Report

Pregnancy outcome in gestational and established diabetes in Bahrain

F.E. Mustafa [1] and A.K. Sandhu [1]

Introduction

Diabetes may be the most frequent pathological condition affecting the pregnant woman and her fetus. Some 0.3% of women of reproductive age are diabetic and in 0.2%–0.3% of all pregnancies the woman is known to have had diabetes prior to conception. Gestational diabetes mellitus complicates 1%–12% of all pregnancies [*1,2*].

Gestational diabetes (GDM) according to the World Health Organization (WHO) recommendations is the term restricted to pregnant women in whom the onset of glucose intolerance first occurs during pregnancy. In the majority of cases, glucose tolerance returns to normal after delivery, but the lifetime risk of impaired glucose tolerance is reported to increase and type 2 diabetes is substantially increased.

The prevalence of GDM is reported to have increased in Bahrain in the past decade [*3*]. This could be due to the major changes in lifestyle which have led to an increased prevalence of the determinants of diabetes and/or due to more effective screening programmes for GDM in the country.

The value and method of screening for GDM among a pregnant population remains controversial as is its clinical relevance and effect on pregnancy outcome. The measurement of blood glucose performed 1 hour after a 50 g oral glucose load has been used as a method of diagnosis [*4,5*], although WHO recommends the use of a 75 g glucose load and estimation of glucose level after 2 hours at 24–28 weeks of gestation [*6*]. Repeating this study later in pregnancy using WHO methods for screening may give different results.

In Bahrain, screening for GDM is performed for all pregnant women. The objective of this study was to examine the effect of both established and gestational diabetes on pregnancy outcome. The parameters studied were gestational age at delivery, rate of induction of labour, rate of Caesarean section, incidence of macrosomia, admission of neonatal babies to the special care baby unit, and the rate and type of congenital abnormalities.

Subjects and methods

During a 12-month period in 1994, a case–control study was carried out at Salmaniya Medical Centre on gestational diabetic and known diabetic pregnant women and non-diabetic pregnant women. The total number of cases seen was 604 along with the same

[1]*Department of Obstetrics and Gynaecology, Salmaniya Medical Centre, Bahrain*
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number of controls selected randomly during the same period. Data were collected from the labour ward registry book and were stratified according to the type of diabetes and whether controlled by diet or insulin. All pregnant women who were not known on presentation to be diabetic before underwent the screening test between 28 weeks and 32 weeks of gestation. Diagnosis of GDM was made on the basis of a 1-hour glucose level of ≥ 162 mg/dl.

Control of GDM is important to avoid its adverse effect on pregnancy outcome [7]. Dietary control is important for regulation of maternal diabetes. Patients who failed to maintain adequate control through diet were treated with insulin. With improved glycaemic control and better methods of antepartum fetal surveillance, most patients were allowed to deliver at term. Nevertheless, the rate of elective intervention still remained high in pregnancies complicated by diabetes. Where antepartum testing suggested fetal compromise, delivery of the baby was considered with deteriorating fetal condition, for example, if the results of both the non-stress test and ultrasound indicated fetal compromise.

Decisions on the route of delivery were made on an individual basis. An elective Caesarean section was scheduled at 37–38 weeks of gestation if the fetus was at a significant risk of intrauterine death because of the mother's poor metabolic control or a history of stillbirth, or if fetal macrosomia > 4.5 kg was expected. In well controlled patients with or without insulin therapy, intervention was delayed until as near 40 weeks as possible.

Results

Table 1 shows that the majority of women with GDM delivered near term. We found that the gestational age at delivery was influenced by the degree of glycaemic control. The proportion of deliveries before 34 weeks of gestation was significantly higher in known diabetics compared with the GDM and control groups ($\chi^2 = 17.15$, $df = 4$, $P < 0.01$).

The rate of macrosomia (birth weight > 4 kg) among those women with GDM and known diabetics was 7.5% (45 cases) compared with 6% (37 cases) among the control group but the difference was not significant. This finding suggests that many factors other than hyperglycaemia, e.g. obesity, maternal height, weight gain, can influence fetal birth weight.

Table 1 **Gestational age at delivery in the study sample**

Gestational age at delivery (weeks)	Gestational diabetics controlled by diet		Gestational diabetics controlled by insulin		Known diabetics		Control group	
	No.	%	No.	%	No.	%	No.	%
< 34	5	1.2	2	1.8	3	5.0	12	2.0
34–37	35	8.0	15	13.5	6	10.2	36	6.0
≥ 37	394	90.8	94	84.7	50	84.8	556	92.0
Total number of cases	434	100	111	100	59	100	604	100

The mode of delivery among the diabetic and control groups is shown in Table 2. The rates of emergency Caesarean section, elective Caesarean section and induced labour were significantly higher among women with GDM or pre-existing diabetes compared with the control group. The rate of Caesarean section was nearly 1½ times that of the control group. The rate of induced labour was nearly four times higher among diabetic groups (χ^2 = 151.06, $df = 4$, $P < 0.0001$).

The number of cases of shoulder dystocia and the number of babies transferred to the special care baby unit were higher in the diabetic group than the control group (Table 3) but the difference was not significant. It was also noted that the rate of perinatal mortality and morbidity was not significantly higher amongst the diabetic group compared with controls (χ^2 = 7.6, $df = 4$, $P < 0.1$) (Table 3).

Although macrosomia was not found to be significantly higher in the diabetic group, the incidence of shoulder dystocia was four times higher among diabetic pregnancies compared with controls.

Table 2 **Type of delivery in the diabetic and non-diabetic groups**

Type of delivery	Gestational diabetics and known diabetics		Control group	
	No.	%	No.	%
Spontaneous delivery	318	52.6	466	77.2
Assisted delivery	26	4.3	27	4.5
Emergency Caesarean section	69	11.4	45	7.4
Elective Caesarean section	36	6.0	26	4.3
Induced labour	155	25.7	40	6.6
Total	604	100	604	100

Table 3 **Fetal outcome among diabetic and non-diabetic groups**

Fetal outcome	Gestational diabetics and known diabetics		Control group	
	No.	%	No.	%
Live birth with good Apgar score	545	90.3	555	91.9
Stillbirth	5	0.8	6	1.0
Neonatal death	3	0.5	9	1.5
Shoulder dystocia	5	0.8	1	0.2
Transferred to special care baby unit	46	7.6	33	5.4
Total	604	100	604	100

Table 4 **Congenital abnormalities among diabetic and non-diabetic groups**

Congenital abnormality	Gestational diabetics and known diabetics No.	Control group No.
Hydrocephalus	2	1
Hydrocephalus + achondroplasia	–	1
Hydrocephalus + cleft palate	1	–
Diaphragmatic hernia	1	–
Meningocele + diaphragmatic hernia	1	–
Total	5 (0.8%)	2 (0.3%)

The total number of congenital abnormalities was higher in women with diabetes compared with the control group but it was not significant ($\chi^2 = 2.82$, $df = 4$, $P < 0.5$) (Table 4). Many studies have documented a two- to four-fold increase in major malformations in infants of insulin-dependent diabetic mothers [5].

Conclusion

The clinical relevance of GDM remains controversial and continues to be diagnosed differently but control of GDM is believed to be important in avoiding complications. Mothers with GDM managed with diet only were encouraged to deliver at term. Control of diabetic women before and during pregnancy is anticipated to reduce the incidence of congenital malformations and macrosomia. The infants of the diabetic mothers (untreated or with uncontrolled blood sugar) were at increased risk of perinatal mortality and morbidity.

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