

Self-Monitoring of Blood Glucose During Pregnancy in Women with Juvenile Diabetes

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Eight pregnant patients with insulin-dependent juvenile diabetes were persuaded to start self-monitoring of blood glucose between the 10th to the 20th week of gestation. One patient with two children discontinued this effort after a short period. Four patients are still on a regimen of self-monitoring during their pregnancy, and three have delivered normal infants. The latter three patients were all able to achieve almost normal blood glucose levels during the pregnancies. These observations, in addition to those of others, lead to the conclusion that self-monitoring of blood glucose can be an useful tool in the management of diabetes, particularly in pregnant women, who have a high degree of motivation to achieve good control. *DIABETES CARE* 3: 175-177, JANUARY-FEBRUARY 1980.

Impressive evidence has accumulated to indicate that poor control of diabetes is one of the major factors responsible for the development of the chronic complications of the disease,¹⁻³ including those encountered during pregnancy.⁴ Continuous euglycemia can be achieved by using an artificial pancreas,^{5,6} but the presently available machines require hospitalization of the patient and are not very practical.

The index of control used most often by the patient or the parents—frequent urine spot tests—has its limitations, particularly in its inability to detect hypoglycemia.⁷ The recently devised small blood glucose reflectance meters (Eyestone, Ames; Reflomat, Boehringer; Glucocheck, Medistron) enable patients to make direct tests of the blood glucose levels as often as required, whether once weekly or several times daily.⁸⁻¹⁰ The difficulty with this method, in addition to the price of the meter, lies in convincing the patient to make a finger-prick at such frequent intervals. Obviously, children and adolescents present the greatest difficulty. During the past 2 yr we have been successful in convincing a small group of young diabetics to make such a self-determination.¹¹

We have found that pregnancy provides strong motivation to the young female diabetic to achieve optimal control. Eight young women who had been under our care and observation for many years because of juvenile diabetes agreed to carry out self-monitoring of blood glucose levels during their

pregnancies, starting from the 10th to the 20th week of gestation. One patient, who already had two children, discontinued the monitoring after a short period. Of the remaining seven, four are still pregnant and continuing with the monitoring, whereas in three there has been a successful outcome, with delivery of a healthy infant in each case. Hereby presented is a description of these three patients and their pregnancies.

Patient no. 1. B.Z., 22 yr of age, had had diabetes for 11 yr, and this was her first pregnancy. Before pregnancy she had been receiving 48 U of NPH insulin once daily. Her compliance was low and she attended the clinic very infrequently. The control achieved was poor to fair, but she had no diabetic complications. Once she became aware that she was pregnant she appeared more frequently at the clinic, and we were able to persuade her to start self-monitoring of blood glucose levels at the 10th week of gestation. She became very enthusiastic about the possibilities of improved control, and, using the Eyestone Dextrostix system (Ames),¹² she measured her blood glucose as often as six times daily: fasting in the morning, before lunch, 1 h after lunch, before supper, 1 h after supper, and sometimes at night as well. Figure 1 presents the means of the seven determinations made at each testing time during 1 wk, the first dot representing the morning determination. Initially, while she was receiving two injections of insulin daily, the blood glucose levels fluctuated

with smaller fluctuations. In the 38th week of gestation, she delivered an infant weighing 3.4 kg. There were no notable complications aside from a slight transitory hypoglycemia.

Patient no. 3. S.G., aged 26 yr, had had diabetes for 11 yr without any complications, and this was her first pregnancy. In the 12th week of gestation, using a Reflomat (Boehringer) Reflectance meter¹³ she began to monitor blood glucose four times daily (morning, before noon, 1 h after the noon meal, and sometimes after supper). The blood glucose levels ranged between 90 and 150 mg/dl. GHb levels were 6.4 and 6.9% during the second and third trimesters, respectively. A normal infant was delivered after 36 wk of gestation with birth weight being 3.2 kg.

DISCUSSION

It is well known that during pregnancy there is considerable risk to the fetus when the mother is diabetic. Several investigators have therefore attempted to institute a program of home monitoring of blood glucose levels in pregnant diabetic women.^{8,9,14,15} We concur with these investigators that such monitoring can help to improve control of diabetes and therefore should be started as early as possible. We found that the factor of pregnancy greatly increases the motivation of the young diabetic patient. After marriage, some of our diabetic patients, for one reason or another, had not been attending the clinic regularly before becoming pregnant. Pregnancy brought with it an increased recognition of the importance of good control and a willingness to cooperate in achieving this. The three cases described above illustrate the potential benefits to be derived from this approach.

Bearing in mind that only long-standing, steadfast control of the disease can minimize the chronic complications known to be associated with diabetes,¹ particularly the risk of diabetic pregnancy,¹⁶ it is our aim to convince the newly married young diabetic woman to start self-monitoring of blood glucose even before becoming pregnant and to continue with this regimen after delivery as well. A concentrated effort towards this goal is being made by our multidisciplinary team.¹⁷ We realized that the young diabetic mother may be lax in continuing such a regimen, especially after the birth of the baby and the additional duties ensuing, but we feel that every effort should be made to encourage the patient to maintain the self-monitoring.

In conclusion, we stress that self-monitoring of blood glucose is a promising method for the management of diabetes¹⁸ and should be put into effect wherever possible.

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