ORIGINAL ARTICLE

MATERNAL AND FOETAL OUTCOME IN GESTATIONAL DIABETES

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Background: Gestational diabetes is impaired carbohydrate metabolism first diagnosed in pregnancy. Knowledge of diabetes dates back to centuries before Christ. Objective was to describe maternal complications during antenatal period and Maternal and neonatal outcome in gestational diabetes mellitus. **Methods:** This Descriptive observational study was conducted at Department of Obstetrics and Gynaecology, Alhada Military Hospital, Taif, KSA. It was done during January–December 2009 to measure maternal and neonatal outcome. Hundred pregnant women diagnosed through glucose tolerance test as diabetic were enrolled as study subjects. All the subjects were enrolled and followed regularly at Obstetric and Gynaecology out-patient Department of Alhada Military Hospital, Taif. Blood glucose level was controlled either by diet or by diet and insulin. Study subjects were hospitalised for adjustment of dose of insulin and for management of complications. Foetal well being was assessed by kick count, cardiotocography and ultrasound. Time and mode of delivery was decided at 36 week of gestation. Intra-partum maternal blood glucose level was monitored and foetal monitoring was done by cardiotocography. **Results:** Total numbers of women delivered were 2,858. Hundred cases of diabetes mellitus during pregnancy were studied. Eighty-eight patients were above 25 years of age, multiparous ladies with gestational diabetes in 76% of cases. Insulin was required in 64% of patients. Polyhydramnios was most common maternal complication. Two out of 100 had spontaneous miscarriage; 14 underwent preterm delivery while 84 reached term with two intrauterine death. Caesarean section was carried out in 58 patients. Total number of babies delivered alive were 92. There were 4 neonatal deaths. Hyperbilirubinemia was the most common neonatal complication. **Conclusion:** It was concluded that early detection, constant supervision, strict glycaemic control, delivery with intensive intrapartum monitoring and facilities of expert neonatologist can result in good maternal and foetal outcome, without much morbidity.

Keywords: Pregnancy, Gestational diabetes mellitus, Maternal outcome, Neonatal outcome

INTRODUCTION

Gestational diabetes is impaired carbohydrate metabolism first diagnosed in pregnancy.[1] Knowledge of diabetes dates back to centuries before Christ. The Egyptian Papyrus Ebers (1500 BC) described an illness associated with the passage of much urine. Gestational diabetes mellitus (GDM) is the most common and serious metabolic complication which put mother and baby at risk of potential complications. The GDM is a distinct clinical entity deserving early recognition, treatment and research. It is estimated that 2–3% of pregnancies are complicated by diabetes and 90% of these cases represent women with GDM.[2,3] Its frequency is rising in United State and occurs in 1–14% of all pregnancies.[4] The carbohydrate intolerance is usually a temporary condition induced by the metabolic stress of pregnancy and treated by diet control alone or by insulin therapy. This abnormality in glucose metabolism may or may not normalised to normal after delivery. Gestational diabetes recurs in about 60% of subsequent pregnancies and 40% of Gestational diabetics will develop non-insulin dependent diabetes mellitus within 15 years after delivery[5] and this was the background for the original diagnostic criteria[6]. Normoglycaemia in the peri-conceptual period and first trimester is essential to reduce the increase incidence of congenital malformations, which threaten the organogenesis.[7,8] Early diagnosis and prompt treatment decreases the incidence of congenital malformations.[9] If GDM is not properly treated the risk of adverse maternal (pre-eclampsia, pregnancy induced hypertension, emergency caesarean section, assisted delivery) and neonatal (macrosomia, still birth, birth trauma, shoulder dystocia) outcome increases.

The incidence of gestational diabetes mellitus is between 0.15–15%, which corresponds to the prevalence of type 2 diabetes and impaired glucose tolerance in a given country. The prevalence of gestational diabetes mellitus is 0.15% in New Castle, UK, 1.8% in Nairobi, 1.9% in Riyadh, 2–3% in North America[10,11], 5.4% in Bahrain, 2.5–7.5% in Bostol and 7.2% in Australia.[12–14] Local studies showed that the prevalence of gestational diabetes mellitus is 1.68% in Lahore[15], 3.2% in Karachi[16] and 3.75% in Rawalpindi[7]. The GDM is becoming a major health problem in developing countries that are because of rapid changes in lifestyle, dietary habits and body mass index.

Maternal and neonatal mortality that was 40% and 65% before the discovery of insulin is now 2–3% and 2–5% respectively.[17,18] Major hurdles to be crossed in our country include lack of education and socio-

culture taboos leading to improper and substandard antenatal care, failure of screening of high risk pregnancies and their referral to the appropriate health facilities at the proper time.

The objective of study is to describe maternal complications during antenatal period and maternal and neonatal outcome in gestational diabetes mellitus.

MATERIAL AND METHODS

It was descriptive observational study conducted in the Department of Obstetrics and Gynaecology, Alhada Military Hospital, Taif, KSA from January to December 2009. Total Hundred pregnant women diagnosed through glucose tolerance test as diabetic were enrolled as study subjects and the main outcome measures was Maternal and neonatal outcome.

Pregnant women with risk factors like family history of diabetes mellitus, previous history of GDM, repeated abortions, still births, neonatal deaths, history of macrosomic or congenitally malformed baby or presented with recurrent monilial infection, urinary tract infection, Polyhydramnios, preterm labour or good sized baby were subjected to glucose tolerance test (GTT) and the patients found to be diabetic were enrolled as our study subjects Diabetic pregnant women suffering from any other disorders which directly or indirectly may affect the outcome of pregnancy were excluded, e.g., Asthma, Epilepsy, Hypertension, Thyroid dysfunction, Anaemia or Heart problems. Purposive sampling technique was used for selection of Study subjects.

All the subjects were enrolled and followed regularly at Obstetric and Gynaecology out patient department of Alhada Military hospital, Taif. Oral Glucose Tolerance Test (OGTT) was done according to modified O'Sullivan criteria.[14] Blood glucose level was controlled either by diet or by diet and insulin. Study subjects were hospitalised for adjustment of dose of insulin and for management of complications. Foetal well being was assessed by kick count, cardiotocography and ultrasound. Time and mode of delivery was decided at 36 week of gestation. Intra-partum maternal blood glucose level was monitored and foetal monitoring was done by external cardiotocography.

Elective caesarean section was reserved for those diabetic women who had foetal macrosomia or presence of more than one risk factor. Paediatrician was called in the delivery room and blood glucose level of the newborn was checked at half an hour and if found to be less than 45 mg, newborn was shifted to paediatric unit and managed as hypoglycaemic baby.

Data were analysed using SPSS-11 and the results were tabulated as number and percent.

RESULTS

A total of 2858 women delivered between January–December 2009 at department of Obstetric and Gynaecology, Alhada Military Hospital, Taif. Hundred patients were diagnosed as a case of gestational diabetes mellitus through oral glucose tolerance test, giving 3.5% proportional morbidity of GDM. Age was measured as a continuous variable in our study and for the purpose of analysis; it was categorized into up to 25 years and above 25 years. There were 12 subjects up to age 25 years while 88 subjects in age above 25 years. Mean age was 32.3 years. Age has a statistically significant association with diabetes mellitus. Table-1 shows socio-demographic data.

Clinical data with important variables (Parity, treatment given to control DM, hospitalisation for control of DM, gestational age at the time of GDM and time of delivery) are mentioned in Table-2.

It was observed that despite good glycaemic control out of 100 patients 44 were having no complication, 56 patients had complications. Multiple complications were observed in 12 patients. Multiple complications were observed in 26 babies. Thirty six babies were macrosomic and only 2 babies were congenitally abnormal. Details of complications are given in Table-3.

Regarding the outcome, it was observed that 34% patients had normal vaginal deliveries, 44% patients had elective caesarean section and 14% had emergency c-section while 36% patients were delivered by ventouse. Out of 40 patients delivered vaginally 6 babies had mild shoulder dystocia.

No incidence of birth trauma was encountered. Apgar score was noted at 1 minute and 5 minutes of birth. Initial resuscitation was required in 22 babies. Eight babies had Apgar score <7 even after 5 minutes.

Neonatal weight was measured as a continuous variable. It was categorized up to 2.5 Kg, between 2.6–3.9 Kg and 4 Kg or above. It was observed that 36 babies weighed more then 4 Kg, 58 between 2.6–3.9 Kg while 6 babies were up to 2.5 Kg.

Out of 100 babies born, two had intrauterine death and 92 were alive but early neonatal death occurred in four and there were two miscarriages. Causes of early neonatal deaths were pre maturity and respiratory distress syndrome.

Table-1: **Socio-Demographic data of patients**

Variables		No.
Age (Years)	<25 Years	12
	>25 Years	88
Educational Status	Uneducated	44
	Primary Education	28
	Secondary Education	20
	Higher Education	8
Socio-economic Group	Lower	58
	Middle	26
	Upper	16

Table-2: Clinical data (n=100)

Variables		No.
Parity	Nullipara	24
	Multipara	70
	Grand Multipara	6
Gestational Age (Weeks) at the time of DM	<28 Weeks	18
	28–32 Weeks	62
	>32 Weeks	20
Control of Diabetes Mellitus	Diet	36
	Diet + Insulin	64
Hospitalization for control of DM	Yes	72
	No	28
Gestational Age (Weeks) at the time of delivery	<24 Weeks	2
	24–36 Weeks	14
	37–40 Weeks	84

Table-3: Outcome and complications (n=100)

Variables		No
Outcome of Pregnancies	Spontaneous Miscarriage	2
	Spontaneous Vaginal Delivery	34
	Ventouse Delivery	6
	Emergency C-Section	14
	Elective C-Section	44
Complication Rate	Maternal	56
	Foetal	48
Maternal Complications (During Antenatal Period)	Miscarriage	2
	Preterm Labour	14
	Premature Rupture of Membrane	10
	Polyhydramnios	18
	Recurrent Monilial Infection	6
	Recurrent UTI	6
	PIH	12
Foetal Complications	Miscarriage	2
	Macrosomic Baby	36
	Congenital Abnormalities	2
	Shoulder Dystocia	6
	Hypoglycemia	8
	Respiratory Distress Syndrome	2
	Jaundice	18

DISCUSSION

Gestational diabetes is the most common metabolic complication that affects pregnant women. In our study morbidity of gestational diabetes mellitus was 3.5% which was higher than other local studies on GDM, i.e., 1.68% from Lahore[15], 2.7% from Rawalpindi[19] and 3.2% from Karachi[16]. It was also higher than the previous international reports 0.96%[20], 1.5%[21] and 1.9%[12]. Reason for this high proportion was geographical, ethnic and racial variations in the pattern of carbohydrate intolerance.[14] In this study, ratio of age distribution above and below 25 years was 88:12. Increasing maternal age was associated with higher frequency of GDM and this was in accordance with other studies.[22,23] This emphasis upon screening blood glucose levels of women over 25 years. Most professional organizations have recommended screening for gestational diabetes mellitus for all the pregnant women.[24] Carmody[25] reported interesting relationship between teenagers with type 1 diabetes mellitus and adverse pregnancy outcomes. Increasing parity, as an associated risk factor for GDM was well demonstrated. Our study reported 76% while Randhawa[23] reported 80% of patients with GDM were multi-parous. Glucose intolerance increases as pregnancy advances.[15] This trend was also evident in the study presented, where 82% patients diagnosed as a case of GDM in late second and third trimester. The results were comparable with another study conducted at Civil Hospital, Karachi.[26]

Approximately 15% of women with GDM require insulin therapy.[27] In our study 64% and in one study from Jinnah hospital, Lahore[23] 40% patients were treated with insulin. Such high number in the present study was due to illiteracy and lack of comprehension about the principles of good diabetic control. Despite good glycaemic control the maternal complications were 44% in the present study. Polyhydramnios is a common complication, reported by Falls J (3–32%)[28] and 18% in our study. Premature labour occurred in 16% cases in our study which was comparable to another study from Lahore (15.38%).[15] Women with good glycaemic control and no other complications of pregnancy ideally will be delivered at 39–40 weeks of gestation. This fact was also proved by our study as well as study conducted at Shaikh Zayed Hospital, Lahore.[15]

Infants of diabetic mothers have an increased risk of developing congenital malformations. Woon *et al*[29] in their study found that severe and major malformation occurred in 15.5% infants while this rate was 2% in our study. Our study result correlates well with other studies 3.3%[19], 3.85%[15] and 4%[30]. Low rate in our study could be due to this fact as 82% women developed diabetes in late second or third trimester.

Macrosomia is a well recognized complication of diabetes. Foetal hyperinsulinism as a cause for macrosomia was proposed more than 25years ago. In our study, it was 48% which was comparable to the study from developing world (46.6%).[31] Maternal blood control in the first trimester has been proposed as an important determinant of birth weight of babies.[32]

Woon *et al*[29] reported 41.8% caesarean section rate. Rate of caesarean section was 58% in our study which was similar to the study done in Sir Ganga Ram Hospital, Lahore.[30] The high percentage of caesarean deliveries in the present study was due to the fact that we considered macrosomia a risk factor for shoulder dystocia and birth trauma, in planning the mode of delivery. Study from Shaikh Zayad Hospital, Lahore reported Hyperbilirubinemia the most common neonatal complication in the women with gestational diabetes[15] which was comparable to our study (18% of neonates develop jaundice).

In the present study 8% neonates showed hypoglycaemia which was similar to the study by Mannan J *et al*.[30] Good maternal glycaemic control during pregnancy and delivery decreases the risk of neonatal hypoglycaemia. One baby developed respiratory distress and died on fifth day of life. That baby was delivered before 32 weeks of gestation. Join

Clinic reported an incidence of 31% of respiratory distress syndrome in infants of diabetic mothers declining to an average of 5.5% in the same clinic with better glycaemic control.[33,34]

CONCLUSION

Early detection of GDM by screening high risk groups and treatment at appropriate time and good facilities will reduce the social and financial burdens of managing the results of untreated diabetes.

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