Early postpartum glycaemic assessment in patients with gestational diabetes

Uptake of postpartum glycaemic assessment in women with gestational diabetes (GDM) has been shown to be low, with six weeks postpartum testing (as recommended by the UK National Institute for Health and Care Excellence) inconvenient for new mothers who prioritise their new baby over their own health at this time. As pregnancy-related insulin resistance returns to pre-pregnancy levels immediately after placental delivery, we hypothesised that early postpartum fasting blood glucose testing, while the mother is likely to be still in hospital, would increase uptake of postpartum glycaemic assessment.

A novel protocol for early postpartum fasting blood glucose testing in women with GDM was implemented and prospectively evaluated looking at uptake of postpartum glycaemic testing in the first year after implementation.

In all, 118 consecutive patients with GDM delivered in our trust between September 2015 and September 2016. Mean (SD) age was 32(5.7) years; mean (SD) body mass index was 30.6(6.5)kg/m². A total of 107 patients (90.7%) had a fasting glucose test while in hospital, five re-attended the maternity unit for a fasting glucose within four weeks, giving a total uptake of postpartum glycaemic testing of 94.9%. Two (1.8%) patients had impaired fasting glucose and no patients had a fasting glucose of 7mmol/L or greater detected by early postpartum testing.

It was concluded that early postpartum glycaemic assessment in women with GDM, using fasting blood glucose measurement while still in hospital after delivery, is an effective strategy that improves the follow-up rate to near complete uptake.

**Key words**

gestational diabetes mellitus; postpartum; follow up

**Background**

In women with gestational diabetes (GDM), blood glucose levels usually return to normal immediately postpartum, although in 3–6% of women impaired fasting glucose persists.\(^1\)\(^-\)\(^4\) Early identification of women at high risk of developing type 2 diabetes allows lifestyle modification to reduce their risk of developing the condition\(^5\)\(^,\)\(^6\) with earlier testing for GDM in subsequent pregnancies to avoid the teratogenic effect of hyperglycaemia.\(^7\)

The UK National Institute for Health and Care Excellence (NICE) recommends postpartum glycaemic assessment of all women with GDM\(^8\) but, nationally, uptake is low with less than 20% receiving the recommended postpartum glycaemic follow up.\(^9\) This is consistent with findings in European countries, North America and Canada.\(^10\)\(^-\)\(^15\)

Current NICE guidance for postpartum testing of GDM specifies that a fasting glucose should be measured at 6–13 weeks after the birth.\(^8\) although this reasoning seems given to logistics rather than physiology as it coincides with the standard six-week baby check. Qualitative research has investigated the barriers to postpartum glycaemic assessment in patients with GDM and found that women who have recently delivered may attend a baby check but find it difficult to prioritise preventative care for themselves.\(^16\)\(^,\)\(^17\) Local patient feedback identified inconvenience as a significant factor, with mothers of young babies struggling to attend additional follow-up appointments at six weeks postpartum. As pregnancy-related insulin resistance returns to pre-pregnancy levels immediately after placental delivery,\(^18\)\(^-\)\(^20\) there seems no physiological reason to delay testing beyond discharge from hospital.

For postpartum testing of women with GDM in our centre, we had previously used oral glucose tolerance testing (OGTT) either before discharge from hospital or at 6–12
weeks after birth. We hypothesised that early postpartum glycaemic assessment using fasting glucose before discharge from hospital would increase the uptake of follow up for women with GDM. In this service development project we developed, introduced and prospectively evaluated this pilot service as an alternative to existing management pathways.

Methods
A protocol for early glycaemic assessment after delivery and before discharge for mothers with confirmed GDM was designed, approved and prospectively evaluated in our trust. A diagnosis of GDM was made, according to the NICE guidelines from 2015, following a glucose tolerance test at any stage in pregnancy with either a fasting glucose of 5.6mmol/L or higher or a 2-hour glucose of 7.8mmol/L or higher.

From September 2015, all women with GDM were offered a fasting glucose test prior to discharge, obtained by midwifery staff. If a woman requested an earlier discharge that did not facilitate the time for a fasting glucose test, then an appointment was made for her to return to the maternity unit within four weeks of birth for testing.

Exclusion criteria were: massive postpartum haemorrhage, steroid treatment prior to delivery or patient refusal.

The unit’s diabetes specialist midwife managed the results according to the following thresholds: a fasting glucose of below 6mmol/L indicates a low probability of having type 2 diabetes; between 6.0 and 6.9mmol/L indicates impaired fasting glucose and a high risk of developing diabetes; and a fasting glucose of 7mmol/L or above indicates a high probability of having type 2 diabetes, and diagnostic testing to confirm diabetes was advised.

Both the patient and the patient’s general practitioner were notified of the results, with recommendations for ongoing annual testing for diabetes.

This was a service development project, so ethical approval to collect these data was not required. Data were collected for the first year of this process onto a spreadsheet (Microsoft Excel) with the primary outcome being rate of uptake of postpartum glycaemic assessment.

Results
Data were obtained from 118 consecutive patients with GDM delivered in Poole Hospital NHS Foundation Trust between September 2015 and September 2016.

Mean (SD) age was 32(5.7) years; mean (SD) BMI at the booking visit was 30.6(6.5)kg/m², with 28% of the women overweight and 52% obese according to WHO criteria. The mean (range) gestational age at diagnosis was 28 weeks (14–35 weeks). By delivery, 64 (54%) required pharmacotherapy with 25 (21%) prescribed insulin. In these women, 107 (90.7%) had a fasting glucose test prior to discharge. No patient declined to fast overnight to comply with testing in the immediate postpartum period. Of the 11 women who did not have a fasting glucose prior to discharge (postpartum haemorrhage \([n=2]\), steroid treatment \([n=1]\) early discharge \([n=7]\), patient declined \([n=1]\) ), five attended the maternity unit by four weeks post-delivery for a fasting glucose test, one moved away and five did not have a postpartum glucose test; thus total uptake of postpartum glycaemic assessment was 94.9%.

In this cohort, the mean (SD) postpartum fasting glucose was 4.4(0.6)mmol/L. Two women, both of whom had been treated with insulin during their pregnancies, had impaired fasting glucose, both of 6.1mmol/L, and were informed of this result via telephone and were advised to continue with the lifestyle advice given to them during pregnancy (weight control, diet and exercise). Their general practitioners were informed in writing and were asked to offer advice, guidance and intervention in line with the NICE guidance on preventing type 2 diabetes, including annual fasting blood glucose. No patients had a fasting glucose of 7mmol/L or higher. The remaining 110 women had a fasting glucose of less than 6.0mmol/L.

No midwives declined to participate and none required further training in order to implement the new protocol.

Discussion
In response to low uptake of postpartum glycaemic testing in those with GDM, we pragmatically developed postpartum testing prior to discharge from the maternity unit, achieving a high rate of postpartum glycaemic assessment with near complete uptake. We believe that the reason behind the improved rate of testing is the timing. Compared to NICE-recommended testing at 6–13 weeks postpartum, this is more convenient for new mothers whose focus is understandably on their baby in the first few weeks postpartum.

Previous series have demonstrated low rates of postpartum glycaemic assessment, yet identifying hyperglycaemia in this hard to reach population is very beneficial as lifestyle intervention can reduce the conversion rate from impaired fasting glucose to type 2 diabetes.

Furthermore, preconception counselling in women who may not have otherwise been diagnosed with type 2 diabetes has been shown to reduce the developmental and obstetric complications in subsequent pregnancies.

Our series, together with others recently described, shows how much higher rates of follow up using early postpartum glucose testing can be achieved. Other attempts to increase the rate of postpartum glycaemic assessment in women with GDM, such as text message reminders sent to women at six weeks post-delivery, have not yielded comparable results.

The rationale for the convention of delayed postpartum glucose testing (at 6–13 weeks) of women with prior GDM is based on expert consensus. This timing was selected as it coincided with the baby checks and therefore was thought to be convenient, but as demonstrated in a nationally representative sample, this seems not to be the case, as only 18.5% of women with GDM had a postpartum glycaemic assessment. Previous series have demonstrated lower rates of postpartum glycaemic assessment with GDM, we pragmatically developed postpartum testing prior to discharge from the maternity unit, achieving a high rate of postpartum glycaemic assessment with near complete uptake. We believe that the reason behind the improved rate of testing is the timing. Compared to NICE-recommended testing at 6–13 weeks postpartum, this is more convenient for new mothers whose focus is understandably on their baby in the first few weeks postpartum.

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GDM which show an immediate return to pre-pregnancy insulin sensitivity. Therefore, we feel that an early test still gives an accurate assessment of the woman’s glucose tolerance, and as an added precaution any woman with an abnormal test (only 1.9% in our cohort) is recommended to have further follow up in primary care. Fasting glucose has been adopted for post-GDM testing as it has been shown to be adequate at diagnosing type 2 diabetes as a replacement to the OGTT which can be impractical in this group.

While we observed near complete uptake in postpartum testing, there are limitations to our study of this new way of post-GDM testing. This service development removes the responsibility of postpartum glycaemic assessment from primary care, and we need to ensure that subsequent annual glycaemic assessment still occurs. Early postpartum glycaemic assessment requires women who have just given birth to fast. While none of the women objected to this, we have not established the acceptability of fasting during this period. The reliability of early fasting glucose in the postpartum period to predict hyperglycaemia has not been formally established; however, there is no reason to suspect that this timing would miss an abnormal result when compared to the six-week fasting glucose as specified by NICE guidance. Further validation of our findings in larger datasets may be required to confirm reliability and correlate early postpartum hyperglycaemia with a future risk of type 2 diabetes. Despite improving postpartum follow up and identifying women with persisting hyperglycaemia following GDM, this service does not address the long-term glycaemic screening for this patient group and this is an area that is under exploration.

Conclusion

Early postpartum glycaemic assessment in women with GDM using fasting blood glucose measurement while still in hospital after delivery is an effective strategy that improves the follow-up rate to near complete uptake.

Declaration of interests

There are no conflicts of interest declared. Funding: none.

References