Original Research Article

A Retrospective Study of Emergency Laparotomies done in a Tertiary Care Centre of Mysuru

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Abstract

Introduction: Compared to elective setting, poorer clinical outcomes are observed in laparotomy done in emergency. Nowadays interventional research designed to enhance the outcome, care and quality from emergency surgery is being done with respect to previous observational studies which just assess the outcome of surgery. To conduct research with optimal approach, there are no proper consensus. This study mainly focuses on intra operative presentation and postoperative complications in the patients presenting to tertiary care centre Perforation of hollow viscus is the commonest finding in patients underwent laparotomy. These conditions are of utmost significance as death of the patient might occur due to delay in timely surgical intervention. Following laparotomy, morbidity and mortality of patients depends on symptomatology, etiology, time gap between onset of symptoms and laparotomy, patient's general condition and comorbidities, anaesthetic complications and postop care.**Methods:** This is a hospital-based retrospective study. Those patients who presented to our tertiary care centre with acute abdomen or trauma were included in our study. Study period was from 16 August 2020 to 15 August 2021, and the data were collected from hospital OT records from medical records department. It was conducted in accordance with the institutional guidelines.**Results:** This is a hospital based retrospective study of 77 emergency midline laparotomies done in our institute. Most of the patients belonged to the age group of 40–60-year. Around 93 % cases presented with acute abdomen , amongst which around 62% of them had gastrointestinal perforation. Around 90 % of the cases had pain abdomen as the most common presentation associated with other symptoms. Fever was the most common complication followed by wound infection. No complications were seen in 13 percent cases and mortality occurred in 13 percent cases.**Conclusion:** Early detection and immediate intervention with better postoperative care can minimise both morbidity and mortality associated with emergency laparotomy. To reduce both morbidity and mortality for patients who needs emergency intervention, it is of utmost importance to have public awareness, health education amongst public to get proper medical care, timely referral and mobilization of patient to a well equipped centre without any delay.

Keywords: Laparotomies, Gastrointestinal Perforation, Mortality, Health Education.

Introduction

On an emergency basis, Laparotomies are one of the most commonly performed surgeries where the abdomen is opened and the abdominal organs examined for any disease or injury. They can be done on a patient presenting with acute abdomen or trauma. Ephraim McDowell in Kentucky in 1809 performed the first successful laparotomy without anaesthesia. A miner who was shot in the abdomen with a revolver near Arizona Territory was treated by George E. Goodfellow during 1881. Good fellow was able to operate on the man nine days after he was shot, when he performed the first laparotomy to treat a bullet wound[1].The term comes from the Greek word λἄπάρᾱ (lapara) 'the soft part of the body between the ribs and hip, flank'] and the suffix -tomy, from the Greek word τομή (tome) '(surgical) cut[2].Once the exploration is done after assessing clinical presentation, involved pathology is identified and intraoperative management might vary accordingly. The underlying pathophysiology determines the outcome of laparotomy done. The emergency nature of this operation, variation in surgical pathology and time limitation make it extremely risky procedure[3].

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Included under this umbrella term are a heterogeneous group ranging from truly emergent cases , such as patients with life-threatening haemorrhage , to urgent cases with intraabdominal sepsis and peritonitis and on to what we might term ' expedited ' cases, such as those with adhesive bowel obstruction who needs a non elective procedure if a trial of non-operative management is unsuccessful[4].
Patients requiring emergency laparotomy are few emergency cases in the hospital and within few hrs from the time of admission, nearly 50 to 60 % need surgical intervention. Even though immediate intervention is needed, there is always a room for short time resuscitation for unstable patients before taking to operating room
Compared to elective setting, poorer clinical outcomes are observed in laparotomy done in emergency. Nowadays interventional research designed to enhance the outcome, care and quality from emergency surgery is being done with respect to previous observational studies which just assess the outcome of surgery. To conduct research with optimal approach, there are no proper consensus[5].
Traditionally, emergency surgery has had limited attention from the medical and surgical community, with a low incidence of specialist involvement compared with elective procedures[6].Also, the limited research into patient care pathways has been striking when compared with the abundance of literature on enhanced recovery (ERAS) after elective colorectal and other major surgical procedures.[7] However, this has been partly atoned for in the last decade, where the poor

outcome and heterogeneity of care in this patient group has been shown through both national audits and cohort studies from large surgical centres.[8] The variability may represent both differences in quality of care, the selection of relatively low risk patients in some cohorts, exclusion of patients with complications after elective surgery in others, and differences in triage for surgery in patients where care is potentially futile.Not only do individual patients have a comparatively poor outcome after emergency laparotomy, but the total group of patients represents a disproportionately high number of the total burden of surgical deaths[9,10].As a reaction to the poor outcome after emergency laparotomy, several interventional single- and multi-centre cohort studies have been performed, focusing specifically on standardising the early peri-operative period, with a focus on diagnostic computerised tomography, reduced time to surgery, timely administration of antibiotics, goal-directed fluid therapy and provision of enhanced care levels in the immediate postoperative period All these cohort studies have been associated with improved outcome and significant reductions in mortality, but with little impact on length of stay and with poorly documented measures of recovery. In trauma, a major asset in the treatment of a trauma patient is knowledge of damage control concepts. As part of the resuscitation process in severely injured patients Damage control surgery (DCS) can be performed.In DCS, the goal is to reduce operating time as much as possible, preferably within 1–1.5 h, in which hemorrhage and contamination is controlled, while additional damage is prevented. Thereby limiting the lethal triad in trauma consisting of coagulopathy, hypothermia, and acidosis and provide the possibility to restore physiology[11-13]. Patients might be brought back to the operating room for further resuscitation by doing relaparotomy , as the first procedure may not be adequate to have proper control. Even though there have been significant changes with a revoluntary concept of damage control surgery over the past decades, the mortality and morbidity remains high especially in patients who arrive to emergency room at critical level[13,14]. For patients undergoing laparotomy due to trauma, death rate is upto 21% with among 60% of these occurring in high volume centres.

This study mainly focuses on intra operative presentation and postoperative complications in the patients presenting to tertiary care centre. Perforation of hollow viscus is the commonest finding in patients underwent laparotomy. These conditions are of utmost significance as death of the patient might occur due to delay in timely surgical intervention. Following laparotomy, morbidity and mortality of patients depends on symptomatology, etiology, time gap between onset of symptoms and laparotomy, patient's general condition and comorbidities, anaesthetic complications and postop care.

Aim and Objectives

To study the presentation, diagnosis, management and complications in patients presenting with acute abdomen or trauma

Methods

This is a hospital-based retrospective study. Those patients who presented to our tertiary care centre with acute abdomen or trauma were included in our study. Study period was from 16 August 2020 to15 August 2021, and the data was collected from hospital OT records from medical records department . It was conducted in accordance with the institutional guidelines. A single-center retrospective observational study was performed in the our tertiary care centre after collecting data . The patients were categorized with inclusion and exclusion criteria and finally 77 patients were included in the study. The data included age at admission, day of admission, duration of hospital stay, time to procedure from admission, day of procedure, and day of in-hospital death. Patient characteristics, presenting complaints , diagnosis, management and postoperative complications were assessed. Routine investigations were observed and minimal necessary radiological investigations were done for diagnosis which was noted. Categorization of surgical findings were done. Telephonic conversation was made with few patients to assess the complications .

Inclusion Criteria

- Age more than 16 years
- All patients presenting to our institution with acute abdomen includes peritonitis ,penetrating or blunt injuries etc
- Only midline laparotomies

Exclusion Criteria

- Pregnant ladies
- Pediatric group
- Laparotomy approached by other than midline incision.
- Elective laparotomies.

Statistical Analysis

The data were collected and entered in Microsoft Excel and analysed using Statistical Package for the Social Sciences (SPSS). Chi-square test were used for testing level of significance where applicable. All P-values ≤ 0.05 were considered significant.

Results

77 cases which were done by midline laparotomy as emergency procedures were included in the study . Among those 77 cases, 72 underwent surgery for acute abdomen and 5 cases for trauma. On analysing it, 40–60-year age group (45.5 %) was the group with a majority of cases followed by 20 to 40-year age group (40.2 %), 60 to 80 year age group (10.4 %), below 20 years (3.9 %). In trauma laparotomies, among 5 cases, three of the cases were done for blunt abdominal trauma

And among 77 cases, 61 were males and 16 females. Most of the patients presented to our hospital with chief complaints of pain abdomen followed by vomiting and abdominal distension.

About 16 cases presented in state of shock for whom initial aggressive resuscitation done. 4 patients couldnot be revived and were excluded in study. Another 12 cases were taken up for surgery after resuscitation. Flank drain was placed in 6 hollow viscus perforation cases during resuscitation period and before taking up for surgery, out of which 3 cases survived and other 3 cases expired postoperatively. Overall out of 12 cases presented with shock, 7 cases expired.No history of previous laparotomy was present in any of the patients.Postoperatively the patients were classified based on the diagnoses made on-table. Duodenal ulcer perforation was the most common , observed in 25 (33 %) patients

In 90% of cases Intensive care unit (ICU) admission was required postoperatively. Reasons for ICU admission varied. In 50% of the cases, it was for monitoring postoperatively, 30% case for the need of ventilatory support and remaining 20% of cases went into postoperative hypotension and needed inotropes support. No complications were seen in 10 % of the patients postoperatively .

Fever was the most common complication observed. Postoperatively, 13 % of the patients died within the same hospital admission and 87 % of cases got discharged.

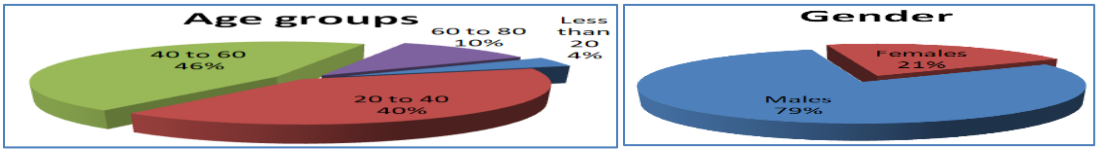

Fig 1: Age and Sex distribution

Table 1: Presenting complaints

	Presenting complaints	Number	Percentage	
Presenting complaints	Pain abdomen	70	90.9	
	Vomiting	40	52	
	Abdominal distension	15	19.5	
	Others	10	13	
	Shock	12	15.5	

*A patient presented with 2 to 3 presenting complaints , hence total numbers in table 1 exceeded the study number.

In almost all the cases, patient presented with 2 or 3 complaints among which most common being pain abdomen followed by vomiting followed by abdominal distension. Other complaints include fever, nausea, altered bowel habits. Those patients who presented with shock were resuscitated and later taken up for surgery.Patients were subjected to minimal investigations for diagnosis like chest x-ray, erect x-ray and USG abdomen and taken up for surgery. Very few hemodynamically stable cases were subjected to CECT abdomen. The timing between patients presenting to hospital and patients taken up for surgery varied according to preoperative diagnosis and on an average, it is 120 minutes.

Discussion

Laparotomies are one of the commonly performed surgeries in an emergency operating room. The operating surgeon carrying out emergency laparotomy should be experienced and well versed with the broad knowledge of variety of features inside the abdomen and their management. Usually the procedures that were done were classified into those done for trauma and acute abdomen. Laparotomies done in case of trauma are on descent with recent advent of modern diagnostics. Surgeons find it safer to avoid a laparotomy in patients who are hemodynamically stable and in conditions that usually get resolved by itself as in splenic and hepatic injuries of lower grade[15]In many instances when the exact diagnosis is not known before surgery with limited investigations, these laparotomies are termed exploratory laparotomies and exact diagnosis is made only on opening the abdomen. Instead of delaying in performing emergency surgery with exhaustive investigations, deterioration of patient's general condition has to be prioritized and surgery has to be performed.At the same time in patients presenting with acute abdomen with shock, a short delay with resuscitation and basic investigations may be beneficial as immediate surgery on patients presenting with shock may carry higher mortality rate[16]

Rectifying and correcting the pathology with less trauma is the important aspect next to surgical safety for the enhanced recovery of the patient. For a better outcome following surgery, patients may be optimized if situation allows.In abdominal trauma, hypovolemic shock is a major cause of death. Circulatory state to be assessed by quick measurable indicators like pulse rate and blood pressure.

As a routine diagnostic tool, Focused assessment with Sonography for trauma [FAST] helped a great extent in decision making for detection of abdominal cavity free fluid.

In hemodynamic instable patients , it is quiet challenging to find out the causes of pathology which can be surgically correctable as even common diagnostic tests cannot be done. Imaging quality of portable CT abdomen is less compared with that of portable CT head. This might warrant abdominal exploration as a diagnostic modality which can turn out to be a therapeutic option in seriously ill patients when there is no alternative cause for the presentation. Patients who are hemodynamically unstable and those who are unsafe to transport to the Operating room for whom an intra-abdominal catastrophe is believed to be the underpinning etiology may be explored at the bedside in the ICU[17].Even then those patients will be having bad outcome whether intervened or not, leaving exploration as an "intervention of last resort." There is no well-defined metric by which the postoperative outcome may be predicted with sufficient certainty to inform surrogate decision makers, as well as the surgeon, in deciding on the advisability of undertaking bedside exploration with regard to outcome and quality of life[18].Current efforts to create clinical pathways for emergency laparotomy have focused mainly on the immediate peri-operative period: to diagnose the patient early , resuscitate if needed and shift the patient to operating room without significant delay, teamwork by operative surgeon and anaesthetist, effective fluid resuscitative measures and effective postoperative intensive care based on necessity. When these factors were implemented successfully, reduction in mortality can be achieved . Even though these interventions have been necessary and commendable, the question remains whether they represent 'first aid' to a completely inadequate or non-existent previous patient pathway rather than actual optimisation. As such, what these rational organisational changes have tried to correct could be considered a long-standing medical chauvinism towards emergency surgery and must be regarded as the low hanging fruit in optimising the patient pathway[19]In our patients with 77 laparotomies, laparotomy was done more common in 40 to 60 year age group followed by 20 to 40 years. Perforation of hollow viscous was the most common cause for laparotomy. The sex ratio was found to be around 4:1 for male-female. Males outnumbered females. Duodenal ulcer perforation was most common followed by ileal ulcer perforation followed by gastric ulcer perforation. In cases of small or large bowel obstruction who are hemodynamically stable and without toxic features, a trial of conservative management has been done. Few of them have improved with conservative management and those who have failed have been taken up for emergency surgery.Overall 10 deaths have occurred out of which majority have been shared by duodenal ulcer perforation and intestinal obstruction cases. Most of the patients amongst these presented with shock, hemodynamic instability, prolonged duration of pathology and old age with comorbidities and all were males.In cases of trauma, total 5 cases have been taken up for surgery which includes 3 blunt trauma and 2 penetrating trauma. Most of the trauma cases have undergone conservative management and were successful. Very few cases warranted surgery. 3 blunt trauma cases were splenic laceration for which splenectomy has been done. 2 penetrating injuries were jejunal perforations for which primary repair has been done. All 5 operated cases improved significantly and discharged within a week.

Table 2: Frequency distribution based on postoperative diagnosis

Diagnosis	Frequency	Percentage	Test statistics
Duodenal ulcer perforation	25	32.46%	Chi-square: 55.730; p=0.001
Gastric ulcer perforation	9	12%	
Ileal ulcer perforation	10	13%	
Small bowel obstruction	8	10.4%	
Mesenteric ischemia	6	7.74%	
Large bowel obstruction	4	5.2%	
Appendicular perforation	4	5.2%	

Obstructed inguinal hernia	3	3.9%	
Burst abdomen	3	3.9%	
Blunt trauma	3	3.9 %	
Penetrating trauma	2	2.6%	

Out of 9 cases of gastric ulcer perforation, 2 cases turned out be malignant postop with biopsy report and after getting necessary investigations, they were planned accordingly. Among 4 cases of large bowel obstruction, 2 cases turned out to be malignant and managed accordingly.

Table 3: Postop ICU admission

Postop icu admission	**Postop ICU admission**	**70**	**90.9**	Chi-square: 53.200; p=0.001
	For ventilation	21	30	
	For observation	35	50	
	For Inotrope support	14	20	

Postoperative Complications

Patients were observed for any postop complications like fever, vomiting, urinary tract infections and respiratory infections and were monitored regularly. Wound examination was started on 2nd postop day. Any discharge, redness or edema noted and were further followed up for sequale like dehiscence. Gastrointestinal complications observed during the postop period include paralytic ileus, intestinal obstruction, anastomotic leak, enterocutaneous fistula.Most of the patients were encouraged to do early postop ambulation, chest physiotherapy and importance of respirometer. The patients were also followed up after discharge from hospital to look for incisional hernia, stoma related complications and subacute intestinal obstruction[20]

Table 4: Postoperative complications

Complications	Number	Percentage	Test statistics
Fever	54	70.13	Chi-square: 172.429; p=0.001
Nausea vomiting	21	27.27	
Chest infection	28	36.36	
Wound infection	47	61	
Paralytic ileus	34	44.15	
Wound dehiscence	7	9	
Stoma related complications	3	3.8	
No complications	10	12.98	
Anastomotic leak	2	2.5	
Enterocutaneous fistula	2	2.5	
Death	10	12.98	

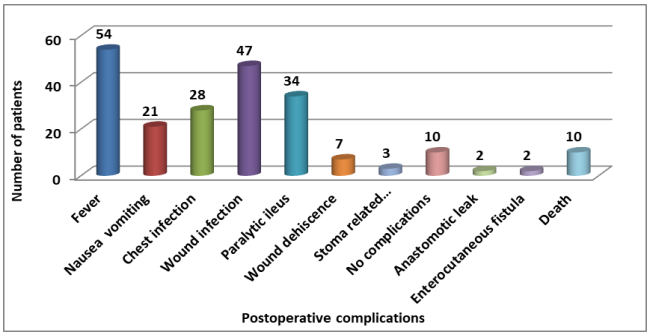

Fig 2: Postoperative complications

Conclusion

Early detection and immediate intervention with better postoperative care can minimise both morbidity and mortality associated with emergency laparotomy.In trauma, few number of cases require emergency laparotomy even with advances in non-operative management. A dedicated surgical team with experience and maintenance in damage control surgery can achieve acceptable outcomes in terms of mortality and morbidity rates, although further centralization of these patients might be warranted to further optimize logistics and efficiency.

Results are poor after emergency surgery , with an almost nil scientifically-based patient care pathways. This applies especially to the postoperative period. Recent work has, to some degree, addressed this by establishing simple protocols and early peri-operative pathways, which have reduced mortality by rational standardisation, and allocates emergency surgical and anaesthesia resources more in line with the severity of the conditions

To reduce both morbidity and mortality for patients who needs emergency intervention, it is of utmost importance to have public awareness, health education amongst public to get proper medical care, timely referral and mobilization of patient to a well equipped centre without any delay.

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