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Original Article

Assessment of the Impact of Twin Pregnancy on Obstetric and Perinatal outcomes in Diabetic Females

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***ABSTRACT*:**

Background: Diabetes mellitus affects 2 to 10% of pregnancies, and most (about 90%) of diabetes in pregnancy are gestational diabetes. Pregnancy is a relatively "diabetogenic" state due to the increase in hormonal antagonists of the insulin (e.g. human placental lactogen) resulting in reduced tissue sensitivity to insulin. **Aim of the study:** To assess the impact of twin pregnancy on obsetetric and perinatal outcomes in diabetic females. **Materials and methods:** The present study was conducted in the Department of Obstetrics and Gyneclogy at MGM Hospital, Navi Mumbai, Maharashtra. Medical records were reviewed to identify women with pregestational DM (type 1 or type 2) who gave birth to twins between the study period. Diabetes was defined according to the classification of the American Association of Diabetes. The following obstetric and perinatal outcomes were analyzed: gestational age at delivery, prematurity (pregnancy duration b37 or b34 weeks), mode of delivery (vaginal or cesarean), and birthweight. **Results:** The mean age of the patients in type 1 DM cases was 31.25 years and in type 2 DM cases was 32.8 years. The mean BMI in Type1 and Type 2 DM cases was 24.25 and 27.32 respectively. Hypertensive complications were seen in 2 cases each in Type 1 and Type 2 DM. the number of patients admitted to NICU was 8 in Type 1 and 6 in Type 2 cases. The mean birthweight in Type 1 DM was 2471 g and was at 68th percentile. **Conclusion**: The risk of peri-natal morbidity increases in women with pregestational diabetes; however, non-significant difference was observed between Type 1 and Type 2 diabetes mellitus patients.

Keywords: Diabetes mellitus, obstetrics, twin pregnancy.

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INTRODUCTION:

Diabetes mellitus affects 2 to 10% of pregnancies, and most (about 90%) of diabetes in pregnancy are gestational diabetes. Pregnancy is a relatively "diabetogenic" state due to the increase in hormonal antagonists of the insulin (e.g. human placental lactogen) resulting in reduced tissue sensitivity to insulin.[1, 2] The increased risk of preterm delivery, post-partum hemorrhage and hypertensive disorders in multiple pregnancy is a well-known issue. Additionally, low birth weight and small-for-gestational-age (SGA) status were reported at higher rates in infants conceived in multiple pregnancy than with singleton pregnancy, and these are known risk factors for prenatal mortality and morbidity.[3, 4] Because multiple pregnancy can contribute significantly to adverse maternal and perinatal outcomes, it is important to comprehensively investigate the risks involved in multiple pregnancy in India. Previous studies suggest comparable maternal glycaemic control and perinatal morbidity, including rates of large for gestational age, preterm delivery and neonatal care in Type 1 and Type 2 diabetes. In Type 1 diabetes, rates of large for gestational age are increasing, perhaps attributable to increased maternal obesity and reduced microvascular complications.[5] By contrast, there is clear evidence that intensive management, with diet, insulin and/or metformin, is associated with reduced large for gestational age, preterm delivery and neonatal care in gestational diabetes. Maternal glycaemic control is the strongest predictor of perinatal

morbidity in gestational diabetes.[6]Hence, the present study was conductedto assess the impact of twin pregnancy on obsetetric and perinatal outcomes in diabetic females

MATERIALS AND METHODS:

The present study was conducted in the Department of Obstetrics and Gyneclogy at MGM Hospital, Navi Mumbai, Maharashtra. Medical records were reviewed to identify women with pregestational DM (type 1 or type 2) who gave birth to twins between the study period. Diabetes was defined according to the classification of the American Association of Diabetes. The inclusion criteria were a pregnancy duration of 22 weeks or more and a birthweight of 500 g or more. The absence of reliable data in the clinical history was a criterion for exclusion. We included 30 women with pregestational DM and a twin pregnancy. To assess the effect of the type of DM, 2 subgroups were established, Type 1 diabetes mellitus (n=15) and Type 2 diabetes mellitus (n=15). Data on maternal demographics and history of chronic hypertension were collected from the clinical records. Glycosylated hemoglobin (HbA1c) levels in each trimester of pregnancy were recorded and expressed as standard deviation from the mean for the relevant reference laboratory. The following obstetric and perinatal outcomes were analyzed: gestational age at delivery, prematurity (pregnancy duration b37 or b34 weeks), mode of delivery (vaginal or cesarean), and birthweight.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

RESULTS:

Table 1 shows the demographic data of the patients. The mean age of the patients in type 1 DM cases was 31.25 years and in type 2 DM cases was 32.8 years. The mean BMI in Type1 and Type 2 DM cases was 24.25 and 27.32 respectively. The number of obese patients in Type 1 DM was 9 and in Type 2 DM was 8. On comparison, the results were found to be statistically non-significant. Table 2 shows the comparative analysis of outcomes of twin pregnancy in type 1 and type 2 diabetic patients. Hypertensive complications were seen in 2 cases each in Type 1 and Type 2 DM. the number of patients admitted to NICU was 8 in Type 1 and 6 in Type 2 cases. The mean birthweight in Type 1 DM was 2471 g and was at 68th percentile. The birthweight in Type 2 DM was 2391 g and was at 58th percentile. On comparison, the results were found to be statistically non-significant.

Table 1: Demographic data of patients

Demographic variables	Type 1 diabetes mellitus (n=15)	Type 2 diabetes mellitus (n=15)	p-value
Mean age (years)	31.25	32.8	0.3
Mean BMI (kg/m^2)	24.25	27.32	0.12
Obese (n)	9	8	0.4

Table 2: Comparative analysis of outcomes of twin pregnancy in type 1 and type 2 diabetic patients

Outcomes	Type 1 diabetes mellitus (n=15)	Type 2 diabetes mellitus (n=15)	p-value
Hypertensive complications	2	2	0.661
Admission to NICU	8	6	0.3
Umbilical artery pH	7.2	7.2	0.8
Mean Birthweight • **Weight, g** • **Percentile**	 2471 68.00	 2391 58.29	 0.12 0.84
Apgar score <7 • **At 1 month** • **At 5 months**	 3 1	 2 1	 0.31 0.12
Mean Gestational age, weeks	35.21	36.02	0.2
Cesarean delivery (no. of cases)	9	7	0.8

Figure 1: Demographic data

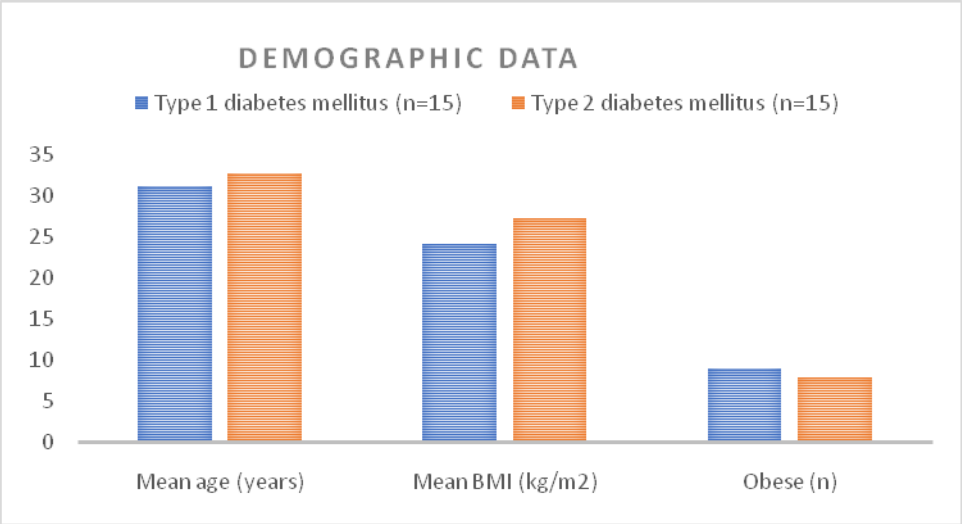
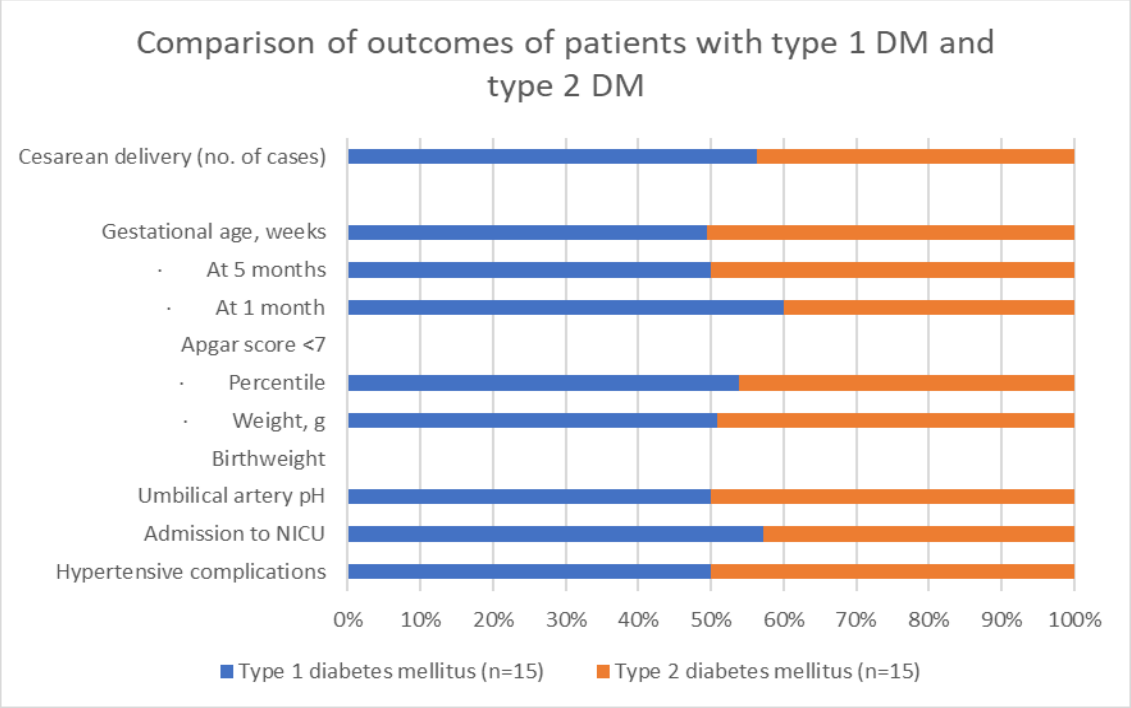


Figure 2: Comparison of outcomes for twin pregnancy in patients with type 1 and type 2 DM



DISCUSSION:

Pregestational DM and twin pregnancy are each associated with ahigh risk of adverse perinatal outcomes, but the combined effectof these two conditions was not previously known. In the present study, we observed that on the basis of hypertensive complications, only 2 cases were observed each in Type 1 and Type 2 DM. The number of patients admitted to NICU was 8 in Type 1 and 6 in Type 2 cases. The mean birthweight in Type 1 DM was 2471 g and was at 68th percentile. The birthweight in Type 2 DM was 2391 g and was at 58th percentile. On comparison, the results were found to be statistically non-significant. The results were compared with previous similar studies and was found to be consistent with previous studies. González González NL et al assessed the impact of twin versus singleton pregnancy on obstetric and perinatal outcomes among women with pregestational diabetes mellitus (DM). Multicenter retrospective cohort study of women with pregestational DM and twin or singleton pregnancy, conducted in Spain during 2005-2010. Each group included 63 women (type 1 DM, n=39; type 2 DM, n=24). Of 269 565 deliveries, 68 (0.025%) were twins of mothers with

pregestational DM, with 28/63 (44.4%) conceptions achieved with assisted reproduction technology. Among women with type 1 DM, hypertensive complications were more common among those with twins than among controls; the rate of preterm birth was higher; and the rate of admission to the neonatal intensive care unit was higher. Twin pregnancy was an independent risk factor for adverse perinatal outcomes regardless of the type of diabetes. They concluded that twin pregnancy in women with either type of DM dramatically increased the risk of perinatal morbidity. In mothers with type 1 DM, twin pregnancy was more often associated with hypertensive complications than singleton pregnancy. Darke J et al analyzed data on 27 women with a twin pregnancy and pregestational diabetes (54 babies) and 6407 women with a twin pregnancy without diabetes (12 814 babies) from the Northern Survey of Twin and Multiple Pregnancy during 1998-2010. A composite adverse pregnancy outcome (comprising fetal loss before 24 weeks, termination of pregnancy, stillbirth, infant death or any major congenital anomaly), extended perinatal mortality (stillbirths and neonatal deaths) and major congenital anomaly were the main outcome measures. Adjusted rate ratios were estimated using generalized estimating equations for Poisson regression controlling for potential confounders. Mothers with twin pregnancies with diabetes were older and had higher body mass indices than those without diabetes. Their twins were more likely to be delivered earlier, be delivered by cesarean section, be large-for-gestational-age and require admission to a special care baby unit. Pregestational diabetes was associated with significantly increased rates of the composite adverse outcome and major congenital anomalies in twins. They concluded that maternal pregestational diabetes in twin pregnancies is associated with a significantly increased risk of an adverse pregnancy outcome.[7, 8]

Rackham O et al identified the causes of stillbirth and neonatal death in infants of women with type 1 and type 2 diabetes; 2) to determine whether the causes of perinatal mortality are the same for women with type 1 and type 2 diabetes; and 3) to ascertain the relationship between perinatal mortality and maternal glycemic control. The case notes of women with type 1 and type 2 diabetes mellitus who had a stillbirth or neonatal death were identified and examined by 2 reviewers independently. Ninety-three perinatal deaths were identified (59 women with type 1 diabetes; 34 women with type 2 diabetes). There were 73 stillbirths, 12 were early neonatal deaths, and 8 were late neonatal deaths. Eighteen deaths were attributed to congenital anomalies, 64 to antepartum asphyxia, 4 to intrapartum asphyxia, 3 to postnatal hyaline membrane disease, 2 to postnatal infection, 1 was unclassifiable, and 1 case had no details available. Median postmenstrual age at death was 34 weeks for both women with type 1 and type 2 diabetes. Congenital anomalies were less common in women with type 1 diabetes than those with type 2 diabetes. The relationship between preconceptional and maximal maternal glycosylated hemoglobin (HbA1c) concentrations and birth weight was curvilinear: at low HbA1c levels, the fetal weight was normal; when HbA1c levels were moderately raised, there was macrosomia; very high HbA1c levels were associated with severe intrauterine growth restriction. They considered that this provides evidence that hyperglycemia not only causes fetal macrosomia but also an angiopathy affecting the utero-placental blood vessels and consequent fetal hypoxia. Murphy HR et al compared obstetric and perinatal outcomes in women with Type 1 and Type 2 diabetes and relate these to maternal risk factors. Prospective cohort study of 682 consecutive diabetic pregnancies in East Anglia during 2006–2009. Relationships between congenital malformation, perinatal mortality and perinatal morbidity (large for gestational age, preterm delivery, neonatal care) with maternal age, parity, ethnicity, glycaemic control, obesity and social disadvantage were examined using bivariable and multivariate models. There were 408 (59.8%) Type 1 and 274 (40.2%) Type 2 diabetes pregnancies. Women with Type 2 diabetes were older, heavier, more frequently multiparous, more ethnically diverse and more socially disadvantaged. Although women with Type 2 diabetes had shorter duration of diabetes and better pre-conception glycaemic control, rates of congenital malformation and perinatal mortality were comparable. Women with Type 2 diabetes had fewer large-for-gestational-age infants, fewer preterm deliveries and their offspring had fewer neonatal care admissions. Third trimester HbA1c and social disadvantage were risk factors for large for gestational age. They concluded that despite increased age, parity, obesity and social disadvantage, women with Type 2 diabetes had better glycaemic control, fewer large-for-gestational-age infants, fewer preterm deliveries and fewer neonatal care admissions.[9, 10]

CONCLUSION:

From the results of the present study, we conclude that the risk of peri-natal morbidity increases in women with pregestational diabetes; however, non-significant difference was observed between Type 1 and Type 2 diabetes mellitus patients.

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