

## Clinical and metabolic profiles of very severely obese pregnant women and their associations with birth weight

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### Abstract

**Introduction:** During gestation diminished maternal insulin sensitivity (IS) increases the availability of fuels allowing fetal growth. Class III obesity (OB; BMI $\geq$ 40kg/m<sup>2</sup>) is associated with reduced IS but it is not known how nutrient availability differs and how this impacts on birth-weight versus normal pregnancies (CON).

**Methods:** 239 OB (median (interquartile range) 43.2(41.1-46.3) kg/m<sup>2</sup>) and 105 CON (BMI 22.6(21.2-23.5)kg/m<sup>2</sup>) pregnant Caucasians had maternal weight, fasting glucose, non-esterified fatty acids (NEFA) and insulin concentrations measured at 16, 28 and 36 weeks(wk). Premature births (<37 weeks) (4 OB, 1 CON) were excluded.

**Results:** Weight gain (WG) was greater in CON vs. OB (10.4(7.6-13.0)kg vs. 5.2(2.4-8.3)kg; p<0.0001; 16-36wk). Glucose, NEFA and insulin were higher in OB vs. CON throughout pregnancy (p<0.0001). IS was lower in OB vs. CON (p<0.0001); in CON IS was lowest at 36 weeks whereas in the OB, IS was lowest at 28 weeks. Glucose peaked at 28wk: OB (16wk 4.5(4.2-4.7)mmol/l; 28wk 4.6(4.3-4.9)mmol/l; 36wk 4.5(4.1-4.8)mmol/l; p=0.05) and CON (16wk 4.2(4.1-4.4)mmol/l; 28wk 4.2(4.0-4.5)mmol/l; 36wk 4.1(3.9-4.3)mmol/l; p=0.0003). NEFA fell at 28wk: OB (16wk 0.49(0.41-0.60)mmol/l; 28wk 0.44(0.37-0.55)mmol/l; 36wk 0.50(0.39-0.61)mmol/l; p=0.005) and CON (16wk 0.31(0.25-0.40)mmol/l; 28wk 0.29(0.22-0.36)mmol/l; 36wk 0.33(0.27-0.46)mmol/l; p=0.03). Birth weights after adjusting for confounders were greater in OB 3610(3280-3980) g vs. CON 3600(3260-3860)g (p=0.03). In multivariate regression, increased 36wk glucose in OB (p=0.03) versus increased BMI and WG and diminished NEFA in CON were associated with increased birth-weight (all p<0.05).

**Conclusion:** OB women were more insulin resistant vs. CON during pregnancy, with greater glucose, NEFA and insulin concentrations and greater adjusted birth-weights. Increased glucose was positively associated with birth weight in the OB and diminished NEFA with birth weight in the CON which may indicate altered fetal preference for metabolites during these pregnancies.

### Biography

Shareen Forbes was awarded her MBChB from the University of Edinburgh in 1993 and did her clinical training in Diabetes, Endocrinology and General Medicine in North West London. She was awarded a PhD from Imperial College, London in 2005 and was awarded a Fellowship to study the relationship between diabetes and non-alcoholic fatty liver disease. She is based at the Royal Infirmary, Edinburgh and the Queen's Medical Research Institute, University of Edinburgh, and is a Senior Lecturer in Diabetes and Endocrinology, a principal investigator examining pregnancies complicated by obesity and the lead diabetologist for the islet transplant programme in Scotland.