

Management of diabetic pregnancy



Professor
Robert
Tattersall

Today's diabetes world is fast-moving and exciting; knowledge is accumulating at an astonishing rate, new discoveries and understanding lead to new ideas and innovations in treating, managing and preventing diabetes.

However, there's nothing new under the sun. To help understand the present, it sometimes helps to examine the past.

Tattersall's Tales will enable readers to do just that. In every issue, Robert Tattersall, renowned diabetes sage and guru, will consider an aspect of diabetes and place it in a suitable historical context. Research, treatment, people and products will all feature.

In this installment, Robert Tattersall discusses 20th century management of pregnant women with diabetes and the pioneering advances leading to reduced maternal and foetal mortality.

For many diabetologists the antenatal clinic is the most enjoyable part of the week. The patients are young, enthusiastic, co-operative and grateful. Disasters do occur but the odds are overwhelmingly in favour of a live healthy baby. This is completely different from the way it was 50, and even 25, years ago.

Before insulin therapy was available most women with diabetes were malnourished and amenorrhoeic so that conception was uncommon. Elliot Joslin only saw 10 pregnancies in women with diabetes between 1898 and 1917, from which only four babies and seven mothers survived. In 1928, four years after the introduction of insulin therapy, the influential obstetrician Joseph Lee wrote that, 'the treatment of diabetes in pregnancy has undergone a complete revolution' (De Lee, 1928). This was true in the sense that maternal mortality was greatly reduced but the benefits to the foetus were much less and remained so in most hospitals for the next 60 years. Twenty years later, Wilfrid Oakley and John Peel (1949) reported a foetal mortality rate of 25% at King's College Hospital compared to an average of 40% in 26 other British teaching hospitals. Results were even worse in Edinburgh where between 1943 and 1947 foetal mortality was 51.4% (Gilbert et al, 1949).

The cause of these dreadful results was unclear. Blood sugars, although done infrequently, did not seem to differ between women whose babies died and those whose babies survived. Babies were often very large but the placenta was equally so, making placental insufficiency an unlikely culprit unless it had a subtle form of microvascular disease. Other suggested mechanisms were excessive growth hormone or cortisol secretion. The problem was that, even when a pregnancy seemed to be going well, the baby would suddenly die in utero at 36 weeks. The anguish suffered by the women and their

doctors is well told by Chris Feudtner (2003) using the Joslin Clinic (Boston) archives. The 'obvious' solution was delivery before 36 weeks in the hope that the pediatricians could keep the premature babies alive. This was the policy in most units from 1950 to 1970, combined with admission and strict bed rest from 32–33 weeks.

Some of the most important advances were made by the Danish physician Jørgen Pedersen (1914–1978). In 1952 he suggested that maternal hyperglycaemia led to increased foetal insulin secretion which acted as a growth hormone. The aim of treatment was, therefore, normoglycaemia in the mother. Diabetic control in hospital was managed by a single physician, with fasting and three postprandial blood sugar measurements every day. The average level was 7.5 mmol/l, which produced a foetal mortality of only 8% (Pedersen and Brandstrup, 1956). Pedersen's message was that the pregnant patient with diabetes should be looked after by one physician and one obstetrician and that 'it is unnecessary to do a lot of caesarean sections or to give sex hormones'. The latter was a reference to the practice of Priscilla White (1900–1989) in Boston who claimed that the crucial factor in her excellent outcomes was injection of stilboestrol and progesterone, often daily. In retrospect it seems likely that her results were due to what Feudtner calls 'the charismatic attention she lavished on her patients'.

Another pioneer was Ivo Drury (1905–1988) who was diabetologist to all three Dublin maternity hospitals between 1951 and 1979. Two-thirds of the first 32 perinatal deaths in his series were due to prematurity, which led him to question the dogma of delivery at 36 weeks. By postponing delivery he achieved a perinatal loss over the whole 28-year period of 8.4% (Drury, 1989).

Elsewhere the lessons of one physician and a personal service were ignored and salvation was thought to lie in the increased use

of technology and foetal monitoring. Simply incarcerating pregnant women with diabetes in hospital without the personal supervision of a Jørgen Pedersen, Ivo Drury, or Priscilla White was repeatedly shown not to work. A paper in 1958 described the problems in a hospital in Providence, Rhode Island, where 93 deliveries were done by 26 different obstetricians, while 43 internists and general practitioners looked after the diabetes. Blood sugars were hardly ever done and there were 62 episodes of ketoacidosis in the 251 viable pregnancies (Jones, 1958). In another American paper in the 1950s, the author wrote, 'We have taken blood sugars every week in the last 113 diabetics. We do not get the blood sugar back until the next week, so this is of no value, since the insulin requirement may double in that time!'

With the benefit of hindsight it seems obvious that that the common factor in the success of White and Pedersen could not have been hospitalisation, since most of White's patients were treated as outpatients, at least until the last month. Yet, Pedersen's results and the powerful advocacy of John Peel and Wilfrid Oakley led to three decades where women spent the last two or three months of the pregnancy in hospital and the babies were delivered three or four weeks early. In most English hospitals between 1955 and 1975

patients were treated by a number of obstetricians and physicians without a uniform management policy. Outpatient glycaemic control was judged on urine tests and after admission glucose control was managed (or mismanaged) by a junior doctor or visiting physician with a sliding scale of insulin based on urinalysis.

What has changed in the past 25 years is recognition of the importance of glycaemic control and the single physician together with a switch to outpatient management facilitated by self-glucose monitoring and HbA_{1c} measurement.

De Lee JB (1928) *The principles and practice of obstetrics*. (5th ed) WB Saunders: Philadelphia: 543

Drury MI (1989) 'They give birth astride of a grave'. Banting Memorial Lecture. *Diabetic Medicine* 6: 291–98

Feudtner C (2003) *Bittersweet: diabetes, insulin and the transformation of illness*. University of North Carolina Press, Chapel Hill and London.

Gilbert JAL, Dunlop DM (1949) Diabetic fertility, maternal mortality and foetal loss rate. *British Medical Journal* 1: 48–51

Jones WS (1958) Management of the pregnant diabetic. *Diabetes* 7: 439–45

Pedersen J, Brandstrup E (1956) Foetal mortality in pregnant diabetics: strict control of diabetes with conservative obstetric management. *Lancet* 1: 607–10

Peel JH, Oakley WG (1949) Transcript of the 12th British Congress of Obstetric Gynaecology:161