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. Several centres have reported stillbirth rates in women with type 1 diabetes that are comparable to those in non-diabetic women. 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.

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 1 diabetes. There are many reasons why pregnancy and neonatal losses might differ between type 1 and type 2 diabetes. 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.

![Fig1: A](image1)

![Fig1: B](image2)

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

<table>
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<tr>
<th>Patient ID</th>
<th>Fasting sugar (mg/dl)</th>
<th>Sugar pp (mg/dl)</th>
<th>Miscarriage</th>
<th>Still birth</th>
<th>Estradiol (40-50 pg/ml)</th>
<th>testosterone (2-45 ng/dl)</th>
<th>FSH (3.8-8.8 IU/L)</th>
<th>LH (2.1-10.9 IU/L)</th>
<th>Serum insulin (IU/L)</th>
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Fig1: C
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 al11, the risk of stillbirth and neonatal death was doubled in women with a mean BMI>30 mg/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.

REFERENCES


