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JIMMA UNIVERSITY
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PROSPECTIVE STUDY ON PATTERN, ASSOCIATED FACTOR AND OUTCOME OF RELAPAROTOMY AMONG SURGICAL PATIENT AT JIMMA UNVERSITY MEDICAL CENTER FROM JANUARY 1,2021 - DECEMBER 30, 2021, JIMMA, SOUTH-WEST ETHIOPIA.

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I would like to thank Postgraduate research program office who gave me this chance to conduct this study.

ABBREVATIONS AND ACRONOMYS

APACHE ll - Acute physiology and chronic health evaluation

COPD - Chronic Obstructive Pulmonary Disease

DM – Diabetic mellites

GIT – Gastro intestinal tract

HTN – Hypertension

ICU – Intensive care unit

JUMC – Jimma university medical college.

KM – kilometer

MD – Medical doctor

MOD – Multi organ death

OR – Operating room

RL – Re laparotomy

SPSS - Statistical Package for Social Science

SSI – Surgical site infection

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ABSTRACT

Re-laparotomy defined as a re-abdominal operation performed within 60 days relate to the first surgery. In practice laparotomy and relaparotomy as thus defined are performed with few exceptions during the same stay in hospital. The most common indications for re-laparotomy are peritonitis, infection, bleeding, abscess, anastomotic leakage, wound dehiscence, necrotizing pancreatitis, bowel necrosis, bowel obstruction and evisceration. patients with re-laparotomy had high in mortality as well as exposed to the disease. It accounts about 1.5-27% of patients with abdominal surgery.

The objective was to assess the pattern, associated factor and outcome of relaparotomy among all surgical patient and Cross-sectional study design was carried out at JUMC from January 1, 2021- December 30, 2021.

Out of 939 patients who underwent laparotomy procedure, for 78 patient's re-laparotomy was done which gives the overall prevalence of 8.3% in our study. The leading indication for re operation was post op collection in 17 (26.6%) followed by anastomotic leak in 14(21.9%), obstruction 12 (18.8%), and dehiscence in 10(15.6%). The mean time to re laparotomy was 6.5 days. the post operative mortality rate was 20.3%. the majority of relaparotomy was done on demand base (87.5%). Mortality rates for re laparotomy following anastomotic leak was found to be high (40%), while mortality due to wound dehiscence and obstruction (16.7%) have been low.

Intra-abdominal collection and anastomotic leak were the most common indications of re-laparotomies. Anastomotic leaks were significantly associated with mortality.

***Keyword**: Re-laparotomy, anastomotic leak, intra-abdominal collection, mortality.*

OPERATIONAL DEFINATIONS

Relaparotomy: - operations performed within 60 days after initial surgery.

Early relaparotomy: - relaparotomies done within the first 30 days of initial surgery.

On-demand relaparotomy: - where the patient's condition necessitates re-exploration.

Planned relaparotomy: - performed at routine intervals for re-exploration, or drainage and peritoneal lavage of the abdominal cavity.

1.INTRODUCTION

Background

The term relaparotomy is used in multiple contexts in the medical literature to refer to abdominal reoperations. Generally, relaparotomy is operations performed within 60 days after initial surgery. We can classify relaparotomies as; early vs. late, planned vs. unplanned, and emergency vs. elective. Early relaparotomy is relaparotomies done within the first 30 days of initial surgery (1). Some of the important indications of relaparotomy are anastomotic leakage, peritonitis, intestinal obstruction, burst abdomen, intestinal perforation and hemorrhage. Incidence of relaparotomy ranges from 0.5-15% in various reported studies. Highest incidence was seen in gastrointestinal surgeries, while lowest in vascular surgeries (2).

There is lack of consensus on definition of each type of relaparotomy. “Urgent relaparotomy” to indicate emergency re-exploration for clinical deterioration, failure to improve, or radiographic evidence of intra-abdominal collection. classify relaparotomy as ‘on-demand surgery’ where the patient’s condition necessitates re-exploration and ‘planned’ wherein a relaparotomy is performed at routine intervals for re-exploration, or drainage and peritoneal lavage of the abdominal cavity(1).

Patients are usually critically ill, and these surgeries are known as “final-choice operations,” with high morbidity and mortality rates(3). Mortality ranges from 24 to 71%. Some of the factors associated with high mortality are elderly patients, peritonitis at the initial surgery and sepsis with multi organ failure(2).

The higher morbidity and mortality of relaparotomy is attributed due to complication take long time to treat which result in psychologic and economic burden, repeated surgery can responsible for poor immunity which may influence the outcome.
Majority of patients need admission to ICU. The highest incidence of relaparotomy is found in hospital with training facility(4).

Statement of the problem

Re-laparotomy is one of the causes of morbidity and mortality among patients with abdominal surgery; unless efforts are made to prevent in advance by identifying the potential risk factors. This higher often attributed to treatment of complications take a long time, which creates a psychological and economic burden of those who are undergoing repeated abdominal surgery related to the first abdominal surgery of mortality (4).

Even Preoperative and postoperative antibiotic, counting of the instruments, instrumental processing and wound care used as a preventive approach; problems of health system service, patient factors, and comorbidity may be underlying factors leading to poorer outcomes after first surgery. Although it is preventable, it is still one of the problems after first surgery (4).

Intraabdominal sepsis after abdominal surgery is associated with a mortality rate of 50% to 80% among patients requiring intensive care unit (ICU) admission and is responsible for approximately 13% of ICU admissions. Studies relying on predicted mortality and historical controls have suggested that re laparotomy with clearance of intraperitoneal sepsis may be beneficial when patients develop signs of intraabdominal sepsis after abdominal procedures (5).

Although the re-laparotomy is expected in abdominal surgery, there is lack of evidence showing the magnitude of the problem and associated factors in Ethiopia. Due to this reason, study was conducted with the title of prospective study on pattern, associated factor and outcome of re laparotomy among all surgical patient at JUMC.

Significance of the study

Re laparotomy can be done in different part of the world. So, information on the pattern, associated factor and outcome is important to minimize the adverse effect. Therefore, to offer baseline information and highlight magnitude of the problem, the current study was proposed to assess the pattern, associated factor and outcome of relaparotomy at JUMC. The collected data can potentially be used by organization to create or improve policies, procedure and training. The study is also important to

researchers and scholars, as the collected data will potentially provide a foundation for further research on this topic

2.LITERATURE REVIEW

A survey was made of 3,680 patients who had undergone abdominal operations in our department of Surgery Beilinson Medical Center, Tel Aviv University Medical School, Petah Tikva, Israel from 1966 to 1975. Re laparotomy is a serious reality for every General surgeon. Older age patients are at greater risk and have prognosis. Complications that carried out high mortality are namely wound rupture after colon surgery and suture breakdown with peritonitis following gastric surgery. In most cases the first sign of the complication appeared on the 4th to 6th postoperative day although occurrence ranged from the 1st to the 20th day). As expected, the interval between operation and the occurrence of a burst abdomen was longer than that for other types of complications, averaging 6.6 days(6).

The two major causes for reoperation were peritonitis and ileus, which developed in 34 (32.6 percent) and 33 (31.7 percent) of the cases in the study series, respectively, but in only 0.9 and 0.8 percent, respectively, of the general series. Bleeding was a much less frequent cause for reintervention, occurring in only four cases. The mortality in the study series was 38 percent (37 patients) as compared with 4.5 percent in the general series (after the 95 patients in the study series had been deducted). which shows the distribution of mortality according to age and sex, it is apparent that most of the fatalities-occurred in male patients (30 patients, 81 percent). It is also obvious that patients over the age of 70, who had a mortality of 59 percent, constitute a high-risk group. After the age of 80 the mortality was 100 percent(6) .

Most common finding during re laparotomy was intra-abdominal abscess, other finding included anastomotic leak, necrotic bowel, evidence of technical errors and acalculous cholecystitis. The most common clinical finding were localized tenderness, fever and absent bowel sound. Factors that appear to correlate with mortality are age over more than 50 years peritonitis at initial procedures and multiple system failure. Criteria leading to re laparotomy are usually clinical (tenderness, fever, and absence of bowel sounds) and to a minor extent depending on radiological procedures The decision to re operate was based on clinical findings in 97.8% although investigations

were often helpful in localizing the site of the complicating lesion. Leaks and bleeding were most frequent and carried a high mortality(7) .

The overall mortality rate after relaparotomy is 40% (range 24-71%) and depends on the type of facility reported from and the kind of patients included in the studies. Mortality is highest in organ disruption and lowest in obstruction. Mortality after an emergency initial operation is higher than after elective primary laparotomy (40 versus 50). The mean age at death in fatal cases is 65 years; over the age of 85, the mortality rate approximates 100%. Mortality is lowest in trauma patients, which might be attributed to their younger ages The mortality rate directly related to the relaparotomy procedure is estimated to be as high as 20%(7).

A retrospective case-control study from 1986 to1996 in 523 patients with secondary peritonitis who were treated at the Department of General Surgery of the Hospital Lainz Vienna. Any severe organ failure that was present at the beginning of treatment had a significant impact on survival in patients who required relaparotomy, especially if the heart, kidneys, or liver was involved. With regard to the liver, even moderately
severe organ failure significantly influenced mortality. Age of 70 years was not only a more frequent finding in patients of the study group, but also had a significant impact on survival in these patients (mortality 67.3% versus 35.8%). Some patients are prone to persisting intraabdominal infection regardless of initial eradication of the source of infection. There was no significant difference in the postoperative mortality rate between “planned re laparotomy” and “re laparotomy on demand” (54.5% versus 50.6%). Timely re laparotomy provides the only surgical option that significantly improves outcome. To improve overall survival the decision to perform re laparotomy on demand after an initially successful eradication of the source of, infection must be made within 48hr, at least before MODS emerges(8).

A retrospective case series was designed from medical records of 230 patients suffering from postoperative small bowel obstruction admitted to the Tokyo University Branch Hospital Postoperative small bowel obstruction following abdominal procedures is more common in patients who have undergone laparotomy The typical winter weather in Tokyo is characterized by low temperatures, low humidity and moderate air pressure. These winter climate conditions could be

correlated with an increased incidence of postoperative small bowel obstruction in during our observation period(9).

Prospectively data collected on a general hospital ICU database between January 1997 and January 2002. Relaparotomy may be beneficial in patients developing intraperitoneal sepsis after abdominal procedures. They also assessed the effect of patient age &sex, disease presentation and severity, interval to relaparotomy, and the number of relaparotomies on survival after relaparotomy. Patient age and multiorgan failure prior to relaparotomy-but not urgency of initial laparotomy or the acute physiology and chronic health evaluation (APACHE ll) score prior to relaparotomy, interval to relaparotomy, or number of relaparotomies-affected the outcome. The identification of intraperitoneal sepsis and performance of relaparotomy earlier after the initial abdominal surgery might reduce the high rate (60%) of multiorgan failure prior to relaparotomy and improve survival after it(5)

In this study, data were collected both retrospectively (2004–2005) and prospectively (2006–2008) using a case record form including patient charts, operation reports, and hospital clinical information system. The majority of the relaparotomies were emergencies performed in an on-demand strategy (89.5%). The overall mortality of the series was 22%. The main cause of death was septic shock intrabdominal sepsis (41%), including secondary postoperative or tertiary peritonitis as defined by Calandra and Cohen. Pneumonia (18%), multiple organ failure (11%), heart failure (9%), hemorrhage (3%), and combination (8%) were other causes of death. Patients who died were significantly older than survivors (73±11 vs. 59±17 years)(3).

Mortality was associated with past history of cardiovascular disease, malignancy, and previous treatment with platelet anti-aggregate drugs. The association with history of chronic renal failure almost reached statistical significance. In this series, we did not find any association between mortality after relaparotomy and diabetes mellitus, lung or liver disease, immunosuppression, stroke, previous abdominal surgery, corticoids, or anticoagulant drugs. The relative frequencies of the index operations and their associated mortality. The most common were colorectal, hepato-bilio-pancreatic, and gastrointestinal procedures. There were also appendectomies, abdominal wall surgeries, trans-abdominal urologic or gynecologic procedures, and abdominal trauma. Mortality after relaparotomy for colorectal surgery was 26%, 22%

after upper gastrointestinal procedures, 20% after hepatobiliary and pancreatic surgeries,17% after trauma surgeries and 7% after abdominal wall surgeries. There was no mortality after appendectomies(3).

A Retrospective cross-sectional study was conducted at Debre-Markos Referral Hospital from three hundred and ninety charts (390) from January 1, 2015, to January 30, 2017. Out of 390 patients who underwent laparotomy procedure, 48 patients performed re-laparotomy which gives the overall prevalence of 12.3%. Patients with the duration of operating on initial surgery >60 hrs. were 3.3 times more likely to develop re-laparotomy compared with patients underwent first abdominal surgery within <60 hrs. of the illness. Moreover, patients with diabetes mellitus were 4.8 times more likely to develop re-laparotomy compared patients who have no diabetes mellitus. But patients with elective surgery were about 83% times less likely to undergo re-laparotomy compared those patients that had emergency abdominal surgery(4).

A retrospective review of all pediatric surgical patients (< 13 yr.) who underwent a relaparotomy at Tikur Anbessa Teaching Hospital between September 1, 2011 and August 31, 2016 was under taken. study population was comprised of 53 relaparotomy cases included in final data analysis. After the initial laparotomy, patients who required relaparotomy presented with clinical features of peritonitis, intestinal obstruction, complete wound (fascial) dehiscence or stoma-related complications. All relaparotomies in our population were unplanned or emergency operations with indications related to complications from the primary laparotomy. Forty (75.5%) operations occurred during overnight/ weekend duty hours while the remaining 13(24.5%) operations took place during daytime working hours. Senior residents operated on 43 (81.1%) and the remaining 10 (18.9%) cases had involvement by senior surgeons (1).

3. STUDY OBJECTIVE

General objective

- To assess the pattern, associated factor and outcome of re laparotomy among all surgical patient at JUMC from January 2021 to December 2021.

Specific objective

- To assess the pattern of re laparotomy among all surgical patient at JUMC from January 2021 to December 2021.
- To assess factor that associated with re laparotomy among all surgical patient at JUMC from January 2021 to December 2021.
- To assess patient out come after re laparotomy among all surgical patient at JUMC from January 2021 to December 2021.

4. METHODOLOGY

4.1 Study area

The study was carried out in JUMC, which is found in Jimma town, Oromia regional state, located 350km southwest of Addis Ababa. It is one of teaching and referral hospital in the south western part of the country. One of the universities in Ethiopia known for its pioneer in community-based education. There are 10 specialty units (surgery, Internal medicine, GYN/OBS, Ophthalmology, Dermatology, Psychiatry, pediatrics, Maxillofacial, Emergency medicine and Anesthesia) run by the hospital. Surgical unit is one of the pioneer specialty units giving service to the community with general surgeons, sub specialists, residents, GPS and nurses. The unit has a total of 189 beds. With total of eight operation rooms.

4.2 Study period: -

Data was collected from January 2021 to December 2021.

4.3 Study design

Cross-sectional study on surgical patient who under gone re laparotomy.

4.4. Population

4.4.1. Source population

All surgical patient who under gone laparotomy and admitted to surgical ward.

4.4.2. Study population

Data was collected from patient under gone re laparotomy during the same period.

4.5. Eligibility Criteria: -

All the patients of any age group who underwent re laparotomy within 60 days of the initial laparotomy.

The patient giving negative consent were excluded from the study.

4.6 Study variables

4.6.1 Dependent variable

- ✓ Pattern of Re laparotomy
- ✓ Outcome of Re laparotomy

4.6.2 Independent variables

- ✓ Age
- ✓ Sex
- ✓ Urgency of the index surgery
- ✓ Latency of the index surgery
- ✓ Professional who performs the index surgery
- ✓ Number of re laparotomy
- ✓ Type of surgery

4.8 Sampling Technique and Sample Size

Consecutive sampling technique was used. All re laparotomy patients that was admitted to JUMC in the study period was included.

4.9 Data collection

The principal investigator and Residents working in surgical unit took history from the patients and the caretaker during first admission. A physical examination of each patient was conducted. The information was filled in the designed check list.

Training for one day was given and supervised subsequently by principal supervisor for filling data appropriately, missed data was checked weekly.

4.10. Data processing and Analysis

The collected data was checked for completeness at the end of each data collection day and data was analyzed using SPSS computer software. Descriptive statistics and

chi-square test was employed to assess association among variables. P-value less than 0.05 considered statistically significant. Variables tested were age, address, type of surgery, admission diagnosis, level of operating surgeon, delayed presentation for more than 48 h, indication for relaparotomy and number of relaparotomy operations. Finally obtained result was presented using tables and figures.

4.10.1 Data quality control

Data initially checked for completeness and consistency continuously by supervisor or investigator.

4.11. Ethical Consideration

Ethical clearance was taken from Jimma University ethical clearance board. Study objective was explained to Hospital administrative. Written verbal consent was taken from each patient and confidentiality was kept strongly.

4.12 Possible Limitation of the study

There were patients lost from the follow up.

4.13 Dissemination of result

After completion of the study, formal report was prepared and copy of the research was given to Jimma university department of surgery, Jimma University institute of Health research, post graduate study coordinator office and Jimma Zonal health Office. To publish on different journals and distribute on different electronics media.

5. RESULT AND DISCUSION

5.1 Result

5.1.1 Socio demographic characteristics

A Total of 64 patients under gone re laparotomy in our study. For our study, minor surgical procedures and operations on the abdominal wall were excluded. All cases in which the peritoneal cavity had been explored, including those in which laparotomy had shown no disease or had revealed an inoperable lesion were included. The age ranges from 2 month to 75 years. With mean age of 33.45 year.

Among these ,43(67.2%) were males and 21(32.8%) were females (Table 2). About 64 of the total re-laparotomies 5(7.8%), 9(14.1%), 23(35.9%), 10(15.6%), 17(26.6%) were belonged in age group of above 60, 46-60, 31-45, 16-30, and less than 16 years old respectively (Table 1).

Table 1: - Age of the patients

Age			
		Frequency	Percent
	less than 16	17	26.6
	16 to 30	10	15.6
	31 to 45	23	35.9
	45 to 60	9	14.1
	greater than 60	5	7.8
	Total	64	100.0

Table 2: Sex of the patient

SEX			
		Frequency	Percent
	male	43	67.2
	female	21	32.8
	Total	64	100.0

5.1.2 Pattern and Associated factors for re laparotomy

From the total re laparotomy the index surgery was done 54(84.4%) of the case at JUMC and other 10(15.6%) was done at nearby hospitals (table 3). Most of the re laparotomy patient had their primary surgery done as emergency 54(84.4%) and 10(15.6%) as elective case (table 4). From the total of 64 patients 49(76.6%) of them came after 48 hrs. of developing symptoms and 15(23.4%) came within 48 hrs. (table 5).28(43.8%) where operated during day time, and the rest 36(56.3%) where operated during night time (table 6).

From those cases 46(71.9%) of the index surgery was primarily done by surgeon,14(21.9%) done by senior resident alone and other 4(6.3%) was done by other profession (table 7). Bowel surgeries 28(43.8%) and gastric surgeries 15(23.4%) was the two leading procedures followed by exploratory laparotomy (figure 1)

Table 3: - Hospital at which the index surgery was done

HOSPITAL AT WHICH SURGERY DONE			
		Frequency	Percent
	JUMC	54	84.4
	other	10	15.6
	Total	64	100.0

Table 4: - The urgency of the index surgery

Urgency of initial surgery			
		Frequency	Percent
	emergency	54	84.4
	elective	10	15.6
	Total	64	100.0

Table 5: - Latency of index surgery after the development of symptom

Latency of the initial surgery			
		Frequency	Percent
	within 48 hrs.	15	23.4
	after 48 hrs.	49	76.6
	Total	64	100.0

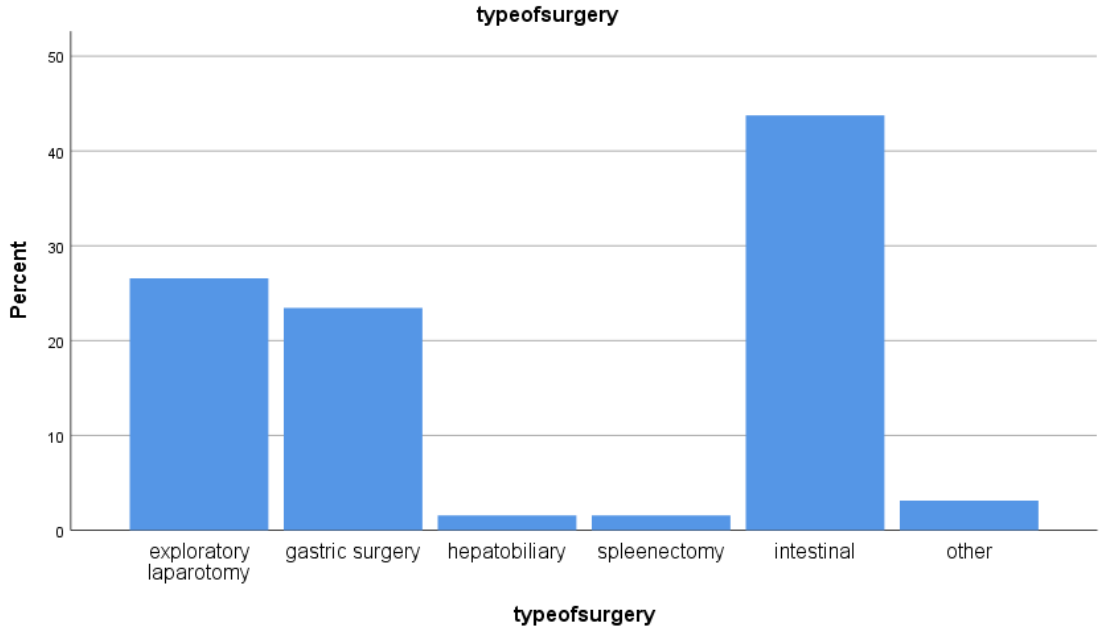
Table 6: - Time of the index surgery

Time of the initial surgery			
		Frequency	Percent
	day time	28	43.8
	night time	36	56.3
	Total	64	100.0

Table 7: - Professional who performed the index surgery

		Frequency	Percent
	surgeon	8	12.5
	resident alone	14	21.9
	both surgeon and resident	38	59.4
	Other profession	4	6.3
	Total	64	100.0

Figure 1: - Type of surgery done during index surgery



Around 15(23.4%) patients are found to have past medical illness. From this Twenty-five patients (23.4%) had one or more co morbidity namely HTN 4(30.8%), malignancy 3(23.1%).DM 1 (7.7%), COPD (7.7%) and other (table 9).

Table 8: - Past medical condition of the patient

Past Medical condition			
		Frequency	Percent
	yes	15	23.4
	no	49	76.6
	Total	64	100.0

Table 9: - Any identified medical condition

Identified medical conditions			
		Frequency	Cumulative Percent
Valid	DM	1	7.7
	HTN	4	30.8
	COPD	1	7.7
	malignancy	3	23.1
	other	4	30.7
Total		13	100

The leading indication for re operation was post op collection in 17 (26.6%) followed by anastomotic leak in 14(21.9%), obstruction 12 (18.8%), and dehiscence in 10(15.6%) (figure 2). The mean time to re laparotomy was 6.5 days. Timing of relaparotomy ranged from the first postoperative day to the 49th postoperative day. Majority done within the first 20 days (figure 3). Only 20(31.3%) of the patient required more than one re laparotomy (figure 4), peritoneal collection was found in 7(35%), anastomotic leak in 5(25%), the other found to have wound dehiscence and bowel obstruction.

Figure 2: - Indication for re laparotomy

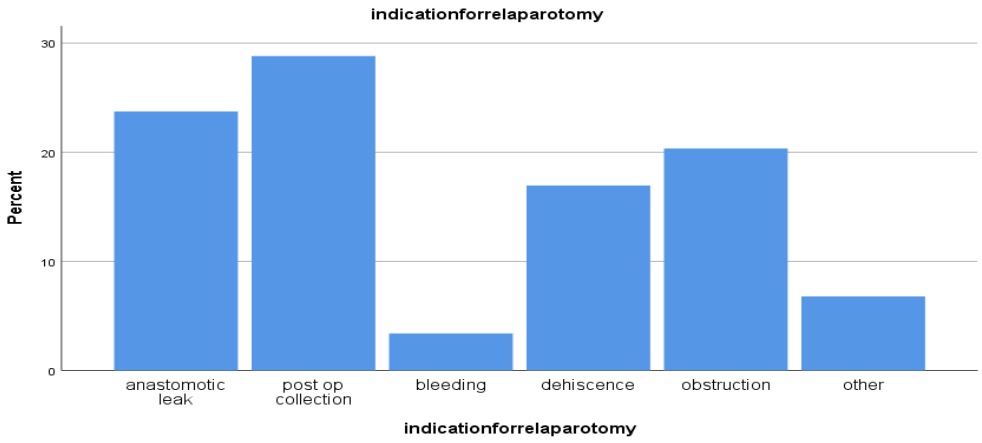
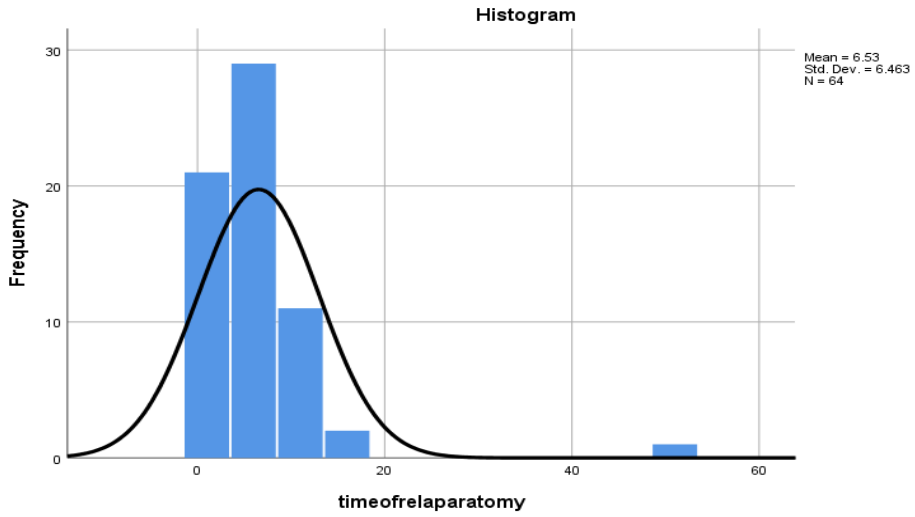


Figure 3: - Time of re laparotomy following the index surgery



Out of 64 re laparotomy 56(87.5%) were unplanned or done on demand and other 8(12.5%) done on planned base (table 10). 47(73.4%) of the relaparotomy was decided clinically only, 9(14.1%) were decided both clinically and imaging and 8(12.5%) were decided intraoperatively.38(59.4%) of the re laparotomy (table 16),

index surgery was done primarily by surgeon,14(21.9%) done only by residents and other 10 were operated in other nearby hospitals.

Table 10: - Type of the re laparotomy

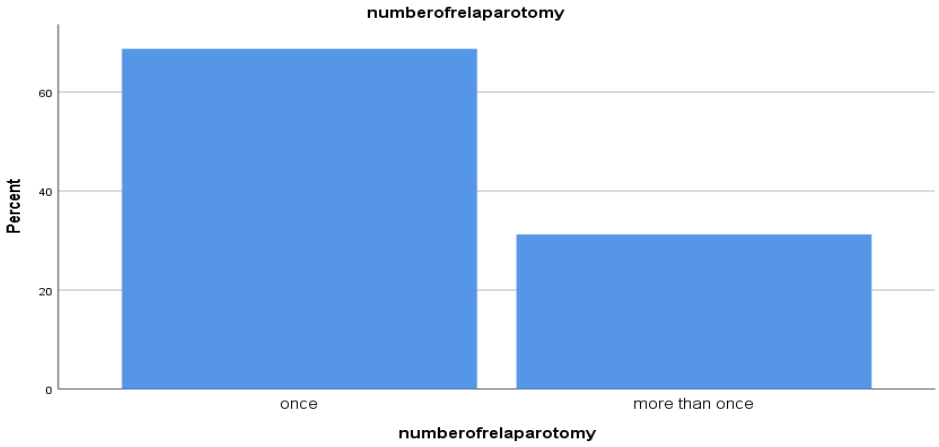
The type of re laparotomy			
		Frequency	Percent
	planned	8	12.5
	on demand	56	87.5
	Total	64	100.0

Table 11: - Decision for re laparotomy

Decision for re laparotomy			
		Frequency	Percent
	clinical	47	73.4
	none	8	12.5
	both clinical and imaging	9	14.1
	Total	64	100.0

5.1.3 Outcome of Relaparotomy

Figure 4: - Number of re laparotomy done



The mean duration of hospital stay for all patients were 21.8 days. with the majority staying10 to 20 days (figure 5). only 23(35.9%) admitted to ICU. Majority of ICU admission was with indication of mechanical ventilatory and inotropic support 10 (43.5%), only mechanical ventilatory support 7(30.4%) and inotropic support 3(13%) of the cases (table 19).13(20.3%) was found to have respiratory failure,10 (15.6%) has both respiratory and cardiovascular failure,5 (7.8%) has cardiovascular failure and the remaining 3 has both renal and respiratory failure (table 13). From this 51(79.7%) were improved and discharged and 13(20.3%) of them died (figure 6).

Table 12: - place of admission after re laparotomy

Admission after re laparotomy			
		Frequency	Percent
	ward	41	64.1
	ICU	23	35.9

	Total	64	100.0

Table 13: - Indication for ICU

Indication for ICU			
		Frequency	Valid Percent
	mechanical ventilatory support	7	30.4
	inotropic support	3	13.0
	mechanical ventilator and inotropic support	10	43.5
	other	3	13.0
	Total	23	100.0

Table 14: - Identified organ system dysfunction

Organ system dysfunction			
		Frequency	Percent
	respiratory failure	13	20.3
	cardiovascular failure	5	7.8
	respiratory and cardiovascular failure	10	15.6
	respiratory and renal failure	3	4.7
	no	33	51.6
	Total	64	100.0

Figure 5: - Total day of hospital admission

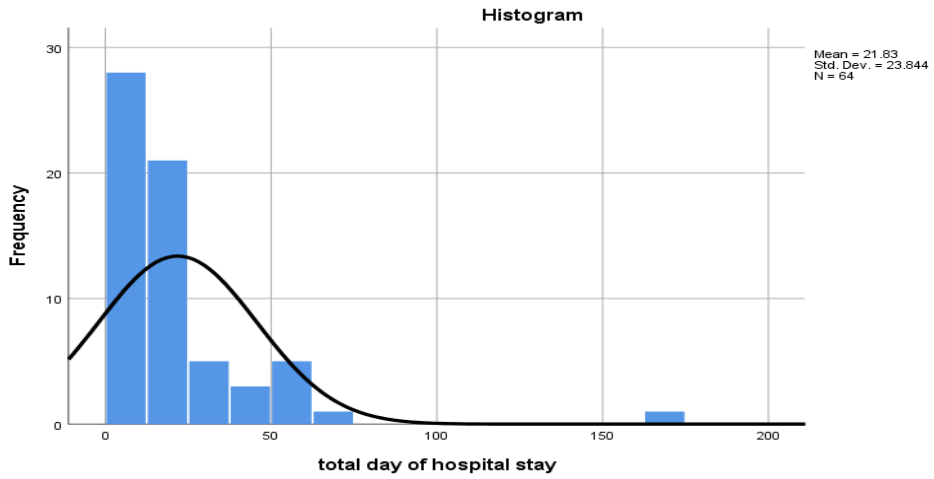


Figure 6: - Condition of the patient on discharge

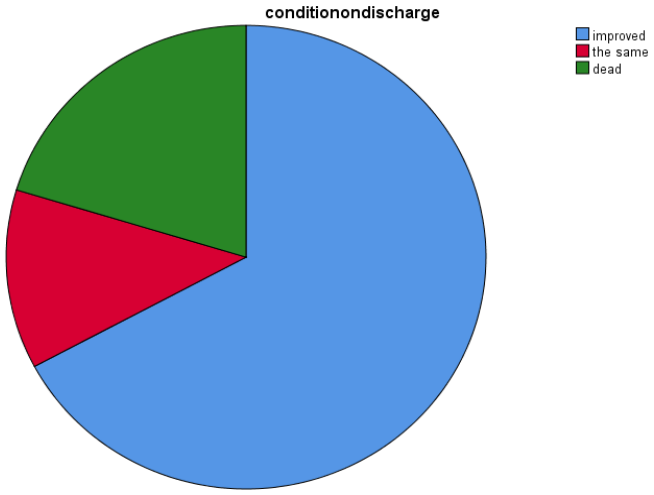


Table 15: -Indications of Re-laparotomy and Mortality Rate among Patients Who Needed RL.

no	Indication for re laparotomy	Total no (%)	Mortality (%)	P-value
1	Obstruction	18.8%	-	0.998
2	dehiscence	15.6%	-	0.352
3	Anastomotic leak	21.9%	40 %	0.025
4	Post op collection	26.6%	23.1 %	0.198

5.2 Discussion

The reported rate of re-laparotomy in various countries ranges from 1% to 15%(2). Out of 939 patients who underwent laparotomy procedure, for 78 patient's re-laparotomy was done which gives the overall prevalence of 8.3%. study from St. Paul's hospital is comparable to our study 6.9%. our study finding was lower than study done at Debre Markos referral hospital 12.3%(4). The finding is also lower than study conducted in India 18.5%(10). But our finding was higher than compared to the study done in Zambia 3.3%. The lower rate (8.3%) in this study than others studies reflect difference in study subjects. The discrepancy might be due to the inclusion of gynecological and obstetric surgery in this study while only general surgery included in our study. The finding was lower compared with the study conducted at Netherlands 27%. The studies done in the Netherlands included only emergency surgery but, in our study, both emergency and elective surgeries included, this might be due to the reason why those studies find out high prevalence of re-laparotomy compared to our study(7).

In our study, the two major indications for relaparotomy were postoperative intra-abdominal fluid collection and anastomotic leak. In our setting almost all of the

decision was made on clinical base, these diagnoses are generally made intra-operatively with varied preoperative manifestations of peritonitis. Postoperative fluid collections and anastomotic leak comprised approximately 60% of indications for relaparotomy. The study done at Tikur Anbesa teaching hospital shows the two comprise around 66.1% of the total indication for re laparotomy which is almost similar to our study(1). In one of the study in Tanzania the leading cause for re laparotomy was anastomotic leak 40(37.6%) patients followed by post operative abdominal collection 19(18.87%), bowel fistula in 14(13.9%) and in 13(12.7%) patients re laparotomy was non diagnostic(11). One study done at Turkey had shown anastomotic leaks and intestinal perforation as the cause for redo-laparotomies in 52 % patients (12).

Most studies revealed male predominance. Study done at St. Paul's and Negussie et al's demonstrated similar rates in both sexes(1). But in our study, there is male predominance (2/1). This may reflect differences in study subjects and disease incidence. The mean age of patients who had RL in the western countries were higher than African and Indian reports. The high life expectancy and disease pattern, more malignant condition in the western world which tends to occur in older age, may contribute to this discrepancy. The Tanzanian and St. Paul's, Ethiopian studies reported 35 and 37.8 years respectively, which is similar with our finding (33.45 years)(13).

Rygachev and colleagues reported mortality of 66.5 % for multiple laparotomies versus 30.6 % for a single laparotomy. But in our study, we found the mortality to be 22.7 % (10/44) in patients who had undergone single re-exploration as compared to 15 % (3/20) in patients with multiple re-explorations. This result deference is due to number of samples used in our study is low.

Re laparotomy patient place higher demand on the health care system, especially in low-income centers. Due to lower number of ICU bed only 35.9% of our patient are

admitted to ICU and other 64.1% were admitted in the ward, despite multiple surgery and complication requiring close monitoring. In study done in Tanzania ICU admission was found to be 1in 3 patients (33.3%).which is comparable to ours(11).

Literatures reported that overall mortality rate ranged from 20% to 40%. In our study the post operative mortality rate was 20.3%. the majority of relaparotomy was done on demand base (87.5%). The study which was conducted in Tanzania shows about 76.6 % of the primary laparotomy was done on demand base(11). Study conducted in Barcelona, Spain the majority of the relaparotomies were emergencies performed in an on-demand strategy (89.5%). The overall mortality of the series was 22%. The main cause of death was septic shock intrabdominal sepsis (41%)(3).
Study done at Netherlands shows mortality rate of 20%. Mortality is highest in organ disruption and lowest in obstruction. Mortality after an emergency initial operation is higher than after elective primary laparotomy (40 versus 50). But in our study the mortality rate between emergency and elective primary laparotomy is equal (25% vs 25%). This is due to number of re laparotomy done for primary elective cases are much lower than that of emergency. Study done in Barcelona, Spain show that There were no differences in mortality rates regarding to the elective or urgent character of the first laparotomy (19% vs. 21%; P=0.4) According to that, the presence of abdominal sepsis causing the initial operation was not related to mortality after relaparotomy (P=0.2). Nevertheless, as expected, the existence of an anastomosis during the first procedure was associated with a significant increase in mortality after the reoperation(P=0.05)(3).

The cause of re-exploration has been found to be an important factor in influencing mortality rates in re-laparotomies. Mortality rates for re laparotomy following anastomotic leak was found to be high (40%), while wound dehiscence and obstruction (16.7%) have been low in our study (p= 0.025). the Ethiopian study done at St. Paul's shows, anastomotic leak caused the highest mortality among the indications of RL(13). In one of the studies conducted in India, important factor affecting mortality is the system or organ that re laparotomy is performed on. Consistent with this view the study show high mortality rate in GIS surgery(12).which

is almost similar to our study, this is because of greater septic complication rate after this complications.

In this series, we did not find any association between mortality after relaparotomy and diabetes mellitus, HTN, lung disease and immunosuppression. Which is similar to study done in Spain.

In our study the presence of MOF increase mortality. If we see death after re laparotomy 46% of the patients found to have respiratory and cardiovascular failure and 15.4% has respiratory and renal failure(p=0.010). study done at UK; the presence of MOF doubled the risk of in-hospital death (an increase of 27-64%) after relaparotomy. However, MOF was not selected as a significant survival predictor when patient age was included. The most likely explanation is that MOF developed more frequently in older patients, and that patient age contributed more relevant survival information to the regression analysis than did MOF(5).

6. CONCLUSION AND RECOMMENDATIONS

Re laparotomies are associated with mortality rates, which higher than after the index procedures. While on demand re laparotomy are usually unavoidable, the adequacy of the first redo surgery is important as multiple redo-laparotomies are associated with a significantly higher mortality.so the most efficient way of reducing re laparotomy and mortality is avoiding the possible complication during the first surgery.

The highest incidence for re laparotomy is found in patient with peritonitis. Good preoperative bowel preparation (i.e., lavage), adequate prophylactic antibiotic treatment, clean and gentle handling of the abdominal organs abstaining from anastomosing in contaminated bowels, all form the basis to ensure an operation with minimal problems.

Adequate team management of patients at risk is of great value in understanding and preventing perioperative problems which would lead to early relaparotomies.

Examining and identifying high-risk patients and accordingly taking all appropriate care should be done to decrease the risk of re-laparotomy.

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ANNEX

Questionnaire

Hello, I am……. team of collecting data on pattern, associated factor and outcome of re laparotomy among all surgical patient admitted to JUMC. I would like assure confidentiality of your information. Information will be used only for research purpose and has right to participate or reject study any time during interview. Information you will give us has very important for successful completion of this study. If you have any question, you can ask the principal investigator, phone no 0913353684.

Are you willing to participate in this study?

Agree_____ continue

Do not agree_____ stop

Thank you

Data collector Name_____ Date_____ Sign_____

Supervisor_____ Date_____ Sign_____

Part 1 Sociodemographic characteristics

1.1 Admitted ward _____

1.2 Card No_____

1.3 Age in year_____

1.4 Sex: a) Male

b) Female

1.5 Residency: a. Urban b. Rural

1.6 Marital status: a. Single b. Married

c. Divorced d. Widowed

1.7 Religion: a. Muslim b. Orthodox

c. Protestant d. Others_____

1.8 Occupation: a. House wife b. Farmer

c. Government Employee c. self-Employee

1.9 level of education: a. cannot read and write b. Grade 1-8

c. grade 9-12 d. higher education

Part 2. Index surgical procedure done

2.1 Hospital at which the initial surgery was done.

a) JUMC b) Other hospital……

2.2 The urgency of initial surgery.

a) Emergency b) Elective

2.3 The latency of the initial surgery after patient develop symptom.

a) Within 48 hours b) After 48 hours

2.4 During what time was the initial surgery done.

a) Day time b) Night time

2.5 Professional who perform the initial surgery.

a) Surgeon

b) Resident

c) Both surgeon and resident

d) Other ……..

2.6 The number of relaparotomy done.

a) Once

b) More than once

2.7 What type of surgery was done during initial procedure.

a) Exploratory laparotomy

b) Gastric surgery

c) Hepatobiliary

d) Splenectomy

e) Intestinal

f) Other…….

Part 3. Re laparotomy

3.1 type of re laparotomy

a) planned b) on demand

3.2 decision for re laparotomy was done by

a) clinically b) With laboratory

c) imaging d) none

3.3 Any identified medical condition.

a) YES B) NO

3.3.1 If it is yes…….

a) DM b) HTN c) COPD d) malignancy e) jaundiced

f) other……

3.2 What was the indication for re laparotomy.

a) Anastomotic leak b) Post op collection

b) Bleeding c) Dehiscence

d) Obstruction d) Other ……

3.3Time of re laparotomy following the initial laparotomy

a) within 36hrs b) 48 hrs to 5 days

c) 5 to 10 days d) greater than 10 days

3.4 Place of admission after re laparotomy.

a) Ward

b) ICU

3.4.1 If admitted to ICU what was the indication.

a) Mechanical ventilatory support

b) Inotropic support

c) Hemodialysis for acute renal failure.

D) Other……

3.6 Any identified organ system dysfunction after relaparotomy.

a) Respiratory failure

b) Cardiovascular failure

c) Renal failure

d) Other……

3.7 Total Day of admission……

3.8 Condition of the patient on discharge.

a) Improved

b) The same

c) Deteriorated

d) Dead