Concurrent Session 16: Infants and Children

Maternal and infant vitamin B12, folate and homocysteine in pregnancy and postpartum

AJ Hure[1,2], CE Collins[1], R Smith[2]
[1]*School of Health Sciences, University of Newcastle, NSW 2308*
[2]*Mothers and Babies Research Centre, Hunter Medical Research Institute, NSW 2305*

Background – Vitamin B12 (cobalamin) and folate are important nutrients for pregnancy, with deficiencies related to serious adverse outcomes including neural tube defects. These nutrients are required for DNA synthesis and are involved specifically in homocysteine metabolism. Experimental advances in the developmental origins of health and disease have implicated this as a potentially important 'programming' pathway.
Objectives – (i) To longitudinally characterise the values of plasma B12 (pB12), plasma folate (pFol) and red cell folate (rcFol), in a cohort of women during pregnancy and after birth; and (ii) to conduct a mother-infant paired sub-analysis of vitamin B12 and folate biomarkers in relation to plasma homocysteine (pHcy).
Design – Prospective longitudinal study of women during pregnancy and after birth. Maternal fasting blood samples were collected at 18 (*n* 132) and 36 (*n* 142) weeks gestation during pregnancy, and at 13 (*n* 111) and 26 (*n* 100) weeks postpartum. Samples were assayed for pB12, pFol, and rcFol. A sub-sample of infants' provided a non-fasting blood sample at 26 weeks postpartum, and pB12, pFol and/or rcFol, and pHcy assays were performed (*n* 16).
Outcomes – Maternal pB12 levels declined between 18 and 36 weeks gestation (mean ± SD: 189 ± 64 to 155 ± 47 pmol/L, P<0.001), and then increased by 13 weeks postpartum (274 ± 137 pmol/L, P<0.001). Maternal rcFol levels progressively declined between 18 weeks gestation and 26 weeks postpartum (1281 ± 490 to 933 ± 359 nmol/L). In the sub-analysis pHcy increased between 36 weeks gestation and 13 weeks postpartum (median, 10-90th percentile 5.1, 2.9-6.9 to 7.9, 5.9-9.6 mol/L, P=0.004). No differences were detected between maternal and infant biomarkers at 26 weeks postpartum. Maternal pregnancy folate levels predicted infant pHcy at 26 weeks postpartum (P=0.05).
Conclusion – Significant changes in maternal B12 and folate occur during pregnancy and after birth. Maternal vitamin B12 and folate status may 'program' the offspring's homocysteine metabolism. However larger prospective studies are required to confirm this preliminary finding, with emphasis placed on measuring and reporting on important clinical outcomes for mother and baby.

The association of pre-pubertal body composition in healthy girls and boys with the timing of early and late pubertal markers

AE Buyken, N Karaolis-Danckert, T Remer
Research Institute of Child Nutrition Dortmund, University of Bonn, Germany

Background – It is controversial whether pre-pubertal body composition is implicated in the timing of puberty onset.
Objective – To investigate whether body composition preceding the pubertal growth spurt is associated with attainment of early and late pubertal markers in healthy German boys and girls.
Design – Regression analyses were performed in 215 participants of the DONALD Study for whom BMI and body fat percentage (BF%) at two and one years prior to the onset of pubertal growth spurt (age at take-off, ATO) were available.
Results – Higher levels of BMI and BF% z-scores one year before ATO showed only modest associations with chronological age at ATO (P for trend, adjusted for early life factors in girls: P=0.1 and P=0.04, respectively; boys: P=0.2 and P=0.2). Similar modest associations were observed with body composition two years before ATO among girls only (p for interaction: 0.02 and 0.1). Conversely, prepubertal body composition more clearly predicted age at peak height velocity (APHV) and puberty duration (APHV minus ATO) in both sexes and age at menarche in girls (girls: P=0.01, P<0.0001, and P=0.04, respectively; boys: P=0.002 and P=0.06).
Conclusion – This longitudinal study suggests that pre-pubertal body composition in healthy boys and girls may not be critical for the initiation of the pubertal growth spurt, but instead affects the progression of pubertal development resulting in earlier attainment of later pubertal stages.