

Re-Laparotomy after Caesarean Section at a Tertiary Hospital in Egypt: Cross Sectional Study

Reham Elkhateeb*, Ahmad Ezz El-Din Mahran, Ahmad Samir Sanad and Haitham Ahmad Bahaa

Department of Obstetrics and Gynecology, Minia University, Minia, Egypt

Abstract

Objective: To identify the risk factors and complications associated with re-laparotomy after caesarean section (CS) at Mina Maternity university Hospital in Egypt.

Methods: Cross sectional study including thirty two women that underwent re-laparotomy after CS at Minia Maternity university Hospital during the period from April 2015 and March 2016 whether the primary operation was done at the hospital or patients were referred from other hospitals or private centres.

Results: Repeated Cs was the most common indication for CS followed by re-laparotomy (37.5%). The second most common indication was morbidly adherent placenta (MAP) (15.6%). Intra-peritoneal collection was the indication for re-laparotomy in 50% of cases. CS was done by junior obstetricians in 56.3%, of cases. Fifteen cases were haemodynamically unstable at the time of re-laparotomy (46.9%) and 20 cases (62.5%) were admitted to ICU postoperatively. The main surgical procedure performed during re-laparotomy was hysterectomy (15 cases). The most common complication was massive blood transfusion. Maternal mortality occurs in eight cases (25%). The cause for maternal deaths was irreversible shock in four cases, multiple organ failure in two cases, disseminated intravascular coagulopathy (DIC) in one case and sepsis in one case.

Conclusion: Re-laparotomy after CS is associated with high maternal morbidity and mortality. Efforts should be directed to reduce the rate of CS as repeated CS was identified as the main indication for CS followed by re-laparotomy.

Introduction

Caesarean section (CS) is the most common obstetric surgery carried out in daily obstetric practice. There is dramatic increase in CS rate in both developed and developing countries with no evidence showing parallel improvement in the maternal and perinatal outcome. Increase rate of CS is explained by many factors including increase maternal age at their first pregnancy and increase number of CS performed upon maternal requests. Increased incidence of obesity and diabetes during pregnancy can be a contributing factor of the high CS rate [1]. Some obstetric practices such as labour induction and epidural analgesia may be claimed to contribute in the rise in the rate of CS [2]. Despite Improving the facilities and safety of Caesarean section, it is still a major operation with associated with risks and potential complication [3].

According to WHO, etiological study in 2015, CS can cause significant and occasionally permanent complications, disability or death particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications [4]. Studies reporting complications of re-laparotomy after CS have shown mortality rates ranging from 0.4% to 3.5% depending on the settings where these studies were conducted. A high mortality rate of 45% was reported from a study in India [5].

Unfortunately we did not have enough data documenting incidence of re-laparotomy after CS inside or outside Egypt a part from sporadic studies documented prevalence in some setting or tertiary hospital.

The procedures performed during re-laparotomy after CS should be tailored according to the indication of exploration. There is no standard procedure for all cases. Procedures include hysterectomy, uterine artery ligation, Internal iliac artery ligation, Drainage of blood clots and parietal hematoma, securing angles of uterine incision, removal of a foreign body or drainage of pus and suturing abdominal wall and repair of urinary bladder or bowel injuries [6,7]. Reduction of CS rate in developing countries can be helpful in reduction of risks and morbidities as not all

safety measures and facilities are available especially the rural areas [8]. Early recognition and treatment of post-operative complications which necessitate surgical exploration are mandatory to achieve a safe and successful outcome [9].

Patients and Methods

This study is a cross section study conducted at Minia Maternity University Hospital in Egypt during the period between April 2015 and March 2016. Ethical approved by the institutional review board before start of the study. The hospital where the study was conducted is one of the largest tertiary hospitals in Egypt. About 10,500 women give birth at the hospital every year including nearly 3500 CS giving a CS rate of 33.3% according to the latest hospital report. The labour ward is supervised by consultants, senior specialist and specialist. The decision of re-laparotomy and the surgical procedure is always taken by the consultant in charge.

Inclusion criteria

All cases were undergone relaparotomy after CS during the period between April 2015 and March 2016 were included in the study after getting verbal and written consent from patients or their guardians.

*Corresponding author: Reham Elkhateeb Department of Obstetrics and Gynecology, Faculty of Medicine, Minia University, Minia, Egypt, Tel: 002-01011966648; E-mail: rehamelkhateeb78@yahoo.com

Received March 04, 2017; Accepted March 26, 2017; Published March 30, 2017

Citation: Elkhateeb R, Mahran AEE, Sanad AS, Bahaa HA (2017) Re-Laparotomy after Caesarean Section at a Tertiary Hospital in Egypt: Cross Sectional Study. Gynecol Obstet (Sunnyvale) 7: 433. doi: [10.4172/2161-0932.1000433](https://doi.org/10.4172/2161-0932.1000433)

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Exclusion criteria

- Patient with history of thrombophilia.
- Patient with history of receiving anticoagulant therapy due to any cause.
- Patient refusal.

Once decision for re-laparotomy was taken, the cases were enrolled in our study after obtaining informed consent from the patients or guardian. Data confidentiality was kept throughout and after the study. Patients were included if they had undergone re-laparotomy after CS for any indication which is related to the primary procedure. Thirty two patients had undergone re-laparotomy; seven of them had the primary operation inside the hospital twenty five patients were referred from other hospitals or private centres).

Patients' data were filled in data collection sheets. Data collected include patients' demographics characteristics, indication for CS, indication for re-laparotomy, details of the procedure done, preoperative hemodynamic state of patients, interval between CS and re-laparotomy, experience of surgeon performed CS and re exploration, ICU admission, blood transfusion, morbidities and mortalities.

Procedure done was documented in the operative notes of each patient file, most common procedure was supravaginal hysterectomy with or without ligation of the anterior division of internal iliac artery, and suction drain was left for at least 24 hours for early detection of intraperitoneal haemorrhage, postoperative strict follow up in ICU or HDU. Notification of consultant in charge if any deterioration occurred.

Data were analyzed using statistical package for social science (SPSS) version 21. Data were described in terms of mean \pm SD (standard deviation) for continuous variables and frequencies (number of cases) and percentages for categorical data. Independent Student's t-test was used to compare quantitative variables and Chi square test was used to compare categorical data. $P < 0.05$ was considered significant.

Results

The study included thirty two patients that underwent re-laparotomy after CS. The main risk factors identified were high parity, age > 30 years, high body mass index (BMI), scarred uterus and low socioeconomic standard. The mean GA at the time of CS was 35 ± 5.2 . Characteristics and risk factors in the study population are shown in (Table 1).

The main indication for CS in the study population was repeated CS (37.5%) followed by morbidly adherent placenta (15.6%). The surgeon performed the Cs was a junior obstetrician in eighteen cases (56.3%), a senior obstetrician in ten cases (31.2%) and a consultant obstetrician in four cases (12.5%). The mean time interval between CS and re-laparotomy was 71.8 ± 13.9 minutes. Data of primary surgery is summarized in (Table 2). It is well noticed that both two common causes that raised the incidence of re-laparotomy (primary outcome) are due to scarred uterus.

The main indication for re-laparotomy was intra-peritoneal collection (50%) followed by postpartum haemorrhage (PPH) (31.1%). The mean haemoglobin at the time of re-laparotomy was 6.5 ± 2.6 gm/dl and the main number of blood units transfused during re-laparotomy was 6.5 ± 3.5 units.

The main surgical procedure performed during re-laparotomy was hysterectomy (15 cases). It was done alone in eight cases and in combination with ligation of the anterior division of the Internal Iliac artery in seven cases. There was high rate of complications associated

	Mean \pm SD	Range
Age	30.1 \pm 9.3	19-38
Parity	3.4 \pm 1.9	1-6
No. of previous CS	1.8 \pm 1.4	0-5
BMI	30.8 \pm 2.8	21.3-41.2
Gestational age	35 \pm 5.2	31-40
Baby weight at birth	3.275 \pm 453	1.864-4.235
	Frequency	Percentage
Residence		
Urban	14	43.80%
Rural	18	56.20%
Socioeconomic standard		
Low	17	53.10%
Middle class	10	31.30%
High	5	16.60%
Educational level		
Primary	7	21.90%
Secondary	17	53.10%
Tertiary	8	25%

CS=Caesarean Section, BMI=Body Mass Index.
Data is presented as mean \pm SD or frequency and percentages.

Table 1: Characteristics and risk factors in the study population.

	Frequency	Percentage
Indication of CS		
Repeated CS	12	37.50%
MAP	5	15.60%
FTP	3	9.40%
Malpresentaion	3	9.40%
Placental abruption	3	9.40%
Placenta praevia	2	6.30%
Fetal macrosomia	2	6.30%
Fetal distress	1	3%
Hypertension	1	3%
Obstetrician performed the CS		
Junior obstetrician		
Senior obstetrician	18	56.30%
Consultant	10	31.20%
	4	12.50%
Place where CS was performed		
Done inside hospital	25	78.10%
Referred from other hospitals or private centres		

Data is presented as frequency and percentages.
MAP: Morbidly Adherent Placenta, FTP: Failure to Progress.

Table 2: Data of primary surger.

with re-laparotomy. Maternal mortality occurs in eight cases (25%). The cause for maternal deaths was irreversible shock in four cases, multiple organ failure in two cases, disseminated intravascular coagulopathy (DIC) in one case and sepsis in one case. The indications, procedures performed and complications of re-laparotomy are shown in (Table 3).

The main causes that lead to increased incidence of complication and maternal mortality (secondary outcome) were late diagnosis, primary

CS cause, need for high replacement procedure done not correlated to outcome, it was dependant to condition of the patient intraoperative.

Analysis of maternal mortalities revealed no significant difference as regards age, parity, number of previous CS or gestational age at time of CS between cases of maternal deaths and survivals. Cases of maternal deaths were more likely to be haemodynamically unstable at time of re-laparotomy (87.5% vs. 33.3%, P=0.01) with significantly lower preoperative haemoglobin levels (5.7 ± 1.3 vs. 7.1 ± 1.3, P=0.01) compared to survivals. Morbidly adherent placenta (MAP) was the indication for CS in four cases of maternal deaths, while it was the indication of CS in one case among the survivals (50% vs.4.2%, P=0.003). No significant difference was found between the two groups regarding the level of obstetrician performed the CS. Cases of maternal deaths received larger number of blood units transfused compared to survivals (9.9 ± 2.2 vs. 5.4 ± 3.1, P=0.001).the main procedure done intraoperative during relaparotomy in cases of maternal mortality was ligation of anterior division of internal iliac alone or combined with ligation of bleeders in three cases and with hysterectomy in 4 cases while the main procedure done in survivals was hysterectomy. All cases of maternal deaths were admitted to ICU after re-laparotomy compared 12 cases of survivals (100% vs. 50%, P=0.01). Risk factors and details of CS and re-laparotomy in cases of maternal deaths and survivals are shown in (Table 4).

	Frequency	Percentage
Indication for re-laparotomy		
Intra-peritoneal collection	16	50%
PPH	10	31.30%
Sepsis	4	12.50%
Parietal hematoma	2	6.30%
Hemodynamic status		
Stable	17	53.10%
Unstable	15	46.90%
Procedure done during re-laparotomy		
Hysterectomy	15	46.90%
Alone	8	25%
Combined with anterior division of IIA ligation	7	21.90%
Bleeder ligation	8	25%
Ligation of anterior division of IIA		
Alone/combined with hysterectomy	13	40.70%
Evacuation of parietal hematoma	2	6.30%
Removal of foreign body and drainage of pus	4	12.50%
Complications		
ICU admission	20	62.50%
Massive blood transfusion	14	43.80%
DIC	6	18.60%
Febrile complications and sepsis	5	15.60%
Renal impairment	3	9.40%
ARDS	1	3.10%
Maternal mortality	8	25%

PPH=Postpartum Haemorrhage, IIA=Internal Iliac Artery, ICU=Intensive Care Unit, DIC=Disseminated Intravascular Coagulopathy, ARDS=Adult Respiratory Distress Syndrome.

Data is presented as frequency and percentages.

Table 3: Indications, procedures performed and complications of re-laparotomy.

	Maternal deaths (N=8)	Survivals (N=24)	P value
Age	32.7 ± 6.2	33.4 ± 1.8	0.8
Parity	2.9 ± 1.5	1.6 ± 1.7	0.07
Number of previous CS	3 ± 1.5	3.6 ± 2.1	0.4
Gestational age	30.5 ± 5.6	31.1 ± 5.3	0.8
Preoperative HB%	5.7 ± 1.3	7.1 ± 1.3	0.01*
Unstable hemodynamic status	7(87.5%)	8(33.3%)	0.01*
Indication for CS			
Repeated CS	2 (25%)	11 (45.8%)	0.01*
MAP	4 (50%)	1 (4.2%)	0.003*
Placenta praevia	2 (25%)	1 (4.2%)	0.01*
Obstetrician performed CS			0.7
	4 (50%)	14 (58.3%)	
Junior obstetrician	3 (37.5%)	7 (29.2%)	
Senior obstetrician	1 (12.5%)	4 (16.5%)	
Consultant			
Interval between CS and re-laparotomy (minutes)	64.7 ± 16.8	74.1 ± 13.2	0.9
Indication for re-laparotomy			
Intra-peritoneal collection	4 (50%)	12 (50%)	
PPH	3(37.5%)	7 (29.2%)	
Sepsis	1 (12.5%)	3 (12.5%)	
Parietal hematoma	0	2 (8.3%)	
Procedure done			
Hysterectomy			
Alone	4(50%)	11(45.8%)	
Combined with anterior division of IIA ligation	0(0%)	8(33.3%)	0.9
Bleeder ligation	4(50%)	3(12.5%)	
Ligation of anterior division of IIA			
Alone/combined with hysterectomy	3(37.5%)	5(20.8%)	
Evacuation of parietal hematoma	7(87.5%)	6(25%)	
Removal of foreign body and drainage of pus			
	0(0%)	2(8.3%)	
	1(12.5%)	3(12.5%)	
No. of Blood units transfused	9.9 ± 2.2	5.4 ± 3.1	0.001*
ICU admission	8 (100%)	12 (50%)	0.01*

MAP=Morbidly Adherent Placenta, PPH=Postpartum Hemorrhage, ICU=Intensive Care Unit, *statistically significant.

Data is presented as Frequency and percentages.

Table 4: Comparison between cases of maternal deaths and survivals.

Discussion

Caesareans delivery rate persistently increases worldwide, although re laparotomy is one of the rare complications of CS, it carries a high risk of maternal complications and mortality. Reports documenting the rates, causes, and risk factors for re-laparotomy after CS are lacking [10]. Furthermore, the few available studies reported risk factors, demographic characteristics and the surgical procedures performed for patients that underwent re-laparotomy and surgical procedure without highlighting the details of maternal complications and mortality rate in these cases.

In this study, it was difficult to estimate the rate of re-laparotomy as

78.1% of cases had the primary surgery at district hospitals or private centres for which we do not have real estimates. Only seven cases had the primary surgery done at the hospital giving at rate of 0.2% which is consistent with the previous reports [11-13].

The mean age of patients in the current study was 30.1 ± 9.3 years which is similar to patients' age in the study done by Fazari et al. [8]. In the study done by Biswas et al., the mean age of patients was 25 years [14]. Most cases were multipara which is consistent with other studies [14,15]. The most common indication for re-laparotomy in the current study was intra-peritoneal collection (50%) followed by PPH (31.3%). In a study done in Turkey including 113 cases over four years, intra-peritoneal collection accounted for 70.8% of indications for re-laparotomy followed by PPH (14.7%) [5]. In the study done Farazi et al., intra-peritoneal collection was the indication for re-laparotomy in 44% of cases [8]. On the other hand, the leading causes identified by Shinar and colleagues were hemodynamic shock and subcutaneous hematoma [16].

The main surgical procedure performed during re-laparotomy in the current study was hysterectomy (15 cases) either alone (8 cases) or combined with ligation of the anterior division of IIA (7 cases). These results are similar to those quoted from other studies [8,17]. The time interval between CS and re-laparotomy was variable according to the indication of re-laparotomy. Short time intervals were noticed in cases of intra-peritoneal collection and PPH, while relatively long intervals were noticed in cases of sepsis. This logic observation was in accordance with other studies dealing with the same subject [1,11,17].

The main procedure done in mortality cases was ligation of anterior division of internal iliac but this procedure is not considered as risk factor for mortality it reflected the degree of bleeding and blood loss was present in mortality cases that indicted more haemostatic steps to stop bleeding.

There is wide variety of maternal complication reported in different studies [8,10,14,17]. In the current study, the most common complication reported was ICU admission (62.5%) followed by massive blood transfusion (43.8%). Eight maternal deaths were reported in this study giving a case fatality rate of 25%. A similar rate was reported in a study in Bangladesh [5]. Khan et al. reported a case fatality rate of 18.5% [17]. A rate of 12.76% and 15.38% were reported in two studies from India [18,19], while no deaths were encountered in the study done by Lurie et al. [20]. This wide variation in incidence of maternal mortality reported in different studies is due to variable availability of safe procedure, skilled personnel, adequate blood components, facilities for rapid transfer of complicated cases, close monitoring and timely decision for intervention.

Conclusion

In conclusion, this study identified repeated CS and MAP to be the most common indications for CS followed by re-laparotomy. Intra-peritoneal collection and PPH were the main indications for re-laparotomy with hysterectomy being the most common procedure performed. In this study re-laparotomy after CS was associated with case fatality rate of 25%.

Recommendations to Decrease Incidence and Complications of Relaparotomy

- Decrease rate of CS so decrease need for repeated CS and decrease placental complications.
- Good and strict monitoring after CS for early detection of postoperative complications.

- Clear systematic guidelines for early diagnosis and management of post CS complications.
- Cases with confirmed diagnosis of MAP must be referred to tertiary centres.
- Advanced training obligatory programs for all obstetricians in the peripheral hospital supervised by a group of good experienced skilled consultant with continuous follow up and auditing.
- Early diagnosis and on time referral for cases need special care and management.
- Provide hospital with good equipment and facilities
- Deterrent strict law for malpractice.

Limitation of the study

- Short duration of the study.
- Small sample size included.
- Primary Surgery in most of cases was outside the hospital.

Authors' Contribution

All authors have made a significant contribution to the manuscript. R. Elkhateeb and A. Mahan conceived the idea and planned the design of the study. All authors were involved in the planning of analysis and interpretation of results. A Sanad and H. Bahaa performed the literature review and drafted the manuscript. A Mahan, R Elkhateeb prepared the final version of the manuscript and it was approved by all authors.

Acknowledgement

The authors are grateful to the entire medical, nursing and laboratory staff at Minia Maternity University Hospital for their help and cooperation throughout the research work.

Conflict of Interest

All authors declare no conflict of interest related to this study.

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Citation: Elkhateeb R, Mahran AEE, Sanad AS, Bahaa HA (2017) Re-Laparotomy after Caesarean Section at a Tertiary Hospital in Egypt: Cross Sectional Study. *Gynecol Obstet (Sunnyvale)* 7: 433. doi: [10.4172/2161-0932.1000433](https://doi.org/10.4172/2161-0932.1000433)

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