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Research Article

STILLBIRTH AND MISCARRIAGE ASSOCIATED WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

This is a study with 225 female diabetic who were attending diabetic clinic at IPGME & R (S.S.K.M. Hospital, kolkata). Particularly the female diabetic of reproductive age group and post-menopausal women with diabetes mellitus had been included. Age matched non-diabetic female controls were taken from the patients attending GOPD of Ulluberia, S. D. Hospital who fulfilled the inclusion criteria. Particularly free testosterone and estrogen, LH, FSH levels were measured from blood sample. Fertility pattern was evaluated with history of infertility, or repeated fetal loss or successful pregnancy.

Our results showed that there is significant association of fasting sugar and different hormonal levels (testosterone, LH, FSH and insulin) of diabetic patient who showed miscarriage and stillbirth. Significant number of diabetic females showed miscarriage. Our results revealed significant association between BMI and rate of miscarriage.

Keywords: Diabetes Mellitus, Miscarriage, Stillbirth, BMI.

INTRODUCTION

Before the discovery of insulin, a woman with type 1 diabetes had almost no chance of successful delivery of a healthy baby. With the advent of insulin treatment, pregnancy losses continued to be high, predominantly through stillbirth, but neonatal deaths due to congenital malformation, birth trauma, hypoglycemia, and respiratory distress syndrome all took their toll [1]. Several centres have reported stillbirth rates in women with type 1 diabetes that are comparable to those in nondiabetic women [2,3,4,5]. Pregnancy losses due to congenital anomalies (resulting from poor glycemic control in early pregnancy) have proven harder to reduce, so terminations of pregnancy or neonatal death resulting from severe congenital anomalies now account for a large proportion of pregnancy losses in women with type 1 diabetes [4,6].

The developing epidemic of obesity over the last two decades has seen a substantial reduction in the age of onset of type 2 diabetes and its emergence in women of childbearing age. In many areas of the world, the number of pregnancies in women with type 2 diabetes now exceeds that of women with type 1diabetes. There are many reasons why pregnancy and neonatal losses might differ between type 1 and type 2 diabetes[4,6]. Women with type 2 diabetes

tend to be older, poorer, more obese, of higher parity, and to be from minority communities, all risk factors for poor pregnancy outcome, whereas women with type 1 diabetes are more likely to have vascular complications of diabetes. In this article, we report the rates and causes of pregnancy loss in women with type 2 diabetes.

MATERIALS AND METHODOLOGY

Our study includes 200 female type 2 diabetes mellitus patients who were attending diabetic clinic at the Institute of Post Graduate Medical Education & Research (IPGME & R), Kolkata. Age matched non-diabetic female controls were taken from the patients attending GOPD of Ulluberia, S. D. Hospital who fulfilled the inclusion criteria. The work has been approved by the Institutional ethical committee of IPGME & R, Kolkata (Ref. No. Inst/IEC/35, dated, 3rd January, 2007). Female diabetic of reproductive age group was included, provided they were not taking oral contraceptive pill or injectable or oral steroid hormone for any other clinical reason. Normal sample was taken from volunteers without diabetes having similar fertility disturbances. Diabetic teenagers who have not attended menarche were not included. Insulin dependent diabetic females were not considered for estimation of blood insulin level. After selection of the patients, information was collected by personal interview.

Blood samples were collected in the early follicular phase of the cycle. Hormone estimation was done by ELISA Chemo luminescence method. Particularly free testosterone and estrogen, LH, FSH levels were measured from blood sample taken within first 10 days of menstruation. Blood was collected for serum insulin estimation 48 hours after stoppage of anti diabetic medicine and insulin injection only if the clinical situations permitted. Fertility pattern was evaluated with history of infertility, or repeated foetal loss or successful pregnancy.

RESULTS

Significant number of diabetic females showed miscarriage (Fig1: A). Our results showed significant association between BMI and rate of miscarriage (Fig1: B). Diabetic patients with more duration of diabetes showed less age of menopause (Fig1C). Our results showed that there is significant association of fasting sugar and different hormonal levels (testosterone, LH, FSH and insulin) of diabetic patient who showed miscarriage and still birth (Table 1, 2 and 3).

DISCUSSION

Our results showed that an increase in BMI is generally associated with a significant increase in prevalence of miscarriage. Earlier research revealed that an increase in BMI is generally associated with a significant increase in prevalence of diabetes mellitus [7,8]. In the present study, we

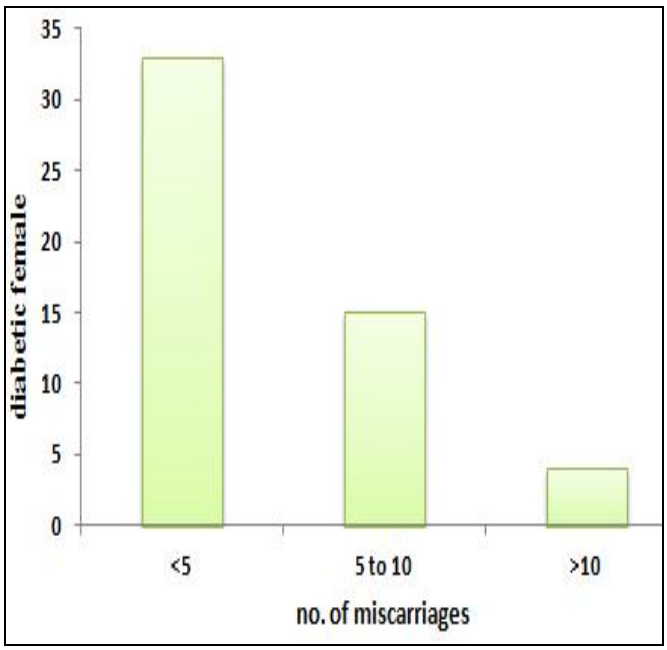

Fig1: A

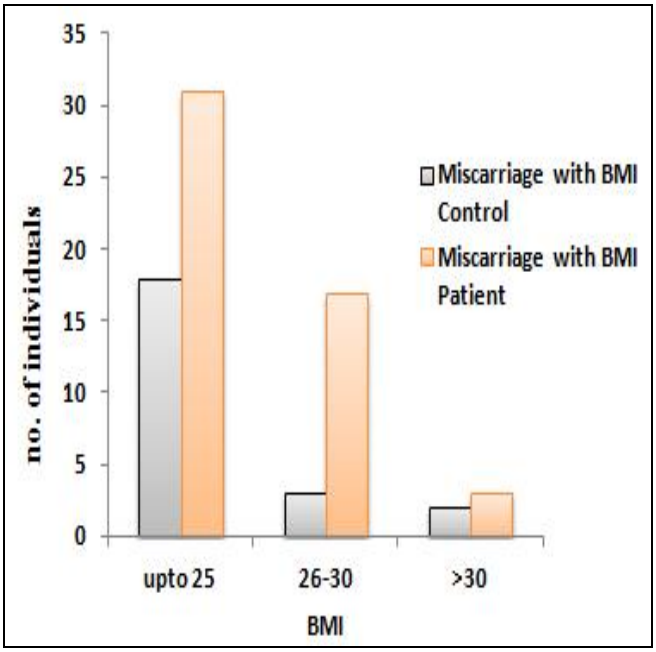

Fig1: B

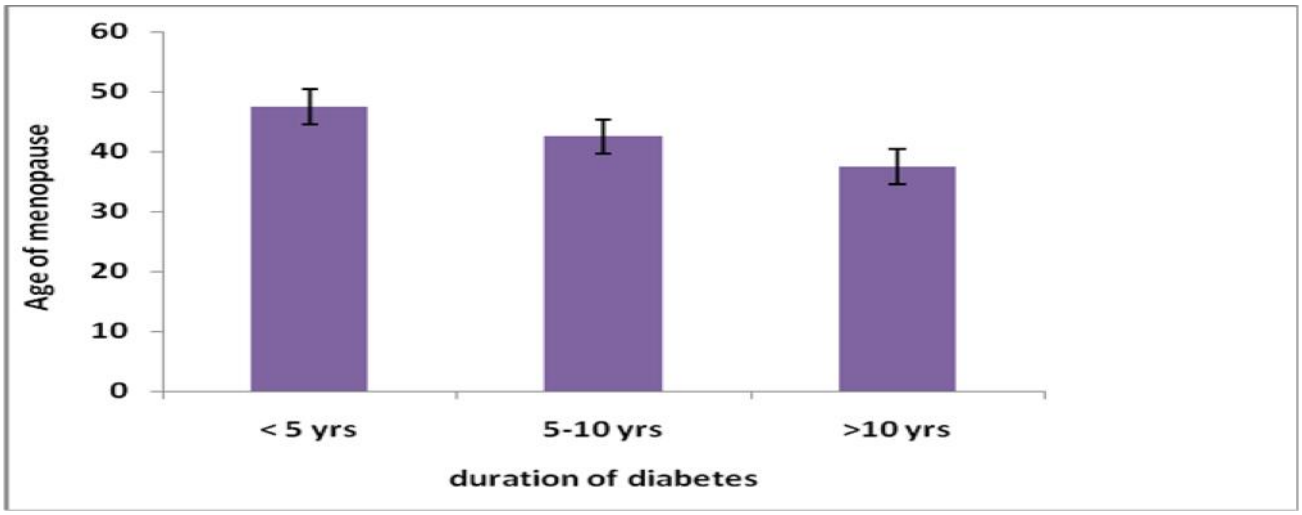

Fig1: C

Table 1: Clinical manifestation of some diabetic females in study population

Patient ID	Fasting sugar (mg/dl)	Sugar pp (mg/dl)	Miscarriage	Still birth	Estradiol (40-50pg/ml)	testosterone (2-45 ng/dl)	FSH (3.8-8.8IU/L)	LH (2.1-10.9 IU/L)	Serum insulin (IU/L)
1	100	149	Yes		187.0	2.00	10.8	4.3	5.1
2	172	162		Yes	157.0	0.60	12.8	8.0	1.7
16	345	500	Yes		190.0	0.40	4.70	5.2	1.0
18	198	251	Yes		294.0	0.26	13.0	3.4	1.2
19	202	270		Yes	297.0	0.29	15.5	7.0	1.0
213	210	400		Yes	174.0	0.40	11.9	8.8	4.1
28	201	241	Yes		150.0	0.84	33.2	9.3	3.5
29	260	335		Yes	149.3	0.32	8.2	10.7	9.7
45	202	319		Yes	363.0	1.00	18.8	8.7	1.0
48	212	308			201.0	0.60	10.3	0.8	1.4
54	350	308	Yes		168.0	0.04	9.9	5	1.7
75	202	256	Yes		191.0	0.29	13.6	4.5	2.9
98	388	608		Yes	146.0	0.71	12.4	5.6	1.8
102	238	342			208.0	0.37	18.0	28.0	2.7
117	226	350		Yes	180.0	0.53	4.2	13.4	1.2
129	326	692			163.0	0.55	7.9	2.8	2.9
192	362	415			183.9	0.68	8.9	1.8	0.8

Table 2: Association of fasting sugar and different hormonal levels of diabetic patient who showed miscarriage.

Fasting Sugar [Mean ±SEM (mg/dl)]	Hormone	Hormonal Level [Mean ±SEM (pg/ml)]	P-Value
232.66±39.63	Estradiol	196.66±20.52	0.4387
	Testosterone	0.638±0.292	0.0002
	FSH	14.2±4.01	0.0003
	LH	5.28±0.84	0.0002
	Insulin	2.56±0.644	0.0002

All the data were presented as mean ±SEM. The data were analyzed by t-test. Results with P <0.05 were considered statistically significant.

Table 3: Association of fasting sugar and different hormonal levels of diabetic patient who showed stillbirth.

Fasting Sugar [Mean ±SEM (mg/dl)]	Hormone	Hormonal Level [Mean ±SEM (pg/ml)]	P-Value
237.14 ±27.10	Estradiol	209.47±32.27	0.5239
	Testosterone	0.55±.094	<0.0001
	FSH	11.97±1.79	<0.0001
	LH	8.88±0.96	<0.0001
	Insulin	2.92±1.2	<0.0001

All the data were presented as mean ±SEM. The data were analyzed by *t*-test. Results with P <0.05 were considered statistically significant.

observed higher prevalence of miscarriage among the patient population. We also observed few recurrent miscarriages. Based on the previous studies, it has been seen that higher risk of miscarriages are associated with a higher BMI in diabetic women. Our results reflect the significant association of fasting sugar with testosterone, LH, FSH and insulin levels of diabetic patients having the history of miscarriage and stillbirth (Table 1, 2 and 3). In type 2 diabetes, the major causes of pregnancy loss are stillbirth, birth asphyxia, and chorioamnionitis. Unexplained stillbirth and chorioamnionitis were strikingly more prevalent in women with type 2 diabetes than in women with type 1 diabetes [9,10]. Maternal obesity is strongly linked to pregnancy loss [9,10,11]. For example, in the study of Kristensen et al[11], the risk of stillbirth and neonatal death was doubled in women with a mean BMI>30 kg/m2. Our observations indicate that BMI, testosterone, LH, FSH and insulin levels might be the indicator of pregnancy failure.

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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