Gestational diabetes

GDM

There is no consensus about the definition or management of gestational diabetes. It occurs when those who were not formerly diabetic develop the disease in pregnancy and suffer many of the problems that are common with established diabetes in pregnancy. A number of the hormones of pregnancy raise blood glucose. There are often other factors that predispose to impaired glucose tolerance.

Renal blood flow and glomerular filtration rate (GFR) rise in pregnancy with the result that the renal threshold for glycosuria is reduced.

Glucose tolerance tests may be unreliable especially as gastric emptying is delayed in pregnancy.

Epidemiology: Known diabetes mellitus occurs in about 1 pregnancy in 250[1] but GDM occurs in about 2 in 100[2] but figures vary considerably depending upon criteria used. Some may not recover after pregnancy and it is possible that they had undiagnosed type 1 or 2 diabetes, especially if sugar levels are very high.

Having had gestational diabetes in a previous pregnancy does not necessarily mean that it will recur in future pregnancies. A study from Japan looked at those with previous GDM and also those with one previous abnormal feature of an oral glucose tolerance test. About two thirds of those with previous gestational diabetes and around 40% of those with one previous abnormal value developed the condition.[3]

Risk factors: GDM is more likely with:

- Increasing age[3]
- High BMI before pregnancy[3]
- Smoking doubles the risk of gestational diabetes[4]
- Increase in weight between pregnancies[3]
- Short interval between pregnancies[3]
- Previous unexplained stillbirth
- Previous macrosomia
- Family history of GDM[5]

Screening: Because the condition may be asymptomatic but have serious consequences that can be reduced by treatment[6] it is a candidate for screening. There is lack of consensus about who to screen and the criteria for diagnosis. Urine should be checked for glucose at every antenatal visit and if it is present at ++ or more further investigation is required. The World Health Organisation advise that a 75 g oral glucose tolerance test (OGTT) should be conducted if the blood glucose exceeds 5.5 mmol/l at 2 hours or more after food, or exceeds 7 mmol/l within 2 hours of food. The criteria recommended for diagnosis of GDM are fasting venous plasma glucose over 5.5 mmol/l or 2 hours after OGTT over 9mmol/l.

Screening will detect 50% or more of all cases[7] which means that up to half will not be screened or detected. Hence vigilance is required during antenatal care, especially if there is glycosuria.

If the OGTT is performed at or before 16 weeks gestation, a negative result does not necessarily exclude future problems and if the results are borderline the test should be repeated between 32 and 34 weeks.[8]

Early diagnosis of GDM is associated with poor maternal and fetal outcome.[9] Rather than suggesting that management is counterproductive, this probably means that the more severe cases present earlier. Treatment of gestational diabetes reduces serious perinatal morbidity and may also improve the woman's health-related quality of life.[6]

Management:

- If there is gross abnormality of blood sugar this must be corrected as a matter of urgency
- An ultrasound examination should be performed to assess for macrosomia. This is usually taken as dimensions above the 95th centile for that period of gestation. If it is present dietary management is required but it may also be necessary to use insulin to obtain suitable glucose levels. This management causes a modest but consistent reduction in the weight of the baby. Measurement of abdominal circumference of the baby can exclude macrosomia and reduce the need for insulin without impairing outcome.[10]
- A paper from the USA described the use of glyburide (glibenclamide in UK) in GDM with some benefit but possibly an increased risk of pre-eclampsia.[11] This is unusual as sulphonylureas are usually used in type 2 diabetes and such drugs are usually avoided in pregnancy. Lispro has also been used with possible benefit.[12]
- If there is not macrosomia but glucose levels are in the diabetic range, intensive therapy is required as in diabetes
- If, after dietary advice, fasting glucose levels exceed 6mmol/l and 2 hours postprandial the figure is over 7mmol/l, then intensive therapy is required
- If there is not macrosomia, and glucose levels are not grossly abnormal, intensive therapy should be avoided as it may be counterproductive
- If the fetus is small for dates in women on intensive therapy, the outcome for the baby is poorer than if the baby is normal or large.[13] This is probably a reflection of placental inadequacy
- If there is no macrosomia and after dietary advice the blood glucose levels before and after meals are normal, treat as normal

Prognosis: GDM is a variable disease with different criteria for diagnosis and different degrees of severity. Hence it is impossible to be clear about prognosis but some features do seem apparent.
The risks to mother and baby are similar to those with known diabetes. This is largely related to the problems of a large baby with shoulder dystocia and obstructed labour although sudden intrauterine death, placental insufficiency and neonatal hypoglycaemia can all occur. The traditional pride of a new father to a very large baby is misplaced. A large baby is an unhealthy baby.
Most women will apparently recover after the pregnancy but with a 2 in 3 chance of recurrence in a future pregnancy.[3] However, the chance of developing overt diabetes, usually type 2, at some stage is much greater than in those who did not have it. During pregnancy, the highest fasting glucose level, followed by the severity of glucose intolerance, and earlier gestational diabetes are the best predictors for postpartum diabetes.[14] Impaired glucose tolerance in the first few months after delivery is associated with a high risk of diabetes in the near future.[15]
Children whose mothers had GDM are more likely to be obese[16] but this does not necessarily imply a genetic or intrauterine effect. The parents tend to be obese too and families eat together and acquire similar attitudes to food. The problem may simply be behavioural.
Advice after gestational diabetes: A woman who has had GDM should be given the following advice:
You are at risk of developing diabetes and so:

- Achieve and maintain a satisfactory BMI

- Take regular exercise
- Do not smoke
- Do not have pregnancies in rapid succession. Whereas combined oral contraceptives and hormone replacement therapy do not seem to increase the risk of developing diabetes, further pregnancy does.[17]

References Used

1. Department of Health National Service Framework for Diabetes
2. Dornhorst A, Beard RW; Gestational diabetes: a challenge for the future.;*Diabet Med* 1993 Dec;10(10):897-905.[abstract]
3. Nohira T, Kim S, Naiad H, et al; Recurrence of gestational diabetes mellitus: Rates and risk factors from initial GDM and one abnormal GTT value.;*Diabetes Res Clin Pract* 2005 Jul 5;.[abstract]
4. England LJ, Levine RJ, Qian C, et al; Glucose tolerance and risk of gestational diabetes mellitus in nulliparous women who smoke during pregnancy.;*Am J Epidemiol* 2004 Dec 15;160(12):1205-13.[abstract]
5. McLellan JA, Barrow BA, Levy JC, et al; Prevalence of diabetes mellitus and impaired glucose tolerance in parents of women with gestational diabetes.;*Diabetologia* 1995 Jun;38(6):693-8.[abstract]
6. Crowther CA, Hiller JE, Moss JR, et al; Effect of treatment of gestational diabetes mellitus on pregnancy outcomes.;*N Engl J Med* 2005 Jun 16;352 (24):2477-86. Epub 2005 Jun 12.[abstract]
7. Maresh M; Screening for gestational diabetes mellitus.;*Semin Fetal Neonatal Med* 2005 Aug;10(4):317-23.[abstract]
8. Bito T, Nyari T, Kovacs L, et al; Oral glucose tolerance testing at gestational weeks </=16 could predict or exclude subsequent gestational diabetes mellitus during the current pregnancy in high risk group.;*Eur J Obstet Gynecol Reprod Biol* 2005 Jul 1;121(1):51-5.[abstract]
9. Barahona MJ, Sucunza N, Garcia-Patterson A, et al; Period of gestational diabetes mellitus diagnosis and maternal and fetal morbidity.;*Acta Obstet Gynecol Scand* 2005 Jul;84(7):622-7.[abstract]
10. Kjos SL, Schaefer-Graf U, Sardesi S, et al; A randomized controlled trial using glycemic plus fetal ultrasound parameters versus glycemic parameters to determine insulin therapy in gestational diabetes with fasting hyperglycemia.;*Diabetes Care* 2001 Nov;24(11):1904-10.[abstract]
11. Jacobson GF, Ramos GA, Ching JY, et al; Comparison of glyburide and insulin for the management of gestational diabetes in a large managed care organization.;*Am J Obstet Gynecol* 2005 Jul;193(1):118-24.[abstract]
12. Allen SR; Gestational diabetes: a review of the treatment options.;*Treat Endocrinol* 2003;2(5):357-65.[abstract]
13. Garcia-Patterson A, Corcoy R, Balsells M, et al; In pregnancies with gestational diabetes mellitus and intensive therapy, perinatal outcome is worse in small-for-gestational-age newborns.;*Am J Obstet Gynecol* 1998 Aug; 179(2):481-5.[abstract]
14. Schaefer-Graf UM, Buchanan TA, Xiang AH, et al; Clinical predictors for a high risk for the development of diabetes mellitus in the early puerperium in women with recent gestational diabetes mellitus.;*Am J Obstet Gynecol* 2002 Apr;186(4):751-6.[abstract]

15. Buchanan TA, Kjos SL; Gestational diabetes: risk or myth?;*J Clin Endocrinol Metab* 1999 Jun;84(6):1854-7.[abstract]
16. Schaefer-Graf UM, Pawliczak J, Passow D, et al; Birth Weight and Parental BMI Predict Overweight in Children From Mothers With Gestational Diabetes.;*Diabetes Care* 2005 Jul;28(7):1745-1750.[abstract]
17. Kjos SL, Peters RK, Xiang A, et al; Hormonal choices after gestational diabetes. Subsequent pregnancy, contraception, and hormone replacement.;*Diabetes Care* 1998 Aug;21 Suppl 2:B50-7.[abstract]

Internet:

- Scottish Intercollegiate Guidelines Network Publication 55, November 2001 *Management of diabetes* chapter 8
- www.diabetes.org.uk/pregnancy/gdm.htm Gestational diabetes, information for patients from Diabetes UK