

Original Research Article

Trends in Indications, Intraoperative Findings and Outcome of Relaparotomy after Caesarean Section at a Tertiary Hospital in Eastern Zone Tanzania; Five Years' Review

Musa Kakiziba^{1,2}, Tom Kakumbi^{1,3,4*}, Isaac Rugemalila⁴, Stephen Mihungo^{1,4}, Philip Muhochi⁴, Ntoli Mwakibete^{1,4}, Sara Mkono⁴, Peter Kunambi¹, Furaha August^{1,4}, Peter Wangwe^{1,4}, Ali Said^{1,4}

¹Muhimbili University of Health and Allied Sciences, MUHAS PO Box 65001, Dar es Salaam, Tanzania

²Department of Obstetrics and Gynecology, Mbagala Rangi Tatu Hospital, PO Box 45232 Dar es Salaam, Tanzania

³Department of Obstetrics and Gynecology, Kilimanjaro Christian Medical Centre, KCMC PO Box 3010 Kilimanjaro, Tanzania

⁴Muhimbili National Hospital, MNH Mloganzila, PO Box 65000 Dar es Salaam, Tanzania

Article History

Received: 27.05.2024

Accepted: 01.07.2024

Published: 05.07.2024

Journal homepage:

<https://www.easpublisher.com>

Quick Response Code



Abstract: Background: The increased incidences of caesarean section rate is associated with a number of post-operative complications; one being re-laparotomy which is considered a maternal near-miss. The purpose of a re-laparotomy isto manage complications of the previous surgery such as unsecured hemostasis, manage intraabdominal infection, repairing of iatrogenic damaged organs like bowels, ureters and bladder, relieve intestinal obstruction and maintain intestinal continuity or to carry out delayed curative surgery. In general, second surgery increases not only the morbidity but also the risk of maternal mortality. **Methods:** The study was cross sectional, conducted at the Department of Obstetrics and Gynecology in MNH. It involved review of medical records of all women who necessitated re-laparotomy following Caesarean Section (CS) that was performed either at MNH or from referring health facilities during the study period. **Results:** There were 193 relaparotomy cases, 98% were referrals. Atonic uterus and sepsis (septic uterus, pelvic abscess and pus in peritoneal cavity) as intraoperative finding showed statistical significance in our study. Atonic uterus for those women who underwent relaparotomy due to post-partum hemorrhage (PPH) increase from 1(7.7%) in 2017 to 6(14%) in 2021 with an average increase of 2.31 % every year. Number of cases for sepsis (combination of septic uterus, pelvic abscess and pus in peritoneal cavity) was significant decreasing every year from 22(37.3%) in2018 to 7(16.3%) 2021with an average decrease of 3.15% every year from 2017 to 2021. The number of cases who had hysterectomy as one of the post-operative outcomes was statistically significant decreasing from 44(74.6%) to 26(60.5%) over the study period with an average decrease of 5.89% every year from 2018 to 2021. **Conclusion:** The most frequent indication for relaparotomy after CS was a burst abdomen. For the women who had relaparotomy due to uncontrollable PPH, the main intraoperative finding was atonic uterus and their numbers were significantly increasing with time. Sepsis during relaparotomy was decreasing significantly with time. For the maternaloutcome, hysterectomy showed significant decrease in number with time.

Keywords: Relaparotomy, caesarean section, indication, intraoperative findings, outcome.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

In everyday obstetric practice, the Caesarean section (CS) is the most common obstetric procedure. In underdeveloped countries, the CS rate has risen dramatically, with no evidence of a similar improvement in maternal and neonatal outcomes [1, 2]. The most typical aspect of rising caesarean birth trends is an

increase in unneeded interventions, which is likely influenced by current regulations such as insurance and private practice [3].

Cesarean deliveries, both planned and unplanned, lead to the rise in risks and problems. In some situations, the problem necessitates a relaparotomy, which means the patient must return to the operating

*Corresponding Author: Dr Tom Kakumbi

Muhimbili University of Health and Allied Sciences, MUHAS PO Box 65001, Dar es Salaam, Tanzania

room [2]. Despite the high demand for this procedure, individuals who undergo CS face a high risk of short- and long-term consequences. Re-laparotomy following cesarean section is one of the most serious consequences [4]. The most common reason for re-laparotomy is peritoneal cavity hemorrhage and hematoma. Re-laparotomy patients require more blood transfusions, are admitted to the ICU more frequently, and stay in the hospital longer [5].

In women with known risk factors for uterine atony, active treatment of the third stage of labor with rectal misoprostol or oxytocin infusion can prevent uterine atony-related bleeding [6]. Intra-abdominal hemorrhage following CS is dependent on the operator's ability and experience, as well as the surgical technique used, which can be difficult to manage [7]. Re-laparotomy is associated with placenta previa, abruption of the placenta, severe preeclampsia, and previous cesarean procedure [6, 8].

Re-laparotomies do occur after cesarean deliveries, although there are no statistics on the frequencies, reasons, or risk factors [9]. Despite the rising prevalence of cesarean deliveries, just a few descriptive publications on this topic (re-laparotomy) have been published worldwide [10]. However, neither a study nor a clinical survey on the subject has been conducted in Tanzania or locally (at MNH).

The aim of the study was to determine the trend in indication, intraoperative finding and outcomes of relaparotomy after CS at MNH from 2017 to 2021.

MATERIALS AND METHODS

Hospital based cross sectional study utilizing data collected retrospectively by reviewing all cases that

underwent relaparotomy after caesarean section between January 1st 2017 and December 31st 2021 at the Department of Obstetrics and Gynaecology at the Muhimbili National Hospital in Tanzania. We carefully reviewed doctors daily operating registration book report from 2017 to 2021 looking for demographic details, date of relaparotomy as well as indication of relaparotomy for all women who underwent relaparotomy after CS. The team also reviewed the daily nurses report book page by page from 2017 to 2021 looking for the same information as for doctor's case registration book. Care was taken to avoid repetition of details. The checklist was in English language. Files with important missing information were excluded.

The Ethical Clearance was granted from Muhimbili University of Health and Allied Sciences (MUHAS Senate Research and Publication Committee, Approval Reference: MUHAS-REC-07-2021-872).

Data Analysis

Data collected was sorted and checked on daily basis to check their completeness and consistence. In case of any missing information or inconsistency, the researcher went back to the particular study unit to make necessary adjustment. Also, data on indication for relaparotomy after CS, intraoperative findings and maternal outcomes were extracted. Data cleaning and analysis was done, descriptive statistics was used to summarize and describe obtained data by using Statistical Package for Social Sciences (SPSS) version 23. Data were presented using frequency tables, figures and percentages. Trends over time were determined using chi-square tests such that a p-value of less than 0.05 was considered statistically significant.

RESULTS

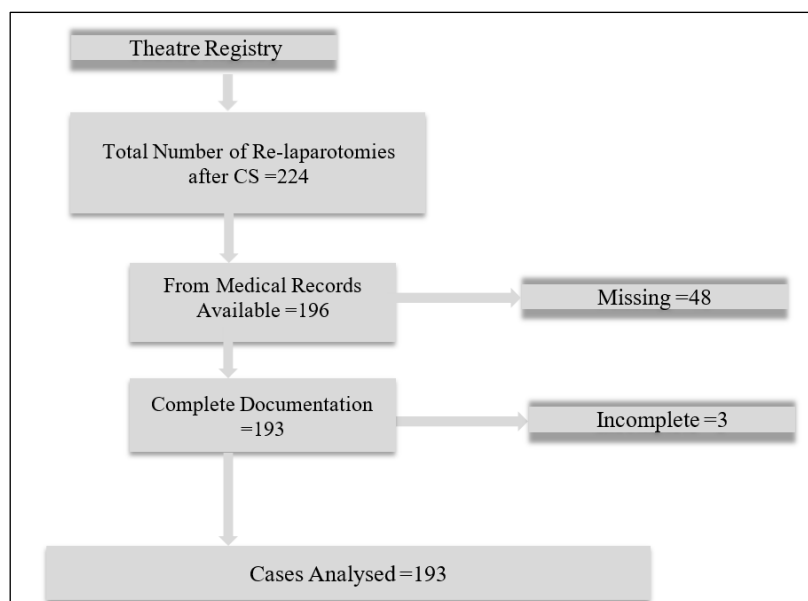


Figure 1: Study Flow Chart

Table 1: Socio-demographic and obstetric characteristics of study participants (N=193)

Variable	n (%)
Age group	
<20	16 (8.3)
20-35	125 (64.8)
>35	52 (26.9)
Parity	
1	52 (26.9)
2-4	93 (48.3)
>5	48 (24.8)
Primary site of CS	
Amana	39 (20.2)
Temeke	40 (20.7)
Mwananyamala	29 (15.1)
Sinza	24 (12.4)
Vijibweni	19 (9.8)
Muhimbili	4 (2.1)
Out of Dar es Salaam	38 (19.7)
Time from delivery to relaparotomy	
1 day	60 (31.1)
2-7days	45 (23.3)
8-42 days	83 (43.0)
43-60 days	5 (2.6)
Mode of admission	
Referral	189 (97.9)
MNH	4 (2.1)
Incision at primary surgery	
SUMI	153 (79.3)
Pfannenstiel	40 (20.7)

For the trend of the common indications of relaparotomy after CS during the study period is shown in Table 2. In 2018, 2019 and 2020 burst abdomen was leading as an indication for relaparotomy by 37.3%,

43.9% and 41.7% respectively. The number of cases for relaparotomy due to intra-abdominal bleeding were increasing each year though both of indications did not show statistically significant.

Table 2: Trend of the common indications of Relaparotomy after caesarean section (CS) from 2017 to 2021

Variable	Year of occurrence of Relaparotomy					Chi-square for trend P-value
	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	
PPH	4 (30.8)	11 (18.6)	6 (14.6)	6 (16.7)	8 (18.5)	0.583
Peritonitis	0 (0.0)	4 (6.8)	6 (14.6)	4 (11.1)	4 (9.3)	0.379
Burst abdomen	4 (30.8)	22 (37.3)	18(43.9)	15(41.7)	14 (32.6)	0.901
Intra-abdominal bleeding	4 (30.8)	21(35.6)	11(26.8)	11(30.6)	17(39.5)	0.6596

Table 3 shows the trend of the common intraoperative findings of Relaparotomy after CS. There was a statistically significant increase trend for atonic uterus from 7.7% to 14% with P- value of 0.042 with an average increase of 2.31% per year, while Sepsis (combination of septic uterus, pelvic abscess/pus in peritoneal cavity) showed a statistically significant decrease over the study period with P-value of 0.031, with an average decrease of 3.15% per year, while

Incision bleeding, haemoperitoneum and open rectus did not show any statistically significant on its trend.

The trend of the common maternal outcomes of relaparotomy after CS is shown in Table 4. Hysterectomy (total & subtotal) showed a statistically significant decrease from 44(74.6%) to 26(60.5%) over the study period with p -value of 0.048, on average it was decreasing by 5.89% every year from 2017 to 2021.

Table 3: Trend of the common intraoperative findings of Relaparotomy after CS

Variable	Year of occurrence of Relaparotomy					Chi-square for trend P-value
	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	
Atonic uterus	1 (7.7)	2 (3.4)	2 (4.9)	5 (13.9)	6 (14.0)	0.042
Incisional bleeding	2 (15.4)	16 (27.1)	11 (26.8)	9 (25.0)	10 (23.3)	0.974
Hemoperitoneum	5 (38.5)	12 (20.3)	7 (17.1)	10 (27.8)	9 (20.9)	0.756
Open Rectus	2 (15.4)	6 (10.2)	7 (17.1)	5 (13.9)	8 (18.6)	0.369
Sepsis	3 (23.1)	22 (37.3)	12 (29.3)	7 (19.4)	7 (16.3)	0.031

Table 4: Trend of the common maternal outcomes of Relaparotomy after caesarean section (CS) from 2017 to 2021

Variable	Year of occurrence					Chi-square for trend P-value
	2017 n (%)	2018 n (%)	2019 n (%)	2020 n (%)	2021 n (%)	
Hysterectomy	11 (84.6)	44 (74.6)	27 (65.9)	23 (63.9)	26 (60.5)	0.048
Reopening	4 (30.8)	15 (25.4)	10 (24.4)	8 (22.2)	10 (23.3)	0.593
Septic wound	7 (53.8)	32 (54.2)	12 (29.3)	14 (38.9)	19 (44.2)	0.245
Necessity for transfusion	2 (15.4)	5 (8.5)	1 (2.4)	3 (8.3)	5 (11.6)	0.851
ICU admission	6 (46.2)	25 (42.4)	15 (36.6)	19 (52.8)	21 (48.8)	0.398
AKI	2 (15.4)	8 (13.6)	4 (9.8)	7 (19.4)	5 (11.6)	0.999
Death	1 (7.7)	5 (8.5)	2 (4.9)	1 (2.8)	3 (7.0)	0.589

DISCUSSION

In our study burst abdomen was the predominant indication for relaparotomy after CS from 2018 to 2020 though cases were decreasing each year. The number of cases operated due to PPH secondary to atonic uterus almost doubled in percentage from 2017 to 2021. Sepsis as an intraoperative finding for relaparotomy after CS number of cases was decreasing every year from 2017 to 2021. The number of cases who had hysterectomy as one of the post-operative outcomes was significantly decrease from about eighty-five percent to sixty percent over the study period. Other outcomes showed an increase in their number, particularly needs for blood transfusion and ICU admission.

During our 5-year study evaluation, the increase in indication did not exhibit statistical significance in women who required relaparotomy following CS though burst abdomen cases was decreasing slowly from 2018 to 2021. This decrease is most likely owing to an increase in new and renovated Comprehensive Emergency Neonatal and Obstetric Care (CEmNOC) sites across the country, notably from 2018 to date.

Burst abdomen, however was among of the common indication in study done in India [2] and Egypt [13]. For the Indian study it was attributable to the length of the surgical procedure, fewer aseptic procedures, and for Egypt study the chief surgeon's experience, BMI and patient hygiene was identified as the risk factor. All of those risk factors were not analyzed in our review because of retrospective setting and data was difficult to obtain. The peak of peritonitis and intraabdominal bleeding were both noted in the study, and while neither showed a statistically significant trend, but they could

have contributed to the etiology of the burst abdomen. The hit of COVID 19 pandemic may have aided the cause this increase as it caused global scarcity of resources examples; masks, sutures, gloves antibiotics etc.

In our study at MNH, intraabdominal hemorrhage and peritonitis were also the second and third most common reasons for relaparotomy. These also were the main findings of two other studies conducted in Egypt and India [7, 12] and accounted for 92.3% and 57.2% respectively of cases in these studies. The majority of the research analyzed found the same thing, though at various rates. Peritonitis was identified as a reason for re-laparotomy in our investigation, with a reasonably consistent frequency of cases throughout the study. The occurrence of rectus sheath hematoma can be reduced by securing the bleeding points on the undersurface of the rectus sheath and from the rectus muscle before suturing the rectus sheath. This was supported by the findings in two reviewed studies in India and Israel in which rectus sheath hematoma was among of their first three intraoperative finding with different rate in each study [2, 9].

Atonic uterus as an intraoperative finding exhibited a statistically significant increase in the linear trend model. Almost all of the patients with atonic uterus during surgery they had primary PPH which necessitated relaparotomy after CS. Between 2017 and 2021, the fraction of atonic uterus nearly doubled. This trend could be attributable to the inappropriate use of uterotonic medicines and other medications during or after CS. The WHO as well as the Tanzania Ministry of Health's guidance on appropriate use of uterotonic medicines emphasized that effective use could reduce maternal

death from atonic uterus-related post-partum hemorrhage by nearly half. Finding in this study correlate with those observed in India [2] where atonic uterus was among of the commonest intraoperative finding and were managed by internal iliac ligation. In Egypt study [10] also atonic uterus was common finding observed and were managed by uterine compression sutures in majority of patients.

Sepsis which combines septic uterus, pelvic abscess pus in peritoneal cavity was found as an intraoperative finding with greater number of cases in our 5-year review analysis. Though numbers were high but its linear trend indicated a statistically significant decline from 23.1 percent to 16.3 percent with a P-value of 0.031 across the study period. This decrease probably may be due to improvement in health sector as we have been observing from those years to date.

On the other hand, we found that virtually all of the patients in this cross-sectional retrospective review study had multiple outcomes, and in some cases. In a five-year evaluation research, hysterectomy reduced in the linear trend model from 84.6 percent to 60.5 percent. The declining trend was most likely owing to the advent of alternate methods for preserving the uterus in atonic uterine patients, such as compression sutures and balloon tamponade. This is even higher compared to the study done in Egypt [7] that found the rates at 46.2%. Another study in Turkey [14] reported that the risk for hysterectomy increased by a 14-fold in patients who had 3 and more previous CS and the risk after placenta abruption and multiple pregnancy were 15.28% and 1.85% respectively. Infection being the principal indication in our study, explains the septic degree of the uterus that necessitated removal upon re-laparotomy.

Our study also discovered that most women undergoing re-laparotomy at MNH required more ICU admission and blood transfusion, however the trend was not statistically significant. In an Egyptian study, 33.3 percent of relaparotomy following CS patients required ICU stay. ICU admission not only forecasts the patient's post-operative prognosis, but it also reveals the physiological weight of the pathology that need additional care. Blood transfusion principally accounts for the second leading indications of relaparotomies i.e., hemorrhage and uncontrolled PPH.

Death was found in 12 women who underwent re-laparotomy after CS at MNH and this can be explain by the complications following the procedures. This is slightly higher compared to the study done in Egypt and Turkey [7] and [4] that had 3 and 1 respectively but in those studies they had few study population compared with our study. Good experience of the chief surgeon and expertise, available resources and emergency care, socioeconomic status, comorbidities are perhaps the causes of the slight differences.

CONCLUSION

The most frequent indication for relaparotomy after CS was a burst abdomen. Atonic uterus was an intraoperative finding in majority of the cases secondary to uncontrollable PPH post CS necessitated relaparotomy and cases were linearly increasing with time. Number of cases found with sepsis during relaparotomy was decreasing significantly with time. For the maternal outcome hysterectomy showed significant decrease in number with time. We recommend further prospective studies in order to establish other risk factors which we have not managed to study in relation to relaparotomy after CS to our setup as it has been seen in previous studies elsewhere. This will help to compare our results and other studies.

Authors Contributions

M.K conceived the study idea and drafted the proposal. T.K reviewed the draft proposal, did data cleaning and preliminary analysis and wrote the final manuscript and P.K did data analysis. A.S reviewed the draft proposal, directed the analysis and reviewed the manuscript. F.A and P.W helped with the analysis and interpretation of the study outputs into the drafting and revision of the manuscript.

Conflict of Interest: None.

Ethical Approval

The Ethical Clearance was sought from Muhimbili University of Health and Allied Sciences (MUHAS Senate Research and Publication Committee, Approval Reference: MUHAS-REC-07-2021-872) for conducting this research.

Patient Consent

Written consent was not required because the study anonymously used retrospective data in the files at the clinics.

Funding Information

This study was made possible by fund from Tanzania Ministry of Health, Community Development, Gender, Elderly and Children.

ACKNOWLEDGEMENTS

We acknowledge the staffs at the Muhimbili National Hospital Medical Records for their tireless assistance during data collection.

Consent for Publication (all authors): All authors consent for publication.

REFERENCES

1. Elkhateeb, R., Mahran, A. E. E., Sanad, A. S., & Bahaa, H. A. (2017). Re-laparotomy after caesarean section at a tertiary hospital in Egypt: cross sectional study. *Gynecol Obstet (Sunnyvale)*, 7(433), 2161-0932.
2. Seal, S. L., Kamilya, G., Bhattacharyya, S. K.,

- Mukherji, J., & Bhattacharyya, A. R. (2007). Relaparotomy after cesarean delivery: experience from an Indian teaching hospital. *Journal of Obstetrics and Gynaecology Research*, 33(6), 804-809.
3. Muganyizi, P. S., Kidanto, H. L., Kazaura, M. R., & Massawe, S. N. (2008). Caesarean section: trend and associated factors in Tanzania. *African Journal of Midwifery and Women's Health*, 2(2), 65-68.
 4. Gedikbasi, A., Akyol, A., Asar, E., Bingol, B., Uncu, R., Sargin, A., & Ceylan, Y. (2008). Re-laparotomy after cesarean section: operative complications in surgical delivery. *Archives of gynecology and obstetrics*, 278, 419-425.
 5. Bowyer A. anae.13312.pdf. 2015.
 6. Vasudeva, A., Amin, S. V., Prakashini, K., Bharatnur, S., & Mundkur, A. (2016). Post-caesarean haematomas, septic collections and wound disruptions—re-laparotomy based on abdominal imaging. *Journal of clinical and diagnostic research: JCDR*, 10(11), QJ01.
 7. Raagab, A. E., Mesbah, Y. H., Brakat, R. I., Zayed, A. A., & Alsaammani, M. A. (2014). Re-laparotomy after cesarean section: risk, indications and management options. *Medical Archives*, 68(1), 41.
 8. Huras, H., Radon-Pokracka, M., & Nowak, M. (2018). Relaparotomy following cesarean section—a single center study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 225, 185-188. Available from: <https://doi.org/10.1016/j.ejogrb.2018.04.034>
 9. Levin, I., Rapaport, A. S., Satzer, L., Maslovitz, S., Lessing, J. B., & Almog, B. (2012). Risk factors for relaparotomy after cesarean delivery. *International Journal of Gynecology & Obstetrics*, 119(2), 163-165.
 10. Raagab, A. E., Mesbah, Y. H., Brakat, R. I., Zayed, A. A., & Alsaammani, M. A. (2014). Re-laparotomy after cesarean section: risk, indications and management options. *Medical Archives*, 68(1), 41-43.
 11. Rafiei, M., Ghare, M. S., Akbari, M., Kiani, F., Sayehmiri, F., Sayehmiri, K., & Vafaei, R. (2018). Prevalence, causes, and complications of cesarean delivery in Iran: A systematic review and meta-analysis. *International journal of reproductive biomedicine*, 16(4), 221-34.
 12. Ahmed, M., Pandya, S. T., & Supraneni, T. (2016). Return to the operation theatre: an analysis of repeat surgeries in operative obstetrics. *The Journal of Obstetrics and Gynecology of India*, 66, 117-121.
 13. Sandall, J., Tribe, R. M., Avery, L., Mola, G., Visser, G. H., Homer, C. S., ... & Temmerman, M. (2018). Short-term and long-term effects of caesarean section on the health of women and children. *The Lancet*, 392(10155), 1349-1357. Available from: [http://dx.doi.org/10.1016/S0140-6736\(18\)31930-5](http://dx.doi.org/10.1016/S0140-6736(18)31930-5)
 14. Çintesun, E., & Al, R. A. (2017). The effect of increased number of cesarean on maternal and fetal outcomes. *Ginekologia polska*, 88(11), 613-619.
 15. McCurdy, R. J., Schnatz, P. F., Weinbaum, P. J., & Zhu, J. (2014). Contraceptive use in adolescents in Sub-Saharan Africa: evidence from Demographic and Health Surveys. *Connecticut medicine*, 78(5), 261-72.

Cite This Article: Musa Kakiziba, Tom Kakumbi, Isaac Rugemalila, Stephen Mihungu, Philip Muhochi, Ntoli Mwakibete, Sara Mkono, Peter Kunambi, Furaha August, Peter Wangwe, Ali Said (2024). Trends in Indications, Intraoperative Findings and Outcome of Relaparotomy after Caesarean Section at a Tertiary Hospital in Eastern Zone Tanzania; Five Years' Review. *East African Scholars J Med Surg*, 6(7), 224-229.
