GUIDELINES FOR THE MANAGEMENT OF GESTATIONAL DIABETES IN MALTA

CHARLES SAVONA - VENTURA
CONSULTANT OBSTETRICIAN I/C DIABETIC PREGNANCY JOINT CLINIC

1. INTRODUCTION

The Maltese population has repeatedly been shown to have an overall higher prevalence of DM/IGT, mainly of the Non-Insulin Dependent form. This higher prevalence is reflected in the pregnant population. Epidemiological studies have suggested that the prevalence of DM/IGT in the Maltese pregnant population approximates 6%, including a small proportion of pre-existing DM.

CLINICAL SEVERITY	% total pregnant pop.
Pre-existing DM	0.3%
Gestational DM	0.8%
Gestational IGT	4.7%

Table 1: Prevalence rates

2. SCREENING

Clinical screening alone using defined "historic" and clinical risk factors appears to enable the identification of about 40% of anticipated cases, particularly the severe forms of metabolic abnormalities. Minor forms of abnormalities can only be identified by performing routine 75 gm oral Glucose Tolerance Test screening in the whole pregnant population - the cost-effectiveness of which has still to be established.

- *Urine should be tested for glycosuria at every antenatal visit (preferably fasting urine specimen).*
- *Timed or random venous plasma glucose measurements should be made if fasting glycosuria is detected, or if historic and/or clinical risk factors are present before 28 weeks.*
- *75g oGTT should be carried out preferably after 28 weeks gestation if any of the following criteria are present:*
  **blood glucose >6.0 mmol/l 2hrs or more after food*
  **blood glucose >8.0 mmol/l <2hrs after food*
  **presence of "historic" or clinical risk factors*

A screening program for GDM/GIGT should identify those pregnant women with blood glucose levels that are associated with an adverse fetal outcome or increased risk of future diabetes in the mother. It is unlikely that the perfect screening program will be devised. This recommended program will need to be kept under review and may be revised as further evidence becomes available.

While "historic" risk factors can be identified during the booking visit, these patients should be booked for a 75 gram oGTT only after 26 weeks of pregnancy (unless strongly indicated). Earlier testing is often not conclusive, and may give a false sense of security since the metabolic state may deteriorate during the third trimester.

RISK FACTORS	**risk in Maltese population**
Historic	
Maternal Age >35yrs	x ~3.0-4.0 risk
P/H Abortions	x ~4.0 risk
P/H Perinatal loss	x ~2.0-3.0 risk
Multiparity 4+	x ~2.0-4.0 risk
P/H Macrosomia	x ~1.0-2.0 risk
F/H Diabetes	
Maternal	x ~2.5 risk
Paternal	x ~2.0 risk
Siblings	not assessed
Clinical	
Glucosuria x2+	x ~2.0 risk
Polyhydramnios	not assessed
Present macrosomia	x ~2.0 risk
Present malformation	x ~1.0-1.5 risk

3. DIAGNOSTIC CRITERIA

There is uncertainty and confusion around the subject of diagnosis of GDM/GIGT. The WHO criteria recommends using the same levels for pregnancy as the non-pregnant state. However, since carbohydrate metabolism alters during pregnancy, the EASD has recommended using the 95th centile of oGTT values as the cut-off point for diagnosis. The criteria for diagnosis are therefore recommended as:

Blood Glucose mmol/l	***NORMAL***	***G-IGT***	***GDM***
Fasting	<6.0	6.0-7.9	>=8.0
2 hour	<9.0	9.0-10.9	>=11.

4. ANTENATAL MANAGEMENT

The St. Vincent Declaration aim for pregnancy is: "To achieve pregnancy outcome in the diabetic woman that approximates that of the non-diabetic woman". This can be achieved by a multidisciplinary team, where a specialist team including a named physician(s) and a named obstetrician(s) should see all pregnant diabetic women in a combined

ANTENATAL SCREENING PROGRAM SUMMARY

1. *The presence of "Historic" or "Clinical" Risk Factors places patient as High Risk of developing gest. IGT/DM and needs to be investigated.*

2. *High Risk individuals identified prior to 28 weeks of pregnancy:*
   perform a blood glucose estimation:

   If elevated: refer patient for a 75g oGTT immediately

   If normal: refer patient for a 75g oGTT after 26 weeks

3. *All patients identified as High Risk [including those who have undergone an oGTT prior to 26 weeks and were found normal] should have a 75g oGTT performed after 26 weeks of pregnancy.*

clinic in a hospital with a neonatal intensive care unit. The Diabetic Pregnancy Joint Clinic was restructured in October 1998, after the criteria of referral and management were reviewed by the Department of Obstetrics & Gynaecology and the Diabetes Clinic. The Diabetic Pregnancy Joint Clinic is managed jointly by the Obstetric Department [Dr. C. Savona-Ventura - Dr. M. Chircop] and the Diabetes Clinic [Dr. J. Azzopardi - Dr. A. Ellul]. Consultations with the dietitian would be arranged after the first visit and subsequently if deemed necessary.

The scope of the Diabetic Pregnancy Joint Clinic is to ensure that all diabetic women have:

- Tight control of diabetes during pregnancy
- Education about treatment of hypoglycaemia and avoidance of ketoacidosis
- Access to a specialist team
- Quality ultrasound scanning to assess gestation and fetal growth
- Fetal monitoring, particularly if at very high risk
- Regular examination of fundi and assessment of renal function.

4.1 Criteria for Referral to Clinic

All patients who are diagnosed to suffer from any form of significant carbohydrate intolerance during their pregnancy should be referred to the Diabetic Pregnancy Joint Clinic. These patients include:

- Pre-existing Diabetes Mellitus or I.G.T. who have become pregnant;
- Gestational Diabetes Mellitus [oGTT 2-hr value >11.0 mmol/l];
- Gestational I.G.T. [oGTT 2-hr value 9.0-11.0 mmol/l].

4.2 Clinic Management policies

The precise roles of different members of the diabetes pregnancy care team cannot be clearly defined as all members of the team are involved, each adding their own contribution. It is planned that patients will be seen by the Diabetic Pregnancy Joint Clinic team at specific times during their pregnancy in line with the standard schedule given to antenatal patients and in harmony with the routine antenatal care being given to these patients either in the Hospital Antenatal Clinic or by their private specialists/doctors. Referral is direct by appointment with the Karin Grech Hospital Antenatal Clinic [tel. no. 2595-1381]. Visits are scheduled for:

12-14 weeks
20-22 weeks
28-30 weeks
34 weeks
36 weeks
38 weeks and
6 weeks postpartum.

Of course the scheduled visits will depend on the stage of pregnancy that diagnosis is made and the severity of the condition. It is thus envisaged that patients with pre-existing disorders would attend all the scheduled visits, whereas patients diagnosed during the pregnancy would attend for visits scheduled during the last trimester. There is no need for routine admission in early or late pregnancy, other than when diabetic or obstetric complications of pregnancy are present. However admission may be necessary for those patients with gestational carbohydrate metabolism problems who find it difficult to self-assess their blood glucose levels. Referral to the Diabetic Pregnancy Joint Clinic will further ensure that these patients are reviewed in the postpartum period, and long-term metabolic advice given accordingly. It is to be emphasized that the overall responsibility for the patient care and management will remain that of the original attending Specialist Diabetologist and Specialist Obstetrician. The role of the Diabetic Pregnancy Joint Clinic is to facilitate and organize regular metabolic and obstetric assessments, including investigations to assess carbohydrate metabolism, renal function, and fetal growth and well-being. It must be emphasized that the visit regimen proposed above by the Diabetic Pregnancy Joint Clinic is not a comprehensive antenatal regimen since further interim visits to the attending Specialist Obstetrician and diabetologist should be scheduled. In addition, monitoring for fetal well-being in the last month of pregnancy may need to be done more frequently (even twice weekly) than the regimen proposed herein.

4.3 Targets in Antenatal Care

- Avoid destroying the normal experience of pregnancy through over zealous application of medical technology.

- The routine admission of patients in early or late pregnancy is not essential, especially when the patient is undertaking self-monitoring of blood glucose regularly and reliably.

- All pregnant diabetic women should be seen in a dedicated multidisciplinary combined clinic. The Specialist Team should include a named physician(s) and named obstetrician(s) with a special interest in diabetic pregnancy. These consultants should lead a team and liaison with the dietitian, the diabetes teaching nurse/midwife, and other specialists [neonatologist, ophthalmologist] as required. It is not acceptable for women to have to go to separate clinics on different days. Liaison with other consultants responsible for the care of the patient can be achieved by the use of a specific co-operation card.

- The precise role of the different members of the diabetes pregnancy care team cannot be clearly defined as all members of the team are involved, each adding their own contribution.

** Optimisation of diabetic control*

All women suffering from IDDM, NIDDM, or GDM should carry out regular blood glucose monitoring. The frequency can be individualized, but testing four times a day - before breakfast, before lunch, before evening meal and before late night snack - is recommended. Occasionally it may be desirable to suggest some post-prandial or night tests. Self-monitoring of blood glucose with a reliable system is the optimum, but this may not be suitable for those women diagnosed as diabetic for the first time late in pregnancy.

The target blood glucose should be as close to normal as possible, while avoiding hypoglycaemia. Each individual should therefore be encouraged to run their blood glucose levels at between 4 and 7 mmol/l [Fasting blood glucose 3.5-5.5 mmol/1 or 60-100 mg/dl; Post-prandial blood glucose 5.0-8.0 mmol/l or 90-145 mg/dl].

Long-term control can also be assessed regularly during pregnancy by measuring glycated haemoglobin or fructosamine, aiming to achieve levels within the normal non-diabetic range.

Insulin regimens should be individualized. It is usually preferable to use human insulin in the form of multiple injections of short acting insulin with long or intermediate acting insulin at night. Alternately, twice daily, short and intermediate acting insulin may be appropriate. In GDM, insulin should be introduced if the fasting or pre-meal blood glucose levels consistently exceed 6 mmol/l.

Estimation of insulin requirements can be gauged after metabolic daily blood glucose profiles have been obtained. The initial requirements can follow the administration of a short-acting insulin according to a sliding scale, the dose depending of the blood glucose level. The daily requirements can then be assessed and managed by the introduction of intermediate acting insulin.

Dietary advice is essential for optimal diabetic control during pregnancy. All women who have diabetes should have regular access to a dietitian. Dietary advice should be individualized on the basis of the woman's weight, home blood glucose monitoring, lifestyle and personal circumstances. Food intake should be adequate to maintain maternal and fetal nutrition. An energy prescription of 30-35 kcal/kg pre-pregnant ideal body weight is recommended, though this should be flexible to correct for any alteration in activity levels. Those women whose body weight exceeds 120% of their ideal body weight may require a lower energy intake per kg in order to limit their weight gain during pregnancy. Frequent small meals may facilitate improved blood glucose control. Complex carbohydrates should provide about 50% of the total calories. This should be distributed in the form of 10 gram exchanges as regular main meals and snacks throughout the day. Levels of dietary fibre of 30-50g per day should be advised. Foods rich in antioxidants - fresh fruits and vegetables - may have a role in reducing malformations. Sucrose and glucose ingestion in the form of sweets, cakes, soft drinks, etc should be completely avoided even in women with G-IGT or borderline cases [2hr post-oGTT glucose value of 8.0-9.0].

Folate supplements (4 mg/day) should be routinely prescribed in the first trimester to reduce the risk of neural tube defects.

** Screen for diabetic complications*

There should be a regular screening for ophthalmic and renal disorders each trimester of pregnancy with regular retinal examinations and measurement of renal function. The blood pressure should be assessed regularly throughout pregnancy in view of the increased risk of the development of pregnancy-induced hypertension in these patients.

** Antenatal Obstetric Surveillance*

There are no good data which demonstrate superiority of one type of surveillance program over another. There are wide variations between centers which share good and similar outcome results. Obstetric review in diabetics should be carried out every 2-4 weeks until 28 weeks, then every 2 weeks until 34-36 weeks and then weekly depending on the severity of the metabolic disorder. This can be done in conjunction with the regular attending obstetrician through the use of their joint Antenatal/Diabetic co-operation card.

Surveillance is dependant on regular clinical assessment, ultrasound scanning, and biophysical profile.

ANTENATAL MANAGEMENT SUMMARY

- *Dietary advice should encourage diets with high levels of complex carbohydrates and soluble fibre and reduced saturated fats. Folic acid supplements should be offered. Sucrose and glucose should be completely avoided.*
- *All women should undertake frequent home blood glucose monitoring, and blood glucose levels should be maintained as near normal as possible.*
- *Metabolic control should be assessed by measurement of glycated Haemoglobin; and ketonuria should be searched for if blood glucose is high or in the presence of intercurrent illness.*
- *Fundi, blood pressure and renal function should be assessed.*
- *Ultrasound scanning must be made available for assessing gestational age, examining for congenital anomalies and for assessing fetal growth.*
- *Maternal monitoring of fetal movement should be encouraged. Fetal monitoring with cardiotocography and biophysical profiles is controversial, but it should definitely be used for high risk pregnancies.*

5. Post-Puerperal Management

The long-term follow-up of patients with IDDM or NIDDM requires a regular reassessment of their carbohydrate metabolism status to ensure optimum control. Patients identified during pregnancy to suffer from GDM or G-IGT should be referred to the Diabetic Pregnancy Joint Clinic in the post-puerperal period in order that their carbohydrate metabolic status is re-assessed. These women have a ~60% risk of eventually developing diabetes mellitus within the next 20 years, particularly in the presence of obesity. Obese women should be encouraged to lose weight even if their glucose tolerance returns to normal in the postpartum. An annual check of fasting or postprandial blood glucose allows for the early identification of asymptomatic diabetes. All women with a history of gestational IGT/DM should be screened for GDM during any subsequent pregnancy. Those mothers whose impairment of glucose tolerance persists in the postpartum period should be advised about the importance of optimum control prior to embarking on another pregnancy. Contraception should be discussed as early as possible. Contraceptive advice for IDDM need not differ from that given to non-diabetic women. The contraceptive pill does marginally impair carbohydrate tolerance, though it does not generally increase insulin requirements in IDDM patients. The pill may not be suitable for women with a genuine latent gestational diabetes. There may be an increased risk of infections with the use of the IUCD in overt diabetics.

REFERENCES

Savona-Ventura C, Grech ES: Abnormal glucose metabolism in the Maltese pregnant population. Diabet. Croat., 15-3:127-134, 1986

Schranz AG: Gestational Diabetes in Malta. D.Sc. Thesis, University Medical School, Zagreb, Yugoslavia, 1985

Schranz AG, Savona-Ventura C: Gestational IGT in Malta. Medit. Group for the Study of Diabetes Bulletin, 4(2):9-13, 1991

Savona-Ventura C: The Significance of Gestational Impaired Glucose Tolerance in the Maltese population. Ph.D. Thesis. Institute for Mother and Child, Warsaw, Poland, 1997

Savona-Ventura C, Schranz AG, Chazan B: The clinical significance of gestational impaired glucose tolerance in the Maltese population. Archives of Perinatal Medicine, 3(4): 55-60, 1997

Savona-Ventura C, Azzopardi J, Sant R: Risk Factors for Gestational Diabetes Mellitus in the Maltese Population: a population based study. Int J Risk Safety Med., in press, 2000