

Effect of postnatal diet on reverting cardiovascular remodeling in fetal growth restriction

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Objective

To determine the influence of postnatal environment on cardiovascular (CV) remodeling in IUGR children.

Methods

A cohort study in 5 years-old children including 80 cases of IUGR matched by gender and gestational age at delivery with 120 children with adequate fetal growth (AGA). IUGR was defined by birthweight below 10th centile. Postnatal left ventricular sphericity index (LVSI) by echocardiography, carotid intima-media thickness (cIMT) and blood pressure were considered as cardiovascular end-points. Linear and robust regressions were fitted adjusted by matched variables in order to evaluate the effect of prenatal and postnatal variables on the postnatal cardiovascular end-points.

Results

LVSI was significantly lower, while cIMT and blood pressure were significantly increased in IUGR as compared to AGA. Factors related to LVSI were: IUGR (coefficient -0.4038; $p < 0.001$), hypertensive disorders during pregnancy (-0.0996; $p = 0.04$), cIMT (-0.0891; $p = 0.06$), child height (0.0040; $p < 0.001$) and breastfeeding >6 months (0.0982; $p = 0.02$). Otherwise, IUGR (0.0202; $p < 0.001$), paternal smoking (0.0096; $p = 0.04$), child age (0.0036; $p = 0.02$), child body mass index (0.0022; $p = 0.07$), low socio-economical status (0.0128; $p = 0.10$) increased the cIMT, while gestational age at delivery (-0.002; $p = 0.002$) and healthy fat ratio (-0.0131; $p = 0.03$) decreased it (Figure). Adjusting by gestational age at delivery, gender and child height percentile, IUGR and child age increased systolic and diastolic blood pressure in a similar and significant magnitude (almost 5 mmHg and 1 mmHg, respectively).

Conclusion

Postnatal environment has an effect on CV remodeling of fetal origin. In particular, breastfeeding >6 months improved cardiac remodeling while healthy fat ratio improved vascular remodeling. This opens new opportunities for postnatal public health interventions to reduce long term CV risk.