AN EXPERIENCE WITH PREGNANT DIABETICS

A Prospective Study of 180 cases

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With the modern management of diabetes fertility is no problem for diabetic women. However, the same is not true in attaining motherhood. Pregnancy in diabetic has always carried sinister prognosis so far as the foetus is concerned. However, with the better understanding of risk factors and greater co-operation among the diabetologist, obstetrician and pediatrician, the salvage rate has considerably improved. In this paper the progress of 180 pregnant diabetics is presented.

Material and Methods

The case material was obtained from the Diabetes Clinic of K.E.M. Hospital, Bombay. There was no selection of cases. All the cases who were attending Diabetes Clinic and where the pregnancy was confirmed were taken up for study. In all 220 cases were studied, out of these 40 cases were lost to follow-up.

The case material consisted of, (a) confirmed diabetics who became pregnant—135 cases. (b) Those who were pregnant and diabetes was suspected because of glycosuria, family history, previous history of abortion, perinatal foetal loss, pre-eclampsia, hydramnios, large babies—45 cases. In these cases diagnosis of diabetes was established by oral glucose tolerance (GTT) with 50 gms. glucose. The venous sample of blood was examined by the Folin Wu's method. The diagnostic criteria employed were fasting blood sugar more than 120 mg%, peak of glucose tolerance test (GTT) 180 mg% or more and blood sugar at the end of 2 hours of administeration of glucose 130 mg% or more. The GTT was done after 3 days of minimum intake of 300 gms. carbohydrates in diet.

All the patients were thoroughly examined and their data were recorded on special proforma. Fundus examination of eyes and vascular pulsations in the inferior extremities were examined routinely in all cases.

Careful attention was paid to the course and outcome of previous pregnancies (if any), with particular reference to the occurance of toxaemia, hypertension, hydramnios, pedal oedema, glycosuria, miscarriage, stillbirths, congenital malformations and behaviour of new born in the neonatal period.

Besides blood sugar estimations, complete blood count and urine-analysis were also carried out. Other relevant investigations were done whenever necessary, e.g. blood urea nitrogen, urine for

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culture and sensitivity test, X-Ray, etc. Urinary oestriol estimations were not done as a matter of routine. It was estimated in 35 cases only.

Diet: The caloric intake was calculated to prevent malnutrition or excessive gain in weight. The optimum increase of weight permitted during pregnancy was between 10-12 kgs. The patients were advised to minimise salt intake.

All the patients, except the ones who had complications or had history of recurrent abortions, were advised half hour walk twice a day and were encouraged to do household work.

Severity of Diabetes: The patients were arbitrarily divided into three groups according to the degree of fasting hyperglycaemia (FBS). Patients with FBS below 150 mg% were grouped as mild diabetics. Diabetics with FBS 150-250 mg% were considered moderately severe and those with FBS more than 250 mg% as severe diabetics. No attempt was made to classify our patients into group A through G as suggested by Pricilla White.

Drugs: So far as the selection of drugs was concerned the patients were divided into following groups.

1. Freshly discovered diabetics:

(a) Mild diabetics.

(i) Sulfonylurea compounds if the age was 30 years or more and build was average.

(ii) Phenformin hydrochloride if the age was 30 years or more and patients were obese.

(iii) Were advised Lente or NPH insulin if age was less than 30 years.

2. Previously known Diabetics:

(a) If they were not taking any treatment at the time of diagnosis of pregnancy they were treated as the guide lines given in (1) above.

(b) If they were already on oral antidiabetic compounds (Sulfonylurea compounds or phenformin hydrochloride) and if their diabetes was under good control as per the criteria laid down below they were advised to continue them till they escaped from control or if surgery was contemplated when insulin was instituted.

If the diabetes was not under control with oral antidiabetic drugs, treatment with insulin was commenced.

(c) Those patients who were on diet control only were advised to continue if diabetes was under control. If diabetes was not under control they were treated as in (1) above.

(d) Patients already on insulin therapy were continued on insulin with proper adjustment in dose.

All the patients were routinely given Vitamin B-Complex factors and symptomatic and corrective treatment, as and when required e.g. for hypertension, oedema, eclampsia, urinary tract infection, anaemia, etc. No patient was administered hormones.

Twenty pregnant diabetics came to us only when in labour or when nearing term. These cases were either not properly treated or did not have blood sugar reports or any other data with them. These patients were grouped as "No treatment group".

In the first trimester patients came for follow-up once a month, in the 2nd trimester once in three weeks and during 14th to 30th weeks once in two weeks, and thereafter once a week till the time of delivery. Those patients who had complications were called more frequently for follow-up. At the each follow-up attendance the obstetrician and diabetologist jointly examined the patient and looked for complication, if any. The patients

were accurately weighed, the postprandial blood sugar levels were assessed and adjustment in the diet and dose of antidiabetic drugs were advised. The patients with complications were hospitalised.

The Criteria of Control of Diabetes

(a) *Good Control*: Blood sugar at the end of 2 hours of meals (PPBS) 140 mg% or less. (b) *Fair Control*: PPBS 140-160 mg%. (c) *Poor Control*: PPBS more than 160 mg%.

Time and Mode of Delivery: Indian babies being generally smaller in weight, early interruption of pregnancy was not practised as a matter of routine. Patients in whom diabetes was mild or moderate and well controlled, cases who did not develop complications of pregnancy, such as pre-eclamptic toxaemia, and the cases who did not give history of stillbirths or difficult labour were allowed to go to full term and spontaneous labour. However, the diabetic patient was not allowed to have prolonged labour and the indications for caesarean section were more liberal in case any obstetric complications developed.

In the absence of above indications and cases in whom clinical examination indicated viable foetus, induction of labour was resorted to at 38 weeks of pregnancy. The patients with cardiac, renal or retinal complications were subjected to induction even earlier. Induction was carried out by sweeping of membranes rupture of membranes and intravenous infusion of pitocin. Cases who failed to go in labour after induction or developed uterine inertia, cervical dystocia or foetal distress were taken up for caesarean section.

Elective lower segment caesarean section was done in cases with (i) abnormal presentation, (ii) history of difficult labour, stillbirths, previous unsuccessful trial of labour, (iii) large foetus, (iv) severe uncontrolled diabetes, (v) cephalopelvic disproportion, (vi) presence of obstetric complications, like pre-eclamptic toxaemia, (vii) elderly primipara.

At the end of puerperium those cases in whom diabetes was discovered during pregnancy were reinvestigated. If oral GTT was now normal they were labled as cases of gestational diabetes. Out of 45 cases, 15 cases were gestational diabetics.

Discussion

In the series of pregnant diabetics studied by us the highest number of diabetics were in the fourth decade followed closely by patients in the third decade. Small number of cases seen in the age group of 40 and over is rather paradoxical, considering the fact that incidence of diabetes is highest in fifth decade (Mody *et al* (1959); Vaishnav *et al*, (1964). This discrepancy is due to onset of menopause and decline in mortality after the age of 40 years. Bhasin *et al* (1971) had also recorded highest incidence of pregnant diabetics in the fourth decade. So far as the age is concerned it did not influence the foetal salvage rate (Table 1).

TABLE I

Age Distribution

Age group (in years)	No. of cases	Foetal Salvage
Below 30	70	55 (78.5%)
31-40	80	64 (80.0%)
Over 40	30	24 (80.0%)

High foetal loss was found in primiparae and multiparae above parity five. This was probably due to undetected cephalopelvic disproportion, uterine inertia and prolonged labour in primiparae. In women with parity V and over there

are greater chances of babies being large, abnormal presentations, obesity and obstetric complications like pre-eclamptic toxaemia. All these factors may attribute to high foetal loss (Table II).

TABLE II

Parity Distribution

Parity	Total No.	Foetal Salvage
Primipara	18	12 (66.6%)
2-4 para	87	75 (86.2%)
5 para and over	75	56 (74.6%)

Severity of diabetes is one of the important factors to be considered when judging the prognosis. Mild diabetics fare better than severe diabetics (Table III) possibly because it is easier to regulate and control metabolic abnormality, the fluctuations are less and requirements of insulin are less.

TABLE III

Severity of Diabetes

Severity of diabetes	Total No.	Foetal Salvage
Mild	84	72 (85.7%)
Moderately severe	66	51 (77.2%)
Severe	30	20 (66.6%)

As can be judged from the results (Table IV) foetal prognosis is directly related to the degree of metabolic control. The foetal loss was maximum in those cases where metabolic control was poor. (P less than 0.001) Patients with good metabolic control have excellent salvage rate, very close to the salvage rate observed in non-diabetics. Table V clearly reveals that control of diabetes has greater influence on the foetal salvage rate than that of severity of diabetes. Easterman (1946) reports spontaneous abortion rate of 16% in controlled diabetics and 25% in uncontrolled diabetics.

TABLE IV

Control of Diabetes

Control of diabetes	Total No.	Foetal Salvage
Good	106	94 (88.6%)
Fair	42	36 (85.7%)
Poor	32	13 (40.6%)

Another important factor to be considered in improving the foetal salvage rate is the necessity of regular antenatal supervision. One hundred and forty-eight cases who came for regular antenatal care had foetal salvage in 130 cases (87.8%) as compared to 32 cases who were not regular in antenatal visits who had only 13 livebirths i.e. foetal salvage rate of 40.6%. Those patients who attended regularly and took advantage of good

TABLE V

Correlation of Severity of Diabetes & Foetal Salvage

	Mild		Moderately severe		Severe	
	Total Number	Foetal salvage	Total Number	Foetal salvage	Total Number	Foetal salvage
Good control	60	53 (88.3%)	30	28 (93.3%)	16	13 (81.3%)
Fair control	20	17 (85.0%)	14	12 (85.7%)	8	7 (87.5%)
Poor control	4	2 (50.0%)	22	11 (50.0%)	6	0 (0.0%)
	84	72	66	51	30	20

antenatal supervision had far better prognosis (P less than 0.001) than those who were casual attenders simply because good follow-up attendance offers the best chance of achieving good metabolic control as well as early discovery of complications of pregnancy and its immediate correction.

Duration of diabetes has an indirect influence on the foetal outcome. One hundred and fifty-four cases in this series had either recently discovered diabetes or diabetes of less than 10 years duration. In them the salvage rate was 83%. Twenty-six cases had diabetes of more than 10 years duration. In these the salvage rate was 73%. Poor outcome in patients with diabetes of long standing is due to high incidence of vascular involvement which results in placental insufficiency, hypertension and renal damage. These factors singly or in combination lead to high foetal loss. It is desirable to admit these patients at least one week before the expected day of delivery. It helps in improving control of diabetes. An improvement in uterine blood flow with rest has been claimed (Peel 1962). Having no established routine in this matter, no attempt is made to demonstrate any specific value of early admission in our cases.

In the management of pregnant diabetics insulin is considered as the drug of choice. Oral antidiabetic drugs are considered to be contraindicated. Suggestions, based on experimental work, that these compounds may be teratogenic and lethal in some other manner have not so far been confirmed in clinical practice (Dolger and Herzsetein, 1944). The results in 41 cases collected from centres in Britain do not reveal any deleterious effect on the foetus compared with other methods of treatment (Malins 1968). None of the patients in our series who received oral antidiabetic drugs delivered babies with congenital anomalies. Similar observations were also made by Sterne *et al* (1965) and Toress *et al* (1969).

We have observed (Table VIII) that the various types of treatment including oral antidiabetic agents, if carefully chosen and properly administered, produce comparable results in terms of foetal salvage. There was no statistically significant difference in different treatment groups. The crucial point is not the mode of treatment but the quality of control achieved.

The foetal loss is directly related to the insulin requirements for the control of diabetes (Table VII). The best results

TABLE VI

Foetal Prognosis in Different Treatment Groups

Treatment group	Total	Foetal salvage	S B	A B	N N D
Insulin	90	84 (93.3%)	3	2	1
Oral hypoglycaemic drugs					
Tolbutamide	19	14 (73.6%)	1	3	1
Phenformin	17	14 (82.3%)	—	2	1
Insulin + oral	16	12 (75.0%)	1	3	1
Diet control only	18	13 (72.4%)	1	4	—
No treatment	20	6 (30.0%)	1	10	3

(SB = Stillbirth, AB = abortions, NND = neonatal deaths).