

Analysis of Different Factors Associated with Re-Laparotomy after Cesarean Section Deliveries at a Tertiary Care Hospital

Risk Factors Associated with Re-Laparotomy after Cesarean Section

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ABSTRACT

Objective: To evaluate the risk factors associated with re-laparotomy after cesarean section.

Study Design: Prospective case-controlled Analysis

Place and Duration of Study: This study was conducted at the Gynecology department of Nishtar Medical University & Hospital Multan from Aug 2020 to Jan 2021 for a period of six months.

Materials and Methods: The study involved all the cases who underwent re-laparotomy after a cesarean section. The study cases were matched with control subjects who underwent cesarean section without re-laparotomy after cesarean. The study participants were compared for demographic information, obstetric clinical data, and indications of the cesarean section.

Results: Out of a total of 837 cesarean section deliveries conducted in the hospital within the study period, 19 (2.2%) underwent exploratory re-laparotomy. The average time between primary surgical procedure and re-laparotomy was 1.2 ± 0.5 days. Postpartum hemorrhage (PPH) was the major indication of re-laparotomy reported in 12 (63.1%) women. The leading indications of cesarean section were multiple prior cesareans (18, 31%), fetal distress (9, 15.5%), placental previa (7, 12%), and placental abruption (6, 10.3%). Upon multivariate logistic regression, Placenta previa (OR 5.97; CI 0.96- 21.3), fetal macrosomia (OR 5.61; CI 0.91-23.1), and pre-Eclampsia were found to be significant risk factors of re-laparotomy.

Conclusion: In the present study, re-laparotomy was conducted in 2.2% of cases during the study period. Placenta previa, fetal macrosomia, and pre-Eclampsia were the strongest risk factors causing re-laparotomy after cesarean section.

Key Words: Cesarean section, relaparotomy, risk factors, obstetric complications

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INTRODUCTION

Globally, the rate of cesarean section deliveries is constantly on the rise both due to maternal factors, such as obesity and late pregnancy age, and obstetric practices like epidural anesthesia and labor induction^(1, 2). According to the Center for Disease Control and Prevention report of 2020, 31.7% of overall births in the USA are by cesarean section⁽³⁾.

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The increasing rate of cesarean section is caused by both planned and unplanned (emergency) cesarean deliveries. Although unplanned or emergency cesarean section has a larger share in maternal morbidity rate. Any cesarean section triggers a series of future cesarean delivery as contemporary obstetric intervention and obstetricians prefer repeat cesarean to a subsequent trial of labor⁽⁴⁾.

Recent data has found a correlation between maternal complications and the number of deliveries through cesarean sections⁽⁵⁾. Therefore, as the trend of cesarean deliveries rises, obstetrician fears the risk of escalating maternal complications. In this regard, re-laparotomy after cesarean delivery is a life-threatening procedure that not only poses a high risk of maternal mortality but also acts as a critical challenge for the obstetrician. Thus, in the last two decades, multiple studies have been conducted to report the incidence rate of re-laparotomy and investigate the associated factors^(6, 7). However, Pakistan lacks behind in this critical research area. Similarly, only a few studies have conducted comparative research to investigate the risk factors

associated with re-laparotomy after cesarean delivery. Therefore, the present study was designed to evaluate the risk factors associated with re-laparotomy after cesarean section by comparing the clinical obstetric data of re-laparotomy cases with the control subjects.

MATERIALS AND METHODS

This prospective study was conducted at the gynecology department of Nishtar Medical University & hospital from Aug 2020 to Jan 2021. During this period all the cases who had undergone exploratory re-laparotomy were included in the study. For each case, 2 control subjects who had just undergone cesarean section without re-laparotomy within the same study period were randomly chosen from the data registry. All the participants were approached through their contact numbers and were informed of the study objectives and their consent was sought. The ethical approval was taken from the ethical review committee of the hospital. The women from both groups were investigated for maternal age; gestational age; parity, gravidity; history of a mode of deliveries, miscarriages; elective v/s emergency primary operation; birth weight, duration of cesarean operation. Additionally, indications of cesarean and re-laparotomy were also observed. The data was then analyzed to predict the risk factors of re-laparotomy. Preterm delivery was characterized as births that took place before 34 weeks of gestation ⁽⁸⁾. Both essential hypertension and pregnancy-induced hypertension were considered hypertensive disorders complicating pregnancy. Operative time was considered from skin incision to closure of skin incision. Lastly, fetal macrosomia was defined as birth weight greater than 4kg ⁽⁹⁾, and fetal distress was detected through cardiotocography (CTG). Statistical analysis

SPSS (version 18) was used for statistical analysis. Fisher exact test was used to find a statistical difference between categorical variables whereas student's t-test was used to determine statistically different continuous variables. Multivariate analysis was conducted by including all the independent variables. The analysis was then presented as odd ratios (OR) and confidence interval (CI). A p-value (2-sided) of less than 0.05 was considered statistically significant.

RESULTS

During 6 months, a total of 837 caesarian sections were conducted. Out of which, 19 (2.2%) underwent re-laparotomy. The majority of patients, 17 (89.4%) required re-laparotomy in less than 24 hours of cesarean section while the remaining 2 (10.5%) were the cases of sepsis who were opened after 2-3 days. However, 1 patient (5.2%) patient presented with urinary incontinence due to Utero-Vesical fistula after 4 four weeks of cesarian section and relaparotomy was

performed after 3 months (12 weeks) of the primary surgery. Therefore, the average time in between primary surgical procedure and re-laparotomy was 1.2 ± 0.5 days. An average of 3.7 ± 1.5 blood units were transfused to all patients. Postpartum hemorrhage (PPH) was the major indication of re-laparotomy reported in 12 (63.1%) women followed by pelvic hematoma (3, 15.7%), pelvic abscess (2, 10.5%), rectus sheath hematoma (1, 5.2%). Among the cases that underwent re-laparotomy, maternal mortality was reported in 3 (15.7%) cases ultimately due to disseminated intravascular coagulation (DIC) whereas no fetal death or immediate neonatal death was found. Among other 818 mothers who had cesarean delivery but didn't require re-laparotomy, 4 (0.48%) women died through the same period.

Table I represents the demographic and obstetric data of the study and control group. The patients in study groups had significantly increased number of prior cesarean section than control group (100% vs 54%, $p=0.003$); emergency cesareans (21% vs 15.7%, $p=0.04$); and duration of cesarean section (42.5 ± 22.8 vs 27.6 ± 13.4 , $p=0.003$).

The leading indications of cesarean operations were multiple previous cesareans (18, 31%), fetal distress (9, 15.5%), placental previa (7, 12%), and placental abruption (6, 10.3%) (Table 2).

Multiple logistic regression was conducted to explore the strongest predictors of re-laparotomy while considering the control group as a reference. Placenta previa (OR 5.97; CI 0.96- 21.3), fetal macrosomia (OR 5.61; CI 0.91-23.1), and pre-Eclampsia were found to be significant risk factors of re-laparotomy (Table 3).

Table No.1: Comparison of demographic and obstetric data between two groups (N=57)

Variables	Study group (n=19)	Control group (n=38)	P-value
Maternal age, years	34.3 ± 5.4	32.1 ± 5.3	0.7
Gestational age, weeks	36.4 ± 1.8	37.5 ± 2.56	0.96
Parity	2.2 ± 1.65	4.8 ± 1.4	0.6
Gravidity	2.2 ± 1.9	1.89 ± 1.2	0.2
History of CS, n (%)	19 (100%)	21 (54%)	0.003
Emergency CS, n (%)	4 (21%)	6 (15.7%)	0.04
Duration of CS, min	42.5 ± 22.8	27.6 ± 13.4	0.003
Preterm delivery, n (%)	(14.5%)	(11.2%)	0.07
Fetal weight, g	3.3 ± 0.67	3.1 ± 0.431	0.7

Table No.2: Factors responsible for Caesarian section (N=58)

Factors	N (%)
Placenta previa	7 (12%)
Fetal macrosomia	4 (6.8%)
Eclampsia	3 (5.1%)
Fetal distress	9 (15.5%)
Tender scar	1 (1.7%)
Multiple CS	18 (31%)
Twin fetal pregnancy	2 (3.4%)
Placental abruption	6 (10.3%)
The secondary arrest of labor	5 (8.6%)

Table No.3: Multivariate analysis of potential predictors of re-laparotomy (n=58)

Variables	Control group (n=38)	Study group (n=19),OR (95% CI)	P-value
Placenta previa	1.0	5.97 (0.96-21.3)	0.003
Parity	1.0	0.76 (0.32-1.74)	0.64
History of CS	1.0	0.65 (0.142-1.85)	0.71
Fetal macrosomia	1.0	5.61 (0.91-23.1)	0.031
Pre-Eclampsia	1.0	4.3 (0.91-15.3)	0.03
Arrest of labor	1.0	2.2 (0.5-6.3)	0.23

DISCUSSION

In our study site, the rate of re-laparotomy was 2.2% during the study period. This rate doesn't comply with the majority of previous studies that reported a re-laparotomy rate in between 0.2-0.7%^(10,11). The incredibly higher rate in our study can be justified by unaware women with low literacy rate who doesn't acquire proper antenatal care which consequently increases the rate of emergency cesareans. These emergency cesareans significantly multiplied the incidence of re-laparotomy (p=0.04). Seal et al conducted a similar study and found that among 66 cases of re-laparotomy, 63 (95.5%) had a history of unplanned cesarean delivery. Under this concept, the reporting of low rates of re-laparotomy being conducted in developing countries with high literacy rates, good health care services, and a low rate of unplanned cesareans is understandable.

The majority of patients in the present study reported PPH as the leading indication of re-laparotomy, affecting 63.1% of women. This finding goes hand in hand with the results of previous studies that found intra-abdominal bleeding as the most prevalent factor behind re-laparotomy; however, the rate of women with this presentation varies. In this regard, the PPH rate

reported in our study is comparable with some previous studies^(12,13). Similarly, Kessous et al. documented 70% with an indication of re-laparotomy for laparotomy⁽¹⁴⁾. Given this high prevalence, high-risk women are recommended to be actively managed either through oxytocin infusion or rectal misoprostol^(15, 16). An average of 2.3 hours gap was taken between primary surgical procedure and re-laparotomy, in agreement with previous studies⁽¹⁷⁾. 2 (10.5%) cases presented with pelvic access, as an important indication of re-laparotomy, which was managed through drainage, evacuation, and antibiotics.

The above-discussed study concluded placenta previa, pre-Eclampsia, and fetal macrosomia as the strongest predictor of re-laparotomy in women who underwent cesarean section. These findings are approved by previous authors. For instance, Hasegawa et al. confirmed placenta previa as a risk factor for not only re-laparotomy following cesarean section but also associated with feto-maternal mortality and morbidity⁽¹⁸⁾. Kessous et al agreed with considering pre-eclampsia as a significant risk factor of re-laparotomy and extended the list of risk factors by adding PPH, cervical tear, placental abruption, uterine rupture⁽¹⁴⁾. Similarly, Levin et al found out the duration of cesarean section, the experience of an obstetrician, and placental abruption as significant predictors of re-laparotomy⁽¹⁰⁾. Sak et al. analyzed 113 cases of re-laparotomy and reported HELLP syndrome, previous cesareans, and placental abruption as considerable indicators of re-laparotomy⁽¹⁹⁾.

The current study reported 3 cases (15.7%) of maternal mortality with no fetal death. The mortality rate is unfortunately very high when compared with previous reports. Gedikibasi et al. examined 35 cases of re-laparotomy and reported only 1 case of maternal mortality⁽²⁰⁾. This study was conducted at a tertiary care hospital where more complicated cases are admitted or referred. In developing countries with low resources like Pakistan, statistics of tertiary care hospitals dealing with high-risk obstetrics cases vary. Neglected high risk cases are referred and are usually late by the time they arrive tertiary care hospital. This leads to greater probability of bad outcome in emergency care. This can be a factor for increased mortality rate in our study.

This study is limited in terms of smaller sample size and absence of a follow-up period after re-laparotomy. Therefore, more such multi-center studies with a larger sample size should be conducted in Pakistan which will contribute significantly to the improvement of clinical practices and decrement of feto-maternal mortality and morbidity.

CONCLUSION

In the present study, re-laparotomy was conducted in 2.2% of cases during the study period. Placenta previa,

fetal macrosomia, and pre-Eclampsia were the strongest risk factors causing re-laparotomy after cesarean section.

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