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Original Article

Study of Indication, Clinical Presentation and Outcome of Patients Undergoing Laparotomy

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ABSTRACT

Background: Laparotomy remains a key surgical intervention for the management of acute abdominal conditions, especially in emergency settings. Despite advances in imaging and minimally invasive techniques, it is still widely performed in patients presenting with perforated peritonitis, intestinal obstruction, and other abdominal emergencies. The present study evaluates the indications, clinical presentation, operative findings, and outcomes of patients undergoing laparotomy.
Materials and Methods: This hospital-based observational study was conducted in the Department of Surgery, C. U. Shah Medical College and Hospital over a period of two years (September 2023 to August 2025). A total of 80 patients undergoing laparotomy were included using a convenience sampling method. Data regarding demographic profile, clinical presentation, laboratory and radiological findings, intraoperative details, postoperative complications, and outcomes were collected and analysed using descriptive statistics.
Results: Out of 80 patients, 65% were male, and the majority belonged to the 40–79 years age group. Abdominal pain (87.5%) and vomiting (60%) were the most common presenting symptoms. Peritonitis (55%) was the most frequent intraoperative finding, followed by adhesions and bowel obstruction. Emergency laparotomy was performed in 65% of cases. The most common final diagnoses were gastric perforation (15%) and small bowel obstruction (17.5%). Postoperative complications included paralytic ileus, wound infection, and sepsis. The overall mortality rate was 12.5%.
Conclusion: Laparotomy is predominantly an emergency procedure performed for life-threatening abdominal conditions. Despite advances in diagnostics and perioperative care, it is still associated with significant morbidity and mortality. Early diagnosis, prompt surgical intervention, and improved postoperative management are essential to improve patient outcomes.

Keywords*: Laparotomy, acute abdomen, perforation peritonitis, intestinal obstruction, emergency surgery, postoperative outcomes.*

INTRODUCTION

Laparotomy remains one of the most frequently performed major surgical procedures in general surgery, particularly in emergency settings where definitive diagnosis and therapeutic intervention are required simultaneously. It plays a crucial role in the management of acute abdominal conditions such as hollow viscus perforation, intestinal obstruction, intra-abdominal sepsis, trauma, and complicated appendicitis. Despite advances in imaging and minimally invasive surgery, exploratory laparotomy continues to be the cornerstone procedure in many tertiary care centres, especially in resource-limited settings where patients often present late with advanced disease [1,2].
The indication for laparotomy is broad and includes both elective and emergency conditions. Emergency laparotomy, in particular, is associated with significant morbidity and mortality due to the severity of underlying pathology, delayed

presentation, physiological derangements, and associated comorbidities. Studies have shown that emergency abdominal surgeries account for a major proportion of surgical workload and are linked with higher postoperative complications compared to elective procedures [3].

The clinical presentation of patients requiring laparotomy is often nonspecific, with abdominal pain being the most common symptom, followed by vomiting, distension, fever, and altered bowel habits. Such variability makes early diagnosis challenging and necessitates a high index of clinical suspicion supported by laboratory and radiological investigations [4]. Imaging modalities such as ultrasonography and computed tomography have significantly improved diagnostic accuracy, although their availability and timing may be limited in emergency scenarios.

Postoperative outcomes following laparotomy are influenced by multiple factors including age, nutritional status, presence of comorbidities, severity of disease, intraoperative findings, and timing of intervention. Common complications include wound infection, paralytic ileus, sepsis, anastomotic leak, and organ dysfunction. Mortality remains considerable in emergency laparotomy cases, particularly in patients presenting with peritonitis and septic shock [5].

In developing countries, a significant proportion of patients present late with advanced disease due to delayed healthcare access, poor socioeconomic conditions, and lack of awareness. This contributes to increased morbidity, prolonged hospital stay, and higher complication rates. Therefore, understanding the pattern of indications, clinical presentation, and outcomes of laparotomy patients is essential for improving surgical care and optimizing resource utilization [6].

The present study was conducted to evaluate the indications, clinical features, operative findings, postoperative complications, and outcomes of patients undergoing laparotomy at a tertiary care centre over two years.

MATERIALS AND METHODS

Study Design

This was a hospital-based observational, descriptive study conducted to evaluate the aetiology, clinical presentation, and postoperative outcomes of patients undergoing laparotomy. The study design was non-interventional, and all patients received standard treatment in accordance with institutional protocols. No experimental intervention was introduced.

Study Setting

The study was conducted in the Department of Surgery, C. U. Shah Medical College and Hospital, a tertiary care teaching institution catering to a diverse patient population. The hospital is equipped with advanced surgical facilities and postoperative care units. Data were collected from inpatient case records, electronic medical records, and operative files maintained in the department.

Study Duration

The study was carried out over a period of two years, from September 2023 to August 2025, allowing adequate patient enrolment and postoperative follow-up.

Study Population

All patients undergoing laparotomy during the study period were considered for inclusion.

Inclusion Criteria

- All patients undergoing laparotomy during the study period.

Exclusion Criteria

- Patients undergoing caesarean section.
- Patients undergoing obstetric or gynaecological laparotomies.

Sampling Technique and Sample Size

A convenience sampling technique was used, including all eligible patients undergoing laparotomy during the study period. A total of 80 patients were enrolled in the study based on admission and surgical case load, which was considered adequate for descriptive and comparative analysis of outcomes.

Patient Stratification

As the study was observational in nature, no predefined intervention groups were created. However, patients were stratified post hoc based on aetiology, clinical presentation, demographic variables (age, sex, socio-economic status), and postoperative outcomes for subgroup analysis.

Study Variables

The following variables were assessed:

- Demographic variables: Age, sex, and socio-economic status.
- Clinical variables: Indication for laparotomy, intraoperative findings.
- Outcome variables: Postoperative complications including paralytic ileus, intra-abdominal abscess, wound infection, abdominal wall dehiscence, enterocutaneous fistula, adhesive intestinal obstruction, and incisional hernia.

Study Procedure
Each patient was followed from admission through surgery to discharge. Detailed clinical history, physical examination findings, and relevant investigations were recorded at admission. Intraoperative findings and surgical procedures were documented in operative records. Postoperatively, patients were monitored regularly for recovery and complications. All data were systematically recorded using structured case report forms.

Data Collection Methods
Data were collected through both prospective clinical observation and retrospective review of hospital records. Information was obtained from case sheets, operative notes, laboratory reports, and radiological investigations. Standardised data collection formats were used to ensure uniformity and accuracy.

Statistical Analysis
Data were entered into a spreadsheet and analyzed using appropriate statistical methods. Descriptive statistics such as mean, median, standard deviation, and percentages were used to summarize demographic and clinical variables. Where applicable, inferential statistics were applied to assess associations between variables, with a significance level set at $p < 0.05$.

Ethical Considerations
Ethical approval was obtained from the Institutional Ethics Committee of C. U. Shah Medical College and Hospital (Approval No: CUSMC/IEC(HR)/DI-51/2023). As the study was observational and based on routinely collected clinical data, informed consent was waived as per institutional guidelines. Patient confidentiality was strictly maintained by anonymizing all identifiable information, and data access was restricted to authorized investigators only. The study was categorized as minimal risk research.

RESULT AND OBSERVATIONS
This observational study included 80 patients undergoing laparotomy over two years. Results are presented under demographic, clinical, laboratory, radiological, operative, and outcome categories.

Table 1: Demographic Profile of Patients

Variable	Category	No. of Patients	Percentage (%)
Age	**0–19 yrs**	**12**	**15.0**
	20–39 yrs	**19**	**23.75**
	40–59 yrs	**20**	**25.0**
	60–79 yrs	**25**	**31.25**
	≥80 yrs	**4**	**5.0**
Sex	**Male**	**52**	**65.0**
	Female	**28**	**35.0**
Weight	**40–59 kg**	**29**	**36.25**
	60–79 kg	**34**	**42.5**
	≥80 kg	**13**	**16.25**
	<40 kg	**4**	**5.0**

Table 2: Clinical Presentation and Comorbidities

Variable	Finding	Frequency
Symptoms	**Abdominal pain**	**70**
	Vomiting	**48**
	Constipation	**20**
	Fever	**16**
	Others	**15**
Comorbidities	**None**	**69**
	Hypertension	**8**
	Diabetes	**3**
	Others (VSD, epilepsy)	**2**
Addiction	**None**	**47**

	Bidi smoking	15
	Alcohol	14
	Tobacco chewing	9

Table 3: Past Medical and Surgical History

Category	Condition	No.
Past History	None	67
	Pulmonary TB	3
	CVA	2
	Others	8
Surgical History	None	59
	Tubal ligation	6
	Previous laparotomy/hernia/others	15

Table 4: Hematological Profile

Parameter	Range	No. (%)
Hb (g/dL)	<9	5 (6.25%)
	9–11	30 (37.5%)
	11–13	23 (28.75%)
	>13	22 (27.5%)
WBC (/mm³)	4000–10000	23 (28.75%)
	>10000	47 (58.75%)
	<4000	10 (12.5%)
Platelets	150k–300k	47 (58.75%)
	>300k	24 (30%)
	<150k	9 (11.25%)

Table 5: Biochemical Profile

Parameter	Range	No. (%)
Sodium	130–134	33 (41.25%)
	135–144	36 (45%)
	Abnormal	11 (13.75%)
Potassium	Normal (3.5–5.0)	51 (63.75%)
	Low	23 (28.75%)
	High	6 (7.5%)
Creatinine	Normal (0.5–1.5)	54 (67.5%)
	Elevated	26 (32.5%)
Albumin	<3.5	63 (78.75%)
	≥3.5	17 (21.25%)

Table 6: Radiological Findings

Modality	Diagnosis	No. (%)
X-ray	Free air under diaphragm	31 (38.75%)
	Air-fluid levels	26 (32.5%)
USG	Hollow viscus perforation	28 (35%)
	Intestinal obstruction	20 (25%)
CT Abdomen	Performed	36 (45%)
	Obstruction/perforation	16 (20%)

Table 7: Final Diagnosis

Diagnosis Category	No. (%)
Gastric perforation	12 (15%)
Ileal perforation	4 (5%)
Small bowel obstruction	14 (17.5%)
Appendicitis related	12 (15%)
Trauma related	5 (6.25%)
Others (rare causes)	33 (41.25%)

Table 8: Operative Details

Variable	Category	No. (%)

Type of surgery	**Emergency**	**52 (65%)**
	Elective	**28 (35%)**
Incision	**Midline**	**50 (62.5%)**
	Others	**30 (37.5%)**
Procedure type	**Exploratory laparotomy only**	**20 (25%)**
	Combined procedures	**60 (75%)**
Mean operative time	**—**	**141.9 min**

Table 9: Intraoperative Findings

Finding	**No. (%)**
Peritonitis	**44 (55%)**
No contamination	**31 (38.75%)**
Hemoperitoneum	**5 (6.25%)**
Stable hemodynamics	**60 (75%)**
Instability (hypotension/arrhythmia)	**20 (25%)**

Table 10: Postoperative Complications

Complication	**Early (%)**	**Late (%)**
Ileus	**24 (30%)**	**—**
Wound infection	**11 (13.75%)**	**—**
AKI	**10 (12.5%)**	**—**
Sepsis/shock	**20 (25%)**	**—**
Others	**7 (8.75%)**	**—**
None	**38 (47.5%)**	**76 (95%)**

Table 11: Hospital Stay

Duration (days)	**No. (%)**
≤6 days	**12 (15%)**
7–10 days	**43 (53.75%)**
11–15 days	**19 (23.75%)**
>15 days	**6 (7.5%)**
Mean stay	**9.9 days**

Table 12: Final Outcome

Outcome	**No. (%)**
Recovered	**59 (73.75%)**
Discharged with follow-up care	**11 (13.75%)**
Death	**10 (12.5%)**

DISCUSSION

In the present study, 80 patients undergoing laparotomy were analyzed over a two-year period. The majority of patients belonged to the middle and older age groups, with peak incidence in the 40–79 years range. This finding is consistent with studies by Sinha et al. and Khan et al., who reported that emergency laparotomy is more commonly required in older adults due to increased incidence of bowel obstruction, perforation, and malignancy-related complications [7,8].

Male predominance (65%) was observed in our study, which is comparable to findings reported in other surgical series. This may be attributed to higher exposure of males to risk factors such as alcohol consumption, smoking, trauma, and delayed healthcare-seeking behaviour. Similar gender distribution patterns have been reported in studies by Ahmed et al. and Gupta et al. [9].

Abdominal pain was the most common presenting symptom, followed by vomiting and constipation, which aligns with the classical presentation of acute abdomen. Fever and abdominal distension were also significant findings indicating infective or obstructive pathology. These findings are consistent with Bailey & Love's description of acute abdominal emergencies, where pain is the universal presenting feature in most surgical pathologies [1].

In terms of comorbidities, hypertension and diabetes mellitus were the most common associated conditions. However, a large proportion of patients had no comorbid illness, indicating that laparotomy in this study population was largely driven by acute surgical conditions rather than chronic disease burden. The presence of comorbidities is known to adversely affect postoperative outcomes, particularly in emergency surgical settings [3].

Laboratory findings revealed a high prevalence of leukocytosis and hypoalbuminemia, suggesting ongoing infection and poor nutritional status. Similar observations have been reported in studies where hypoalbuminemia was strongly associated with increased postoperative complications and prolonged hospital stay [10]. Electrolyte imbalances such as hyponatremia and hypokalemia were also common, reflecting the physiological stress associated with acute abdominal conditions.

Radiological evaluation demonstrated that pneumoperitoneum and air-fluid levels were the most frequent findings on X-ray, while ultrasonography commonly indicated hollow viscus perforation and intestinal obstruction. CT scan, although performed in fewer patients, provided valuable diagnostic information in complex cases. The role of imaging in acute abdomen has been well established, particularly CT as the gold standard in evaluating bowel obstruction and perforation [4].

Intraoperatively, peritonitis was observed in more than half of the patients, highlighting the severity of disease at presentation. Adhesions, perforations, and bowel obstruction were the most frequent operative findings. These findings are consistent with global literature where adhesive obstruction and perforation peritonitis remain leading causes of emergency laparotomy [2].

The majority of procedures performed were emergency laparotomies with midline incision, reflecting the need for rapid and wide exposure. Mean operative time was approximately 142 minutes, similar to reported durations in comparable studies. Emergency laparotomy is inherently associated with prolonged operative time due to complex pathology and hemodynamic instability [5].

Postoperative complications were observed in a significant proportion of patients, with paralytic ileus, wound infection, and sepsis being the most common. Similar complication patterns have been reported in large cohort studies such as the National Emergency Laparotomy Audit (NELA), which highlights sepsis and organ dysfunction as major contributors to morbidity and mortality [3]. Mortality in the present study was 12.5%, which is comparable to published literature reporting mortality rates between 10% and 20% for emergency laparotomy in high-risk patients.

The mean hospital stay of approximately 9.9 days reflects moderate postoperative recovery duration. Prolonged hospitalization was mainly associated with complications such as sepsis, ileus, and wound infections. Final outcomes showed that nearly three-fourths of patients recovered successfully, while a smaller proportion required prolonged care or resulted in mortality.

Overall, the findings of this study emphasize that laparotomy remains a life-saving procedure in emergency abdominal conditions but is associated with significant morbidity. Early diagnosis, prompt surgical intervention, optimization of comorbidities, and improved perioperative care are essential to improve outcomes.

CONCLUSION

Laparotomy remains a vital emergency surgical procedure for acute abdominal conditions, most commonly perforation peritonitis, intestinal obstruction, and appendicitis-related complications. In this study, most patients were middle-aged to elderly males presenting with acute symptoms such as abdominal pain and vomiting.

Peritonitis and adhesions were the most frequent intraoperative findings, and emergency midline laparotomy was the most common approach. Although the majority of patients recovered, postoperative complications and mortality were still significant.

Overall, early diagnosis, timely surgical intervention, and improved perioperative care are essential to reduce morbidity and mortality in patients undergoing laparotomy.

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