



Maternal insulin resistance and neonatal profile in pregnancies following bariatric surgery

Maric T, Kanu C, Johnson M, Savvidou M

Chelsea & Westminster Hospital, Imperial College London, London, UK, London, United Kingdom

Objective

The aim of this study was to evaluate the maternal insulin resistance and the neonatal metabolic profile, as assessed by insulin resistance and neonatal body fat composition, of pregnancies following bariatric surgery.

Methods

This was a prospective, observational, longitudinal study investigating the effect of bariatric surgery on maternal and fetal/neonatal outcomes. All women underwent a full 75g glucose load at 28-30 weeks of gestation. At delivery, cord venous blood was obtained. Insulin resistance was measured using homeostasis model assessment- insulin resistance (HOMA-IR) ($\text{HOMA-IR} = \text{fasting insulin } (\mu\text{IU/L}) \times \text{fasting glucose (mmol/L)} / 22.5$). Birthweight was recorded and neonatal anthropometric measurements of length, head, abdomen (in cm) and skin folds (triceps, subscapular and flank), in mm, using a calibrated Harpenden skin calliper, were performed within 72 hours of life. Neonatal body fat was calculated.

Results

The study included 123 pregnant women; 41 with previous bariatric surgery (19 with a restrictive and 22 with a malabsorptive procedure) and 82 pregnant women with similar booking BMI but no history of bariatric surgery. Compared to the no surgery group, maternal HOMA-IR was significantly lower in the bariatric surgery group ($p < 0.001$) and this was the case even after adjusting for maternal age, booking BMI, ethnic group, parity, smoking, method of conception and development of GDM. Neonatal HOMA-IR was similar between the groups. Compared to the no surgery group, neonates of post-bariatric pregnant women were lighter with smaller head, abdominal circumference and less percentage body fat ($p < 0.01$) even after adjusting for gestational age at delivery. In the no surgery group, there was a positive correlation between maternal and neonatal HOMA-IR ($p = 0.02$), neonatal HOMA-IR and birthweight ($p < 0.001$), and neonatal HOMA-IR and percentage body fat ($p < 0.001$) even after adjusting for gestational age at delivery, maternal ethnic group, development of GDM and sex of the neonate. However, these correlations were not detected in the post-bariatric surgery group highlighting a metabolic dysregulation in the energy homeostasis of these neonates, probably through epigenetic programming.

Conclusion

The findings suggest that maternal insulin sensitivity improves following bariatric surgery. Offspring of bariatric surgery women are smaller, lighter and have altered neonatal body composition with significantly lower adiposity, which may have implications for the future metabolic health of these offspring.