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Original Research Article

Evaluation of relaparotomy in surgery and obstetrics and gynecology patients in tertiary care hospital in India: reason, morbidity, mortality: a case controlled study

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ABSTRACT

Background: Many laparotomy may require relaparotomy due to post-operative complication as life-saving procedure. Incidence of relaparotomy and post-operative outcome defers from patient to patient. The objectives of our study were to evaluate the indication of relaparotomy, outcome of the relaparotomy and factors affecting mortality.
Methods: Data was collected between March 2017 and November 2019 in SSG hospital, Vadodara. Patient's demographics, indication and intra-operative findings of initial surgery and relaparotomy with morbidity and mortality were studied. Patients from department general surgery and obstetrics and gynecology were included. Consent was taken in a pre-validated form.
Results: Out of total 5684 laparotomy performed, 146 (2.58%) patients underwent relaparotomy. Male to female ratio was 1.5:1. Incidence was highest in 31-40 years age group (median age: 37 years). Dirty wound in initial laparotomy had highest conversion rate (3.21%) to relaparotomy. Mean interval between initial laparotomy and relaparotomy was 8.57±5.62 days. The major indication of relaparotomy was burst abdomen (39.52%) followed by leak from previously sutured site (24.65%). 50.68% patients were shifted to ICU following relaparotomy. Average days of ICU admission were 4.16±2.25 days. Mortality rate was 23.29%. Maximum mortality was noted in case of leak from anastomotic or perforation site. 14 (38.88%) deaths occurred during postoperative day second to fourth with mean hospital stay of 21.85±8.65 days.
Conclusions: Although relaparotomy is life-saving procedure, it has high mortality rate. The possibility of efficiently lowering relaparotomy depends on success of the first laparotomy, patient's status, early re-exploration with proper surgical techniques and thorough postoperative care.

Keywords: Anastomotic-leak, Burst abdomen, Complication, ICU admission, Morbidity, Relaparotomy

INTRODUCTION

Complications following elective or emergency laparotomy are not uncommon. Some patients might need to undergo relaparotomy for correction of these complications. Relaparotomy refers to operations performed within 60 days of initial laparotomy due to complication of the same. It can be classified depending on time, its goal and nature of urgency (as early or late, radical or palliative, planned or unplanned). Some of the important indications of relaparotomy are anastomotic leakage, septic peritonitis, intestinal obstruction, burst abdomen, intestinal perforation and haemorrhage.[1-6]

Incidence of relaparotomy can be decreased by proper understanding of predisposing factors and by taking appropriate measures. Emergency initial surgery, sepsis and primary suppurative diseases are some of the risk factors for relaparotomy.

Incidence of relaparotomy ranges from 0.5-15% in various reported studies.[1,3] Highest incidence was seen in

gastrointestinal surgeries, while lowest in vascular surgeries.[1-4] Mortality after relaparotomy ranges from 24 to 71%. Factors associated with high mortality are elderly patients, peritonitis at the initial surgery and sepsis with multi organ failure.[1-4]

Majority of patients who undergo relaparotomy are admitted in intensive care unit. Incidence of relaparotomy is also found to be higher in hospital setup associated training facility. Studies have indicated that out of total laparotomy performed, 1-1.6% require early relaparotomy after initial surgery.[1]

This retrospective study aimed to study incidence of relaparotomy in department of general surgery and obstetrics and gynecology of SSG Hospital, Vadodara, India during March 2017 to December 2019. The aim was to study the indications of relaparotomy and to evaluate mortality and morbidity following relaparotomy.

METHODS

Our single center, observational study was conducted in department of general surgery, Sir Sayajirao General Hospital and Medical College, Vadodara from March 2017 to December 2019 with a follow up period of 1 month. Total 146 relaparotomies were conducted in general surgical and Obstetrics and gynecology operation theatre. Evaluation of various causes of relaparotomy, factors responsible for relaparotomy and outcome of relaparotomy in terms of morbidity and mortality was done.

Inclusion criteria

All the patients of any age group who underwent relaparotomy within 60 days of the initial laparotomy were included.

Exclusion criteria

The patient giving negative consent were excluded from the study.

Prior written and informed consent to participate in the study was taken with thorough explanation of the method and treatment. All patients were observed for their preoperative assessment, findings in initial laparotomy, Procedure of relaparotomy with intraoperative findings and post-operative outcomes including morbidity and mortality. Data were recorded in pre-validated form. All the patients were followed up for 1 month after their discharge from the hospital.

Complications were determined based on clinical analysis, hematological and radiological examinations. Relaparotomies was conducted most Frequently in patients with existing hemorrhage resistance to medical management, having progressive peritonitis or fecoperitoneum, abscess formation impossible to drain percutaneously, existing ileus resistant to decompression or medical treatment, worsening of patient's general condition despite medical treatment and planned relaparotomy for removal of intra-abdominal mops, kept to prevent bleeding during initial laparotomy.

Data was presented in frequency in percentage.

RESULTS

Total 5684 laparotomy were performed out of which 146 (2.58%) patients underwent relaparotomies for various complications.

Average interval between onset of symptom to initial emergency laparotomy was 2.79 days (range: 1-27 days). 108 (73.97%) patients underwent emergency initial laparotomy and only 38 (24.03%) underwent planned initial laparotomy. Total 102 relaparotomies were conducted under department of general surgery and 44 were conducted under obstetrics and gynaecology.

Table 1: Patient demographics.

Patient demographics		
Age (years)	**Number of initial laparotomies**	**Number of relaparotomies**
0-15	859	16 (1.86%)
16-30	1519	48 (3.16%)
31-40	872	24 (3.63%)
14-50	373	12 (3.22%)
51-60	929	26 (2.80%)
61-70	846	16 (1.8%)
>70	286	4 (1.4%)
Total	5846	146
Sex		
Male		88 (60.27%)
Female		58 (39.72%)
Wound classification		
Class 1		12 (8.22%)
Class 2		44 (30.14%)
Class 3		44 (30.14%)
Class 4		46 (31.51%)
Anemia		
Mild		40 (27.4%)
Moderate		86 (58.9%)
Severe		02 (1.37%)
Serum Albumin		
Marked hypoalbuminemia		8 (5.48%)
Mild hypoalbuminemia		102 (69.86%)
White blood cell count		
Leukocytopenia		12 (8.22%)
Leukocytosis		70 (47.95%)
Respiratory system		
Good		66 (45.2%)
Fair		50 (34.25%)
Poor		30 (20.55%)

Out of 146 patients 88 (60.27%) were male and 58 (39.73%) were female. Median age of the patient was 37 years (IQR: 25, 58) (range: 7 months to 75 years). Incidence of relaparotomy was highest among 31-40 years age group (3.63%) followed by 41-50 years (3.63%), 16-30 years (3.16%) and lowest in >70 years (1.4%) (Table 1).

The most common indication for initial laparotomy were hollow viscus perforation(56), intestinal obstruction (20), Abdominal hysterectomy (16), LSCS (28), appendectomy (4) and other conditions (22) such as excision of hydatid cyst, septic peritonitis, cystogastrostomy, feeding jejunostomy, excision of umbilical sinus, APR, incisional hernia repair, pyelolithotomy. Details of 1 initial laparotomy were unavailable.

Dirty wound in initial laparotomy had maximum incidence 3.21% of relaparotomy followed by contaminated wound (2.90%), clean-contaminated wound (1.91%). There were no cases of relaparotomy noted in case of initial laparotomy with clean wound.

Table 2: Site and incidence of leak.

Perforation site leak		Anastomotic leak	
Site	**Incidence**	**Site**	**Incidence**
Prepyeloric peptic	16 (61.54%)	Ileoileal	07 (70%)
Duodenal	01 (03.85%)	Ileocolic	02 (20%)
Jejunal	04 (15.38%)	Colocolic	01 (10%)
Ileal	04 (15.38%)	Jejunojejunal	00
Colonic	01 (03.85%)	Ileojejunal	00
Total	26	Total	10

Out of 146 total relaparotomy performed, major indication of relaparotomy was burst abdomen (58, 39.52%) followed by leak from anastomotic or previously sutured perforation site (36, 24.65%), perforation (24, 16.44%) site specificity of both are shown in Table 2.

Other causes were septic peritonitis (10, 6.85%), postoperative haemorrhage (7, 4.79%), intestinal obstruction (4, 2.74%), planned relaparotomy for removal of intraabdominal mops kept for hemostasis during initial laparotomy (3, 2.05%), inadequate diagnosis after initial laparotomy (01, 0.68%), negative relaparotomy (2, 1.36%) and complication of stoma site (2, 1.37%) (Figure 1).

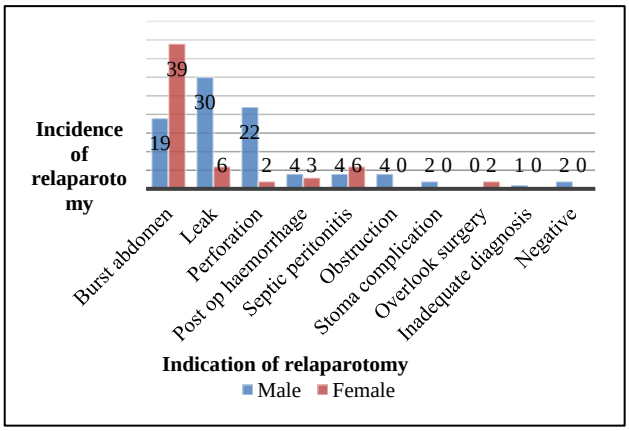

Figure 1: Incidence for relaparotomy according to indication and demographic variation.

The highest 70 (47.94%) relaparotomy were conducted after 5-10 days of initial laparotomy with mean interval of 8.57±5.62 days.

On preoperative assessment, 126 (86.30%) patients were anaemic. 120 (82.20%) patients had hypoalbuminemia, 70 (47.95%) had leukocytosis and 12 (26.08%) had leukopenia. 30 (20.55%) patients had poor respiratory system. 38 patients were chronic smoker whereas 4 patients were alcoholic and 16 patients were both chronic smoker and alcoholic.

12 patients had associated co morbidity in which 1 had carcinoma of right ovary, 1 patient was known case of ischemic heart disease, 3 patients had diabetesmellitus, 2 were operated case of decompressive craniectomy, 1 patient had adrenal adenoma, 3 had abdominal tuberculosis and 1 had typhoid.

Table 3: Summary of ICU admission.

SOFA scoring	Incidence	No. of Intubated patient	Expired patient (% mortality) out of ICU admission	Discharged
0-6	40 (54.05%)	4	04 (15%)	34
7-9	12 (16.22%)	12	08 (50%)	04
10-12	14 (18.92%)	14	14 (100%)	00
13-14	06 (08.10%)	06	06 (100%)	00
15	00 (0%)	00	00 (0%)	00
16-24	02 (2.70%)	00	00 (0%)	02
Total	74	38 (51.35%)	34 (45.95%)	40 (56.76%)

In post-operative period, 74 (50.68%) patients were shifted to ICU following relaparotomy for close monitoring (Table 3). Mean duration of ICU admission were 4.16±2.25 days.

Out of 146 relaparotomies 34 (23.29%) cased died as a consequence of relaparotomy. 32 (94.11%) had emergency and 2 (5.89%) had planned relaparotomy. Maximum mortality was noted in relaparotomy for leak from anastomotic and perforation site 21 (64%) followed by perforation 9 (26%) and 1 (3%) each due to burst abdomen, stomal complication, inadequate diagnosis after initial laparotomy and negative relaparotomy (Figures 1 and 2). Cause of the death are shown in Figure 3.

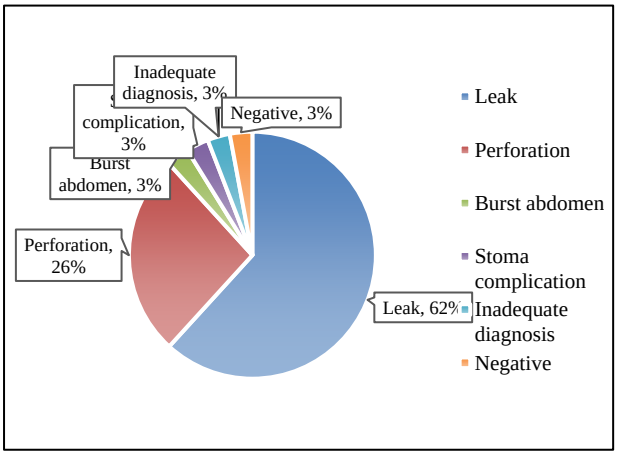

Figure 2: Incidence of mortality.

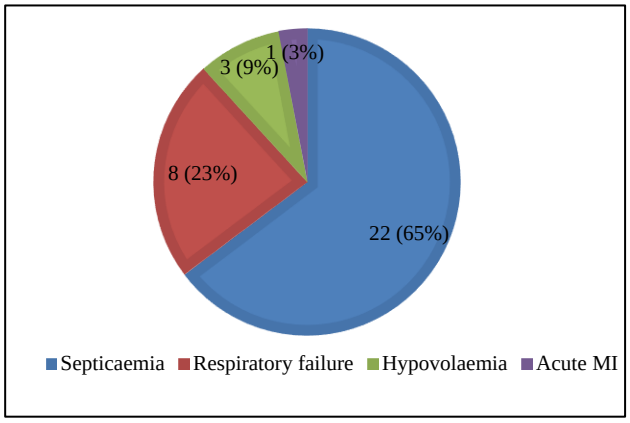

Figure 3: Cause of death.

14 (53.85%) deaths were reported in 51-60 years age group followed by 8 (33.33%) deaths in 41-50 year age group.

Highest deaths of 14 patients (38.88%) were noted within 2-4 days of relaparotomy followed by 12 (33.33%) within 4-6 days, 10 (27.78%) within 2 days, 8 (22.22%) within 6-8 days and 6 (16.67%) after more than 10 days of relaparotomy. The cause of death are shown in Figure 2.

112 (76.71%) patients were discharged after relaparotomies. Patients were discharged between post-operative day 5 to 60 with mean stay of 21.85±8.65 days.

Out of all discharged patients, 109 (97.32%) were followed up for 1 month and did not develop any complications. 3 patients were lost to follow up.

DISCUSSION

In this study, evaluation of 146 patients who underwent relaparotomy in SSG hospital, Vadodara was done. Measures which were carried out to reduce the incidence of relaparotomy are proper preoperative workup, perioperative antibiotics and proper antiseptics, proper surgical techniques, secured haemostasis, complete exploration and appropriate drainage, better postoperative fluid and electrolyte balance.[1]

The incidence of relaparotomy depends upon the disease process and the type of surgery performed. Incidence of relaparotomy in our study was 2.58%. Various studies have different incidence rates of relaparotomy (range: 0.76%-3.4%).[6,11] Incidence is on higher side when compared in general surgery department and lower when carried out exclusively in obstetrics and gynecology department.[2-4,11,12]

Gender wise distribution of relaparotomy was higher in male patients (1.5:1) which is comparable to similar studies.[1-3,6,7] Incidence of relaparotomy was highest in 31-40 years age group (3.22%) and lowest in >70 years age group only 1.34% patients had relaparotomy. Median age of the patients who underwent relaparotomy was 37 years (IQR: 25, 58), which was similar in previous studies.[1,2]

In present study of 146 total relaparotomy, 142 (97.26%) underwent emergency relaparotomy and rest 04 (2.74%) underwent planned relaparotomy whereas when compared to similar study a total of 76% and 24% respectively.[1] Urgent relaparotomies, irrespective of the initial indication, have life threatening consequences.

Mean duration between initial laparotomy and relaparotomy was 8.57±5.62 days, highest (35) being between 5-10 days that was quite similar to the one noted in other similar studies showing 6.85 days and 9.42 days.[1,5] Duration between laparotomy and relaparotomy depends on surgical technique employed during initial laparotomy, post-operative patient care and patient factors.[2]

Out of all patients, 86.30% patients had anaemia, 82.20% patients were having hypoalbuminemia, 47.95% were having leucocytosis and 26.08% were having leukopenia. 20.55% patients were having poor respiratory system. No other study has looked into pre-operative laboratory study.

Major indication of relaparotomy in this study is burst abdomen (39.72%) followed by leak from intestinal anastomosis or sutured perforation site (24.66%), perforation (16.44%) followed by post-operative haemorrhage, septic peritonitis, obstruction, complication of stoma, overlook surgery, inadequate diagnosis of initial laparotomy and negative relaparotomy. Out of all the cases of leak from intestinal anastomosis and sutured perforation site, ileoileal anastomosis (70%) and prepyeloric peptic perforation (53%) had the highest incidences respectively. Indications for relaparotomy in previous studies are more or less similar to this study.[1-3,5,7] Overall the most common indication for the relaparotomy is post-operative haemorrhage.[6,7,9,11] In other studies the most common indication for relaparotomy were leak from anastomotic site and abdominal sepsis.[1,2]

Early diagnosis and immediate surgery to rectify the cause might decrease the mortality.[1] Despite the advances in imaging, surgical technique and critical care, relaparotomy still carries high mortality rate. Despite with best possible post-operative care in our study, mortality rate in case of relaparotomy was high as 23.29%, which is similar to other studies in which mortality rate was in between 26.7% to 37.3%.[2,3,6,7] The study conducted exclusively in obstetrics and gynaecology setup had low mortality rate of 3.5 %.[5] Out of 30 patients who had poor respiration before relaparotomy, 24 (80%) expired in post-operative period.

The cause of relaparotomy has been found to be an important factor in influencing the mortality rates in urgent relaparotomies. Mortality following anastomotic leak and enteric fistula were high, while following wound dehiscence and obstruction have been low in other studies. Some authors have shown higher mortality rates following reexploration of gastro-intestinal surgeries.[1,4] In this study highest mortality was seen in the patients of anastomotic or perforation leak (62%) followed by perforation (26%). The least deaths are noted following relaparotomy for intestinal obstruction, postoperative haemorrhage, burst abdomen.

Despite standard post-operative care, high mortality rate can be due to relaparotomy is being performed only in those patients who do not heal or have increases comorbidities. Compared to planned relaparotomy the patients who undwent emergency relaparotomy had higher mortality rate.

Length of stay in ICU was consider as a marker of morbidity in our study.

In our study, incidence of ICU admission was 74 (50.68%), out of which 38 (51.35%) patients required ventilator support, which is in contrast, existing studies have reported that the ICU admission ranges from 73-84% and requirement of ventilator support ranges from 57.7-69%.[2,6] Length of ICU stay was 4.16±2.25 days in our study which was on a lower range when compared to other study where it ranges from 4-26 days.[2,6] The decrease in mean ICU admission days are due to increase in quality of radiological imaging- helpful in early diagnosis, improved surgical techniques overtime and improved quality in ICU care. The average SOFA score on ICU admission was 6.5. 34 (45.95%) death were reported in ICU post relaparotomy.

The most common cause of death was post-operative septicaemia 64.7% followed by respiratory failure 23.53%, hypovolaemia 17.65%. 1 patient was known case of ischaemic hearth disease and died due to myocardial infarction in post-operative period. These results were similar existing literature where most common cause of death was post-operative septicaemia.[1,2,4]

Mean duration of hospital stay in our study was 21.85±8.65 days, which was similar to 24-27.1 days in similar studies.[2,3,7]

It was a single center study with follow up period of 1 month from discharge, so long term outcome cannot be taken into consideration.

Our study has limitation of being single center and having limited period of follow up. More multicentric study can be conducted to establish association of preoperative status and incidences of relaparotomy in statistically significant way.

CONCLUSION

Relaparotomy is life-saving procedure in many unsuccessful primary laparotomy. Burst abdomen is the most common indication of relaparotomy followed by leak from anastomotic/perforation site. The older, anemic and patient with hypoalbuminemia in pre and post-operative period and dirty wound in 1st laparotomy have higher risk to undergo relaparotomy.

Earlier recognition and treatment of post-operative complications, consideration of relaparotomy with vigorous ICU monitoring and post-operative care leads to decrease post-operative mortality and can raise the incidence of the hospital discharge. Despite the recent advances in the preoperative management and postoperative care, the mortality following relaparotomy ranges around 20-25%.

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