

# Left ventricular mass index and cardiovascular function in adolescents born SGA

Indre Petraitiene<sup>1</sup>, Jurate Kasparaviciene<sup>2</sup>, Margarita Valuniene<sup>3</sup>, Kerstin Albertsson-Wikland<sup>4</sup>, Rasa Verkauskiene<sup>1</sup>

1. Department of Endocrinology, Lithuanian University of Health Sciences, Kaunas, Lithuania
2. Department of Paediatrics, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania
3. Mother and Child Clinic, Republican Siauliai County Hospital, Siauliai, Lithuania
4. Department of Physiology/Endocrinology, Institute of Neuroscience and Physiology, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

**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<sub>SDS</sub> 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<sub>SDS</sub> from birth to 2 years of age and BMI<sub>SDS</sub> 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<sub>SDS</sub> and height)

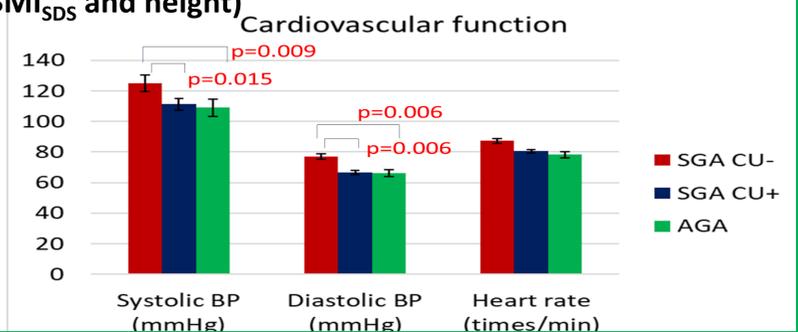


Figure 2. Mean LVMI (g/m<sup>2.7</sup>) in SGA and AGA adolescents (adjusted for sex, current age, BMI<sub>SDS</sub> and systolic BP)

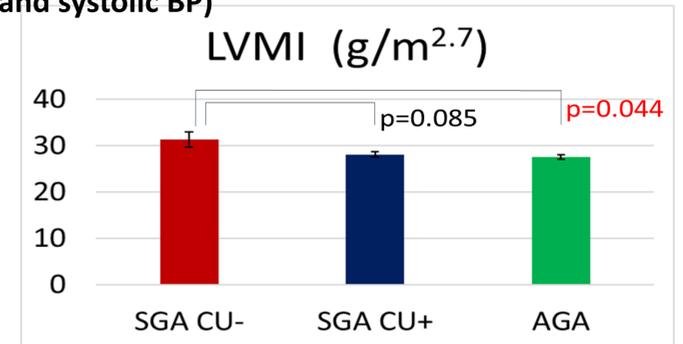
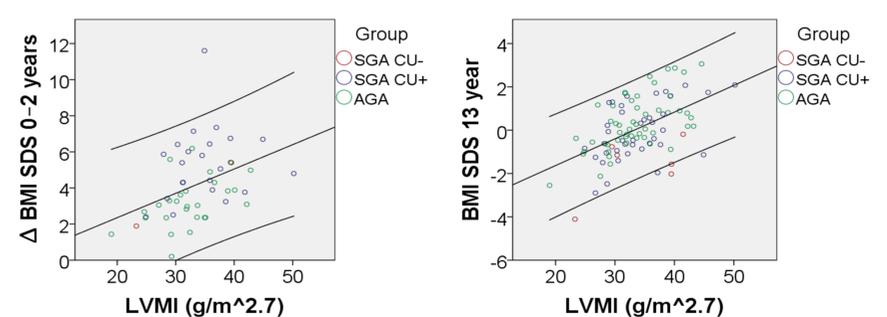


Table 1. Relationship of LVMI (g/m<sup>2.7</sup>) with body size in adolescence (adjusted for sex, current age, BMI<sub>SDS</sub> and systolic BP)

Variable	Standardised coefficient β	B	95% CI for B	P value
<b>Related factors</b>				
Δ height <sub>SDS</sub> 0–5 months	0.031	0.113	-0.972 to 1.198	0.834
Δ BMI <sub>SDS</sub> 0–2 years	0.298	0.700	0.013 to 1.387	0.046
Δ BMI <sub>SDS</sub> 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
<b>Controlling factors</b>				
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 <sub>SDS</sub>	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<sub>SDS</sub>, body mass index standard deviation score; BP, blood pressure; CI, confidence interval; LVMI, left ventricular mass index; Δ BMI<sub>SDS</sub> 0–2 years, change in BMI<sub>SDS</sub> from birth to 2 years of age; Δ BMI<sub>SDS</sub> 6–12 years, change in BMI<sub>SDS</sub> from 6 to 12 years; Δ height<sub>SDS</sub> 0–5 months, change in height<sub>SDS</sub> 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<sup>2.7</sup>) with change in BMI<sub>SDS</sub> from birth to 2 years of age and BMI<sub>SDS</sub> 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<sub>SDS</sub> 0–2 years, change in BMI<sub>SDS</sub> 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<sub>SDS</sub> 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).

**Contact:** petraitiene.indre@yahoo.com

