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Background and Aims Preterm birth is associated with raised blood pressure (BP) and other features of the metabolic syndrome in later life, but effect sizes and biological mechanisms are unknown. We conducted a meta-analysis to address these associations in adult life.

Methods We performed a systematic review and meta-analysis of studies in which metabolic syndrome associated indices were compared in adults (≥ 18 years of age) born preterm (< 37 weeks gestation) and at term (37–42 weeks gestation). Outcome measures included; systolic blood pressure (SBP), diastolic blood pressure (DBP), BMI, percentage fat mass and fasting plasma levels of lipids, glucose and insulin.

Results Data from 27 studies and 306,123 adults (16,094 preterm, 290,029 term) were included, with an average outcome age of 26.1 years. In adults, preterm compared with full-term birth was associated with significantly higher SBP (mean difference [95% confidence interval]: 4.2mmHg [2.7, 5.7], $p < 0.001$), DBP (2.7mmHg [1.2, 4.2], $p < 0.001$) and low density lipoprotein (LDL) (0.14mmol/L [0.05, 0.22], $p = 0.01$). Meta-regression revealed a significant gender effect, with 3.0mmHg greater SBP in preterm compared to term women than in preterm-term men (95%CI: 1.3, 4.7, $p = 0.002$); for DBP this difference was 2.1mmHg greater (0.6, 3.6, $p = 0.009$).

Conclusions Preterm compared to term birth, is associated with higher blood pressure and LDL in adult life. Women born preterm appear to be at greater risk than men born preterm. Follow-up of older subjects born preterm will be required to determine if the effects we observe are exacerbated by age.

354 ADIPOCYTOKINES OMENTIN AND VASPIN ARE UPREGULATED IN LARGE FOR GESTATIONAL AGE FETUSES AT TERM

doi:10.1136/archdischild-2012-302724.0354

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Background and Aims Fetal macrosomia is associated with significant perinatal and long-term complications, including higher risk for later development of insulin resistance/metabolic syndrome. Besides regulating whole body metabolism, adipocytokines have been implicated in fetal growth. We aimed to investigate circulating concentrations of omentin-1 and vaspin (important adipocytokines, regulating glucose metabolism and insulin sensitivity) in fetal samples from large-for-gestational-age-(LGA) and appropriate-for-gestational-age-(AGA) pregnancies and correlate them with several maternal and fetal anthropometric/clinical variables.

Methods Sixty five LGA (14 born from mothers presenting with gestational diabetes mellitus and 51 born from non-diabetic mothers) and 35 AGA singleton full-term infants were recruited. Determination of cord blood omentin-1 and vaspin concentrations was performed by enzyme-linked immunosorbent assay.

Results Cord blood omentin-1 concentrations were significantly higher in LGA compared to AGA neonates ($b = 0.119$, $p = 0.002$, SE 0.036), after controlling for confounding factors. Similarly, cord blood vaspin concentrations were significantly elevated in LGA cases, compared to AGA controls ($p = 0.011$). Finally, cord blood omentin-1 concentrations were lower in cases of vaginal delivery ($b = 0.072$, $p = 0.020$, SE 0.030), after controlling for group.

Conclusions Higher concentrations of omentin-1 and vaspin in LGA compared to AGA fetuses, probably suggest the potential role of both adipocytokines in intrauterine growth, as well as their

possible implication in the metabolic disturbances characterizing fetal macrosomia both in the short- and long-term. Vaginal delivery-associated inflammation may account for the lower cord blood omentin-1 concentrations.

355 FETAL GROWTH IS ASSOCIATED WITH ALTERED EXPRESSION OF IMPRINTED GENES IN THE PLACENTA

doi:10.1136/archdischild-2012-302724.0355

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Background and Aims Both low and high birthweight is associated with adverse health outcomes throughout life. Altered expression of imprinted genes which regulate fetal and placental growth may be one mechanism linking the environment and later disease risk. We have studied the expression of candidate imprinted genes in placenta with respect to anthropometric parameters at birth.

Methods 58 term placentas (27 male) were obtained from the Edinburgh Reproductive Tissue BioBank. Pregnancies complicated by congenital abnormalities or diabetes were excluded. Gene expression was analysed using real-time PCR.

Results Median birthweight was 3900g (interquartile range: 2949–4340g). Insulin-like growth factor 2 (IGF2) mRNA levels correlated positively with standard deviation scores for birthweight (Spearman's $\rho = 0.335$, $p = 0.005$), head circumference (Spearman's $\rho = 0.424$, $p = 0.001$) and length (Spearman's $\rho = 0.259$, $p = 0.041$). Growth factor receptor-bound protein 10 (GRB10) mRNA levels correlated negatively with birthweight standard deviation score (Spearman's $\rho = -0.221$, $p = 0.048$). The expression of two other imprinted genes, PHLDA2 and ZIM2 showed no relation to size at birth.

Conclusion Both IGF2 and GRB10 are imprinted in the placenta and impact on fetal and placental growth. IGF2 is paternally imprinted and increased expression is implicated in overgrowth disorders; in contrast, GRB10 is maternally imprinted in trophoblasts and disruption in mice leads to overgrowth. Additionally, GRB10 has recently been identified as having a role in insulin signaling. As genomic imprinting is under epigenetic regulation, these targets are strong candidates for exploration of environmentally influenced non-Mendelian effects on fetal size and developmental programming.

356 ALBUMIN SYNTHESIS RATES IN VLBW INFANTS - EFFECTS OF HIGH DOSE AMINO ACID AND LIPID ADMINISTRATION FROM BIRTH ONWARDS

doi:10.1136/archdischild-2012-302724.0356

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Introduction Albumin is one of the most important proteins in plasma and plays a key role in physiological processes like preservation of colloid osmotic pressure and binding of bilirubin and drugs. However, albumin concentrations are often low during the first days of life in preterm infants.

We hypothesized that early parenteral lipid and high dose amino acid (AA) administration from birth onwards to very low birth weight (VLBW) infants increases hepatic albumin synthesis rates and albumin concentration.

Methods Inborn VLBW infants were randomized to one of three different parenteral nutritional regimens within 6hrs after birth