CRIB Cardiovascular Research Institute Basel Prevention

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Birth weight and high sensitivity C-reactive protein in young and healthy adults

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PURPOSE

- Low birth weight is a strong and independent predictor for the occurrence of ischemic heart disease and other atherosclerotic diseases during adulthood.
- The underlying mechanisms for these relationships are poorly understood.
- We hypothesized that inflammation, an independent risk factor for cardiovascular disease, might play a role in this relationship.
- We therefore assessed the relation between birth weight and hs-CRP in a large cohort of young and healthy adults.

METHODS

- 'Genetic and Phenotypic Determinants of Blood Pressure and Other Cardiovascular Risk Factors' (GAPP) is a population based study of 2170 healthy individuals aged 25-41 years and living in the Principality of Liechtenstein.
- Exclusion criteria are prevalent cardiovascular disease, known diabetes or a body mass index (BMI) >35kg/m^2. Individuals who were part of a multiple birth were also excluded from this analysis.
- Birth weight data were obtained by self-report.
- Overall, we included 1806 participants in our analysis.
- High sensitivity C-reactive protein (hs-CRP) was assayed from fasting venous blood samples using a Cobas 6000 (Roche, Switzerland).
- Multivariable linear regression models adjusted for potential confounders were constructed to assess the relationship between birth weight and hs-CRP.

RESULTS

- Baseline characteristics are presented in ***Table 1***.
- Hs-CRP levels did not significantly differ between males and females.

Table 1 Baseline characteristics

Total n = 1806	*Males n = 824*	*Females n = 982*	*p-Value*
Age (y)	36 (31; 40)	37 (31; 40)	0.24
BMI (kg/m^2)	25.6 (23.5; 27.7)	22.4 (20.5; 25.0)	<0.0001
Curr. smoking (%)	184 (22.3)	178 (18.1)	0.026
Hypertension (%)	196 (23.8)	46 (4.7)	<0.0001
LDL-C (mmol/l)	3.17 (2.62; 3.81)	2.62 (2.20; 3.13)	<0.0001
HbA_{1c} (%)	5.4 (5.2; 5.7)	5.4 (5.2; 5.6)	0.13
hs-CRP (mg/l)	0.9 (0.5; 1.7)	0.9 (0.5; 2.0)	0.14
Birth weight (g)	3500 (3150; 3800)	3250 (2990; 3570)	<0.0001

Data are numbers (percentage) or medians (IQ range).

- Multivariable regression analyses for the relationship between birth weight and hs-CRP are shown in ***Table 2***.
- In the adjusted models, there was a strong and linear association between birth weight and hs-CRP.
- This association was attenuated but remained significant after additional adjustment for body composition.

CONCLUSION

- Our data show that birth weight is inversely associated with hs-CRP levels in adult life.
- Thus, inflammation may be a potential mediator relating low birth weight and intrauterine growth restriction with the occurrence of ischemic cardiovascular events.
- Differences in body composition may be involved in these relationships.

Table 2 Multivariable linear regression analyses for the relationship between hs-CRP and birth weight

	Continuous†	*Quartile 1*	*Quartile 2*	*Quartile 3*	*Quartile 4*	*P for trend ‡*
Males, n=824		*< 3150 g*	*3150 – 3500 g*	*3500 – 3800 g*	*> 3800 g*	
Females, n=982		*< 2990 g*	*2990 – 3250 g*	*3250 – 3570 g*	*> 3570 g*	
High-sensitivity C-reactive protein, β (95% CI)						
Age- & sex adjusted model	-0.01 (-0.02; -0.00)*	Ref.	0.09 (-0.04; 0.22)	-0.09 (-0.23; 0.05)	-0.11 (-0.25; 0.02)	0.017
Fully adjusted model 1	-0.01 (-0.02; -0.00)**	Ref.	0.08 (-0.04; 0.21)	-0.11 (-0.24; 0.02)	-0.14 (-0.27; -0.01)	0.002
Fully adjusted model 2	-0.01 (-0.02; -0.00)*	Ref.	0.12 (-0.00; 0.24)	-0.06 (-0.19; 0.07)	-0.09 (-0.22; 0.04)	0.033

Model 1 *was adjusted for sex, age, BMI, current smoking, lipid profile, systolic blood pressure, estimated glomerular filtration rate, HbA_{1c}, educational level, physical activity, fruit/vegetable consumption, and total alcohol consumption.*

Model 2 *was in addition to the above mentioned predictors adjusted for body composition (n=1768).*

* *P-value < 0.05;* ** *P-value < 0.01*

† *Log-transformed variable, per 100g increment in birth weight*

‡ *p for trend across quartiles of birth weight*

GAPP studie www.blutdruck.li

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