

Left ventricular mass index and cardiovascular function in adolescents born SGA

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Background: Subjects born small for gestational age (SGA) were shown to be at higher risk for later metabolic consequences.

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

Conclusion:

- SGA adolescents without catch-up growth had higher systolic and diastolic blood pressure and LVMI compared with those born AGA.
- BMI_{SDS} gain from birth to 2 years of age was an independent predictor of LVMI in adolescence.

Results: BP, HR and LVMI in study groups shown in Figure 1 & 2. There was no differences in lipid profile levels between SGA CU-, SGA CU+, and AGA groups.

Variables significantly related to LVMI in univariate analyses were assessed in a multiple regression model. The regression model and controlling factors are presented in Table 1.

The total variance explained by the model was 56.6%, p=0.001. The relationship of LVMI with the change in BMI_{SDS} from birth to 2 years of age and BMI_{SDS} in adolescence, see Figure 3.

Figure 1. Mean blood pressure (BP) and heart rate (HR) in SGA and AGA adolescents (adjusted for sex, current age, pubertal stage, BMI_{SDS} and height)

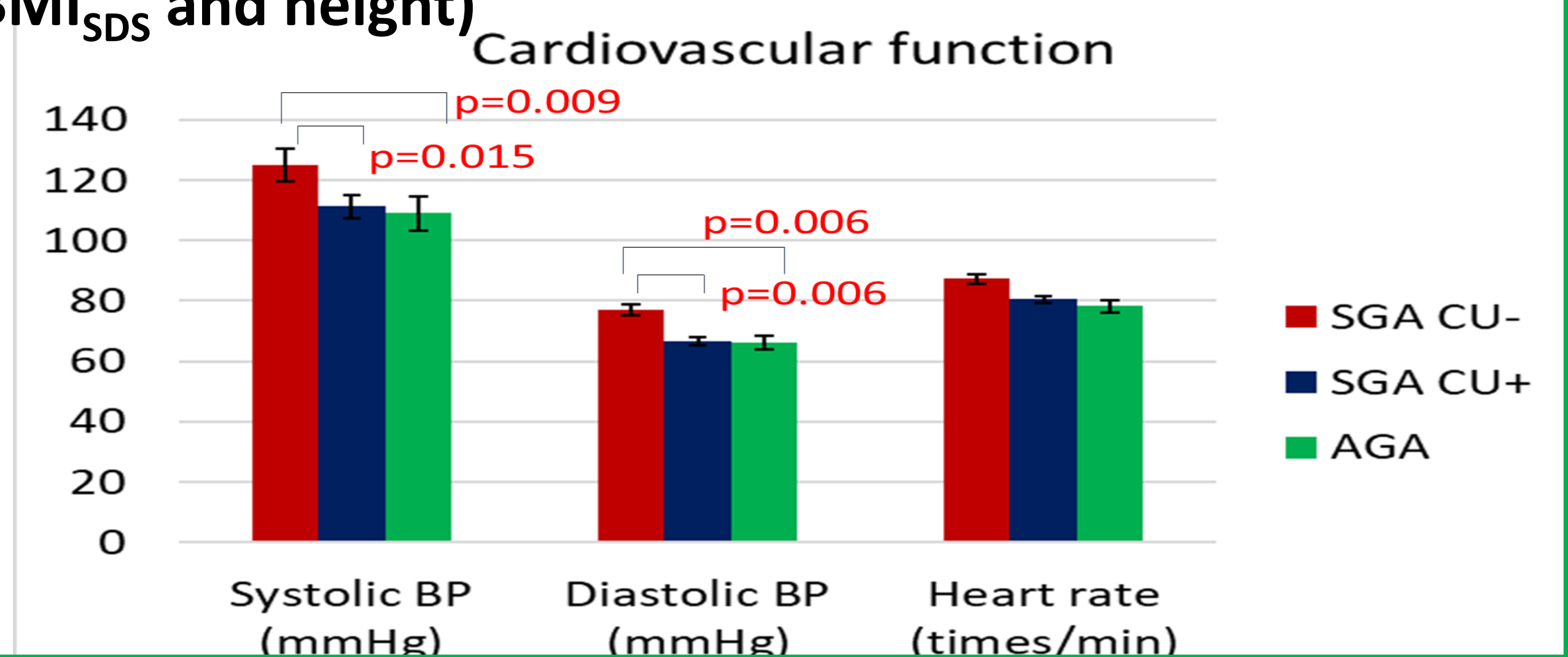


Figure 2. Mean LVMI (g/m^{2.7}) in SGA and AGA adolescents (adjusted for sex, current age, BMI_{SDS} and systolic BP)

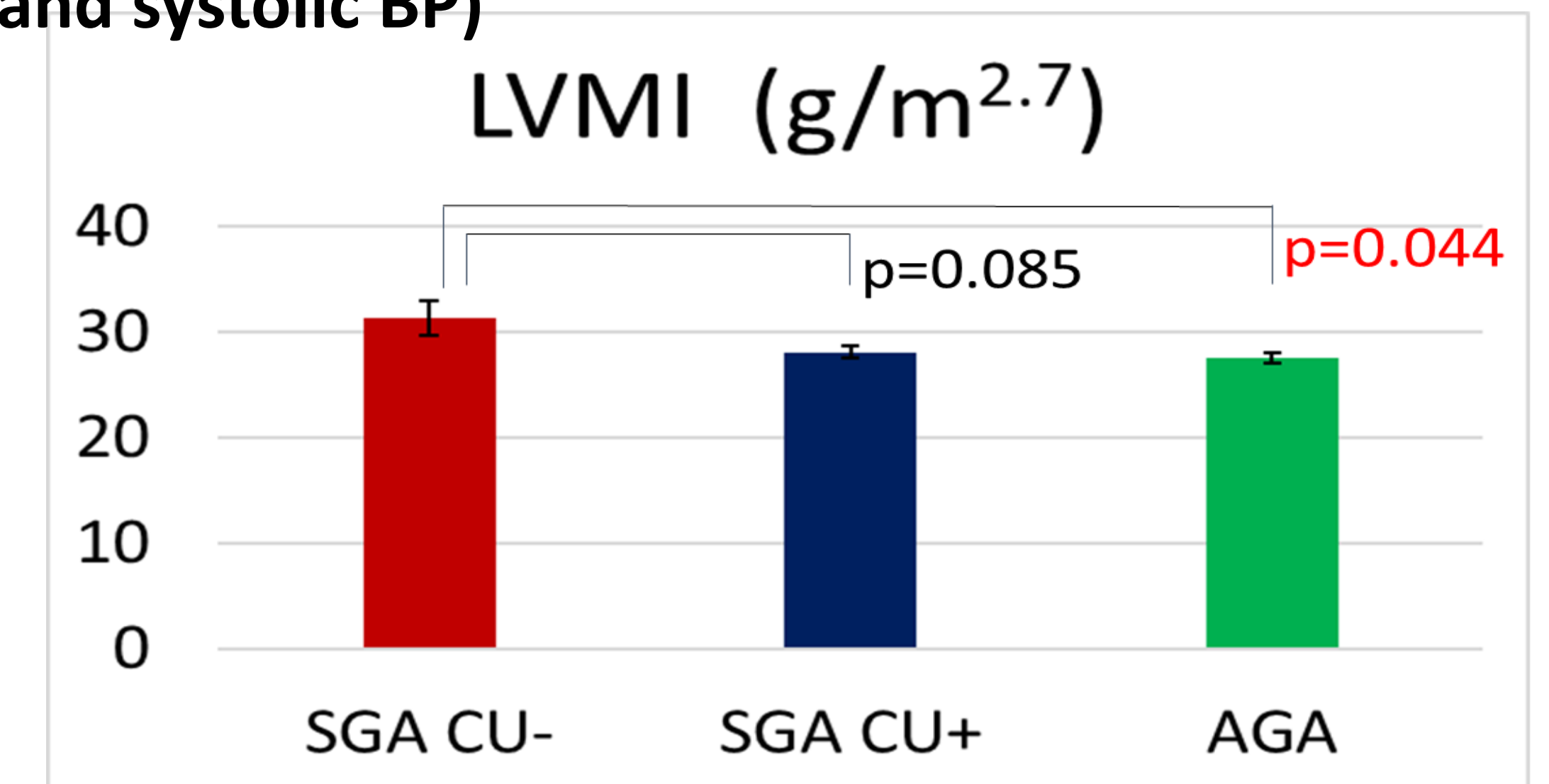
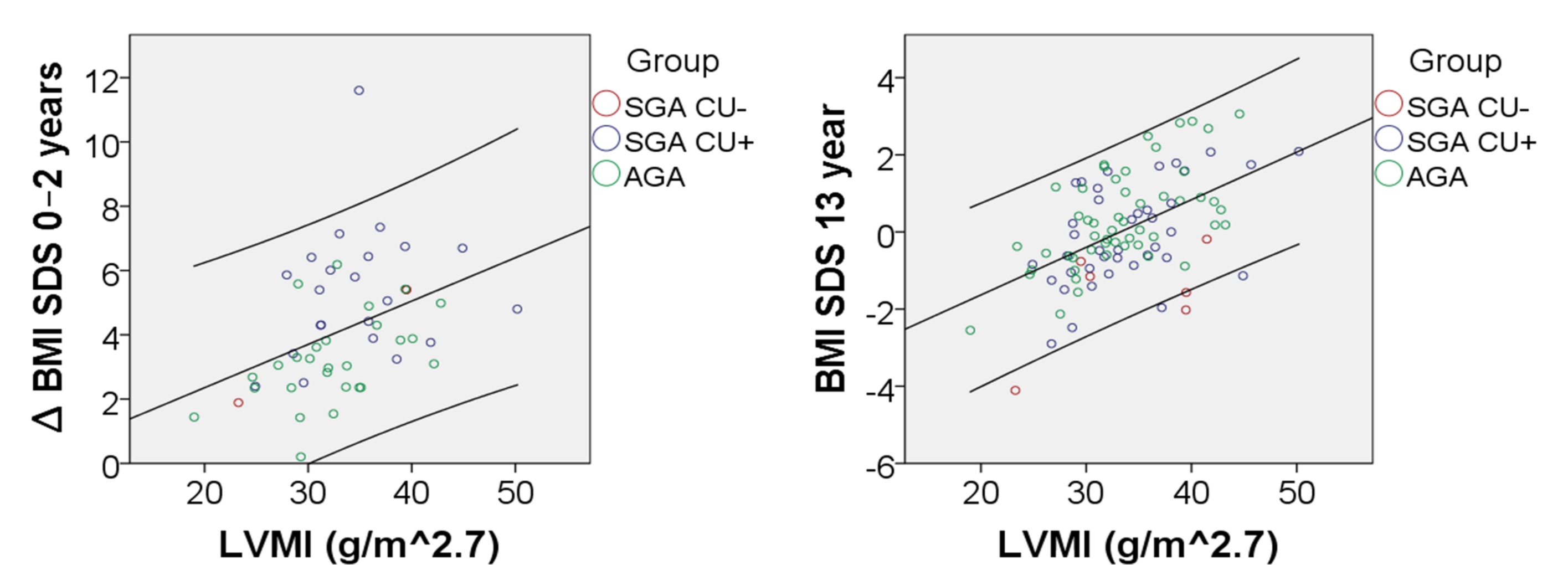


Table 1. Relationship of LVMI (g/m^{2.7}) with body size in adolescence (adjusted for sex, current age, BMI_{SDS} and systolic BP)

Variable	Standardised coefficient β	B	95% CI for B	P value
Related factors				
Δ height _{SDS} 0–5 months	0.031	0.113	-0.972 to 1.198	0.834
Δ BMI _{SDS} 0–2 years	0.298	0.700	0.013 to 1.387	0.046
Δ BMI _{SDS} 6–12 years	-0.251	-0.920	-2.040 to 0.200	0.104
Δ limb skinfold thickness 6–12 years (mm)	-0.286	-0.112	-0.245 to 0.022	0.099
ALT levels (IU/L)	-0.012	-0.004	-0.098 to 0.090	0.929
Cortisol levels (nmol/L)	0.124	0.004	-0.004 to 0.012	0.298
Controlling factors				
Current Age (y)	-0.070	-0.347	-1.669 to 0.975	0.597
Sex	-0.168	-1.571	-4.065 to 0.924	0.209
Current BMI _{SDS}	0.741	2.632	1.378 to 3.887	<0.001
Systolic BP (mmHg)	0.092	0.034	-0.064 to 0.131	0.488

ALT, alanine aminotransferase; BMI_{SDS}, body mass index standard deviation score; BP, blood pressure; CI, confidence interval; LVMI, left ventricular mass index; Δ BMI_{SDS} 0–2 years, change in BMI_{SDS} from birth to 2 years of age; Δ BMI_{SDS} 6–12 years, change in BMI_{SDS} from 6 to 12 years; Δ height_{SDS} 0–5 months, change in height_{SDS} from birth to 5 months of age; Δ limb skinfold thickness 6–12 years (mm), change in limb skinfold thickness from 6 to 12 years of age.

Figure 3. Relationship of LVMI (g/m^{2.7}) with change in BMI_{SDS} from birth to 2 years of age and BMI_{SDS} in adolescence



AGA, appropriate for gestational age; ALT, alanine aminotransferase; SGA CU-, adolescents born SGA without catch-up growth; SGA CU+, adolescents born SGA with catch-up growth; Δ BMI_{SDS} 0–2 years, change in BMI_{SDS} from birth to 2 years of age

Methods: A prospective cohort of 47 SGA and 55 AGA children was followed-up from birth to adolescence (47 boys, 55 girls). At the time of the study, subjects were 11–14 years old (mean 12.5±0.1; SGA 12.3±0.1; AGA 12.6±0.1 years). 14.9% of SGA children did not show catch-up growth in height.

Systolic and diastolic blood pressure (BP) were measured in a quiet environment after 30 min rest using an automatic device. The measurements were repeated twice 5 min apart, and the mean value was used for analysis. Venous blood samples for cortisol measurements, cholesterol and ALT analysis were taken once between 08:00 and 09:00 am after overnight fasting. Echocardiography was performed in two-dimensional-guided M-mode. Left ventricular mass (LVM) was calculated using the Devereux equation [1]. LVMI was obtained according to the equation by S.R. Daniels and G. de Simone [2].

Statistical analyses were adjusted for sex, age, pubertal stage, BMI_{SDS} and current height. LVMI analysis was additionally adjusted for systolic BP.

References:

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Acknowledgement: This study was granted by the Lithuanian Research Council (grant No. MIP-103/2011) and the Swedish Research Council (No.7509).

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