Study of Mortality and Morbidity in Emergency Laparotomies

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ABSTRACT

Background: Emergency laparotomy is a life-saving procedure performed for a wide range of acute abdominal conditions. It is associated with high mortality and morbidity worldwide due to sepsis, delayed presentation, comorbidities, poor nutritional status and intraoperative complications. Identifying risk factors and predicting outcome helps in triaging, counseling and improving patient care.

Aim: To study the morbidity and mortality patterns in patients undergoing emergency laparotomy and determine the associated risk factors affecting outcome.

Methods: This was a prospective observational study conducted over 18 months, including adult patients undergoing emergency laparotomy. Details of demographics, etiology, comorbidities, laboratory parameters, ASA score, POSSUM score, intraoperative findings, duration of surgery, postoperative complications and mortality were analyzed. Morbidity was classified according to Clavien-Dindo grading. Statistical analysis was done using Chi-square test, logistic regression, and Kaplan-Meier survival analysis.

Results: A total of 120 patients underwent emergency laparotomy. The overall **mortality rate was 22.5%** and morbidity was **48.3%**. The most common indications were intestinal obstruction (38%), perforation peritonitis (32%), trauma (18%) and mesenteric ischemia (12%). Significant predictors of mortality were age >60 years, ASA grade III/IV, serum albumin <3 g/dL, septic shock at presentation, delay >24 hrs, and POSSUM score >50. Common morbidities included wound infection (28%), ileus (18%), pneumonia (15%), and anastomotic leak (10%). Early intervention (<12 hrs) showed lower mortality (p<0.05).

Conclusion: Emergency laparotomy carries high morbidity and mortality. Preoperative optimization, early recognition, scoring systems (POSSUM / APACHE II), adequate resuscitation and

multidisciplinary approach can improve outcomes. Predicting high-risk cases allows better triage and intensive care planning.

INTRODUCTION

Emergency laparotomy is one of the most commonly performed major abdominal surgeries. It includes a wide range of surgical emergencies such as intestinal obstruction, perforation peritonitis, abdominal trauma, volvulus, mesenteric ischemia, bowel gangrene, and intra-abdominal sepsis. Globally, emergency laparotomies account for almost **10–20% of all abdominal surgeries** but contribute to **<50% of surgical deaths**.

The mortality rate reported in literature varies from **10% to 44%**, depending on clinical settings and country. Factors influencing poor outcomes include:

- Delayed presentation
- Poor nutritional status & low albumin
- Sepsis or shock at admission
- Multiple comorbidities (diabetes, CKD, COPD, hypertension)
- Age >60 years
- Intraoperative bowel resection
- High ASA / POSSUM / APACHE II scores
- Lack of ICU facilities

Emergency laparotomy is thus considered a **major surgical priority**, and its outcomes reflect the healthcare quality and infrastructure of an institution.

Hence, this study investigates **morbidity, mortality and associated risk factors** in patients undergoing emergency laparotomy in our tertiary care hospital.

AIMS AND OBJECTIVES

Primary Objective

To evaluate the morbidity and mortality among patients undergoing emergency laparotomy.

Secondary Objectives

1. To identify clinical and laboratory parameters associated with adverse outcomes.
2. To correlate ASA and POSSUM scores with postoperative complications.
3. To determine time interval between symptoms and surgery and its impact on mortality.
4. To categorize morbidity according to the **Clavien-Dindo classification**.

5. To suggest possible measures to reduce morbidity and mortality.

MATERIALS AND METHODS

Study Design:

Prospective observational study.

Study Duration:

18 months.

Study Setting:

Department of General Surgery, [Name of Institution].

Sample Size:

120 consecutive patients undergoing emergency laparotomy (calculated based on 95% CI, 8% allowable error, expected 25% mortality).

Inclusion Criteria

✔Age >18 years

✔All emergency laparotomies

✔Patients/relatives willing to provide informed consent

Exclusion Criteria

✘Elective laparotomies

✘Pregnant women

✘Patients unfit for anesthesia

✘Refusal to participate

Data Collection Parameters

Preoperative Variables

- Demographics: age, sex, BMI

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- Duration of symptoms
- Comorbidities: Diabetes, hypertension, CKD, COPD, IHD
- Vital signs: heart rate, BP, temperature
- Laboratory parameters: TLC, Hb, serum albumin, creatinine, lactate
- ASA grade & POSSUM score

Intraoperative Variables

- Etiology (peritonitis / obstruction / trauma / ischemia)
- Bowel resection / stoma formation
- Duration of surgery
- Blood loss & transfusion

Postoperative Variables

- Length of ICU stay / hospital stay
- Ventilator requirement
- Morbidity (Clavien-Dindo grading)
- Mortality (surgical or septic)

OUTCOME MEASURES

Morbidity:

- Superficial surgical site infection
- Deep wound infection
- Ileus
- Pneumonia
- UTI
- Anastomotic leak
- Need for re-exploration
- Sepsis / multiorgan failure

Mortality:

Within 30 days of surgery.

STATISTICAL ANALYSIS

Parameter	Statistical Test
Categorical data	Chi-square / Fisher's exact test

Parameter	Statistical Test
Continuous data	t-test / ANOVA
Predictors of mortality	Logistic regression
Survival probability	Kaplan–Meier analysis
p-value	< 0.05 considered significant

Software: SPSS 25.0 / R / STATA.

RESULTS (SAMPLE FORMAT – MODIFY REAL DATA)

Demographics

Parameter	Value
Mean Age	52.6 ±12.4 years
Male : Female	1.8 : 1
Mean Delay in Presentation	28.5 hours
Mean Serum Albumin	2.7 g/dL

Etiology

Cause	% Cases
Intestinal Obstruction	38%
Perforation Peritonitis	32%
Trauma	18%
Mesenteric Ischemia	12%

Morbidity (n=120)

Complication	No. (%)
SSI (wound infection)	34 (28%)
Ileus	22 (18%)
Pneumonia	18 (15%)

Complication	No. (%)
Anastomotic leak	12 (10%)
Re-exploration required	8 (6.6%)

Mortality Rate:

22.5% (27 patients)

Significant Predictors of Mortality (p<0.05)

✔Age >60 years

✔Delay >24 hrs

✔Serum albumin <3 g/dL

✔ASA grade III/IV

✔Septic shock at admission

✔Bowel ischemia/infarction

✔POSSUM score >50

DISCUSSION

The present study confirms that emergency laparotomy is associated with **substantial morbidity (48.3%) and mortality (22.5%)**. The results are consistent with international data (10–44% mortality).

The strongest predictors of poor outcome were:

- **Delayed presentation** ("golden hours" missed)
- **Hypoalbuminemia** – linked with impaired healing
- **Sepsis and shock** at admission
- **High ASA/POSSUM scores**
- **Advanced age** and multiple comorbidities

The majority of postoperative complications were related to **infection and anastomotic failure**. Early intervention (<12 hours), aggressive fluid resuscitation, timely use of antibiotics, and ICU care significantly reduced mortality.

We strongly recommend the use of **risk stratification scoring systems** such as POSSUM/APACHE II to plan postoperative care and allocate ICU beds efficiently.

CONCLUSION

Emergency laparotomy carries high mortality and morbidity. Early surgical intervention, resuscitation, preoperative optimization and postoperative intensive care are critical to improving outcomes.

High-risk factors identified:

- Age >60 years
- Delay >24 hours
- Albumin <3 g/dL
- Intraoperative bowel ischemia
- Septic shock
- ASA Grade III/IV

RECOMMENDATIONS

1. Use POSSUM / ASA scores routinely.
2. Develop "Emergency Laparotomy Pathway" protocols.
3. Improve pre-hospital referral system.
4. Optimize nutrition & albumin levels preoperatively when feasible.
5. Multidisciplinary approach with anesthetist & intensivist.

LIMITATIONS

- Single-center study
- Limited sample size
- No long-term follow-up
- Did not assess patient quality of life post-surgery

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