

Original Research Article

Observational clinical study of indications and outcome of re-exploration laparotomy in 50 patients

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ABSTRACT

Background: Abdominal surgery that has to be re-done in association with initial surgery (Index surgery), within 60 days of initial surgery, is referred to as re-laparotomy. Redolaparotomies are called, on demand, if laparotomy has to be re-done because of patient condition and planned, if the second laparotomy is decided upon during the course of first surgery itself. Re-laparotomy is associated with increased morbidity and mortality. To find out incidence, indications, morbidity and mortality of re-laparotomy.

Methods: This is a retrospective observational study of 50 cases of re-exploratory laparotomy from 2018 to 2020 done at tertiary care teaching hospital of South Gujarat.

Results: In this study, majority of cases (56%) were seen in the 21-50 age group; males (37) more than females (13) with 3:1 ratio. Index operation was done in emergency in 78% (n=39) and planned in 22% (n=11) of patients. In our study mean duration between 2 laparotomies was 8 days with range of 3-20 days. It is also observed that mean duration of hospital stay among the discharged patients is 30 days with range of 15-60 days. In this study, mortality was 16% (n=8), out of which 5 patients were having co-morbidity. Out of 50 patients 34 (68%) developed local or systemic post-operative complications.

Conclusions: The need for re-laparotomy supersedes risks of severe morbidities and high mortality in view of worsening clinical status of the patient.

Keywords: Laprotomy, Re-exploration, Abdominal sepsis, Peritonitis, Outcome of exploration surgery

INTRODUCTION

Re-abdominal surgery is done in association with preliminary surgery (Index surgery), within 60 days of preliminary surgery is referred to as re-laparotomy.¹ Occasionally laparotomy has to be re-done because the principal pathology associated with re-laparotomy are manifold, hence a high index of suspicion is mandatory to perceive a correctable intra-abdominal pathology after preliminary laparotomy. Redo-laparotomies are called, on demand, if laparotomy has to be re-done because of the patient situation and planned, if the second laparotomy is

decided upon during the course of first surgery itself. Re-laparotomy is associated with augmented morbidity and mortality.^{2,3} Whenever re-laparotomy is essential, mortality increases to as high as 22% to 51%.⁴ Laparotomy has to be re-done due to complications like, biliary peritonitis, faecal fistula, anastomotic leak and burst abdomen, consequential in post-operative peritonitis and intra-abdominal sepsis.⁵ The surgical treatment is primarily aimed at eliminating the source of infection. Patient characteristics like demographics, co-morbidities, pre-operative, intra-operative and post-operative factors has to be analysed to identify the risk factors foremost to

relaparotomy. Prognosis and outcome of these patients hinge on early diagnosis and opportune intervention. Clinical and haematological parameters as well as radiological evidence form the basis of the re-laparotomy.

A huge number of abdominal operative procedures are executed in a tertiary referral general surgery unit and abdominal re-exploration forms a substantial contribution to morbidity and mortality rate. The primary objective of this study is to well define those patients who require further surgical management. It is often very problematic to decide which patient need operative intervention and which need careful observation on an already operated patient who has developed sepsis or SIRS eventually in intensive care for a prolonged period. This is a study to find out incidence, indications, morbidity and mortality of re-laparotomy.

METHODS

This is a retrospective observational study of 50 cases of re-exploratory laparotomy done at department of surgery, new civil hospital, Surat, South Gujarat. After taking permission from ethics committee, case papers of operated cases of re-exploratory laparotomy in department of surgery from 2018 to 2020 were scrutinized according to following criteria.

Inclusion criteria

All patients irrespective of age and sex, who have undergone re-exploration of the abdomen during the period of hospitalization after the first operation (Index operation) and discharge (readmission for re-exploration) within 60 days of primary operation were included.

Exclusion criteria

All the gynecological and obstetrical laparotomies were excluded, patients requiring second re-exploration will not be included.

ARPI index-the abdominal re-operation index

It includes clinical, physiological and organ function parameters which puts together to form a predictive tool.⁶ This helps identify those patients who are in need for revision laparotomy. This scoring system consists of 8 variables and they are listed in Table 1. A score of more than 10 suggests that there is increased chance for revision laparotomy.

Data collection and analysis

Data was collected from indoor case papers retrieved from case record section of the institute. Data regarding patients' information like bio data, history, examination, investigations, management and complications were collected from indoor case sheets, entered in Performa

sheets, ARPI score was calculated and analysed with SPSS software.

RESULTS

In this study, majority of cases (56%) were seen in the 21-50 age group; males (37) more than females (13) with 3:1 ratio. Index operation was done in emergency in 78% (n=39) and planned in 22% (n=11) of patients. Index laparotomy involving upper gastrointestinal surgeries in 22%, surgeries on small bowel in 36% cases and colorectal surgery in 30% cases; hepatopancreatobiliary (HPB) in 10% and urinary system in 2% of cases. The re-exploration was more in clean contaminated primary surgery (46%) followed by contaminated (34%). Indications of re-laparotomy were as per Table 2. In our study mean duration between 2 laparotomies was 8 days with range of 3-20 days. It is also observed that mean duration of hospital stay among the discharged patients is 30 days with range of 15-60 days, with 28 (56%) patients required ICU admission after re-laparotomy, out of which 19 (38%) patients have been required inotropic support. Out of 50 patients 34(68%) developed local or systemic postoperative complications as mentioned in Table 3. In our study there were 4 primary laparotomies were done for malignancies in which 2 patients expired following re-exploration indicating 50% mortality; in 4 patients' primary surgery has been done following penetrating or blunt abdominal trauma, out of which all survived. In this study, mortality was 16% (n=8), out of which 5 patients were having co-morbidity. This study reveals that as age advances, mortality rate increases in cases of re-exploration.

Table 1: Age wise distribution of study participants.

Age group (Years)	Frequency (%)
0-10	3 (6)
11-20	1 (2)
21-30	15 (30)
31-40	7 (14)
41-50	11 (22)
51-60	5 (10)
61-70	8 (16)

Table 2: The abdominal re-operation index (ARPI).

Variables	Score
Emergency surgery	3
Respiratory failure	2
Renal failure	2
Ileus	2
Abdominal pain	5
Wound infection	8
Consciousness alteration	2
Symptoms from 4 th post-operative day	6

Table 3: Indications of re-laparotomy.

Indications	No. of patients (%)	Mortality, (n=8)
Burst abdomen	12 (24)	0
Anastomotic leak	9 (18)	3
Bile leak following primary repair of hepatobiliary surgeries or feeding jejunostomy	9 (18)	4
Retraction of stoma	5 (10)	0
Abscess or intraabdominal collections	4 (8)	0
Intestinal obstruction	3 (6)	0
Hollow viscus perforation	2 (4)	1
Bowel necrosis	2 (4)	0
Enterocutaneous fistula	2 (4)	0
Stump blow out	2 (4)	0

Table 4: Post-re-laparotomy complications.

Post-operative complications	No. of patients (%)
Local complications	
Burst abdomen	1 (2.9)
Wound infection	15 (44.11)
Stomal site infection	2 (5.8)
Stoma prolapse	1 (2.9)
Peri stomal/peri FJ excoriation	5 (14.7)
Systemic complications	
Septicaemia	3 (8.8)
Acute kidney injury (AKI)	2 (5.8)
DIC	1 (2.9)
Pneumonia	2 (5.8)
Respiratory Failure	1 (2.9)
Arrhythmia	1 (2.9)
Total	34

DISCUSSION

Re-laparotomy refers to operations performed within the period of 60 days of initial laparotomy. Depending upon time, its goal and nature of urgency, re-laparotomy can be classified into early or late, radical or palliative, planned or unplanned.^{1,7} Re-do laparotomies are called on demand if the laparotomy has to be re-done because of the patient's condition such as those with clinical deterioration or persistent lack of improvement.¹ On-demand strategy harbours the risk of a potentially harmful delay in the detection of ongoing infectious sources. A re-laparotomy is called planned if the second laparotomy is decided upon during the course of the first surgery itself like in case of severe intra-abdominal sepsis or post damage limitation surgery.^{1,8} The planned strategy may lead to early detection of persistent peritonitis or a new infectious focus but harbours the risk of potentially

unnecessary re-explorations in critically ill patients. Recognition of patients at high risk for re-laparotomy after initial surgery is significant for outcome. The reasons for re-laparotomy are first laparotomy, incision, technique, competence of surgeon, patient co-morbidities, delay in assessment of time interval between the development of complication and re-laparotomy and unjustifiable time delay in reaching correct diagnosis.⁹ Apparently, these factors increase the morbidity and mortality of the patient which makes re-laparotomy the final choice.⁴ With the advent of additional methods of diagnosis of post-operative complications, the fatality after re-laparotomy can be reduced. computed tomography (CT) scan has been proven to be accurate in detecting post-op inflammatory lesions and percutaneous drainage can be done if needed. The pathophysiology after re-do surgery is to trigger inflammatory response such as the release of cytokines like IL 6 leading to hypotension requiring inotropic support. Multiple re-do surgeries have a cumulative effect resulting in systemic inflammatory response syndrome (SIRS) which will worsen the prognosis.¹⁰ Other effects of re-do surgery includes alteration of coagulation profile by proteolytic enzymes, renal failure and also multiple organ dysfunction.¹¹

This study was designed in such a way that the cause of re-laparotomy and the factors leading to re-exploration were analysed by selecting variables starting from pre-, intra- and post-operative period were chosen. The pre-operative factors included patient demography, indications and comorbidity; the intra operative characters were the site of pathology, inotropic support, whereas the post-operative characteristics were surgery related complications. Gender wise distribution of re-laparotomy was higher in male patients which is comparable to similar study, the male: female ratio is 3:1, majority of cases were seen in the 21-30 age group followed by 41-50 age group.⁵ The mean age of participants were 50 with male dominance in a study conducted by Unalp et al.⁵ Indications for re-laparotomy were, burst abdomen (24%), anastomotic leak (18%), bile leak (18%), retraction of stoma (10%), intra-abdominal abscess (8%). Burst abdomen and anastomotic leak seems to be the leading causes of revision laparotomy in similar studies too (Patel et al).^{3,8}

Many of the patients requiring repeat laparotomy in which the index surgery were done as emergency basis. A study of Koirala et al also shows that the maximum relaparotomies are taken as emergency surgery only, which is consistent with our study.¹ In our study all re-laparotomies were taken as emergency surgery. The mean duration between laparotomies depends upon the index surgery, surgical technique and post-operative factors. In this study the mean duration between two laparotomies were 8 days (range 3-20 days); comorbidities like pulmonary/abdominal tuberculosis (33.3%), systemic hypertension (26%), diabetes mellitus (26%), cardiac arrhythmia (13.3%), COPD (7%) and peripheral vascular

disease (7%) were present, are comparable to other studies.^{1,7} In our study the incidence of re-exploration as per site of pathology involving small bowel and colorectal surgery was 30% in each; 46% in clean contaminated primary surgery and 34% in contaminated primary surgery. As per expectations complications related to revision laparotomy are high and our results were no different when post-operative complications were analysed. It was found that wound related complications like wound infection and dehiscence; and stoma related complications were more common in our study which is consistent in a study conducted by Koirala et al.¹

The mean number of days spent in hospital for revision group is 30 days with range of 15 to 60 days. The expected post-operative days in which the patient has undergone re-do surgery is between 3th to 20th day and the mean post-operative day was 8 similar to study of Patel et al.³ Morbidity was taken in account by considering number of days stay in ICU and inotropic support, 28 (56%) patients required post re-exploration ICU admissions and 19 (38%) patients required post re-exploration inotropic support Haluk et al.¹² In our study mortality was 16% (n=8), including 5 males and 3 females and 5 patients were having comorbidity is comparatively less than other studies (Haluk et al, Wain et al and Unalp et al) in which mortality rate was in between 26.7% to 37.3%.^{5,8,12} Mortality was seen more in the patients primarily operated for malignancies (n=4) and with advancing age in this study. High mortality rate in re exploratory laparotomy is due to the fact that it is performed only in those patients who do not heal even with standard post-operative care or patients whose clinical condition was not good.

Despite the development in surgical techniques, anaesthesia, intensive care monitoring and antibiotic therapy re-laparotomies continue to be a problem in general surgery.¹³ They carry high morbidity and mortality as number of re-exploration increases.⁹ In order to overcome these ill effects, a well-arranged primary surgery and efficient time management in handling the postoperative complications is much needed. Nevertheless, if needed re-laparotomy at the correct time can be life-saving. When not performed, it can also lead to death in spite of correctable hidden cause. To identify the risk group of patients, emphasis was placed on pre-operative and intraoperative variables those will be available to the surgeon before abdominal closure of the initial laparotomy.

Limitation

The observational findings were not be generalized cause of lesser no. of sample included in this study. Though, the study providing data on the extent of the problem which assistances in improving patients care and as a baseline for further study.

CONCLUSION

Although repeat laparotomies create a huge stress in the post-operative period for the patient and surgeon both, due to lack of adequate pre-operative nutritional preparation, further worsened by the pathology from the disease/ previous surgery, the need for relaparotomy supersedes these risks in view of worsening clinical status of the patient.

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