

Original Research Article

DOI: <https://dx.doi.org/10.18203/2349-2902.ijssurgery20233670>

A comparative study of short-term post caesarean section complications in normal versus gestational diabetic mothers

**M. Muktar Hossain^{1*}, Sadia Rahman², M. Mir Sufian³, M. Saiful Islam⁴,
M. Abu Jar Gaffar⁵, Mirza Shakil Ahmed⁶**

¹Department of Surgery, Naogaon Medical College, Naogaon, Bangladesh

²Department of Obstetrics and Gynecology, 250 Bedded General Hospital, Naogaon, Bangladesh

³Department of Cardiology, 250 Bedded General Hospital, Naogaon, Bangladesh

⁴Department of Surgery, Niyamotpur Upazilla Health Complex, Niyamotpur, Naogaon, Bangladesh

⁵Endocrinologist, Naogaon Medical College, Naogaon, Bangladesh

⁶Department of Pathology, Naogaon Medical College, Naogaon, Bangladesh

Received: 14 October 2023

Revised: 13 November 2023

Accepted: 17 November 2023

***Correspondence:**

Dr. M. Muktar Hossain,

E-mail: drmuktar@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: There are variegated complications following caesarean section that may compel the mothers to stay longer in hospital with sufferings or to carry a long period of morbidity at home. Unfortunately, these complications are more in gestational diabetes mellitus (GDM). This study was designed to compare post-operative complications following caesarean sections in normal and GDM Mothers.

Methods: This study was conducted in the Department of Obstetrics and Gynecology, 250 bedded general hospital, Naogaon, Bangladesh, from January 2022 to June 2023. In this study 74 participants were included consecutively. Among these, 37 mothers had GDM and 37 had normal pregnancies as control. After caesarean section, data regarding sociodemographic, obstetric and surgical profile were recorded and analyzed.

Results: The mean age of the participants in GDM group was 31.32 ± 5.56 years and in normal pregnant group was 29.24 ± 5.56 years. Post-operative pain were almost same in both groups. Mean time of PO mobilization was 25.2 hours in GDM group and 20.2 hours in normal group. 16 patients in GDM group had PO complications and 6 in normal mothers. Among the complications SSI and UTI were more common in GDM group. No mortality was recorded. Average hospital stay were 5.9 days and 4.9 days in GDM and normal patients.

Conclusions: Some post-operative complications are more common in GDM mothers. So, good glycemic control, appropriate surgical technique and proper post-operative care are needed to reduce post-operative morbidity and hospital stay.

Keyword: Gestational diabetes, Caesarean section, Complication

INTRODUCTION

Pregnancy is a normal physiologocal event and ends in delivery of fetus. The normal way of delivery is vaginal route and some mothers need caesarean section for delivery. Caesarean section is an operative procedure to deliver fetus through an abdominal and uterine incision

and needs anaesthesia, commonly subarachnoid spinal block. So like any other surgical procedure caesarean section also has some complications. The common complications are haemorrhage, shock, disseminated intravascular coagulation, organ injuries, fetal injuries, paralytic ileus, surgical site infection, incisional hernia etc. These complications are more when pregnancy is

complicated by other pathology. GDM is one of the common disorders that affects both mother and fetus during pregnancy.³ GDM by itself is not an indication for caesarean section. The delivery route in patient with GDM is based on an obstetric decision. Caesarean section is generally recommended in presence of cephalo pelvic disproportion (CPD), unfavourable cervix, fetal macrosomia, fetal distress and risk of intrauterine fetal death. The incidence of GDM is increasing world wide and more in the third world countries.³ On the other hand, the incidence of caesarean delivery is also increasing.⁴ GDM is a metabolic derangement that predisposes to more post operative complications.^{5,6} So, surgeons are facing more Caesarean section cases and more post-caesarean complications. This situation has made a burden to surgical team. Many studies showed more post operative complications in GDM mothers.^{1,11} The aim of this study is to compare the results in terms of wound complications, post operative pain, hospital stay, morbidity and other complications in early post-operative period. The study is believed to reveal the differences in post operative outcomes between GDM and normal mothers and would enable the surgeons to take necessary precautions to prevent complications.

METHODS

This prospective study was carried out on patients presented with pregnancy and admitted in the department of obstetrics and gynaecology, 250 bedded general hospital, Naogaon, Bangladesh during the study period from January 2022 to June 2023. All participants are pregnant and admitted in the study place within the study period for caesarean section. We excluded from this study, patients with previous bad obstetrical history, previous caesarean section, patient requiring general anaesthesia, patient with eclampsia, presence of severe systemic disease, eg. renal disease, pulmonary disease, cardiac disease etc., presence of profound shock etc.

In this study we enrolled 74 patients consecutively and divided the participants into two groups. Group I included 37 mothers with GDM and group II was for 37 mothers without GDM. Glycemic control was maintained in GDM patients with insulin. Following standard procedure, all participants underwent caesarean section under subarachnoid spinal block (SAB) through lower right paramedian incision. Antibiotic prophylaxis and analgesics were given as per local practice. After operation, all patients were closely monitored to find out any complication. Preoperative data were collected by a standard questionnaire containing all the variables of interest regarding presenting symptoms and findings in clinical examination and also routine and supportive investigations. Postoperatively, data regarding follow up and complications were recorded. The following variables were compared between two groups: post operative pain at 4, 8, 12 and 24 hours (VAS), patient mobilization after surgery, post operative respiratory complication, post operative abdominal distension,

surgical site infection, fever, UTI, length of postoperative hospital stay and death (if any). All data were recorded, compiled and analysed using computer software. Before starting the study, ethical clearance was taken from the superintendent of the 250 bedded general hospital, Naogaon.

RESULTS

In this study total 74 patients were included. In group I of GDM patients, blood sugar was maintained at an acceptable level with short acting insulin. Table 1 showed the basic profile of all the participants. Mean age of GDM patients was 31.32 years with SD=5.56 years and that of group II were 29.24 years and 5.56 years respectively. This difference was statistically not significant ($p>0.073$). Mean duration of pregnancy and SD were 37.06 ± 0.71 weeks and 38.28 ± 0.99 weeks in group I and II respectively without any statistical significance ($p>1.58$). Average RBS were 122.76 mg/dl and 102.22 mg/dl respectively. Here the difference was also not significant statistically ($p>7.64$). In this study we tried to assess post-operative pain with visual analogue scale (VAS). We recorded pain score at 4 hours, 8 hours, 12 hours, 24 hour and 48 hours post operatively. As was shown in Table 2, we did not find any statistical significance ($p>0.789$) in pain score between the two groups. We made a close follow up to record the post-operative recovery (Table 3). Average stay period in post-operative ward was 7.3 ± 1.4 hours in GDM group and 6.4 ± 0.96 hours in normal mothers ($p>0.046$). Average time to start oral feeding were 18.5 ± 4.4 hours and 15.1 ± 4.6 hours respectively ($p>0.044$). Patient was able to walk after 25.2 ± 7.4 hours post operatively in GDM group and that was 20.2 ± 4.9 hours in normal mothers ($p>0.114$). Bowel moved 26.2 ± 9.7 hours and 24.4 ± 6.6 hours after surgery respectively ($p>0.56$). Average period of hospital stay was 5.9 ± 1.6 days and 4.9 ± 0.74 days respectively ($p>0.004$). Longest stay period was 10 days in GDM group and 6 days in normal patients. Here the stay period in both post-operative ward and in hospital were statistically significant. Regarding the complications, 3 (8.11%) patients in GDM group and 1 (2.7%) patient in normal group developed surgical site infection (SSI). Respiratory complications developed in 2 (5.40%) cases and 1 (2.70%) case respectively. Three (8.11%) GDM patients developed UTI and 2 (5.40%) cases developed UTI in normal group. Two (5.40%) patients from each group developed abdominal distension. Only one patient (2.70%) from GDM group developed post-partum hemorrhage (PPH). Two (5.40%) GDM patients had serum electrolytes imbalance and all normal mothers had normal electrolytes. One patient (2.70%) developed hypoglycemia and 2 patient (5.40%) developed hyperglycemia in GDM group. But all participants had normal blood sugar in normal mother group. All the differences in the incidence of complications were significant statistically except abdominal distension. We did not face any mortality in this study.

Table 1: Baseline characteristics of the study patients, (n=74).

Baseline characteristic	GDM mothers, (n=37), mean \pm SD	Normal mothers, (n=37), mean \pm SD	P value
Age (in years)	31.3 \pm 5.56	29.2 \pm 5.56	0.73ns
Duration of pregnancy (In weeks)	37.1 \pm 0.71	38.3 \pm 0.98	1.58s
RBS (mg/dl)	122.76 \pm 12.7	102.21 \pm 7.28	0.61ns

ns=Not significant, s=Significant.

Table 2: Post-operative pain evaluation, (VAS, 0 to 10), (n=74).

Time after surgery	GDM mothers (n=37), mean	Normal mothers (n=37), mean	P value
At 4 hours	4.9	5.1	
At 8 hours	4.2	4.7	
At 12 hours	4.1	3.8	0.789 ns
At 24 hours	3.6	3.5	
At 48 hours	2.9	2.8	

ns=Not significant.

Table 3: Post-operative recovery, (n=74).

Post-operative	GDM Mothers, (n=34), mean \pm SD	Normal mothers (n=34), mean \pm SD	P value
Stay period in post operative ward (in hours)	7.31 \pm 1.38	6.38 \pm 0.96	0.71ns
Start of oral feeding (In hours)	18.5 \pm 4.4	15.2 \pm 4.6	0.045s
Start of walking (in hours)	25.2 \pm 7.4	20.2 \pm 4.9	0.114s
First bowel movement (In hours)	26.2 \pm 9.7	24.4 \pm 6.6	0.56 ns
Hospital stays period (in days)	5.9 \pm 1.6	4.9 \pm 0.74	0.0044s

ns=Not significant, s=Significant

Table 4: Post-operative complications, (n=74).

Complication	GDM mothers, (n=37) (%)	Normal mothers, (n=37) (%)	P value
SSI			
Mild	2 (5.40)	1 (2.70)	
Moderate	0 (0)	0 (0)	0.71ns
Severe	1 (2.70)	0 (0)	
RTI	2 (5.40)	1 (2.70)	
UTI	3 (8.11)	2 (5.40)	0.61ns
Abdominal distention	2 (5.40)	1 (2.70)	
PPH	1 (2.70)	0 (0)	0.63ns
Electrolytes imbalance	2 (5.40)	0 (0)	
Hypo-glycemia	1 (2.70)	0 (0)	0.57ns
Hyper-glycemia	2 (5.40)	0 (0)	

Ns=Not significant

DISCUSSION

GDM is a metabolic state in which carbohydrate intolerance develops during pregnancy and usually diagnosed during 2nd or 3rd trimester. About 6-9% of pregnancy is complicated by diabetes mellitus and 90% of these patients are GDM.¹ In USA diabetes in pregnancy is about 10%, but in some countries, it may be as high as

17.8-41.9%.⁸ GDM is usually diagnosed by glucose tolerance test (GTT).

In this study, the mean age of the patients was 31.32 years in GDM and 29.24 years in normal patients. Though average age was higher in GDM group, it was statistically not significant ($p>0.05$). Other studies also showed almost similar age distribution.^{2,5,11,12} This study showed

that the duration of pregnancy in GDM mother was one week less than that of normal mothers. Though there is no uniformity all over the world regarding the timing of delivery of GDM mother, this finding was also supported by some studies.⁷ Blood sugar level before cesarean section was maintained within the target level.⁸ We did not find any significant difference in post operative pain score in both groups as all patients were given adequate analgesia. Average stay period in hospital in this study was higher in GDM group than in normal mother with statistical significance. Certainly, complicated mothers had to stay more in hospital. But other studies showed less hospital stay. This longer hospital stay may be due to less availability of community health care providers.⁹⁻¹¹

In this study, normal patients started oral feeding significantly earlier than GDM mothers. Some studies showed no significant consequence following early oral feeding even 6 hours following cesarean operation.¹² We found no significant difference in post operative mobilization time and time of first bowel movement after the surgery. Regarding the complications, we found 4 patients with surgical site infection (SSI). Among them 3 (8.11%) in GDM group and 1 (2.70%) in normal group. As diabetes mellitus predisposes the patient to infection SSI was significantly higher in GDM patients. In normal group SSI incidence was within expected range, though some studies showed higher incidence.^{13,16,17,19}

We found total 3 cases of respiratory tract infection and 5 cases of urinary tract infection. Among 5 cases of UTI 3 (8.11%) cases were found in GDM group. All infective complications are more common in GDM, though in this study it was not so high.¹⁸ We found no significant difference in post operative abdominal distention. Regarding post-partum hemorrhage (PPH), only one patient in GDM group developed PPH. It was much less than other studies.^{14,15,18} It may be due to improved surgical technique and expertise and patient selection criteria. We did not find any imbalance in serum electrolytes and blood sugar in normal mother group. But due to GDM and IV insulin we found 2 (5.40%) patients with electrolytes imbalance and 3 (8.11%) patients with altered glycemic control in GDM group. All were managed well post operatively. There was no mortality in this study.

Limitations

This study was conducted in a single center with small sample size and few parameters. So, to know more about the post cesarean section complications the study should be conducted in multiple centers with a big sample size.

CONCLUSION

In this study we found infective complications that were more common in GDM patients. To combat these, we should be careful regarding antibiotic prophylaxis,

surgical procedures, glycemic control and post operative management.

Recommendations

This study revealed more complications in GDM mothers. So, early detection and treatment of complications in addition to meticulous surgery, judicious use of antibiotics and control of blood sugar are recommended. But to be more specific, a large scale multicentric extended study is needed.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Yuval K, Asnat W, Eyal S. Surgical Site Infection following cesarean deliveries: trends and risk factors. *J Matern Fetal Neonatal Med.* 2017;30(1):8-12.
2. Oluwasegun AA, Christina L, Ofure VO, Akinwale SA, Mojisola EF, Oluwagbemiga AO et al. Disparities in Incidences of Cesarean Section Among Women with Gestational Diabetes Mellitus in the United States. *Cureus.* 2022;14(9):e29400.
3. Kesly LW, Vivienne LS, Emily EF, Ronit K, Joseph KH. Cesarean delivery rates and indications in pregnancies complicated by diabetes. *J Matern Fetal Neonatal Med.* 2022;35(26):10375-83.
4. Moses RG, Knights SJ, Lucas EM, Moses M, Russell KG, Coleman KJ et al. Gestational diabetes: is a higher cesarean section rate inevitable. *Diabetes Care.* 2000;23(1):15-7.
5. Saad B, Hanane S, Ahmed M. Epidemiological profile of maternal complications related to cesarean section at the Al Farabi Hospital in Oujda. *Pan Afr Med J.* 2017;27:108.
6. Dimitrova V, Pandeva I, Tsankova M, Pranchev N. Post-operative complications following elective and emergency cesarean delivery. *Akush Ginekol (Sofia).* 2005;44(7):15-21.
7. Xuan Li, Teng-Teng L, Rui-Xian T, Jia-Jia F, Xing-Xing W, Hui-Hui Y et al. Gestational diabetes mellitus: The optimal time of delivery. *World J Diabetes.* 2023;14(3):179-87.
8. Michelle L, Asha R. Gestational Diabetes: Overview with Emphasis on Medical Management. *Int J Environ Res Public Health.* 2020;17(24):9573.
9. Bahaeldin H, Omer M, Nadiah A, Ishag A. Length of hospital Stay After Cesarean Delivery and Its Determinants Among Women in Eastern Sudan. *Int J Womens Health.* 2022;14:731-8.
10. Anne RK, Linn HA, Dorthe HJ, Henrik K, Finn FL et al. Length of hospital stay after cesarean section in Denmark from 2004 to 2016: A national register-based study. *Acta Obstet Gynecol Scandinavica.* 2016;100(2):244-51.

11. Kathy CM, Rebkah T, Stephen TC, Robin BK. Factors affecting hospital length of stay after cesarean delivery. *Am J Obstetr Gynecol*. 2020;222(1):S694-5.
12. Gocmen A, Gocmen M, Saraoglu M. Early Post-operative Feeding after Caesarean Delivery. *J Int Med Res*. 2002;30:506-11.
13. Enrique RA. Complications of Cesarean Operation, in *Caesarean Section*, IntechOpen. 2018.
14. Everett FM, Sharon E, Maureen H, Robyn C, Grainger L, John CM. Postpartum hemorrhage after cesarean delivery: an analysis of risk factors. *South Med J*. 2005;98(7):681-5.
15. Sue F, Jagidesa M. Postpartum hemorrhage associated with cesarean hysterectomy. *Best Pract Res Clin Obstetr Gynaecol*. 2013;27(2):233-49.
16. Carol AK, Graffunder EM, Vinciguerra TJ, Venezia RA. Risk Factors for Surgical-Site Infections Following Cesarean Section. *Infect Contr Hospital Epidemiol*. 2012;22(10):613-7.
17. Mohammad R, Marzieh SG, Malihe A, Faezeh K, Fatemeh S, Koroush S et al. Prevalence, causes, and complications of cesarean delivery in Iran: A systematic review and meta-analysis. *Int J Reprod Biomed*. 2018;16(4):221-34.
18. Ghasem N, Houshang J, Davood I. Investigation on Urinary Tract Infections Following C-section and Assessment of CTX-M and TEM Genes Prevalence in *Escherichia coli* and *Klebsiella* Causing the Infections in Lamerd. *Int J Med Res Heal Sci*. 2016;5(12):117-24.
19. Youssouf T, Ibrahima T, Amadou B, Malado G, Sidy T, Soumaila S et al. Infectious Complications after Cesarean Delivery: Trends of Incidences, Risk Factors, and Prognosis in a Third Health Level Center in Africa. Case of Gabriel Toure Teaching Hospital. *Open J Obstetr Gynecol*. 2018;8(1):

Cite this article as: Hossain MM, Rahman S, Sufian MM, Islam MS, Jar Gaffar MA, Ahmed MS. A comparative study of short-term post caesarean section complications in normal versus gestational diabetic mothers. *Int Surg J* 2023;10:1891-5.