and gestational age, birth BMI, ponderal index (Table 4) and in the AGA group directly associated with current BMI SDS (r=0.244, p=0.018).

Table 2. Mean DHEAS levels in SGA and AGA groups (µmol/l)

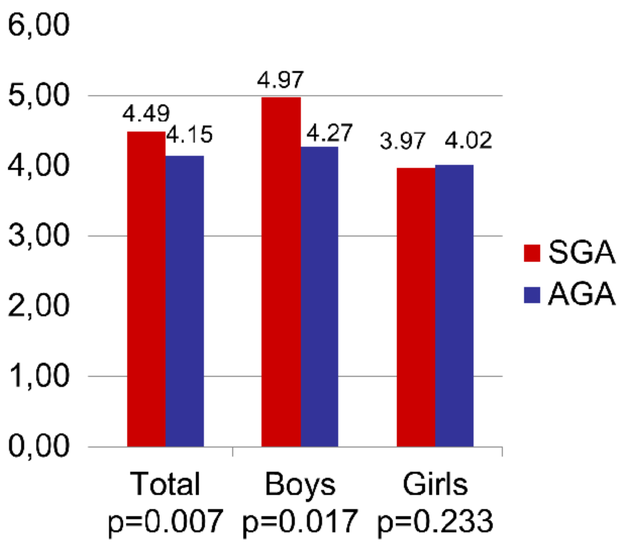

Table 3. Mean Cortisol levels in SGA and AGA groups (nmol/l)

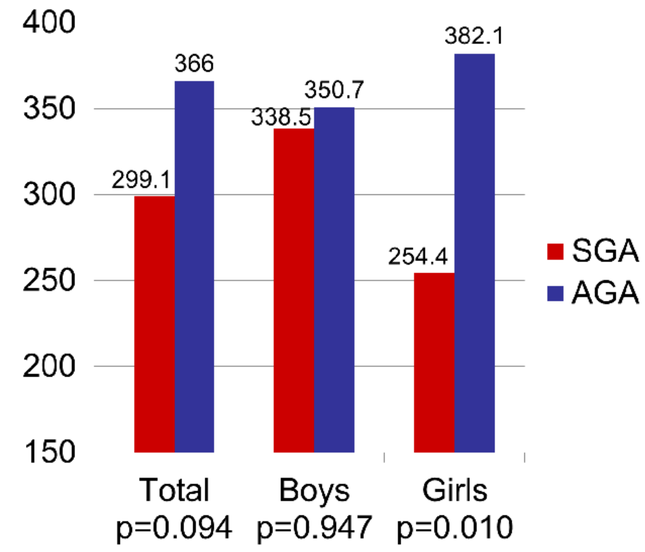

Table 4. Correlations between DHEAS levels at puberty and perinatal factors

Perinatal factors	Correlation coefficient (r)
Gestational age	-0.241**
Birth weight	-0.256**
Birth lenght	-0.230**
Birth BMI	-0.254**
Ponderal index at birth	-0.196*

* P<0.05; **P<0.01

CONCLUSION

Small size at birth is related to higher DHEAS but not cortisol levels in pubertal children indicating the association of fetal growth restriction with adrenal hyperandrogenism in pubery.

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