Frequency of Caesarean Section in Diabetic vs. Non-diabetic Females undergoing induction of labour at term

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Abstract

Objectives:
1. To find the frequency of gestational diabetes (GDM) in patients undergoing induction of labour.
2. To compare the frequency of caesarean section in diabetic (GDM) and non-diabetic females undergoing induction of labour.

Materials and Methods: It was a descriptive case series conducted at the Department of Obstetrics and Gynaecology, Shalamar Hospital Lahore. The duration of the study was six months after approval from IRB. A sample size of 214 cases undergoing induction of labour at term during the study period; calculated with 95%confidence level and 3.4% margin of error and taking the expected percentage of GDM is 6.9%. Purposive sampling was used. 214 females who will fulfill the inclusion criteria were enrolled in the study from the labour room of the Department of Obstetrics and Gynaecology, Shalamar Hospital Lahore. Induction of labour done with tab Prostin 3mg single dose and patients having gestational diabetes were identified and frequency of caesarean section in diabetic and non-diabetic calculated.

Results: In the current study, the mean age of the patients was 27.8±4.4 years. Mean gestational age was 37.1±3.8 weeks and mean BMI was 28.6±4.1 kg/m2. Primigravida were 88 (41.1%) and multigravidas were 126 (58.9%). Gestational diabetes was found to be in 36 patients (16.8%). Caesarean section was performed in 77 patients (36%). Comparison of frequency of cesarean section in diabetic (GDM) and non-diabetic females undergoing induction of labour revealed majority of the caesarean sections performed in GDM patients (p=0.007).

Conclusion: In our study, pregnant women with gestational diabetes have a high caesarean section rate. Major factors that contribute to this high caesarean section rate in patients with gestational diabetes were advanced maternal age and high BMI.

Keywords: Gestational diabetes mellitus, Induction of labour, Caesarean section.

Introduction

Gestational diabetes is associated with an increased rate of perinatal morbidity and mortality. The majority of patients with diabetes had induction of labour at term (≥37 weeks) to prevent maternal and fetal morbidity especially shoulder dystocia, macrosomia, birth trauma, and intrauterine fetal death at term but the risks and benefits of induction of labour are incompletely understood.[1] There is an increased risk of operative delivery with the induction of labour.[2] Induced labour is more painful than spontaneous labour. Failed induction and risk of caesarean section are increased when labour is induced with a poor bishop.

Gestational diabetes mellitus (GDM) is firstly recognized during pregnancy by glucose intolerance. Gestational diabetes is associated with macrosomia, shoulder dystocia, intrauterine fetal death, and birth trauma.[4,5] Induction of labour (IOL) is carried out in over 20% of pregnancies in developed countries.[5,6] An elective delivery in a patient with diabetes Mellitus is performed to prevent these complications related to macrosomia especially in case of shoulder dystocia and intrauterine fetal death.[7] A policy of delivering mothers with diabetes at term by itself has a questionable efficacy against the prevention of the majority of fetal deaths. Good glycemic control remains crucial in this respect.

Induction of labour can be done by different methods; the most commonly used method in cases of an unfavourable bishop is with prostaglandin E2. It is available in the form of vaginal tablets, gel, and slow-release pessary.[8]

It is recommended (nice guidelines) to induce patients with gestational diabetes at term (≥ 37 weeks) to prevent adverse perinatal outcomes and it is seen in many studies that the rate of caesarean section in patients with gestational diabetes can be reduced with induction at term. The rationale of this study was to compare the frequency of caesarean section with the induction of labour in diabetic versus non-diabetic females undergoing delivery at term. Literature has shown that with the induction of labour in diabetics the chances of the caesarean section can be reduced.[9] But not much work has been done in this regard. Moreover, no local evidence has been found in the literature which could help us in implementing the use of induction of labour in pregnant females with gestational diabetes. Some argued that the situation is different in cases of well-controlled gestational diabetes without fetal complications where there is no justification for induction of labour. Among diabetics, cesarean sections are associated with a high risk of complications including scar dehiscence wound infection, and multiple antibiotics are required to prevent infection in diabetics after cesarean section.

So through this study, we will get local evidence, and then we will be able to implement the results of this study in the local setting. This will improve our practice as well as will reduce the burden of obstetricians by reducing the number of cesarean sections among diabetics.

Materials and Methods

Objectives:
1. To find the frequency of gestational diabetes (GDM) in patients undergoing induction of labour.
2. To compare the frequency of caesarean section in diabetic (GDM) and non-diabetic females undergoing induction of labour.

Study Type: It was a descriptive case series conducted at the Department of Obstetrics and Gynecology, Shalamar Hospital Lahore. The duration of the study was six months after approval from IRB.

Sample Size: A sample size of 214 cases undergoing induction of labour at term during the study period; calculated with 95%confidence level and 3.4% margin of error and taking an expected percentage of GDM is 6.9%.

Sampling Technique: Purposive Sampling.

Inclusion and Exclusion Criteria:
- **Inclusion criteria:** Females of age 18-40 years, parity <5 presenting at gestational age >37 weeks on LMP and requiring induction of labour.
- **Exclusion criteria:** Females with chronic diabetes (BSR> 186mg/dl), anemia (Hb<10g/dl), renal disease (creatinine>1.2mg/dl), liver disease (AST>40IU, ALT>40IU,Morbidly obese females (BMI>35kg/m2), Macrosomic fetus (>4000grams baby weight on USG), severe pre eclampsia, eclampsia.

Study Instrument: Data was collected by filling Performa.

Procedure: After taking approval from the hospital ethical committee, 214 females who will fulfill the inclusion criteria were enrolled in the study from the labour room of the Department of Obstetrics and Gynecology, Shalamar Hospital Lahore. A detailed

history was taken to diagnose patients with gestational diabetes. Written informed consent was obtained. Demographic details (name, age, parity, BMI, gestational age) were noted. BSR (random sampling at the time of admission) was noted by glucometer and females were labeled as having GDM or not based on WHO criteria for the diagnosis of gestational diabetes. Then induction of labour was done by using a single dose of 3mg intra-vaginal pessary PGE2. Females were followed-up till delivery. During follow-up number of normal vaginal deliveries and the number of patients who underwent caesarean section was noted indications of caesarean section were also noted. All this information is recorded through Performa (attached).

Data Analysis Procedure: Data was entered and analyzed by SPSS version 21. Mean and SD was calculated for quantitative variables like age, gestational age, BMI, and BSR. Frequency and percentage were calculated for qualitative variables, like a caesarean section, Parity presented as frequency. A Chi-square test was applied to compare the frequency of cesarean section and frequency of GDM in both groups. P-value <0.05 was taken as significant. Effect modifiers like age, parity, gestational age, and BMI were controlled through stratification.

Results

In the current study, the mean age of the patients was 27.8±4.4 years. Mean gestational age was 37.1±3.8 weeks and mean BMI was 28.6±4.1 kg/m2. Primigravida were 88 (41.1%) and multigravidas were 126 (58.9%). Gestational diabetes was found to be in 36 patients (16.8%). Caesarean section was performed in 77 patients (36%). Comparison of frequency of cesarean section in diabetic (GDM) and non-diabetic females undergoing induction of labour revealed majority of the caesarean sections performed in GDM patients (p=0.007). Table 1 shows the demographic data of the study population. Table 2 shows out of 214 patients who had induction of labour 77 (36%) patients delivered through caesarean section and 137 (64%) had a vaginal delivery. Table 3 shows 36 patients (16.8%) had Diabetes and 178 patients were non-diabetic. Women who were diabetic 20(56%) were delivered through caesarean section. The frequency of caesarean section was more in diabetic patients than non-diabetic patients (p=0.007). Table 4 shows Stratification with regard to age, gestational age, parity, and BMI.

Table 1: Demographic Data (n=214)

Demographic Information		Frequency	Percentage (%)
Age	18-30 yrs	158	73.8
	31-40 yrs	56	26.2
Gestational age	37+1-39 wks	163	76.2
	39+1-40 wks	51	23.8
Parity	Primi-gravida	88	41.1
	Multi-gravida	126	58.9
BMI (kg/m2)	<25	43	20.1
	>25	171	79.9

Table 2: Distribution of patients by caesarean section

C-Section	Number	Percentage
Yes	77	36.0
No	137	64.0
Total	214	100.0

Table 3: Comparison of frequency of cesarean section in Diabetic (GDM) and non-diabetic females Undergoing induction of labour

Gestational DM	Caesarean section		Total	P-value
	Yes	**No**		
Diabetic	20	16	36	**P=0.007**
Non-diabetic	57	121	178	
Total	77	137	214	

Table 4: Stratification for Age, Gestational age, Parity, BMI

	Caesarean section n=77		p-value
	Gestational diabetes n (%)	Non-diabetic n (%)	
Age			
18-30 yrs	2(4%)	47(96%)	0.706
31-40 yrs	18(64.3%)	10(35.3%)	0.033
Gestational age			
37+1-39 wks	16(25.5%)	47(74.6%)	0.002
39+1 to 41 wks	4(28.6%)	10(71.4%)	0.602
Parity			
Primigravida	11(23%)	37(77%)	0.049
Multigravida	9(31%)	20(69%)	0.028
BMI(kg/m2)			
< 25	1(7.7%)	12(92.3%)	0.903
> 25	19(29.7%)	45(70.3)	0.008

Discussion

The prevalence of gestational diabetes is increasing with time. It is shown in many studies that it is related to pre-pregnancy Body Mass Index (BMI), advanced maternal age, smoking, family history of diabetes, and decrease in physical activity. However different ethnic groups have different prevalence.[4,10,11] Study conducted in Bahawalpur concluded the risk of gestational diabetes was 22.58% in obese women which were higher than in non-obese women(6.45%).[12] Another study conducted at Khyber Teaching Hospital, Peshawar also found advanced maternal age, BMI, previous history of macrosomia being the risk factors for increased frequency of gestational diabetes.[13]

There is a complex relationship between induction of labour and caesarean delivery. Some studies that compared women who undergo induction of labour to those women who had spontaneous labour at the same gestational age found that the risk of caesarean delivery increased with the induction of labour[14] and some studies showed a decrease rate of caesarean delivery.[15,16,17] Poor bishop score at the time of induction is directly related to the risk of caesarean delivery.[18] The time of delivery in women with GDM is controversial.[19,20,21,22] Study conducted at Toronto Ontario teaching hospitals has been demonstrated that the risk of Caesarean delivery in women with Gestational diabetes was 29.6%.[23] Study conducted at Khyber teaching hospital Peshawar found out the frequency of Gestational Diabetes 26.3%. Our study showed an increase in the frequency of Gestational diabetes (16.8%) in pregnant women and an increase in the frequency of caesarean delivery in patients with GDM who undergo induction of labour at term (36%), these results are comparable to the results of above-mentioned studies. Many factors can contribute to this high frequency of caesarean section in diabetic women; one of them can be the low threshold of an obstetrician for caesarean section in diabetic women. Good glycemic control may reduce the perinatal and maternal morbidity.[24,25]

Conclusion

In our study, pregnant women with gestational diabetes have high caesarean section rate than normal vaginal delivery after induction of labour at term. Major factors that contribute to this high caesarean section rate in patients with gestational diabetes were advanced maternal age and high BMI.

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