



ORIGINAL RESEARCH PAPER

Surgery

INCIDENCE, RISK FACTORS, AND MICROBIOLOGICAL PROFILE OF SURGICAL SITE INFECTION FOLLOWING GASTROINTESTINAL LAPAROTOMY: A PROSPECTIVE OBSERVATIONAL STUDY FROM A TERTIARY CARE CENTER IN INDIA

KEY WORDS: Surgical site infection; gastrointestinal laparotomy; risk factors; Klebsiella; emergency surgery; prospective study.

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ABSTRACT

Background: Surgical site infection (SSI) remains a significant contributor to postoperative morbidity following gastrointestinal laparotomy, particularly in developing healthcare settings. Institution-specific data are essential for optimizing perioperative management strategies. **Methods:** A prospective observational study was conducted from February 2023 to April 2025 at a tertiary care teaching hospital. Fifty adult patients undergoing gastrointestinal laparotomy were evaluated. Demographic characteristics, operative variables, comorbidities, wound classification, and microbiological findings were analyzed. SSI was defined according to CDC criteria. **Results:** The incidence of SSI was 14% (7/50). Patients aged 51–60 years showed the highest infection rate. Emergency procedures accounted for most infections, and operative duration exceeding two hours was observed in all SSI cases. Dirty wounds demonstrated the strongest association with infection. Superficial incisional SSI constituted 85.71% of cases. Gram-negative organisms predominated, with Klebsiella species being the most common isolate, followed by Escherichia coli, Enterococcus faecium, and Pseudomonas aeruginosa. Anemia and hypoproteinemia were frequently associated comorbidities. **Conclusion:** SSI continues to pose a major postoperative challenge following gastrointestinal laparotomy. Emergency surgery, prolonged operative duration, contaminated wounds, and poor nutritional status are key modifiable risk factors. Standardized infection-prevention protocols may reduce postoperative morbidity.

INTRODUCTION

Surgical site infections (SSIs) are among the most common postoperative complications and significantly increase hospital stay, healthcare costs, and patient morbidity. Gastrointestinal laparotomy carries a higher risk due to exposure to endogenous bowel flora and frequent emergency interventions. Despite improvements in surgical techniques and antibiotic prophylaxis, SSI incidence remains substantial in developing healthcare systems.

Local epidemiological studies are essential for guiding antibiotic policies and infection-control practices. This study evaluates the incidence, risk factors, microbiological profile, and clinical implications of SSIs following gastrointestinal laparotomy.

MATERIALS AND METHODS

Study Design And Setting

Prospective observational study conducted in the Department of General Surgery at a tertiary care teaching hospital in India.

Study Period

February 2023 to April 2025.

Participants

Fifty consecutive adult patients (≥18 years) undergoing gastrointestinal laparotomy were included.

Inclusion Criteria: Age ≥18 years; Gastrointestinal laparotomy; Written informed consent.

Exclusion Criteria: Non-GI laparotomy; Pediatric patients; Refusal to participate.

Data Collection

Demographics, operative details, wound classification, comorbidities, and microbiological results were recorded. SSI was classified according to CDC definitions.

Statistical Analysis

Continuous variables were expressed as mean ± SD. Categorical variables were presented as frequency and percentage.

RESULTS

Patient Characteristics

Mean age was 52.86 ± 15.49 years, with most patients in the 51–60 year group. Females constituted 60% of the cohort.

Incidence Of SSI

SSI occurred in 14% of patients (n=7).

Type Of SSI

Superficial incisional: 85.71%
Deep incisional: 14.29%

Operative Factors

Emergency procedures accounted for most infections. All SSI cases involved operative duration >2 hours. Dirty and contaminated wounds showed the highest infection rate.

Comorbidities

Anemia and hypoproteinemia were most frequent, followed by diabetes mellitus and obesity.

Microbiological Profile

Gram-negative organisms predominated. Klebsiella species were the most common isolates, followed by E. coli, Enterococcus faecium, and Pseudomonas aeruginosa.

DISCUSSION

The observed SSI incidence of 14% is comparable to regional data but higher than some international reports. Emergency surgery remains a major risk factor due to contamination and limited preoperative optimization.

Operative duration exceeding two hours emerged as an important determinant of infection risk. Nutritional deficiencies such as anemia and hypoproteinemia highlight the need for perioperative optimization.

The predominance of Gram-negative organisms reflects gastrointestinal contamination patterns and emphasizes the need for targeted antimicrobial strategies.

Limitations

Single-center study; Small sample size; Lack of multivariate analysis.

CONCLUSION

Surgical site infection remains a significant complication following gastrointestinal laparotomy. Emergency surgery, prolonged operative time, contaminated wounds, and nutritional deficiencies are important risk factors.

Implementation of evidence-based infection-prevention strategies is essential to improve outcomes.