

P1-101 Uteroplacental insufficiency causes growth restriction and a nephron deficit but no hypertension in female offspring with adequate postnatal nutrition preventing the nephron deficit

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Aims: In the rat, uteroplacental insufficiency restricts fetal growth and impairs mammary development further compromising postnatal growth. In male offspring, this results in a reduced nephron endowment with glomerular hypertrophy and increased adult blood pressure both of which can be reversed by improving the lactational environment after birth. Our aim was to explore the effects in females.

Study design: Blood pressure (tail-cuff), nephron endowment (unbiased stereology) and renal AT receptor expression (real-time PCR) were examined in female offspring from mothers which underwent bilateral uterine vessel ligation (Restricted) on day 18 of pregnancy. Sham surgery (Control) and a reduced litter size group (Reduced – litter size reduced at birth to 5, equivalent to Restricted group) were used as controls. On postnatal day 1, offspring (Control, Reduced and Restricted) were cross-fostered onto a Control (normal lactation) or Restricted (impaired lactation) mother.

Results: Restricted-on-Restricted female offspring were born small and remained smaller during early lactation but thereafter were of similar weight to Control-on-Control. There were no differences in blood pressure (8, 12, 20 weeks) or renal AT1 receptor expression between the groups at 6 months. Restricted-on-Restricted offspring had a nephron deficit but no glomerular hypertrophy. Providing a normal lactational environment to Restricted females prevented the nephron deficit.

Conclusions: Our study demonstrates, despite having a significant nephron deficit, Restricted-on-Restricted female offspring did not develop hypertension. Adequate postnatal nutrition was critical to ensure normal nephron endowment. This highlights sex specific differences in the programming of adult disease following experimental uteroplacental insufficiency.

P1-102 Fetal growth in early pregnancy and weight at birth; data from the Pune Maternal Nutrition Sub-Study

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Aims: Fetal size measured by ultrasound in the first trimester is used to 'date' pregnancies on the assumption that all fetuses have similar early growth. A recent study in IVF pregnancies, with known conception dates, showed that slower first trimester fetal growth predicted lower birthweight and shorter pregnancy duration. We studied these effects in Indian (non-IVF) mothers, whose last menstrual period (LMP) dates were obtained by monthly home-visits.

Study design: The PMNS is a population-based prospective study of rural Indian women and their offspring. In a sub-group of these women (N=153) fetal ultrasound was performed at 8–10 weeks gestation.

Subjects: 132 pregnant women whose gestation according to their LMP date (observed) differed by <2 weeks from gestation estimated at 8–10 weeks from fetal crown-rump ultrasound measurements (expected). The statistic ' Δ GA' (expected age – observed age) is a proxy for early fetal growth.

Outcome measures: Newborn size and pregnancy duration.

Results: PMNS fetuses grew slower than expected by a mean 4.0 (SD 4.6) days. For each 1-day increase in Δ GA, birthweight increased by 9g ($p=0.3$). After adjustment for pregnancy duration, this became 29g ($p<0.001$), and remained after adjustment for other potential confounders. A 1-day increase in Δ GA was associated with a 1-day decrease in pregnancy duration ($p<0.001$). A 1-day increase in Δ GA reduced the risk of SGA (OR 0.90; 95%CI 0.74–1.08; $p=0.3$).

Conclusion: PMNS fetuses are smaller than expected from international standards, even at 8 weeks. Variations in birthweight and possibly pregnancy duration are partly determined by first trimester fetal growth.

P1-103 Fetal growth and metabolic risk factors in the children at the age of 6 years; data from the Pune Maternal Nutrition Study

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Aims: To examine whether body size and metabolic risk factors in children are associated with fetal size and growth at 18 and 28 weeks gestation.

Study design: The Pune Maternal Nutrition Study is a population-based prospective study of rural Indian women and their offspring.

Subjects: 638 pregnant women whose gestation according to their last menstrual period date differed by less than 2 weeks from gestation estimated from fetal ultrasound measurements at 18 weeks. At 18 and 28 weeks gestation, fetal bi-parietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur length (FL) were measured using ultrasonography. 28-week measurements conditional on 18-week measurements were calculated using regression, as measures of 18–28 week growth.

Outcome measures: Anthropometry (weight, height, head, skinfolds) and metabolic risk factors (insulin resistance, blood pressure, 2-hour glucose, triglycerides, HDL cholesterol) in the children at age 6 years.

Results: 6-year weight, height and head size, but not skinfolds, were all directly associated with 28-week fetal size and 18–28 week fetal growth ($p<0.01$). There were no associations with 18-week fetal size. After adjustment for age, sex, socio-economic status and 6-year height and BMI, 28-week fetal HC was inversely associated with 6-year systolic blood pressure ($p=0.04$) and 28-week fetal AC was inversely associated with 6-year 2-hour glucose ($p=0.04$).

Conclusion: In this rural Indian population, childhood size is directly associated with fetal growth in the second, but not the first, trimester. There is also evidence that larger fetuses in the second trimester have lower risk factors for cardiovascular disease in childhood.

P1-104 Developmental origins of racing performance in the horse and Man

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Aims: The genotype of a thoroughbred racehorse has been closely regulated since the inception of TB racing ~1850s in the General Stud Book. The phenotype of a thoroughbred racehorse can be markedly influenced by the prenatal environment (Allen et al. 2002 Reproduction). If performance on the track is considered as an endpoint heritable trait, as all TB breeding has aimed to achieve, then in theory breeding the best to the best should have, on average, improved racing times over the last 150 years. This abstract will consider this phenomenon in both the racehorse and in Man – as a more heterogenous comparison in which reproduction has not necessarily been considered as the best to the best.

Study Design: The earliest available data for Man were from the first Olympic Games in 1896. Comparative data for racehorses for