Open Access

Original Article

Indications and Outcome of Re-Exploration Laparotomy in Surgical Patients

Abdul Basit Samad, Hamna Khalid*, Muhammad Salim Akhtar, Muhammad Khalid Siddique, Hatim Khalid, Muhammad Ahmad**

Department of Surgery, Combined Military Hospital Rawalpindi/National University of Medical Sciences (NUMS) Pakistan,*Department of General Medicine, Pak Emirates Military Hospital/National University of Medical Sciences (NUMS), Rawalpindi Pakistan,**Department of Pathology, Combined Military Hospital Rawalpindi/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To evaluate indications and outcome of re-exploration laparotomy in surgical patients.
Study Design: Analytical cross-sectional study.
Place and Duration of Study: Combined Military Hospital (CMH), Rawalpindi, Pakistan, from Mar to Sep 2023
Methodology: This study enrolled 40 patients, who had redo-laparotomy between March to September 2023. Patients who needed second abdominal exploration while they were in the hospital or who were readmitted within 60 days following the first surgery were the subject of this research. Systematic data collection was conducted on all patients, including demographic data, medical history, clinical examinations, tests, treatments, and on-going problems.
Results: Enrolled study participants had a mean age of 49.13±10.94 years with 10.00% cases being elective and 75% being emergency with an average of 2.95±1.15 days between laparotomies. The average length of stay for those who were released from the hospital was 19.85±4.34 days, of whom, 85% needed to be transferred to critical care or high dependency units. With a rate of 22.5% (n=9), this study observed a statistically significant increase in mortality following re-exploration.
Conclusion: Re-exploration laparotomy carries significant morbidity and mortality. The predominantly emergency nature of these procedures, combined with the prolonged hospital stays, underscores the gravity of conditions necessitating re-intervention.

Keywords: Emergency, Mortality, Redo-laparotomy, Surgery

How to Cite This Article: *Samad AB, Khalid H, Akhtar MS, Siddique MK, Khalid H, Ahmad M. Indications and Outcome of Re-Exploration Laparotomy in Surgical Patients. Pak Armed Forces Med J 2025; 76(Suppl-2): S450-S453. DOI: https://doi.org/10.51253/pafmj.v76iSUPPL-2.11736*

INTRODUCTION

Re-laparotomy describes surgical operations carried out during the hospital stay connected to the first surgery and can be classified as either early or late, radical or palliative, planned or unplanned, depending on variables like timing, aims, and urgency.[1,2] Redo-laparotomies are referred to as "planned" when the choice for a second laparotomy is made during the first operation, and "on demand" when it is started as a result of the patient's changing state with a higher risk of morbidity and death introduced by the conjunction with re-laparotomy.[3,4] The related mortality rates might increase dramatically, from 22% to 51%, when re-laparotomy is required,.[5,6] as when complications arise, that might lead to post-operative peritonitis, intra-abdominal abscess, wound dehiscence, anastomotic leak, biliary peritonitis, or fecal fistula, making a re-laparotomy necessary.[7-9] It is important to do a thorough analysis of the patient's demographics, concurrent medical conditions, and pre-, intra-, and post-operative considerations in order to pinpoint the main risk factors that ultimately require re-laparotomy as rapid identification of the problems and swift action are critical to these patients' prognosis and final outcome, where a combination of radiographic evidence and the assessment of clinical and hematological markers, provide the basis for deciding whether or not re-laparotomy is necessary with treatment planning and improving patient outcomes greatly influenced by early diagnosis and prompt action. The exact identification of individuals in need of additional surgical intervention is the goal of this investigation as it might be difficult to decide when surgical intervention or cautious monitoring is necessary, especially among postoperative patients in critical care who have sepsis and prolonged hospital stay. Thus, the primary goals of this study are to ascertain the prevalence, indications, and related morbidity and mortality of re-laparotomy.

METHODOLOGY

This analytical cross-sectional study was carried out at Combined Military Hospital (CMH), Rawalpindi, Pakistan, between March to September 2023. Sample size was calculated through World

Correspondence: Dr Abdul Basit Samad, Department of Surgery, Combined Military Hospital Rawalpindi Pakistan
Received: 05 Mar 2024; revision received: 06 May 2024; accepted: 12 Jun 2024

Health organization (WHO) sample size calculator[10], which came out to be 40, with confidence interval of 95%. After gaining approval of hospital's Ethics Committees (ERC) via letter No. 524, participants were enrolled using non-probability consecutive sampling.

Inclusion Criteria: Any patient over the age of 12 years, belonging to either gender, who underwent a second abdominal exploration during their hospital stay after the first procedure and were discharged. Additionally, patients who were readmitted for further investigation within 60 days following the first procedure were also taken into account for the study.

Exclusion Criteria: Patients below the age of 12 years and those in need of a second re-laparotomy were excluded along with patients admitted for gynecological and/or obstetrical laparotomies.

Patients admitted in Surgical High Dependency Unit (HDU) or wards were followed for re-laparotomies. Patient data, encompassing demographics, medical history, clinical exams, diagnostic tests, treatments, and complications, was systematically collected and input into the data collection tool. The Abdominal Reoperation Predictive Index (ARPI) score serves as a predictive tool for identifying individuals requiring laparotomy revision with an eight-variable scoring system which assesses various elements, with a total score exceeding 10 indicating a heightened likelihood of redo-laparotomy necessity. Statistical Package for Social Sciences (SPSS) version 26.00 was utilized for data entry and analysis. Mean values and standard deviations were computed for quantitative data to depict central tendencies and variability, while frequency and percentage calculations were employed to analyze categorical variables.

RESULTS

The study included 40 patients with mean age being 49.13±10.94 years, with a 67.50% male preponderance. Emergency operations comprised 75.00% (n=30) of the cases while 10.00% (n=25) involved elective planning. Index laparotomies included a wide variety of operations, such as colorectal 15(37.50%,), small bowel 7(17.50%,), and upper gastrointestinal 9(22.50%) surgeries. Furthermore, 20.00% (n=8) and 2.50% (n=1) of cases were procedures related to the hepatopancreatobiliary and urinary systems, respectively as shown in Table-I.

Table II outlines the specific indications for re-laparotomy where two laparotomies were separated by an average of 2.95±1.15 days. The average length of hospital stay for patients who were discharged was 19.85±4.34 days, and 34 (85%) of them needed to be transferred to the intensive care unit (ICU) after re-laparotomy.

Out of all redo-laparotomies performed, 29 patients (72.5%) experienced systemic or local postoperative problems, as shown by Table III. A significant increase in mortality linked to re-exploration, with a reported mortality rate of 22.50% (n=9) was seen.

Table-I: Demographic Details, Index Operation Types, Hospital Stay Durations, and Mortality Rates Among Patients (n= 40)

Variables		Values
Age years (Mean + SD)		49.13 ± 10.94
Gender	Male	27 (67.50%)
	Female	13 (32.50%)
Index Operation		
Upper GI surgery		9 (22.50%)
Surgery of small Bowel		7 (17.50%)
Colorectal surgery		15 (37.50%)
Hepatopancreaticobiliary Surgery		8 (20.00%)
Urogenital Surgery		1 (2.50%)
Duration between laparotomies (days)		2.95 ± 1.15
Duration of hospital stay (days)		19.85 ± 4.34
Mortality		9 (22.50%)

**GI: Gastrointestinal, SD: Standard deviation*

Table-II: Indications of Redo-Laparotomy (n=40)

Indications	No. of patients n(%)	Mortality n (%)
Wound Dehiscence	17(42.50%)	0
Anastomotic leak	9(22.50%)	6(15.00%)
Biliary leak	4(10.00%)	2(5.00%)
Retraction of stoma	3(7.50%)	0
Abscess or Intra-abdominal collection	1(2.50%)	0
Intestinal obstruction	2(5.00%)	0
Hollow viscus perforation	2(5.00%)	1(2.50%)
Bowel necrosis	1(2.50%)	0
Entero-cutaneous fistula	1(2.50%)	0

Table-III: Complications of Re-Laparotomy (n=40)

Indications	n (%)
Wound dehiscence	2(5.00%)
Surgical Site Infection	9(22.50%)
Stoma Site Infection	1(2.50%)
Stoma Prolapse	1(2.50%)
Peri stoma excoriation	1(2.50%)
Sepsis	4(10.00%)
Acute Kidney Injury	3(7.50%)
DIC	3(7.50%)
Pneumonia	5(12.50%)
Total	29(72.50%)

DISCUSSION

Re-laparotomy can be necessary due to a number of reasons, such as the strategy used in the initial laparotomy, the method of incision used, the surgeon's skill level, co-morbidities in the patient, inaccuracies in estimating the duration between the onset of the complication and re-laparotomy, and unjustified delays in correctly diagnosing the underlying problems.[11,12] These variables appear to increase patient morbidity and death rates, hence re-laparotomy is ultimately the final option.[6] Gender-specific data on re-laparotomy incidence showed that male patients had a greater incidence, which was consistent with results from similar research in which the male-to-female ratio was 3:1 with an average age of 50 years.[8] Re-laparotomy was necessary for a number of reasons, the most common being an intra-abdominal abscess or collection, wound dehiscence, anastomotic leak, bile leak, stoma retraction, where, anastomotic leak and ruptured abdomen were shown to be the most common reasons for redo-laparotomy, in line with other studies that have found comparable results.[4,13-17] A considerable proportion of patients who required a second laparotomy had had the initial procedure performed as an emergency similar to another study.[11] As expected, there were a lot of difficulties after redo-laparotomies, and our study's findings support this pattern when looking at post-operative complications, where wound-related problems including infection and dehiscence were more common, as were stoma-related complications, similar to previous research.[1,13,18] For the revision group, mean hospital stay was 19.85 ± 4.34 days where patients usually spend between the 3rd and the 20th day in the post-operative period after re-do surgery, similar to findings in published literature,[4,15,19] where length of hospital stay depends on the clinical status and prognosis of the patient.[20] We noted that the death rate in our study was 22.50% (n=9), well within the range of 16-37.30% recorded in previous studies.[13,8,16]

LIMITATIONS OF STUDY

Because of the small sample size of this study, the observational findings might not be generalizable. Nevertheless, in spite of this limitation, the research provides important information about the scope of the issue. This analysis sets a baseline for further research in this area and provides a basis for improving patient outcomes.

CONCLUSION

Re-exploration laparotomy carries significant morbidity and mortality. The predominantly emergency nature of these procedures, combined with the prolonged hospital stays, underscores the gravity of conditions necessitating re-intervention. Early recognition of post-operative complications and timely surgical re-exploration remain essential to optimizing patient outcomes, though the procedure itself poses considerable risk.

ACKNOWLEDGEMENT

To all those who participated directly or indirectly in the study

Conflict of Interest: None.

Funding Source: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

ABS & HK: Data acquisition, data analysis, critical review, approval of the final version to be published.

MSA & MKS: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

HK & MA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Koirala R, Shakya VC, Khania S, Adhikary S, Agrawal CS. Redolaparotomies: reasons, morbidity and outcome. Nepal Med Coll J. 2012; 14(2): 107–110.
2. Girgor'ev SG, Petrov VA, Grigor'eva TS. Relaparotomy: problems of terminology. Khirurgiia. 2003; (6): 60–62.
3. Van Ruler O, Mahler CW, Boer KR, Reuland EA, Gooszen HG, Opmeer BC, et al. Comparison of on-demand vs planned relaparotomy strategy in patients with severe peritonitis: a randomized trial. JAMA. 2007; 298(8): 865–872. https://doi.org/10.1001/jama.298.8.865
4. Patel H, Patel P, Shah DK. Relaparotomy in general surgery department of tertiary care hospital of Western India. Int Surg J. 2016; 4(1): 344–347.
5. Shah P, Choksi D, Arun R, Chauhan S, Kadia R. Evaluation of relaparotomy in surgery and obstetrics and gynecology patients in tertiary care hospital in India: reason, morbidity, mortality: a case controlled study. Int Surg J. 2020; 7(11): 3707–3712.
6. Kim JJ, Liang MK, Subramanian A, Balentine CJ, Sansgiry S, Awad SS. Predictors of relaparotomy after non trauma emergency general surgery with initial fascial closure. Am J Surg. 2011; 202(5): 549–552. https://doi.org/10.1016/j.amjsurg.2011.06.023
7. Abebe K, Geremew B, Lemmu B, Abebe E. Indications and outcome of patients who had re-laparotomy: two years' experience from a teaching hospital in a developing nation. Ethiop J Health Sci. 2020; 30(5): 761–768. https://doi.org/10.4314/ejhs.v30i5.13
8. Unalp HR, Kamer E, Kar H, Bal A, Peskersoy M, Onal MA. Urgent abdominal reexplorations. World J Emerg Surg. 2006; 1: 10. https://doi.org/10.1186/1749-7922-1-10
9. Mwita R, Giiti G, Kotecha V, Chalya PL, Mahalu W. Abdominal re-operations: indications, early surgical outcomes and

prognostic factors at Bugando Medical Centre, Mwanza Tanzania. Tanzan J Health Res. 2023; 24(4): 321–333.
10. Jeannot BM, Valimugighe MM, Nyundo M, Kangwese OK, Nzanzu J. Morbi-mortality and risk factors of relaparotomies at the Hospital Charite Maternelle de Goma, Eastern of the Democratic Republic of Congo. J Angiol Vasc Surg. 2022;7:098.
11. Vaishnavi J. Retrospective study on patients undergoing laparotomy to assess the risk factors of re-laparotomy [dissertation]. Coimbatore: PSG Institute of Medical Sciences and Research.
12. Ching SS, Muralikrishnan VP, Whiteley GS. Relaparotomy: a five-year review of indications and outcome. Int J Clin Pract. 2003; 57(4): 333–337.
13. Zala JN, Badami K, Jivani S, Patel K, Gupta R, Pancholi M. Observational clinical study of indications and outcome of re-exploration laparotomy in 50 patients. Int Surg J. 2022; 9(11): 1830–1834.
14. Abebe K, Geremew B, Lemmu B, Abebe E. Indications and outcome of patients who had re-laparotomy: two years' experience from a teaching hospital in a developing nation. Ethiop J Health Sci. 2020; 30(5): 761–768. https://doi.org/10.4314/ejhs.v30i5.13
15. Ugumba CS, Kasong MK, VdP KC. Study of prognostic risk factors for relaparotomy in university hospitals of Lubumbashi: analysis of biological and therapeutic clinical criteria. Acta Sci Med Sci. 2022; 6(7).
16. Amentie E, Beyene B, Sisay M, Zelka MA, Nigussie S. Magnitude of early relaparotomy and its outcome among patients who underwent laparotomy in a tertiary hospital in Eastern Ethiopia: a cross-sectional study. BMC Surg. 2024; 24(1): 51. https://doi.org/10.1186/s12893-024-02335-6
17. Swallow AY, Akoko LO, Lema LE. Patient's characteristics, management practices and outcome of re-laparotomies in a tertiary hospital in Tanzania. Heliyon. 2020; 6(7): e04295. https://doi.org/10.1016/j.heliyon.2020.e04295
18. Kharadi A, Tiwari AM, Patel DG, Parker P. Evaluation of outcome of relaparotomy in surgical patients: a cross sectional study from a tertiary care hospital. J Popul Ther Clin Pharmacol. 2023; 30(1): 409–414.
19. Ketha J, Valimungighe M, Ilumbulumbu M, Mitima N, Wundiyohangi P, Rugazura J, et al. Abdominal re-interventions in Butembo City, Eastern part of the Democratic Republic of the Congo (DRC). J Med Res. 2019; 5(1): 40–5. https://doi.org/10.31254/jmr.2019.5110
20. Montravers P, El Housseini L, Rekikit R. Postoperative peritonitis: diagnosis and indication for reoperations. Resuscitation. 2004; 13: 431–435.