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Management, complications and outcome of gestational diabetes mellitus in a cohort of pregnant women in Babil Province

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Background and objective: Gestational diabetes mellitus affects 7% of all pregnancies. It is defined as glucose intolerance that begins or is first diagnosed during pregnancy. It is crucial to detect women with gestational diabetes mellitus because the condition can be associated with several maternal and fetal complications. This study aimed to determine the maternal and fetal outcome of gestational diabetes mellitus in Babylon Province, Iraq .

Methods: This prospective observational study had involved 225 pregnant women with gestational diabetes mellitus.

Introduction

Gestational diabetes mellitus (GDM) is defined by glucose intolerance of variable severity with the onset of first recognition during pregnancy. GDM occurs in around 7% of pregnancies; however, its incidence varies according to nutritional habits and differences in genetic patterns between populations. In long-term, GDM women are prone %20-%50 to develop type 2 diabetes mellitus in 5 years after delivery.1 Currently, there is no agreement within the international community on the glucose levels used to screen and diagnose GDM. WHO defines GDM as the joint category of diabetes (fasting glucose ≥7.0mmole /L [126mg/d L] or 2-hour glucose ≥11.1mmole/L [200mg /d L] and impaired glucose tolerance 2/hour glucose >7.8mmole/L [140mg/d L]). A woman is considered high risk if she meets one or more criteria: (history of GDM, Obesity BMI >30, glycosuria, strong family history of diabetes, prior poor obstetrical outcome stillbirth, birth defect.2 The OGTT is a diagnostic test in which the woman is given 100g glucose load after an overnight fast of 8 to 14 hours. The woman is instructed not to smoke and to sit for the duration of the test.3 The diagnostic criteria are those recommended by the Fourth International Workshop-conference on GDM.4 The 75 g two-hour OGTT is the diagnostic test recommended by the WHO organizations.

The diagnosis is made when the fasting glucose level is greater than 126mg/dl (7.0mmol/L) and 2 hours glucose is greater than 200mg/dl (11.1mmol/L).5 The basic objectives of medical nutrition therapy are to provide adequate nutrition for the mother and fetus, provide sufficient calories for appropriate maternal weight gain, maintain normoglycemia, and avoid ketosis.6 Physical exercise has been proposed as part of treatment for GDM based on the fact that, in adults, an

improvement in physical fitness increase insulin sensitivity, improves glucose control and reduces the need for insulin.7 Regular aerobic exercise during pregnancy appears to maintain or improve physical fitness. Healthy pregnant and postpartum women get at least 150 minutes per week of moderate-intensity aerobic activity, such as brisk walking Monitoring glucose levels may also alter the progression of the condition in women with gestational diabetes. One study showed that daily monitoring of pregnant women treated with diet allows identification of those who could benefit from treatment with a hyperglycemic agent, which may lead to a reduction in the rates of macrosomia.8 Women with 1-hour postprandial blood glucose levels within the normal range experience fewer incidences of neonatal hypoglycemia, macrosomia, and cesarean delivery. Although the majority of women will achieve adequate glycemic control with diet and exercise alone, 30-40% require pharmacological treatment.10 When choosing therapies with patients, physicians should always consider efficacy, safety, and patient acceptance. This study aimed to determine the maternal and fetal outcome of GDM patients in Babylon city .

Methods

This study was conducted in Babylon city. A total number of 225 pregnant women diagnosed with gestational diabetes (GDM) were included in this study. Data collected from those women who were in labour and admitted to labour ward and any pregnant lady admitted to the word for controlling blood sugar, and already diagnosed with GDM by 75 gram GTT (details of GTT given in introduction) Detailed information about present pregnancy, family history, past obstetrical history, information about regime of treatment taken. Mode of delivery and if there were any maternal and fetal complications were recorded. Gestational age at birth (the gestational age was calculated from the last menstrual period and confirmed by early ultrasound reports before 20 weeks). The BMI calculated from women's weight in the antenatal cards at booking in early pregnancy (till 12 weeks) and the high. Follow up of studied women and their neonatal outcomes till six weeks after delivery by the phone call. Two main outcomes in GDM women were recorded in this study. First, the maternal outcome included the mode of delivery, and the relationship of maternal complications to the type of treatments. Second, fetal outcome included the weight of the baby, Apgar score in first and fifth minutes, admission to NCU, and any fetal complications (an indication of admission). Inclusion criteria included singleton pregnancy, both primigravida, and multigravida from 24 weeks-42 weeks. Exclusion criteria included women with diabetes before pregnancy, and twin pregnancy, previous cesarean section, medical disease complicated were excluded from the study.

Statistical Analysis

All data then analyzed using the statistical package for the social sciences (version 20 software) computer program. Statistical analysis included descriptive statistics like tables and figures. Chi-square test was used for qualitative variables. In this analysis, the statistically significant association was determined. All P values were based on 2-sided tests, and P equal or <0.05 was considered statistically significant.

Ethical Consideration

Ethical considerations for the study has been obtained from babylon city. Verbal consent was taken from all participants in this study.

Results

About 75% of women were the housewife. The family history of diabetes mellitus was in %60 of women. There was no history of a miscarriage in 75% of women, and no history of the dead fetus in 77% of the studied women. Most of the women (69%) had a BMI of more than 30 kg/m2. The parity was from 1- 4 in most of the studied women (57%), while parity from 5-7 were (18%) as shown in Table 1.

The mean + SD of gestational age at the time of delivery was 36.8 + 1.9 weeks, ranged from 28 to 41 weeks. The mean + SD of the first time of diagnosis was 26.3 + 3.2 weeks, ranged from 24 to 34 weeks (Table 2). In studied women, 37% were delivered before 37 weeks of gestation whereas, 63% of women delivered their 404 baby after 37 weeks of gestation . The studied women used four regimens for treatment of gestational diabetes; 62% of studied women on insulin therapy, 20% of women on diet regime, 9% on metformin tablets, and 9% used of metformin then insulin(table 3).

Discussion

There are many risk factors for GDM. One of these risk factors are the positive family history of diabetes mellitus (DM). The result of this study demonstrated that there was an association of positive family history of diabetes with GDM, in this study %60 of women had GDM with a positive family history of DM. This is in agreement with Williams et al.,11 found that family history of diabetes in a first- degree relative conferred a significantly increased risk of GDM, This also agreed with studies done by Chan et al.,12 reported that a positive family history is an isolated risk factor for women over 30 years. In this study we found that age was an important risk factor that associated with more chance of GDM so that the risk of GDM in women over

years was 3.28 times more than women 25 years, the results are consistent with most of the studies. In a study conducted by Hadaegh et al., the relative risk of gestational diabetes in 35-39 years old group was 15 times more than age groups under 20 years. Among other interfering risk factors for GDM is high BMI which is an independent risk factor, significantly associated with our study. In this study % 69, women with BMI> 30 kg/m2 had GDM, %26 with BMI between 25-30kg/m2 and only % 5 was <25 of women has GDM. This agreed with the study done by Sudhanshu et al.15 in that %73 of the patient of GDM had a BMI>30 kg/m2. Zokaie et al.16 found in their study that chance of developing GDM in overweight and the obese group were 2.91 and 3.69 more times, respectively. This was consistent with the meta-analysis results of Torloni et al.17 In our study, most of the women 68% were delivered by C/S while only 38% of women were delivered vaginally. This is agreed with Casey et al.18 reported that The rate of cesarean delivery was increased significantly with gestational diabetes mellitus. The high rate of cesarean section is may be due to that in GDM induction of labor is usually followed by cesarean section. As there is increased the chance of stillbirth in GDM despite modern management,20 the presence of fasting hyperglycemia >5.8 mmol/l may be associated with an increase in the risk of intrauterine fetal death during the last 4-8 weeks of gestation.20 Perinatal complications are preventable with good glycemic control and early induction of labor but at the cost of a higher cesarean section rate.19 Mother's psychological stress from death or bad outcome of previous infants and previous cesarean section were also seen to be responsible for increased cesarean delivery in GDM.21,22 The operation itself is associated with several maternal morbidities, particularly wound infection and dehiscence, postpartum infection and bleeding, and deep venous thrombosis, as well as the need for the future cesarean section with a subsequent pregnancy. These are exacerbated by the presence of obesity.23,24 Data are sparse for the complications of cesareans among GDM women and obese women. In the infant, elective delivery in late preterm or early term infants has been associated with an increase in both respiratory distress syndrome and transient tachypnea of the newborn. Several studies in India, Pakistan and also in Saudi Arabia have reported increased risk for gestational hypertension and preeclampsia in pregnancies complicated by gestational diabetes. Preeclampsia was noticed to be associated with GDM in another study conducted in Bangladesh which is in agreement with our findings, that 33% of GDM women were associated with (PET, PIH). In our study the rate of cesarean delivery was high with 68% of whole delivery, 14.8% of whole C/S done because of GDM women associated with (PIH+PET). This is agreed with the study done by Thomas et al.30 study the rate of cesarean delivery was high with 93% of whole delivery, 14.41% of women were complicated with PIH, 3.60% of the women were complicated with oligohydramnios and 2.70% were complicated with polyhydramnios. This agreed with our study in that 15% of women were complicated by PIH, 18% of women were complicated by preeclampsia, 8% were complicated by oligohydramnios but not agreed with Thomas et al. study in that 61% of women were complicated with polyhydramnios. In the study of Gandhi et al.31 metformin treatment was compared to dietary therapy in 592 GDM patients. The incidence of fetal macrosomia and birth weight >90 percentile was lower in the metformin group than in the diet group. This result is in agreement with our study which found that 25% of women who delivered macrocosmic babies were on diet regime while only 23.3% of women delivered macrocosmic babies were used metformin. Moore et al.32 reported that stillbirth in women who on metformin lesser than

women who were on insulin. This finding agrees with our study; we found that we had no stillbirth in women who were on metformin while the rate of stillbirth in women who used metformin then insulin were 11.1 % and whose on diet regime 5%. In the study by Rowan et al.,33 the rate of preterm delivery was higher in metformin-treated mothers. This does not agree with our study in that preterm delivery higher in insulin-treated mothers. In fact, there were more preterm births in the insulin group than in the metformin group in the study of Mesdaghinia et al.34 In the study by Rowan et al.,33 the rate of neonatal hypoglycemia was lower in the metformin group compared to the insulin group. Consistent with this result, the incidence of neonatal hypoglycemia was higher in insulin-treated patients in our study. This is also agreed with the study done by Kristiina Tertti et al.,35 in which neonatal hypoglycemia was higher in insulin-treated patients. The cesarean section rate was not reported by Rowan et al.33 Alani ET al.36 found that there is no significant difference between mode of delivery and type of treatment. This is not in agreement in our study in that C/S more in those women who use insulin than another regime of treatment. We recommend screening, diagnosis, and treatment of GDM are to be put into the national antenatal program so that 5-8%of the risk pregnancy from GDM, can be identified. Thus, measures are to be taken to avoid preventable consequence on the mother and fetus/newborn. Also, a detailed history should be taken from pregnant women at their first antenatal visit regarding the risk factors for GDM, to offer early screening if needed to prevent maternal and fetal complication. Finally, women with GDM should be followed after delivery in order to monitor hyperglycemic status, to do GTT at six weeks post-partum and so advised accordingly.

Conclusion

The results conclude that hypertension, cesarean section, and preterm delivery were more prevalent and higher in the women with GDM. Most of the maternal complications occurred in those women who were on metformin. The occurrence of large for gestational age was low in the treated cases of GDM. The fetal complication, macrosomia, and neonatal death were more prevalent in women who were treated with insulin. The risk of GDM increases with an increase in maternal age, family history of diabetes, multiparity, and increasing BMI.

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