Return to the Operation Theatre: An Analysis of Repeat Surgeries in Operative Obstetrics

Maimoona Ahmed¹ · Sunil T. Pandya¹ · Tarakeswari Supraneni¹

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About the Author

Dr. Maimoona Ahmed has completed her under graduation and post-graduation in Obstetrics and Gynecology from Grant medical college and Sir JJ Group of Hospitals, Mumbai. She has worked as Assistant Professor in the Department of OBGY at GMC and Sir JJ Group of Hospitals, Mumbai. Currently she is pursuing Fellowship Programme in High risk Pregnancy and Perinatology at Fernandez Hospital, Hyderabad.

Abstract

Purpose To determine the risk factors and associated comorbidities with a relaparotomy after primary surgery in pregnant mothers and to identify preventable causes.

Dr. Maimoona Ahmed, MS, is a Fellow in High Risk Pregnancy and Perinatology at Fernandez Hospital, Hyderabad, India; Dr. Sunil T. Pandya, MD, is Head of Department of Anaesthesia, Pain and Critical Care at Fernandez Hospital, Hyderabad; Dr. Tarakeswari Supraneni, MD, Head of Department, High Risk Pregnancy at Fernandez Hospital, Hyderabad.

✉ Maimoona Ahmed
azulemontana@gmail.com

Sunil T. Pandya
suniltp05@gmail.com

Tarakeswari Supraneni
drtara@fernandezhospital.com

¹ Fernandez Hospital, Hyderabad, India

Methods A retrospective observational study was done at a tertiary care centre from January 2009 till August 2014. All records of exploratory laparotomy following primary surgery in the obstetric population during this period were retrieved from the hospital database and analysed.

Results The incidence of relaparotomy was 0.22 %. In 94 % cases, the primary surgery was caesarean section. The commonest indication for relaparotomy was due to haemorrhagic complications like bleeding and haematoma (66.8 %). Sepsis was seen in 36.1 % cases with the predominant organism isolated being E coli (54 %). Most common comorbidity was hypertensive disorders (58 %) followed by liver disorders (19 %). 33.3 % needed ventilatory support, 30.5 % needed massive blood transfusion, 16.6 % were on total parenteral nutrition and 2.7 % needed renal replacement therapy. Maternal mortality was 2.8 %.

Conclusion Relaparotomy following caesarean section is considered a near-miss mortality. Care must be taken in primary surgery with meticulous attention to haemostasis.

Strict postoperative vigilance must be adhered to for timely detection of complications and appropriate intervention.

Keywords Caesarean section · Relaparotomy · Hemorrhage · Sepsis · Near-miss mortality

Introduction

There is an increasing incidence of caesarean section all over the world [1]. It is a major surgery, and morbidity is higher as compared to vaginal delivery [2]. One of the rare but serious post-caesarean morbidities is a relaparotomy so much so that it is considered to be a near-miss mortality [3]. The purpose of a relaparotomy is to manage complications of the previous surgery such as secure haemostasis, manage intraabdominal infection or sepsis, relieve intestinal obstruction and maintain intestinal continuity or to carry out delayed curative surgery. A second surgery increases not only the morbidity but also the risk of maternal mortality. Therefore, selection of patients for the same is of utmost importance [4].

The aim of the present study was to determine the risk factors and associated comorbidities with a relaparotomy after primary surgery in pregnant mothers and to identify preventable causes. Operative findings and procedures performed during the relaparotomy were also evaluated.

Materials and Methods

This was a retrospective observational study at a tertiary referral centre. All records of exploratory laparotomy following primary surgery in the obstetric population from January 2009 till August 2014 were retrieved from the hospital database and analysed. An IRB approval was not obtained as this was a retrospective study and that all registrants at the study hospital provide informed consent as a routine for the use of their data for academic and research purposes.

The following demographic and obstetric variables were recorded: age, parity, BMI, gestational age at primary surgery, booking status, indications of primary surgery, elective versus emergency operation, associated comorbidities. In addition, the indications, time interval, intra-operative findings, procedures performed and outcomes of relaparotomy were noted.

Results

During the study period, there were total 36,419 deliveries. Of these, there were 16,473 cesarean sections (45.23 %). A total of 36 mothers underwent a repeat surgery amounting to an incidence of 0.22 %.

Patient Profile

Most of the patients were primigravida (15, 41.7 %) in the age group of 20–30 years (23, 63.9 %). Twenty-one (58 %) had BMI in the overweight and obese category. Among the deliveries, 18 (51.4 %) were preterm and 16 (45.7 %) were term, with 1 miscarriage at 16 weeks. In most cases, the primary surgery had been performed between 28 and 36 weeks. There was no significant difference between the number of referred and booked cases.

Analysis of Primary Surgery

In 34 (94.4 %) patients, the primary surgery was caesarean section. 1 (0.3 %) patient had a laparotomy and 1 (0.3 %) had undergone surgical evacuation of retained products of conception as primary surgery. Among the caesarean section cases, 26 (76.5 %) were emergency and 8 (23.5 %) were elective. The indications for caesarean section are listed in Table 1. Associated comorbidities were hypertensive disorders in 15 (58 %) cases, liver disorders in 5 (19 %), sepsis in 3 (0.8 %) and anaemia in 2 (0.5 %).

Analysis of Repeat Surgery

In our study, 21 (58.3 %) patients needed a relaparotomy for haemorrhage; 13 (62 %) had hemoperitoneum, 6 (28.6 %) had rectus sheath haematomas and 2 (9.5 %) had postpartum haemorrhage. Of these, 7 (33.3 %) were on anticoagulants (LMWH) for thromboprophylaxis. Nineteen (36.1 %) needed to return to the operation theatre for sepsis-related complications; 4 (21 %) had peritonitis and 9 (47.4 %) wound infections. Five (26.3 %) patients had bowel perforation and 1 (5.3 %) had features of pancreatitis. When the time interval between primary and secondary surgery was evaluated, most of the cases complicated with haemorrhage were explored within 24 h (13, 61.9 %), whereas most of the cases complicated with postoperative surgical site infections needed relaparotomy after 1 week (8, 42 %). The procedures performed during relaparotomy are listed in Table 2.

Table 1 Indications of caesarean section

Indications	Number	%
Severe preeclampsia with complications (HELLP, abruption, eclampsia)	9	26.5
Presumed foetal compromise	9	26.5
Non-progress of labour	6	17.7
Previous caesarean	4	11.8
Other twins, IVF conception, placenta praevia	6	17.7

Table 2 Procedures performed during relaparotomy

Procedures performed during relaparotomy	Number
Evacuation of haematoma/haemostasis	17
B/L internal iliac artery ligation	1
Hysterectomy	1
Pus drainage + appendectomy	4
Intestinal resection/colostomy	3
Wound exploration and resuturing	9

Fig. 1 Antibigram

The microbiology profile of the 13 sepsis cases was analysed, and the most predominant organism isolated was *E. coli* (7, 54 %), followed by *Klebsiella* (2, 15 %) and *Enterobacter* (2, 15 %). There was 1 (7.7 %) case with

aspergillosis and 1 (7.7 %) with *Clostridium perfringens*. The antibiogram charted showed multidrug resistance and sensitivity to the higher antibiotics (Fig. 1). Prior to primary surgery in these 13 cases, all had been given prophylactic antibiotics, majority being cefazolin prior to skin incision, followed by metronidazole and amikacin.

In our study group, 11 (30.5 %) patients needed massive transfusion, 12 (33.3 %) needed ventilator support, 7 (19.4 %) received hemodynamic support in the form of inotropes, 6 (16.6 %) were on total parenteral nutrition and 1 (2.8 %) needed renal replacement therapy. Three (8.3 %) of our patients needed to return to the operation theatre twice (Table 3).

The mortality rate in our study was 2.8 % with the single maternal death due to adult necrotising enterocolitis with aspergillosis and complicated by large caecal perforation (Fig. 3). She was a 23-year-old primigravida with twin pregnancy with premature rupture of membranes and chorioamnionitis. She was referred post-vaginal delivery in septic shock. Primary laparotomy was done for peritonitis with drainage of pus. Further course was complicated with multiorgan dysfunction and adult necrotising enterocolitis with caecal perforation for which relaparotomy was performed. However, despite all efforts, patient had cardiac arrest and could not be revived. An interesting case that we managed was of an unbooked primigravida who had attempted termination of pregnancy elsewhere with laminaria tents and presented with sepsis and intrauterine foetal death. Her blood culture confirmed infection with *C. perfringens*. She was managed with empirical higher antibiotics, fortunately turned out to be culture sensitive, ventilatory and ionotropic support given and recovered.

Table 3 Cases with second relaparotomy

No.	Patient profile	Ind of pr. surg.	Comorbidity	Ind of relap	Procedure done	Ind of re-relap	Procedure performed	LOS
1	Age—26 BMI—20 Primi Referred	CS—PFC (PPH—B-Lynch suture)	Twins PE HELLP Sepsis	Ischaemic necrosis sec. to B-Lynch (Fig. 2)	B-Lynch suture removed Findings – uterine necrosis + omental fat necrosis—pancreatitis	Wound infection	Wound debridement and resuturing	29 days
2	Age—33 BMI—27 G2A1 Booked	CS—non-progress of labour	IHCP, Post-op sepsis	Intestinal perforation and peritonitis	Resection of ileum + end colostomy	Colostomy closure	Restoration of GI continuity	24 days
3	Age—22 BMI—16 G3P1L1A1 Referred	SERPC—RPOCs after sp. second trimester miscarriage		Excessive bleeding PV + adherent placenta	Subtotal hysterectomy + abdominal packing	Hemoperitoneum	B/L internal iliac artery ligation	21 days

CS—caesarean section, IHCP—intrahepatic cholestasis of pregnancy, SERPC—surgical evacuation, RPOC—retained products of conception, LOS—length of stay in hospital

Ind indication, pr. surg primary surgery, relap relaparotomy, re-relap re-relaparotomy

Fig. 2 Ischaemic necrosis of uterus secondary to B-Lynch suture

Fig. 3 Large caecal perforation complication, case of sepsis

Discussion

The incidence of relaparotomy in our study was 0.22 %. Studies in the literature have shown the incidence to be ranging between 0.2 and 0.7 % [5, 6].

The main indication for relaparotomy in the present study was haemorrhage (58.3 %). Other studies have also stated haemorrhagic aetiology like bleeding and haematoma to be the leading cause for reexploration [4]. Kessous et al. [7] reported that bleeding accounted for 70 % of indications of relaparotomy and additional risks for relaparotomy after CS included previous CS, severe preeclampsia, uterine rupture, placental abruption and cervical tear. In cases with haemorrhage, mortality and long-term morbidity were nil in our series, as reported in most studies. However, HELLP syndrome associated with acute pancreatitis and postoperative sepsis following massive transfusion leads to increased length of stay in the ICU and hospital.

Levin et al. reported that placental abruption, duration of primary surgery, and the experience of the chief surgeon were significant risks for relaparotomy after CS. They also concluded that variables such as number of previous caesarean deliveries, gestational age, preterm delivery, operations during the night shift, emergency caesareans and twin pregnancy were not found to have a higher association with relaparotomy [5].

Sak et al. in analysis of 113 cases that underwent relaparotomy concluded that placental abruption, HELLP syndrome and previous caesarean section were the most important risks for relaparotomy. They stated that relaparotomy for septic complications is a special condition that needs to be evaluated separately as the morbidity and mortality rates are higher for septic patients as compared to those who undergo relaparotomy for haemorrhagic complications [4]. In our study, 36.1 % patients needed relaparotomy for sepsis. All were referrals from elsewhere already receiving higher antibiotics, with average APACHE II score 20. The incidence of multidrug resistance was high in this group so also the need for total parenteral nutrition in view of underlying bowel pathology. Our single maternal death was also a case complicated by sepsis. The general condition of the patient and the presence of septic component play an important role in the outcome [8].

Seal et al. [3] in their study found that the interval between the initial surgery and relaparotomy is one of the most significant factors influencing the outcome. In the present study, the cases requiring relaparotomy within 24 h were due to haemorrhagic complications. This substantiates the need for strict postoperative vigilance to pick up any hemodynamic instability at the earliest.

Postoperative surgical site infections are also causes for return to the operation theatre, especially during the late period as seen in our study. Other studies have shown that the important risk factors for infection after CS were the duration of the surgical procedure, especially when exceeding 38 min and body mass index of >30, and the commonest site for infection is the surgical site [8, 9].

In our study, there was increased morbidity in terms of prolonged ICU and hospital stay, need for multiorgan support, need for massive blood transfusion and need for higher antibiotics and antifungals. There was 1 maternal death with the mortality rate being 2.8 %. Gedikbasi et al. [10] also reported 1 case fatality after relaparotomy of the 35 studied cases. Overall studies have quoted maternal mortality to be around 3.5 % for cases undergoing relaparotomy [4]. This high rate makes a relaparotomy following caesarean delivery to be categorised as near-miss mortality.

Conclusion

Relaparotomy following caesarean section is considered a near-miss mortality. Care must be taken during primary surgery with meticulous attention to haemostasis, especially in cases with comorbid factors like obesity, hypertensive and liver disorders. Drains (intraabdominal and subcutaneous) should be inserted as indicated. Judicious antibiotic usage and appropriate multiorgan supportive care are of paramount importance in parturient with organ dysfunction and failure. A multidisciplinary team approach is needed to handle high-risk cases. Strict postoperative vigilance and timely intervention can reduce both maternal morbidity and mortality in such cases.

Compliance with Ethical Standards

Conflict of interest The authors declare no conflict of interest.

Human Rights and Ethical Statements This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent All registrants at the study hospital provide informed consent as a routine for the use of their data for academic and research purposes.

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