ABC of Diabetes

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PREGNANCY

Thirty years ago about one-third of diabetic pregnancies ended in fetal death. Now 95% are successful. This remarkable improvement is due to major developments in obstetric, diabetic, and paediatric care. Nevertheless, fetal losses are still two to three times greater than normal, and half of the deaths are due to major congenital malformations.

Management of established insulin-dependent diabetics

Ultrasound measurement of fetal growth showing excessive increase of abdominal girth, indicating delivery of a large baby

Education of diabetics of child-bearing age is important: they should be advised that if they plan a pregnancy their diabetic control should be optimal (haemoglobin A₁ is a useful guide) at the time of conception and during the early weeks of pregnancy. This advice is very important for those who have had a previous catastrophe in pregnancy. Optimal control early in pregnancy may reduce the incidence of congenital malformations. The clinic notes of young diabetic women are therefore tagged and clearly marked after advice has been given to avoid repetition.

Pregnant diabetics should report to their doctor or clinic as early as possible in pregnancy and be referred without delay, preferably to a centre where joint diabetic, obstetric, and paediatric care is available. Team care of this kind is probably the most important factor responsible for the improved prognosis for these pregnancies. An early ultrasound examination establishes the exact gestational age and detects major fetal abnormalities.

Diabetic control should be optimal throughout pregnancy; if it is not admission to hospital, even for short spells, should be arranged without delay. Home blood glucose monitoring is the ideal technique for most pregnant diabetics, while others should perform three or four urine tests each day. Twice or thrice daily insulin injections are needed, and patients should be taught how to adjust their own insulin doses. The dose of insulin needed often increases substantially during pregnancy, sometimes to twice or three times the usual dose. Blood glucose values should be maintained as near normal as possible and should preferably be kept below 6 to 7 mmol/l, though post-prandial values may sometimes be a little higher. Good blood glucose control is quite easily achieved in pregnancy, though continuous subcutaneous insulin infusion may sometimes be needed.

Most patients should be admitted for a short period before planned delivery or for a longer period if there are any problems. Fetal growth is carefully monitored by regular ultrasound measurements; fetal activity is observed by a daily "kick count" chart (the time taken to count 10 kicks); fetal heart rate and its beat-to-beat variation are monitored regularly by instantaneous heart rate meter. Labour is usually induced after about 38 weeks and vaginal delivery achieved whenever possible.

Labour

Regimen:	Blood glucose	Infusion rate:
	<3 mmol/l	1/2 U/h
	3-6 mmol/l	1 U/h
	>6 mmol/l	2 U/h

The neonate

".....they convey the distinct impression of having had such a surfeit of food and fluid pressed on them by an insistent hostess that they desire only peace so that they can recover from their excesses."

JW Farquhar (Arch Dis Childh 1959;34: 76)

General advice

Diabetics with established nephropathy should be advised against pregnancy

Insulin and glucose are given by intravenous infusion for all vaginal deliveries as follows:

Intravenous dextrose (5%)—1 litre every 8 hours delivered at a steady rate by IVAC infusion system.

Intravenous insulin—soluble insulin diluted in normal saline (1 unit insulin per 1 ml saline) and administered from a syringe by infusion pump at about 1 U/h (usual range 0.5-2 U/h). If very low infusion rates are used the insulin concentration may be halved.

Blood glucose concentrations should be maintained at 3 to 6 mmol/l. Insulin infusion is continued until the patient can restart her normal meals: the *prepregnancy* insulin dose is then restarted.

Premature labour—Because of the hazards of premature labour attempts may be made to inhibit uterine contractions by intravenous salbutamol infusion and to promote fetal lung maturity by administering dexamethasone. Both of these measures cause severe hyperglycaemia, and salbutamol may also precipitate ketoacidosis and hypokalaemia. These complications are avoided by intravenous insulin infusion, which is started at the same time as the administration of salbutamol and dexamethasone. Very large doses of insulin are sometimes needed: the exact amount is determined only by trial but when both salbutamol and dexamethasone are given together, the insulin infusion should start at 16 U/h. Experience has shown that most patients need 8 to 32 U/h but less if dexamethasone alone is used. Potassium chloride must be added as well, and about 100 mmol/24 h is needed. Serum potassium concentrations should be measured every four hours.

Caesarean section—Insulin infusion is always used, as described in the section on management during surgery (see Diabetic Emergencies).

The babies of diabetic mothers no longer need routine care in special care baby units unless there are specific reasons. Respiratory distress syndrome is now rarely seen in these infants. Blood glucose concentrations should be checked regularly, especially in jittery babies, because hypoglycaemia is still commoner than in the infants of non-diabetic mothers. Polycythaemia, hyperbilirubinaemia, and hypocalcaemia are also commoner among these infants.

Breast-feeding is encouraged in diabetics as in non-diabetics. The mother's diet should be increased by about 50 g of carbohydrate daily and ample fluids taken. The insulin dose is not usually affected if these measures are followed.

It is wise to suggest some limitation of family size. Diabetic mothers have the added burden of caring for their own health, even in the absence of any complications. Families should probably be limited to two children. When serious diabetic complications are present, it is occasionally necessary to advise diabetics against having children. Proliferative retinopathy alone is not necessarily a contraindication to pregnancy. It occasionally accelerates during pregnancy, but photocoagulation can be performed during the pregnancy if necessary. Nevertheless, the potential hazard of future blindness must make one consider each of these patients very carefully. The presence of proteinuria due to diabetic nephropathy is serious: these patients should be advised against pregnancy, not only because the pregnancy is often unsuccessful but also because curtailment of life will not enable the majority to rear their children to maturity.

Diabetes discovered during pregnancy

Indications for glucose tolerance test

- 1 Glycosuria
 - random 1-2%
 - random glycosuria traces twice or more
 - fasting glycosuria
- 2 Strong family history of diabetes
- 3 Previous baby >4500g
- 4 Previous unexplained fetal losses
- 5 Previous gestational or latent diabetes

2-hour blood glucose during
75-g glucose tolerance test

During pregnancy those with
impaired glucose tolerance
must be treated as diabetic

Fetal losses are also excessive, about double the normal rate, in women discovered to have diabetes during pregnancy, even mild diabetes. These patients should therefore be given the same careful treatment as established diabetics.

Diagnosing diabetes in pregnancy—It is routine practice to test urine samples for glucose at every antenatal clinic attendance. Traces of glycosuria are commonly detected even without diabetes. The diagnosis of diabetes should be suspected:

(a) if there is heavy glycosuria (1-2%) with or without diabetic symptoms. Blood glucose should be measured to establish the diagnosis, and if there is still doubt, a glucose tolerance test should be performed. Blood glucose criteria used for diagnosing diabetes in pregnancy were described in the first article; those with "impaired glucose tolerance" should be treated as if they were diabetic.

(b) if fasting glycosuria is detected, or random glycosuria twice or more, a glucose tolerance test should be performed;

(c) in pregnant women with a strong family history of diabetes and those who have previously had big babies (>4500 g) or unexplained fetal losses. They should be observed carefully through pregnancy, and, unless there is an indication to do so earlier, a glucose tolerance test should be performed at 32 weeks;

(d) in women who have been diabetic previously, either during a previous pregnancy or during illness. They should have a glucose tolerance test during all subsequent pregnancies, at 32 weeks, or before if glycosuria develops.

In future screening for diabetes during pregnancy might be performed either by routine blood glucose measurement or by the use of regular haemoglobin A₁ measurements. At present, however, the traditional methods have survived because of the obvious technical problems in screening hundreds of antenatal patients by these newer methods.

Control of diabetes in these women must be as obsessional as in established diabetics; they are usually treated by diet alone, or diet with insulin. Oral hypoglycaemic agents are not usually used, although there is no evidence that they are harmful.

About six weeks after delivery a glucose tolerance test should be performed to discover whether diabetes persists or whether it has resolved: only patients in whom it has resolved are described as having had gestational diabetes. Ideally gestational diabetics should be seen annually for a urine test and blood glucose measurement, since many of them will develop diabetes later. Above all they should be advised to control their weight and not become obese.

Contraception and diabetes

Contraceptive advice to diabetics is, in general, the same as for non-diabetics. Use of the oral contraceptive pill makes little difference to diabetic control, although a small increase in insulin dose may be needed. The combined low dose oestrogen-progestogen or progestogen-only pill may be used. Care is required if oral contraceptives are given to women who have had gestational diabetes, since they can cause deterioration of glucose tolerance and development of diabetes. In these circumstances oral contraceptives are probably best avoided, but if they are used urine tests and blood glucose measurements should be performed after about three months. There is no sound evidence that oral contraceptives cause more problems in diabetics than in non-diabetics; contraindications are the same in both groups. Nevertheless, doubts about their safety have been expressed, and barrier contraceptive methods may be preferred.

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