The Leeds Teaching Hospitals NHS Trust

Continuous glucose monitoring (CGM) and fetal growth in women with gestational diabetes (GDM)

Cartland SJ[1], Alnaji A[1], Alrefaii L[1], Jennings PE[2], Gilbey SG[3], Murphy HR[4], Law GR[5], Scott EM[1]

1. Leeds Institute of Cardiovascular and Metabolic Medicine, University of Leeds, Leeds. UK 2. York Teaching Hospital, York, UK.
3. Leeds Teaching Hospitals NHS Trust, Leeds, UK. 4. Norwich Medical School, University of East Anglia, Norwich, UK. 5. University of Lincoln, Lincoln, UK.

Background:

Gestational Diabetes (GDM) is the commonest medical condition to adversely affect otherwise healthy women and their babies, and despite extensive research, rates of stillbirth, neonatal death, and on going maternal and childhood morbidity remain at unacceptable levels[1].
The majority of poor outcomes are related to fetal growth restriction or macrosomia[2], making the accurate evaluation of fetal growth in pregnancies complicated by diabetes hugely important. Earlier and more precise identification of abnormal fetal growth would enable treatments to be targeted more effectively.

Aim:

Women with GDM continue to have an increased risk of giving birth to infants large-for gestational age (LGA), despite being actively treated. Our aim was to determine whether a period of CGM at 32 weeks gestation provided information about glucose control that was relevant to LGA.

Methods:

This is a prospective cohort study of 162 multi-ethnic women diagnosed with GDM (by 75g OGTT) at 24-28 weeks gestation based on WHO criteria. Women with a multiple pregnancy, significant co-existent medical or psychiatric condition, or who were non-English speaking were excluded. All participants were treated to achieve tight capillary glucose targets according to NICE guidelines. The study received ethical approval (REC reference 13/YH/0268) and all women gave written informed consent. A week of blinded CGM was performed at 32 weeks gestation; cases were excluded from analysis if <2 days CGM had been undertaken (n=19). LGA was determined as the infants birthweight >90th centile, whilst small for gestational age (SFGA) was determined as the infants birthweight <10th centile. These were adjusted for gestational age, sex, maternal BMI, parity, ethnicity using GROW.

The relationship between mean CGM glucose to LGA and SFGA was determined.

Results:

Sufficient CGM data was obtained from 143 women. The participant characteristics (mean ± SD) were: Age 33±5 years; BMI 30±6 kg/m2; Parity 1.1 ±1.2; Birthweight 3227.5 ±493.2g; gestation at delivery 38.8 ±1.1 weeks. The mean birthweight centile was 44.6 +30.5, and mean glucose was 5.9 ±0.7mmol/l.

11.6% of infants were large for gestational age. The mean glucose in those women who had a LGA infant was 6.2 ±0.6 mmol/l. For every 1 mmol/l increase in glucose the OR (95%CI) of having an LGA infant was 2.11 (0.99-4.51).

14.6% of infants were small for gestational age. The mean glucose in those women who had a SFGA infant was 5.8 ±0.6 mmol/l. For every 1 mmol/l increase in glucose the OR (95%CI) of having an SFGA infant was 0.75 (0.36-0.57).

Conclusion:

Despite active management to achieve tight glucose targets, women with GDM who gave birth to a large-for-gestational age infant were more likely to have a higher glucose detectable by CGM at 32 weeks gestation.

References

(1) NICE. Diabetes in Pregnancy: management from preconception to the postnatal period
http://www.nice.org.uk/guidance/ng3/resources/diabetes-in-pregnancy-management-from-preconception-to-the-postnatal-period-51038446021.2015

(2) Confidential Enquiry into Maternal and Child Health, Diabetes in Pregnancy: Are we providing the best care? Findings of a National Enquiry: England, wales, Northern Ireland, ed. CEMACH2007, London.