Original Article

Comparison of pregnancy outcomes in high risk pregnant women with normal FBS after OGTT test in first trimester of pregnancy and 24-28 weeks of pregnancy

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ABSTRACT

The aim of this study is Comparison of pregnancy outcomes in high risk pregnant women with normal FBS after OGTT test in first trimester of pregnancy and 24-28 weeks of pregnancy. This was a follow up study on pregnant mothers who were at risk of developing gestational diabetes at the beginning of the first trimester of pregnancy. Patients were divided to 2 groups: 164 women had a 2-hour OGTT test with 75 g glucose in the first trimester and 251 ones had -hour OGTT test with 75 g glucose in the second trimester. The studied populations were monitored during the entire pregnancy period in term of complications of gestational diabetes. All of this information was recorded and analyzed by SPSS 19. Based on results, there is no significant difference between two groups in term of these risk factors. The frequency of gestational diabetes mellitus in the first trimester was significantly more than the second trimester (p value = 0.001). In the population with GDM, there was no significant difference between maternal and fetal complications in the two groups. The prevalence of preeclampsia, macrosomia, cesarean section related to gestational diabetes, fetal complications were not significant between two groups. There was a significant difference between the two groups in terms rate of insulin therapy (p-value = 0.035), but there was no significant difference between the two groups in term of other pharmacological and non-pharmacological treatment. Due to the lack of significant difference in some of the complications of gestational diabetes (preeclampsia, cesarean section associated with GDM) and fetal complications between the two groups, it can be concluded that early screening before 24 weeks in women with risk factors for gestational diabetes leads to more costs and discomfort for pregnant mothers without any So, screening for each patient should be done individually in accordance with an accurate assessment of his pregnancy and risk factors for diabetes.

Keywords: Pregnancy, FBS, OGTT Test, Trimester, Gestational Diabetes

Introduction

Diabetes mellitus is one of the most common metabolic disorders that may lead to pregnancy with serious complications [1-3]. Treatment of gestational diabetes can reduce maternal and fetal complications. These patients are at greater risk of weight gain, pre-eclampsia of cesarean section and progression towards diabetes 2 and cardiovascular complications in the future [4]. Embryos of diabetic mothers are at increased risk for macrosomia and birth defects and neonatal hypoglycemia and respiratory distress [5-8]. There is no agreement between the world's best-rated clinics to diagnose Pregnancy diabetes [9]. The purpose of the screening is to identify asymptomatic individuals with high probability of gestational diabetes mellitus. Screening and diagnosis of diabetes reduce maternal and embryonic morbidity [10-12]. So

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far, various protocols for the screening and diagnosis of gestational diabetes have been presented by various health organizations and institutions. There is evidence that many women become hyperglycemic in early pregnancy, early diagnosis and treatment of these women is important in preventing the complications of gestational diabetes [11-14]. On the other hand, early screening have more cost for health. So, in this study we aim to compare the effects of pregnancy on the two groups (early screening and screening in the 24-28th week of pregnancy) by a single-step test with 75 grams of glucose.

Materials and Methods

This study was a follow up study on 500 pregnant mothers who were at risk of developing gestational diabetes at the beginning of the first trimester of pregnancy and who had a fasting blood sugar of less than 92. During the study, 85 patients were excluded from the study because of lack of follow up treatment and second trimester test, abortion and preterm delivery before the second trimester. Retired patients were divided to 2 groups: 164 women had a 2-hour OGTT test with 75 g glucose in the first trimester and 251 ones had -hour OGTT test with 75 g glucose in the second trimester. The studied populations were monitored during the entire pregnancy period in term of complications of gestational diabetes, including cesarean section associated with gestational diabetes, preeclampsia, and embryonic complications such as macrosomia and distress Respiratory, intrauterine growth restriction, and stillbirth. Pregnant mothers in either group with positive OGTT- test were treated with drug treatment (insulin and metformin) and non-pharmacological (regimen). All of this information was recorded and analyzed by SPSS 19.

Results

This study was performed on 415 women with high-risk criteria for gestational diabetes mellitus in two groups of OGTT test (the first trimester of pregnancy (164 women) and the second trimester of pregnancy (251 women)). The average age of the population was 33.68. The frequency distribution of gestational diabetes risk factors was summarized in table 1. Based on this table, there is no significant difference between two groups in term of these risk factors. According to Table 2, the frequency of gestational diabetes mellitus in the first trimester (n = 51) was significantly more than the second trimester (n = 50) (p value = 0.001). In this study, the effects of pregnancy on the incidence of preeclampsia, neonatal macrosomia, cesarean section associated with gestational diabetes, the need for medication and non-pharmacological treatment in patients with gestational diabetes mellitus and embryonic complications (intrauterine death, intrauterine growth restriction, Respiratory distress) was studied. The findings are presented in Table 3. According to Table 3, in the population with GDM, there was no significant difference between maternal and fetal complications in the two groups. The prevalence of preeclampsia in diabetic mothers was 90.8% and 90.8% in the first and second trimester, respectively with no significant difference. The frequency of macrosomia was also not significant between two groups (30.13%, in the first trimester and 80.6% in the second trimester). Although, macrosomia was more frequent in the first trimester group. The frequency of cesarean section related to gestational diabetes in the first trimester group was 6% and in the second trimester, was 2%. So, there is no significant difference between two groups. The fetal complications were also not significantly different (0.001% in the first trimester and % 8.8 in the second trimester) (Table 4). According to Table 5, 160.4% of patients with gestational diabetes mellitus in the first trimester and 60.11% in the second trimester received non-pharmacological treatment based on the diet (P = 0.269). Treatment of metformin was 70.3% and40.4% in the first and second trimester. There was no significant difference between the two groups.

The rate of insulin therapy was 12.8% in the first trimester and 2.4% in the second trimester. There was a significant difference between the two groups in terms rate of insulin therapy (p-value = 0.035).

Discussion

Diabetes mellitus is one of the most common metabolic disorders that may lead to serious complications in pregnancy [15]. These patients are at greater risk of weight gain, pre-eclampsia of cesarean section and progression towards diabetes 2 and cardiovascular complications in the future. Embryos of diabetic mothers are at increased risk for macrosomia and birth defects and neonatal hypoglycemia and respiratory distress. There is no agreement between the world's best-rated clinics to diagnose Pregnancy diabetes. In this study, pregnancy outcomes in high risk pregnant women with normal FBS after OGTT test was investigated in first trimester of pregnancy and 24-28 weeks of pregnancy. There was no significant difference between pregnancy outcomes and gestational diabetes treatment in first trimester and second trimester screening groups. There was no significant difference in term of preeclampsia between the two groups. Cesarean section related to complications of gestational diabetes included cesarean section with decolman and preeclampsia [15]. There was no significant difference between the two groups in term of this variable. Among the embryonic complications of gestational diabetes, macrosomia was found to be significant between the two groups. So that the macrosomia frequency in OGTT performers in the first trimester was 10 (7.8%), which was higher than OGTT in the second trimester (n = 6, 2.50%). There was no significant relationship between the two groups among the population of gestational diabetes mellitus (p = 0.254). Other embryonic complications that were studied in this study included respiratory distress, stillbirth and intrauterine growth restriction, with no significant difference between the two groups. Also, in the population of GDM patients in both groups, the incidence of fetal complications had no significant difference. Bartha et al. showed that early

screening can prevent complications of gestational diabetes, including early delivery and hydrameniosis, but it is unclear whether this early screening is in the interest of the entire population of pregnant mothers or only a high-risk population [16]. This difference in the result is due to the lack of uniformity of the distribution of risk factors for gestational diabetes mellitus in the two groups. On the other hand, preterm labor can be affected by many other unknown factors, including inflammation and unknown infection and socioeconomic factors. Ariaan et al. investigated the pregnancy outcomes in diagnosing gestational diabetes at the age of less than 12 weeks; they found that despite early treatment, these patients had more unfavorable complications toward diagnosis and treatment of diabetes after 24 weeks. This could be due to higher risk factors such as high age and BMI, and more positive family history of diabetes [17]. Similar to this study, our study showed that with the early diagnosis of gestational diabetes and its treatment in the first trimester, there was no difference in the outcomes of pregnancy with the second trimester. Seshiah et al examined the need for glucose tolerance testing in the early weeks of pregnancy. This group found that the risk of diabetes increased with increasing BMI and age. Also, familial history of diabetes or GDM in previous pregnancies was associated with an increase in GDM detection [18]. In this study, the majority of women diagnosed with GDM did not have familial history of diabetes or GDM in previous pregnancies or fetal deaths. This may indicate that the screening has exceptions and supports the general and common principles of GDM screening in all pregnant women. Finally, it was concluded that all pregnant women should be free from the risk factor in the first trimester. In Seshiah et al study, other high-risk criteria for gestational diabetes, such as history of hypertension, metabolic syndrome, and PCO, have not been considered. Population with GDM (under the age of 25 years or without previous diabetes) may have other risk factors for gestational diabetes [19]. Whereas in our study, all these risk factors are considered. Also, the criteria for diagnosis of gestational diabetes in this study was only primary OGTT test; while in our study, all of the high-risk populations were first screened by FBS. All normal persons were entered to study and then OGTT test was performed. Therefore, the difference is the result of the study and our study can be due to the initial FBS test and the condition for its normalization to enter our study.

Marisa et al. (examined the drug treatment and the incidence of GDM in the first trimester screening [20]. They found that screening in the first trimester doubled the incidence of GDM and more people needed drug treatment which was consistent with the results of our study. But in the end, there was no significant difference in neonatal complications, which in our study also did not differ in the fetal complications. In a systematic review on the screening of gestational diabetes, researchers concluded that there are very few studies available on screening benefits before and after 24 weeks, but limited evidence suggests that the diagnosis and treatment of gestational diabetes after 24 weeks improves maternal and fetal outcomes. [21] Although generalized therapeutic interventions reduce fetal complications and maternal gestational diabetes according to the results obtained from these studies. There is no significant difference in the frequency of maternal and fetal complications between the two first-trimester screening and post-24-week screening [22]. Of course, all of these studies were in the general population of high risk and low risk. However, due to the lack of a difference in treatment methods in early diagnosis of gestational diabetes in our study and the lack of any difference in pregnancy outcomes, it can be concluded that early diagnosis of OGTT in high-risk groups and their treatment had no beneficial outcomes. This could be due to the greater benefit of starting treatment in the second trimester with increased insulin resistance.

Conclusion

Due to the lack of significant difference in some of the complications of gestational diabetes, including preeclampsia, cesarean section associated with GDM, and fetal complications between the two groups, it can be concluded that early screening before 24 weeks in women with risk factors for gestational diabetes has no beneficial outcomes. It leads to more costs and discomfort for pregnant mothers in terms of eating glucose powder. More studies are needed in screening for high-risk individuals.

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Table 1. Determination and comparison of the frequency distribution of risk factors for gestational diabetes in the two groups

group	OGTT in first trimester	OGTT in second trimester	total	P-value
A positive family history of diabetes	47 (77)	89 (35.50)	166 (40.00)	0.54
underlying disease	48 (29.20)	57 (22.70)	105 (25.30)	0.667
Previous Positive Gestational Diabetes Mellitus	18 (11)	10 (4)	28 (6.70)	0.08
History of inexcusable abortion	29 (17.70)	53 (21.10)	82 (19.80)	0.233
BMI more than 30	14 (8.50)	18 (7.20)	32 (7.70)	0.37
Birth of a baby above 4100 g	2 (1/20)	2 (0.80)	4 (1)	0.511
Age over 25	149 (90.90)	212 (84.50)	361 (87)	0.073

Table 2. Determination the frequency distribution of underlying diseases in the two groups

group	underlying diseases				total
	blood pressure	consumption of corticosteroids	PCO	Metabolic syndrome	
OGTT in first trimester	19(11.60)	1(0.60)	21(12.80)	7(4.20)	48(29.20)
OGTT in second trimester	19(11.60)	1(0.40)	30(18.20)	9(3.60)	57(22.70)
Total	38(9.15)	2(0.40)	51(12.20)	16(3.80)	105(25.30)

Table 3. Determination of the frequency distribution of gestational diabetes mellitus in the two groups

group	With Diabetes	P-value
OGTT in first trimester	51(31.10)	0.001
OGTT in second trimester	50(20.00)	

Table 4. Determination and comparison of frequency distribution of pregnancy outcomes in GDM patients in the two groups

Pregnancy outcome	OGTT in first trimester	OGTT in second trimester	Total	P-value
Preeclampsia	4(8.9)	4(8.9)	8(8.9)	0.625
Macrosomia	6(13.30)	3(6.80)	9(10.10)	0.254
Cesarean Section Related to Complications of Gestational Diabetes	3(6.00)	1(2.00)	4(4.00)	0.497
Embryonic and infantile complications	4(8.00)	4(8.00)	8(9.00)	0.075

Table 5. Determination of the frequency distribution of treatment type in women with gestational diabetes mellitus in the two groups

Group	Gestational diabetes mellitus in the current pregnancy					
	p-value	Treated with insulin	p-value	Treated with metformin	p-value	diet therapy
OGTT in first trimester	0/035	21(12/80)	0/115	6(3/70)	0/269	24(14/60)
OGTT in second trimester		10(4/0)		11(4/40)		29(11/60)
Total		31(7/50)		17(4/10)		53(12/80)