

Risk Factors for Cesarean Delivery in Patients of Gestational Diabetes Mellitus at a Tertiary Care Centre - A Descriptive Observational Study

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Abstract

Introduction Gestational diabetes mellitus (GDM) is one of the most frequent metabolic disorders during pregnancy, with incidence rates ranging from 1.1% to 14.3%. It is important to identify which risk factors may lead to a cesarean delivery, so to plan the procedure in advance and to avoid possible complications for both the mother and the fetus. Therefore this study was conducted to identify the risk factors associated with cesarean section in pregnant women with GDM. **Objective :** To identify the risk factors associated with cesarean section in pregnant women with GDM **Study Design:** This was a descriptive observational study conducted in a tertiary care centre over a period of 1 year from January 2018 to December 2018 at SKIMS, Soura, Srinagar, Kashmir **Material & Methods:** 100 patients of Gestational Diabetes Mellitus were recruited and mode of delivery and various risk factors associated with cesarean delivery were evaluated **Results:** Among the patients of GDM, who underwent LSCS & NVD, mean age was significantly more (30.8 ± 3.75 years & 28.4 ± 3.42 years respectively, p value < 0.010) in LSCS group. BMI was significantly higher in GDM patients who underwent LSCS as compared to patients who underwent NVD (29.7 ± 2.49 kg/m² vs 25.3 ± 1.98 kg/m², p value < 0.001). Blood sugar fasting and postprandial values were significantly higher in patients of GDM who underwent LSCS as compared to patients who underwent NVD [BS(F) - 99 ± 14.11 g/dl vs 87.6 ± 7.51 g/dl, p value < 0.001 ; BS(PP) - 127.7 ± 30.79 g/dl vs 87.6 ± 7.51 g/dl, p value - 0.041]. Prior cesarean section was also an independent risk factor in deciding mode of delivery in patients of GDM. Among the patients who underwent LSCS, maximum were on insulin (56%) followed by diet (33.3%). Among group B (NVD), maximum patients were on diet (56%) followed by metformin (24%) **Conclusion:** The mean age of patients and BMI was higher in patients who underwent cesarean section ($p < 0.010$ and < 0.001 respectively). High blood sugar levels (fasting and postprandial), primigravida and prior cesarean section were associated with high chances of cesarean section ($p < 0.001$, 0.041 , 0.007 and 0.001 respectively). There were no significant difference between the 2 groups in regards to gestational age at delivery, the weight of newborn and the apgar score at 1 and 5 minutes after birth.

Key words: cesarean section, gestational diabetes mellitus,

INTRODUCTION

Gestational diabetes mellitus (GDM) is one of the most frequent metabolic disorders during pregnancy, with incidence rates ranging from 1.1% to 14.3% (1). It is associated with several

undesirable pregnancy outcomes, including an increased risk of premature rupture of membranes, preterm birth, fetal macrosomia and preeclampsia.

GDM by itself is not an indication for cesarean section and the delivery route in patients with this condition is based on an obstetric indication. Cesarean delivery is generally recommended in the presence of certain factors including cephalopelvic disproportion, unfavourable cervix for induction, fetal macrosomia, fetal distress and risk of intrauterine death. In addition, other factors associated with cesarean deliveries are age above 30 years, occurrence of prior cesarean deliveries, first gestation, cervical dilation of 3cms or less at time of delivery, gestational age below 37 weeks or above 40 weeks, non-cephalic presentation (2-4). Even though the cesarean section has no absolute contraindications, this procedure like any other surgical procedure, is not risk free. In some instances, however, the benefits associated with reducing the maternal-fetal morbidity and mortality outweigh the risks associated with performing a cesarean section (5). Some studies suggest that unplanned (emergency) cesarean section result in increased maternal morbidity compared with planned cesareans (6).

Hence, it is important to identify which risk factors may lead to a cesarean delivery, so to plan the procedure in advance and to avoid possible complications for both the mother and the fetus. Therefore this study was conducted to identify the risk factors related to birth by cesarean section in pregnant women with GDM.

METHODS

Study Design

This was a descriptive observational study conducted in a tertiary care centre over a period of 1 year from January 2018 to December 2018 at SKIMS, Soura, Srinagar, Kashmir. Ethical approval was taken.

Study Population

Singleton pregnant women at 24 weeks or more who attended maternity clinic and delivered at SKIMS Hospital, Soura, Srinagar, Kashmir.

Inclusion Criteria

1. Singleton pregnant women more than 24 weeks period of gestation
2. Pregnant women who were diagnosed with GDM
3. Age 20 years and above

Exclusion criteria

1. Multiple pregnancies
2. Pregnancy with chronic diseases and medical disorders

METHODOLOGY

100 patients who met inclusion criteria and consented for the study were recruited in the study from January 2019 to December 2019 in the Department of Obstetrics and Gynaecology, SKIMS Hospital, Soura, Srinagar, Kashmir. Informed consent from all patients was taken.

A proforma was prepared for each patient asking about her age, BMI, POG, obstetric history, past medical history, signs and symptoms on her first visit.

Women who were admitted to the labor/antenatal ward underwent basic investigations including blood group, CBC, RFTs, LFTs, Blood Sugar (Fasting and PP), & TSH.

Patients were divided into 2 groups according to mode of delivery (Group A -LSCS, Group B - NVD)

The primary outcomes evaluated were maternal age, parity, BMI, gravidity, prior cesarean section, type of treatment used.

Fetal parameters including birth weight, apgar score and chances of NICU admission were also recorded.

Gestational diabetes mellitus was defined as any degree of carbohydrate intolerance first detected during pregnancy (7). In all subjects, Oral Glucose Tolerance Test (OGTT) was done with 75 grams anhydrous glucose and plasma glucose was measured as fasting (after an overnight fast of at least 8 hours), one and two hours. The diagnosis of Gestational Diabetes Mellitus was made when any of the following plasma glucose values were as follows:

Blood sugar (Fasting) ≥ 92 mg/dl
1 hr value ≥ 180 mg/dl
2 hr value ≥ 153 mg/dl

Statistical Methods: The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean \pm SD and Categorical variables were expressed as percentages. Frequency distribution tables, and bar charts were used for data presentation. Chi-square test was employed to determine association of mode of delivery with different variables. P-value less than 0.05 was considered statistically significant.

RESULTS

In our study, 75 % patients of GDM underwent LSCS, and 25 % had normal delivery. Among the patients of GDM, who underwent LSCS & NVD, mean age was significantly more (30.8 ± 3.75 & 28.4 ± 3.42 years respectively, p value -0.010) in LSCS group. Similarly BMI was significantly higher in GDM patients who underwent LSCS as compared to patients who underwent NVD (29.7 ± 2.49 kg/m² vs 25.3 ± 1.98 kg/m², p value <0.001). There was no significant difference in gestational age among patients of GDM who underwent LSCS & NVD (28.7 ± 4.5 weeks & 28.8 ± 3.96 weeks respectively). Among the 42 primigravida patients, 27 had LSCS and 15 had NVD, depicting that primigravida is an independent risk factor for LSCS in patients of GDM. Blood sugar fasting and postprandial values were significantly higher in patients of GDM who underwent LSCS as compared to patients who underwent NVD [BS(F) - 99 ± 14.11 g/dl vs 87.6 ± 7.51 g/dl, p value <0.001; BS(PP) - 127.7 ± 30.79 g/dl vs 87.6 ± 7.51 g/dl, p value - 0.041]. Prior cesarean section was also an independent risk factor in deciding mode of delivery in patients of GDM (Table 1).

Fetal parameters including birth weight, apgar score and chances of NICU admission had no significant association with mode of delivery in patients of GDM (Table 2).

Treatment with diet or use of hypoglycemic agents and / or insulin had influence on outcome as depicted in Table 3. Among the patients who underwent LSCS, maximum were on insulin (56%) followed by diet (33.3%). Among group B (NVD), maximum patients were on diet (56%) followed by metformin (24%) (Table 3).

Regarding the BMI when the parameter was categorized as normal or overweight, the chance of cesarean delivery increased by 1.0 and 1.9 times respectively, whereas obesity increased the

chance of this procedure by 3.2 times (Table 4). When we analysed the OR, we found that primigravida women presented a 4.2 times higher chance of cesarean section. Similarly, pregnant women with history of previous cesarean section had 5.7 times greater chance of requiring a new cesarean delivery. These data are depicted in Table 4.

Parameter	Group A- LSCS	Group B-NVD	P-value
Age (years)	30.8±3.75	28.4±3.42	0.010*
BMI	29.7±2.49	25.3±1.98	<0.001*
Gestational Age (weeks)	28.7±4.5	28.8±3.96	0.949
Primigravida	27 (64.2 %)	15 (35.7%)	0.007*
Prior cesarean section	35 (94.5%)	2 (5.4%)	0.001*
Blood Sugar (Fasting)	99±14.11	87.6±7.51	<0.001*
Blood Sugar (PP)	127.7±30.79	113.5±15.76	0.041*

**Statistically Significant Difference (P-value<0.05)*

	LSCS	NVD	
Baby weight (Kg)	3.28±0.63	3.19±0.42	0.517
Apgar score	7.28±0.91	7.68±0.89	0.070
NICU admission	19 (25.3%)	5 (22.7%)	0.803

**Statistically Significant Difference (P-value<0.05)*

Treatment	Group A- LSCS		Group B - NVD		P-value
	No.	%age	No.	%age	
Diet	25	33.3	14	56.0	0.004*
Metformin	5	6.66	6	24.0	

Insulin	42	56.0	3	12.0	
Metformin+ Insulin	3	4.0	2	8.0	
Total	75	100	25	100	

Statistically Significant (P-value<0.05)

Table 4: Factors associated with cesarean sections			
	OR	95% CI	P-value
Age > 30	1.21	0.78-2.58	0.453
Primigravida	4.2	3.17-7.42	<0.001*
Prior cesarean section	5.7	3.16-8.96	<0.001*
BSF > 90	1.51	0.29-3.94	0.087
PP > 120	0.95	0.83-2.36	0.364
BMI			
< 18.5	0.9	0.72-2.24	0.744
18.5-24.9	1.0	-	-
25-29.9	1.9	1.61-3.43	0.065
≥ 30	3.2	1.92-4.76	0.004*
Treatment			
Diet	0.52	0.03-8.24	0.644
Metformin	1.34	0.06-32.96	0.857
Insulin	0.08	0.01-1.68	0.103
Metformin + Insulin	1.00	-	-

Statistically Significant (P-value<0.05)

DISCUSSION

Due to increased maternal and fetal complications arising from GDM, it became evident that cesarean delivery is choice for many obstetricians, as observed in our study. However, GDM alone is not an indication for cesarean section or for termination before 38 weeks. In our study, 75 % patients of GDM underwent LSCS and 25 % had normal delivery. In a study published by Moore et al, cesarean rates in control versus GDM women were 35 % and 69.44% respectively (8).

We observed a significant relationship between a prior cesarean section and cesarean delivery in women with GDM (OR= 5.7). Even today the occurrence of first cesarean section still determine cesarean section in the following pregnancy. According to some studies, in women with previous cesarean section there are chances of rupture due to fetal macrosomia (9).

In our study we found in patients with BMI ≥ 30 kg/m² odds of having cesarean section were higher (OR-3.2). Gonclaves et al showed a direct relationship between BMI and cesarean rates, especially in group with BMI ≥ 30 kg/m² (p=0.004) (10).

In our study, patients who required insulin for the blood sugar control were the ones who underwent cesarean delivery most frequent. A study published by Landon et al compared the perinatal outcome in pregnant women with GDM. The results showed a significant reduction in cesarean rates among GDM women treated pharmacologically compared with a control group (13% versus 19.7% p = 0.01) (11). GDM treatment reduces the frequency of fetuses large for gestational age, which may have contributed to the lower rate of cesarean section. Our study was inconsistent with this finding.

Our study found a higher incidence of cesarean section than normal delivery in pregnant women with GDM (75% vs 25%). Among the factors that led to increased incidence are a history of a prior cesarean section, first pregnancy, obesity, fasting and postprandial blood glucose levels & GDM patients on insulin treatment.

CONCLUSION

Among the maternal characteristics, the mean age of patients and BMI was higher in patients who underwent cesarean section (p - 0.010 and < 0.001 respectively). High blood sugar levels (fasting and postprandial), primigravida and prior cesarean section were associated with high chances of cesarean section (p < 0.001, 0.041, 0.007 and 0.001 respectively). There were no significant difference between the 2 groups in regards to gestational age at delivery, the weight of newborn and the apgar score at 1 and 5 minutes after birth.

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