GESTATIONAL DIABETES

by

S. AGARWAL,* M.D., M.A.M.S.

and

A. N. GUPTA,** M.D., D.G.O.

Introduction

Metabolic studies in pregnant women have demonstrated three fold rise in insulin secretion in the third trimester of pregnancy (Spellacy, 1971). Women, in whom the pancreas fails to step up the secretion of insulin, manifest with altered carbohydrate metabolism during gestation. This altered state returns to normal after delivery. This clinical situation of altered carbohydrate metabolism, that is gestational diabetes, is a form of latent diabetes and has been classified as Class A diabetes by White (1971).

Variability in the diagnostic criteria has led to considerable controversy in the management of gestational diabetes (GD) (Steven *et al*, 1977). Untreated or improperly GD is associated with high perinatal mortality. Early recognition of GD, prompt management with diet and insulin, monitoring of placental function and foetal organ maturity, and early delivery at appropriate time have led to considerable lowering of the perinatal mortality (PNM) rate. In this paper, our 8 years' experience with GD has been reviewed.

Patients and Methods

In the antenatal clinic of the Nehru Hospital, Postgraduate Institute of Medical Education and Research, Chandigarh, all women with unexplained perinatal loss, birth of large baby, family history of diabetes mellitus and/or persistent glycosuria were subjected to glucose tolerance test. The criteria for the diagnosis of GD were similar to O'sullivan and Mahan (1964). During a period of 8 years, from 1971 to 1978, a total of 125 cases of GD were identified and were classified into following 3 groups:

(1) Class A/ID—when the diagnosis was made before 35 weeks of gestation (34 cases).

(2) Class A 2—when the diagnosis was made between 36 to 37 weeks (69 cases).

(3) Class A 1—when the diagnosis was made after 37 weeks (22 cases).

The first group was managed on low doses of insulin and diet control, second group on diet alone and no treatment was given to the third group. All these patients were subjected to oestriol estimation thrice a week after 34 weeks of gestation, amniotic fluid creatinine and L/S ratio. The patients were induced to deliver at 38-39 weeks of gestation.

* *Lecturer, at Present at L.H.M.E. & S.K. Hospital, New Delhi).*

** *Professor and Head,*

Department of Obstetrics and Gynaecology, Postgraduate Institute of Medical Education and and Research, Chandigarh.

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Observations

Class A diabetes or GD was diagnosed in 125 patients out of a total of 15,883 deliveries during the period giving a incidence of 0.78 per cent. In 113 cases the diagnosis of GD was made before delivery. In 2 of 3 cases referred from other hospitals the infant had already died and third was a malformed baby. In 9 patients the diagnosis was made after the birth of a living infant. 70 per cent of these patients were 26 years or above in age (Table I). 53.6 per cent had 1 or 2 previous deliveries. In 71.3 per cent, there was a bad obstetric past history. Family history of diabetes was recorded in 19.2 per cent (Table II).

TABLE I
Distribution of Age and Parity

Age in years	Parity				Total	%
	0	1 & 2	3 & 4	5		
Less than 20	1	1	1	0	3	2.42
21-25	13	17	3	0	33	26.4
26-30	9	34	10	5	58	46.4
31-35	1	11	4	5	21	16.8
36-40	0	4	3	1	8	6.4
41-45	0	0	0	2	2	1.6
Total	24	67	21	13	125	
Percentage	19.2	53.6	16.8	10.4		

TABLE II
Obstetric History of 125 Gestational Diabetics

	125	%
Total		
Family History of Diabetes	24/125	19.2
Primi Parous	24	19.2
Multiparous	101	80.8
Over weight baby (4 kg.)	32/101	31.7
Bad obstetric history	72/101	71.3
Stillbirths	62/229	27.3
Neonatal deaths	36/229	15.7
Congenital malformations	13/229	5.7
Abortions	59/229	25.8
Hepatomegaly	3/229	1.3

There was no maternal death in the series. Pre-eclamptic toxaemia (PET) was diagnosed in 31 patients. One developed eclampsia but the infant survived. Seven patients had essential hypertension of whom 5 developed toxaemia. Polyhydramnios was observed in 10, out of whom 4 had associated PET. In these 43 cases with complications, the PNM rate was 209 per 1,000. Of the 9 perinatal deaths in this group of 43 women with complications, polyhydramnios and/or congenital malformation contributed to the death of 5. The break up of cases according to the time of diagnosis and the complication has been given in Table III. The incidence of hypertensive disorders of pregnancy was similar in the three groups. In the Class A/1D, managed on insulin and diet, the incidence of large for gestational age (LGA) babies as well as PNM rate was significantly less when compared to the other 2 groups.

The PNM rate was 72 per 1,000. This figure is of course, influenced by inclusion of 3 patients who were referred with IUD or with malformation. The PNM rate in the supervised pregnancies was 53.3 per 1,000 (corrected 17.7 per 1,000). There was 1 fresh still birth, 1 neonatal

TABLE III

Complications of G.D. (Percentage Indicated in Parentheses)

	Class A_1	Class A_2	Class A/1D
Total	22	69	34
Stillbirths	2	1	0
Neonatal malformations	0	1	0
Congenital malformations	1	3	1
PNM/1000	135	72.4	29.4
Corrected P.N.M./1000	90.9	28.8	0
L.G.A.	10 (45.4%)	28 (40.5%)	7 (17.9%)
S.G.A.	1	2	0
Hypertensive disorders	7 (31.7%)	21 (30.4%)	10 (29.4%)
Hydramnios	3	5	2
Urinary tract infection	2	3	1
Vaginitis	2	2	2

death and 4 infants had congenital malformation incompatible with life. The intranatal death was the result of shoulder dystocia and the neonatal death occurred in a severely toxaemic patient induced at 37 weeks which was attributed to intraventricular haemorrhage and extreme dysmaturity (Birth weight 1.4 kg).

Labour was induced in 30 women with GD out of 77 women who delivered vaginally. The rest 48 underwent cesarean section (CS). The CS rate in GD, thus was 38.4 per cent which is much higher than the hospital CS rate of 18.2 per cent. Elective CS was undertaken if the foetal weight was estimated to be 4 kg or more or maternal foetal complications appeared imminent beyond 36 weeks of gestation.

Amniotic fluid creatinine concentrations determined in 66 cases of G.D. were similar to those found at comparable gestation in uncomplicated pregnancy. There was delayed maturation of pulmonary surfactant activity in 1 of 34 (Shake test 11, LS ratio 23) cases where fetal lung maturity was assessed.

Urinary oestriol estimation was done serially in 81 pregnancies. The values were similar to those found at comparable gestation in uncomplicated pregnancies. In cases with abnormal values, timely induction saved all but one baby (I NND).

If fasting blood sugar was normal and mean 2 hour post prandial blood sugar (PPBS) below 140 ugm/100 ml, unexplained IUD was rare (Table IV). Four of 5 deaths in good control group were due to congenital malformations.

TABLE IV

Control of Diabetes Related to Perinatal Deaths Number of Perinatal Deaths Indicated in Parentheses

Control (PPBS mgm/ 100 ml.)	A_1	A_2	A/1D
Good (< 140)	1	58(4)	27(1)
Fair (140-160)	17(1)	5(1)	6
Poor (< 160)	4(2)	6	1

Comments

Clinical outcome of this study on G.D. confirms the impact of undetected or poorly treated G.D. on perinatal outcome. It is pertinent to note that trend to higher

perinatal morbidity, mortality rate, as well as the significantly more frequent LGA babies in women who did not receive low dose insulin therapy. Another factor could be difference in selection cases in the three groups. Neverthless, these observations emphasize the role of early diagnosis of G.D. and prompt treatment with diet control and low doses of insulin.

We see no justification for delay in termination of pregnancy with G.D. once gestational age and maturity are reliably assessed, as by leaving the pregnancy in situ uterine environment can deteriorate inspite of carefully monitoring fetoplacental function tests.

Summary

Gestational diabetes (G.D.) is a form of latent diabetes. The present communication describes the clinical study in 125 consecutive cases of G.D. out of 15883 deliveries during 8 years period (incidence 0.78%). The plan of management included identification and placement of G.D. in high risk clinic, administration of dietary therapy and/or insulin therapy; early delivery; evaluation of fetal organ maturity and fetoplacental function. The perinatal mortality (PNM) in the known gestational diabetics supervised before delivery was 53.1/1000 (corrected 17.7/1000). This is in contrast to overall hospital P.N.M. of 102/1000. The importance of early diagnosis and prompt treatment is stressed.

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