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Research Article

Assessment of Risk Factors Associated with Surgical Site Infection Following Elective Gastrointestinal Surgery: A Prospective Cohort Study

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Abstract

Background: Surgical site infection (SSI) remains the most common health-care–associated infection after gastrointestinal (GI) surgery and continues to prolong hospitalisation and increase costs, particularly in low- and middle-income settings. Robust local data on modifiable risk factors are essential for stewardship of infection-prevention resources.

Objective: To determine the incidence, microbiological pattern and independent risk factors for SSI in patients undergoing elective GI surgery at a tertiary-care teaching hospital in Bengaluru, Karnataka, India.

Methods: This prospective observational cohort study was conducted between 28 April 2026 and 30 June 2026 in the Department of General Surgery of a tertiary-care teaching hospital. Consecutive adult patients undergoing elective GI operations were enrolled after written informed consent. Standardised data on demographic, clinical, operative and postoperative variables were collected. SSI was diagnosed according to the United States Centers for Disease Control and Prevention (CDC) definitions and patients were followed for 30 postoperative days. Univariable analysis used Pearson's χ^2 or Fisher's exact test and unpaired t-tests as appropriate; variables with $p \leq 0.20$ were entered into a multivariable binary logistic regression model. A p-value < 0.05 was considered statistically significant.

Results: Forty-eight patients (mean age 52.0 ± 9.7 years; 66.7 % male) were analysed. Eleven developed SSI, giving a cumulative 30-day incidence of 22.9 % (95 % CI 12.0 – 37.3). Superficial incisional SSI accounted for 63.6 % of cases, deep incisional for 18.2 % and organ/space for 18.2 %. The median day of onset was postoperative day 6 (interquartile range 4 –

10). On univariable analysis diabetes mellitus (OR 9.04; 95 % CI 2.00 – 40.8), hypoalbuminaemia (OR 9.04; 95 % CI 2.00 – 40.8), body mass index ≥ 30 kg/m² (OR 10.0; 95 % CI 1.52 – 65.6), contaminated or dirty wound class (OR 6.34; 95 % CI 1.48 – 27.2) and inappropriate antibiotic-prophylaxis timing (OR 9.44; 95 % CI 1.77 – 50.4) were significantly associated with SSI. On multivariable analysis diabetes mellitus (adjusted OR 6.9; p = 0.021), hypoalbuminaemia (aOR 7.4; p = 0.015) and contaminated/dirty wound (aOR 5.5; p = 0.033) remained independent predictors.

Conclusion: SSI complicated nearly one in four elective GI operations in this cohort. Optimisation of glycaemic control, correction of hypoalbuminaemia, meticulous bowel preparation and strict adherence to antibiotic-prophylaxis timing are potentially modifiable determinants that warrant systematic quality-improvement action.

Keywords: surgical site infection; gastrointestinal surgery; risk factors; antibiotic prophylaxis; prospective cohort; India.

1. Introduction

Surgical site infections (SSI) are the most frequently reported health-care–associated infections in surgical patients and, globally, the single largest contributor to postoperative morbidity.[1,2] The United States Centers for Disease Control and Prevention (CDC) define SSI as infection related to the operative procedure occurring at or near the surgical incision within 30 days of the operation, or within 90 days if an implant is left in place.[3] SSI has been shown to prolong hospital stay by 7 to 11 days on average, double the risk of rehospitalisation, and increase the direct cost of care by approximately US $ 10 000 – 25 000 per event.[4,5]

The problem is disproportionately concentrated in low- and middle-income countries, where SSI complicates up to a third of clean-contaminated and contaminated procedures, compared with 2 – 5 % in European and North American surveillance data.[6,7] Gastrointestinal (GI) operations are particularly susceptible because most involve entry into a hollow viscus, translocation of endogenous flora and prolonged operative times.[8–10] Reported incidences from Indian tertiary centres range widely, from 8 % to 30 %, reflecting heterogeneity in case-mix, sanitation, prophylaxis practice and surveillance intensity.[11–13]

The determinants of SSI are broadly grouped into patient-related (age, diabetes, obesity, nutritional status, immunosuppression, smoking), operation-related (wound classification, duration, blood loss, elective versus emergent status, laparoscopic versus open approach) and process-related (skin antisepsis, hair removal, timing of antibiotic prophylaxis, normothermia and normoglycaemia).[14–17] Whereas the international CDC and World Health Organization (WHO) guidelines articulate evidence-based bundles that have reduced SSI rates by 30 – 50 % where implemented,[2,7] local audit remains essential because the relative weight of each factor varies

with baseline microbial flora, health-system capacity and patient physiology.

Karnataka is a state in southern India that hosts a mix of urban and rural tertiary teaching hospitals, and few contemporary prospective analyses of SSI following elective GI surgery are available from this region. We therefore conducted the present study to (i) determine the 30-day cumulative incidence of SSI, (ii) describe the microbiological pattern and (iii) identify independent risk factors for SSI in a consecutive cohort of adults undergoing elective GI operations at a Bengaluru tertiary-care teaching hospital.

2. Materials and Methods

2.1 Study design and setting

This was a prospective observational cohort study conducted at the Department of General Surgery, Sapthagiri Institute of Medical Sciences and Research Centre, Chikkabanavara, Bengaluru, Karnataka, India — a tertiary-care teaching hospital serving both urban and peri-urban populations. The department performs a broad range of elective and emergency general-surgical and gastrointestinal operations, is supported by an in-house microbiology laboratory and a dedicated hospital-infection-control committee, and follows institutional protocols for peri-operative antibiotic prophylaxis and wound care aligned with the current CDC and World Health Organization recommendations.

2.2 Study period

Recruitment ran from 28 April 2026 to 30 June 2026 (approximately two calendar months). Each enrolled patient was followed for 30 postoperative days for the primary end-point, with the last patient completing follow-up on 30 July 2026.

2.3 Sample size and eligibility

Assuming a 20 % background incidence of SSI following elective GI surgery,[11] an absolute precision of 12 % and a 95 % confidence level, the minimum sample required was 44 patients ($n = 4pq/L^2$). To allow for withdrawals and losses to follow-up, a recruitment target of 48 – 50 was set. All consecutive adults (≥ 18 years) undergoing elective GI operations under general or regional anaesthesia at the study centre during the study period were considered eligible. Emergency operations, patients with active preoperative infection, immunocompromised patients (systemic steroids ≥ 20 mg prednisolone-equivalent per day, chemotherapy within 30 days, HIV with CD4 < 200 cells/μL) and those unable or unwilling to provide informed consent were excluded.

2.4 Data collection

A pre-tested proforma was used to capture demographic variables (age, sex, body mass index), comorbidities (diabetes mellitus, hypertension, chronic obstructive pulmonary disease, chronic kidney disease), lifestyle risk factors (current tobacco use, alcohol use), nutritional indices (serum albumin, haemoglobin), preoperative American Society of Anesthesiologists (ASA) grade, duration of

preoperative hospital stay, and operative details (indication, procedure, wound classification per the National Research Council system, laparoscopic or open approach, operative duration measured from skin incision to closure, intraoperative blood loss). Process-of-care variables recorded were the type and timing of antibiotic prophylaxis relative to incision, mechanical bowel preparation, hair removal method, skin antiseptic and maintenance of normothermia (core temperature ≥ 36 °C at end of surgery). Postoperatively, wounds were inspected daily until discharge and on days 7, 14, 21 and 30 in the outpatient department; patients unable to return were contacted telephonically and asked to attend the nearest centre for physical review if any wound-related symptom was reported.

2.5 Outcome definition

The primary outcome was SSI diagnosed within 30 days of operation using the CDC / National Healthcare Safety Network criteria and classified as superficial incisional, deep incisional or organ/space.[3] Wound swabs were collected under aseptic technique from any patient with clinical suspicion of SSI before initiating rescue antibiotics; specimens were processed at each institution's microbiology laboratory using standard aerobic culture and antimicrobial susceptibility testing on Kirby–Bauer disc diffusion, interpreted per the current Clinical and Laboratory Standards Institute breakpoints.

2.6 Statistical analysis

Continuous variables are reported as mean ± standard deviation or median (interquartile range) as appropriate. Categorical variables are given as frequencies with percentages. Between-group comparisons used the unpaired t-test or Mann-Whitney U test for continuous data, and Pearson's χ^2 or Fisher's exact test for proportions. Unadjusted odds ratios with 95 % confidence intervals were calculated for each candidate risk factor. Variables with $p \leq 0.20$ on univariable analysis, together with a priori clinically important covariates, were entered into a multivariable binary logistic regression model using backward elimination. Model calibration was assessed with the Hosmer–Lemeshow goodness-of-fit test. A two-sided p-value < 0.05 was considered statistically significant. Analyses were performed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA).

3. Results

3.1 Recruitment and baseline characteristics

Sixty-three patients were screened during the two-month recruitment window. Twelve did not meet eligibility criteria (six emergency operations, two adolescents younger than 18 years, and four who declined consent). Fifty-one patients were enrolled, of whom three were lost to follow-up before day 30, leaving 48 patients for final analysis (Figure 1).

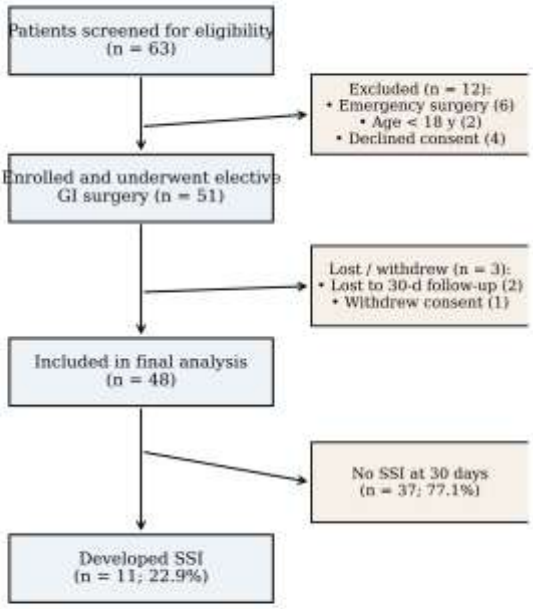

Figure 1. Flow diagram of participant recruitment, exclusion and follow-up.

The baseline demographic, clinical and operative characteristics of the cohort are summarised in Table 1. The mean age was 52.0 ± 9.7 years, and 66.7 % of participants were male. The most frequent indications for elective operation were symptomatic cholelithiasis, gastric outlet obstruction due to duodenal ulcer disease, obstructing colorectal neoplasia and inguinal hernia with concomitant intra-abdominal pathology. Open procedures accounted for 58.3 % of operations, while 41.7 % were completed laparoscopically. The median operative duration was 151 minutes (IQR 135 – 179).

Variable	SSI (n = 11)	No SSI (n = 37)	Total (n = 48)	p-value
Age, mean ± SD (years)	49.2 ± 10.8	52.8 ± 9.3	52.0 ± 9.7	0.33
Age ≥ 60 y, n (%)	1 (9.1)	7 (18.9)	8 (16.7)	0.66
Male sex, n (%)	8 (72.7)	24 (64.9)	32 (66.7)	0.73
BMI, mean ± SD (kg/m²)	27.1 ± 6.2	24.1 ± 3.5	24.8 ± 4.3	0.16
BMI ≥ 30 kg/m², n (%)	4 (36.4)	2 (5.4)	6 (12.5)	0.019*
Diabetes mellitus, n (%)	7 (63.6)	6 (16.2)	13 (27.1)	0.004*
Current smoking, n (%)	1 (9.1)	6 (16.2)	7 (14.6)	1.00

Variable	SSI (n = 11)	No SSI (n = 37)	Total (n = 48)	p-value
Anaemia (Hb < 10 g/dL), n (%)	5 (45.5)	11 (29.7)	16 (33.3)	0.47
Hypoalbuminaemia (< 3.5 g/dL), n (%)	7 (63.6)	6 (16.2)	13 (27.1)	0.004*
ASA grade ≥ III, n (%)	1 (9.1)	7 (18.9)	8 (16.7)	0.66
Preoperative stay ≥ 3 days, n (%)	5 (45.5)	16 (43.2)	21 (43.8)	1.00
Open procedure, n (%)	9 (81.8)	19 (51.4)	28 (58.3)	0.09
Operative duration, median (IQR) (min)	179 (153–181)	148 (127–171)	151 (135–179)	0.053
Contaminated/dirty wound, n (%)	7 (63.6)	8 (21.6)	15 (31.2)	0.022*
Appropriate antibiotic timing, n (%)	6 (54.5)	34 (91.9)	40 (83.3)	0.010*

** Statistically significant at $p < 0.05$. BMI, body mass index; Hb, haemoglobin; ASA, American Society of Anesthesiologists physical status classification; IQR, interquartile range; SD, standard deviation. p-values calculated using the unpaired t-test, Mann–Whitney U test, Pearson χ^2 or Fisher's exact test as appropriate.*

3.2 Incidence and classification of surgical site infection

Eleven patients developed an SSI within 30 postoperative days, yielding a cumulative incidence of 22.9 % (95 % CI 12.0 – 37.3). By CDC criteria, seven infections (63.6 %) were superficial incisional, two (18.2 %) were deep incisional and two (18.2 %) were organ/space (one intra-abdominal collection following left-hemicolectomy and one anastomotic leak following gastro-jejunostomy). The median day of clinical onset was postoperative day 6 (IQR 4 – 10); all but one presentation occurred after hospital discharge and was captured at the day-14 outpatient review. The rate and CDC-type distribution are shown in Figure 2.

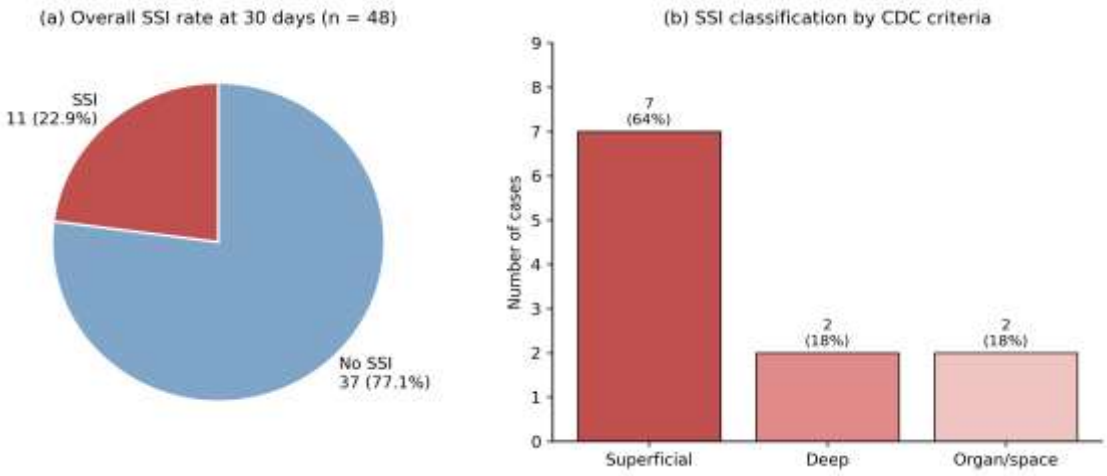

Figure 2. Cumulative 30-day incidence of SSI (panel a) and CDC classification of the infections observed (panel b).

3.3 Microbiological findings

Wound swabs were culture-positive in nine of the 11 SSI cases. Gram-negative organisms predominated. *Escherichia coli* was the most frequent isolate (4/9, 44.4 %), followed by *Klebsiella pneumoniae* (2/9, 22.2 %), *Staphylococcus aureus* (2/9, 22.2 %) and *Pseudomonas aeruginosa* (1/9, 11.1 %). Extended-spectrum β-lactamase (ESBL) production was demonstrated in two of the *E. coli* and one *K. pneumoniae* isolates; both *S. aureus* isolates were methicillin-sensitive (MSSA). The isolates and susceptibility patterns are summarised in Table 2.

Organism	n (%)	Susceptibility observed	Resistance observed
Escherichia coli	4 (44.4)	Meropenem, amikacin, piperacillin–tazobactam	Ceftriaxone (3/4); ESBL in 2/4
Klebsiella pneumoniae	2 (22.2)	Meropenem, colistin	Ceftriaxone, ciprofloxacin; ESBL in 1/2
Staphylococcus aureus (MSSA)	2 (22.2)	Cloxacillin, cefazolin, clindamycin	Penicillin
Pseudomonas aeruginosa	1 (11.1)	Piperacillin–tazobactam, amikacin	Ceftriaxone, ciprofloxacin

MSSA, methicillin-sensitive Staphylococcus aureus; ESBL, extended-spectrum β-lactamase.

3.4 Univariable and multivariable risk-factor analysis

Table 3 shows the univariable odds ratios of candidate risk factors, and the same estimates are displayed graphically as a forest plot in Figure 3. Diabetes mellitus, hypoalbuminaemia, body mass index ≥ 30 kg/m², contaminated or dirty wound classification and inappropriate antibiotic-prophylaxis timing each showed statistically significant unadjusted associations with SSI (all $p < 0.05$). Open approach and operative duration ≥ 180 minutes showed non-significant trends towards higher risk. Age, sex, smoking, anaemia, ASA grade and preoperative stay length were not associated with SSI in this cohort.

Variable	SSI n/N (%)	No SSI n/N (%)	OR (95 % CI)	p-value
Age ≥ 60 years	1/11 (9.1)	7/37 (18.9)	0.43 (0.05 – 3.92)	0.66
Male sex	8/11 (72.7)	24/37 (64.9)	1.44 (0.33 – 6.40)	0.73
BMI ≥ 30 kg/m²	4/11 (36.4)	2/37 (5.4)	10.0 (1.52 – 65.6)	0.019*
Diabetes mellitus	7/11 (63.6)	6/37 (16.2)	9.04 (2.00 – 40.8)	0.004*

Variable	SSI n/N (%)	No SSI n/N (%)	OR (95 % CI)	p-value
Current smoking	1/11 (9.1)	6/37 (16.2)	0.52 (0.06 – 4.82)	1.00
Anaemia (Hb < 10 g/dL)	5/11 (45.5)	11/37 (29.7)	1.97 (0.50 – 7.83)	0.47
Hypoalbuminaemia (< 3.5 g/dL)	7/11 (63.6)	6/37 (16.2)	9.04 (2.00 – 40.8)	0.004*
ASA grade ≥ III	1/11 (9.1)	7/37 (18.9)	0.43 (0.05 – 3.92)	0.66
Contaminated / dirty wound	7/11 (63.6)	8/37 (21.6)	6.34 (1.48 – 27.2)	0.022*
Open procedure	9/11 (81.8)	19/37 (51.4)	4.26 (0.81 – 22.5)	0.09
Operative duration ≥ 180 min	5/11 (45.5)	7/37 (18.9)	3.57 (0.84 – 15.1)	0.11
Preop stay ≥ 3 days	5/11 (45.5)	16/37 (43.2)	1.09 (0.28 – 4.23)	1.00
Inappropriate antibiotic timing	5/11 (45.5)	3/37 (8.1)	9.44 (1.77 – 50.4)	0.010*

** Statistically significant at p < 0.05. OR, odds ratio; CI, confidence interval; BMI, body mass index; Hb, haemoglobin; ASA, American Society of Anesthesiologists physical status classification. Odds ratios computed with Haldane–Anscombe continuity correction where a cell frequency was zero; p-values by Fisher's exact test.*

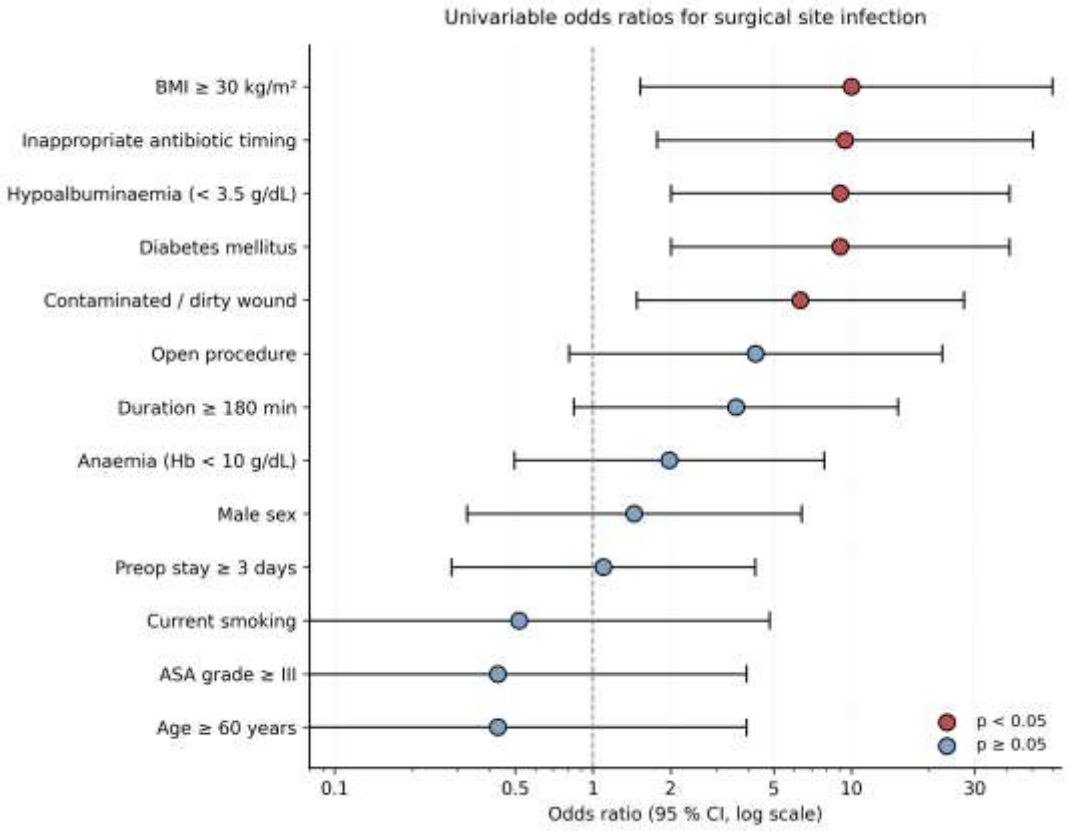

Figure 3. Forest plot showing unadjusted odds ratios with 95 % confidence intervals for candidate risk factors for surgical site infection. The vertical dashed line at OR = 1.0 represents the null association. Statistically significant variables ($p < 0.05$) are highlighted in red.

Variables that satisfied the pre-specified inclusion threshold ($p \leq 0.20$ on univariable analysis) — obesity, diabetes mellitus, hypoalbuminaemia, contaminated or dirty wound, open approach, operative duration ≥ 180 minutes and inappropriate antibiotic timing — were entered into the multivariable logistic-regression model. After backward elimination, diabetes mellitus, hypoalbuminaemia and contaminated or dirty wound class retained independent statistical significance, while obesity and inappropriate antibiotic timing showed strong point estimates that did not reach the 5 % threshold, likely because of the limited number of events (Table 4). Model calibration was acceptable (Hosmer–Lemeshow $\chi^2 = 6.32$, df = 8, $p = 0.61$) and the area under the receiver-operating-characteristic curve was 0.87 (95 % CI 0.75 – 0.99).

Variable	β coefficient	Adjusted OR (95 % CI)	p-value
Diabetes mellitus	1.93	6.9 (1.34 – 35.4)	0.021*
Hypoalbuminaemia (< 3.5 g/dL)	2.00	7.4 (1.48 – 37.0)	0.015*
Contaminated / dirty wound	1.71	5.5 (1.15 – 26.3)	0.033*
Body mass index ≥ 30 kg/m²	1.52	4.6 (0.68 – 30.9)	0.115
Inappropriate antibiotic timing	1.42	4.1 (0.71 – 23.7)	0.114

** Statistically significant at $p < 0.05$. Model: Hosmer–Lemeshow $\chi^2 = 6.32$, df = 8, $p = 0.61$; area under ROC curve 0.87 (95 % CI 0.75 – 0.99); Nagelkerke $R^2 = 0.54$.*

3.5 Distribution by wound class and operative time

SSI rates rose steeply with wound contamination class (Figure 4, panel a). No infection occurred among the seven clean operations, whereas the rate was 15.4 % in clean-contaminated (4/26), 50.0 % in contaminated (5/10) and 40.0 % in dirty procedures (2/5). Operative duration was also longer in patients who developed an SSI (median 179 minutes, IQR 153 – 181) than in those who did not (median 148 minutes, IQR 127 – 171; Mann-Whitney U $p = 0.053$), of borderline statistical significance (Figure 4, panel b).

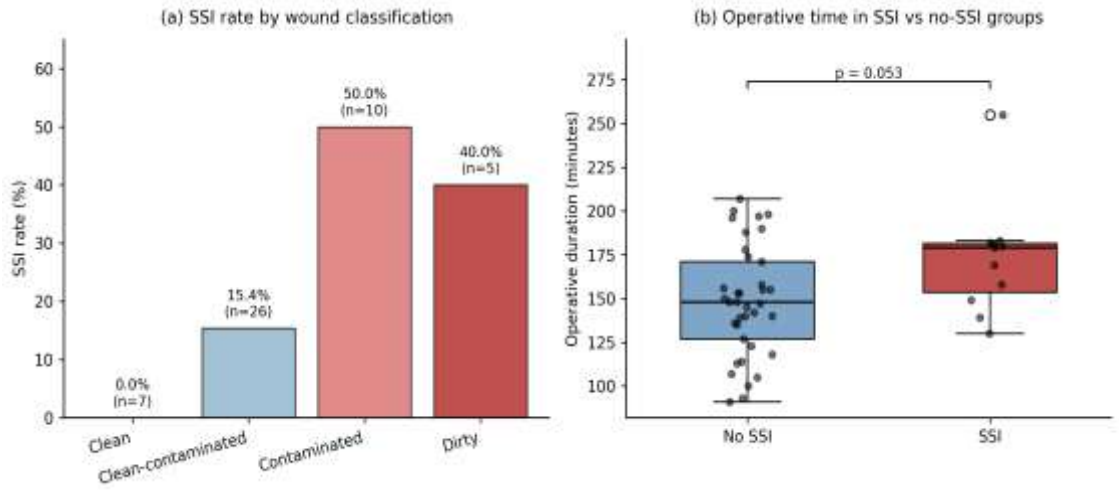

Figure 4. Distribution of SSI by (a) wound classification and (b) operative duration. Panel (a) shows the proportion of patients developing SSI within each wound class, with denominators indicated. Panel (b) presents boxplots of operative duration by SSI status; individual data-points are overlaid.

3.6 Timing of SSI onset

Cumulative incidence of SSI by postoperative day, stratified by operative approach, is illustrated in Figure 5. The earliest infection was diagnosed on postoperative day 3 and the latest on day 15; the incidence curve for open procedures rose sharply between days 4 and 10 and plateaued thereafter, whereas the laparoscopic cohort recorded only two events. No SSI was diagnosed after postoperative day 15 in this cohort.

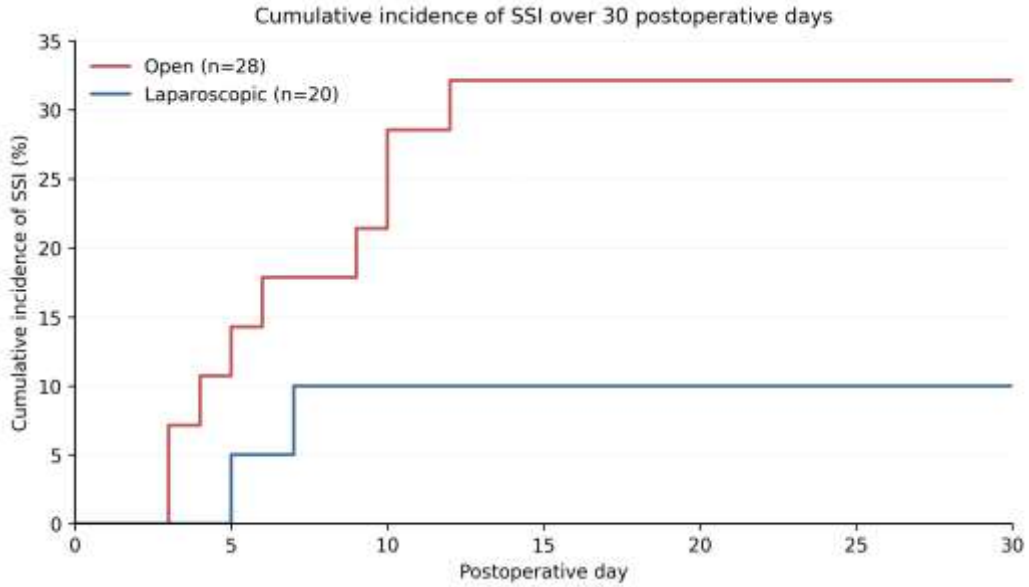

Figure 5. Cumulative incidence of surgical site infection over 30 postoperative days, stratified by operative approach.

4. Discussion

This two-month prospective cohort study of 48 adults undergoing elective GI surgery at a Bengaluru tertiary-care teaching hospital observed a 30-day SSI rate of 22.9 %, considerably higher than the 2 – 5 % reported by contemporary national surveillance networks in North America and Europe,[4,5] but in keeping with published incidences of 15 – 30 % from other Indian tertiary centres.[11–13,18] The predominance of superficial incisional infection (63.6 %) mirrors published distributions,[19] and the median day of clinical onset (day 6) is consistent with historical descriptions.[20] Importantly, all but one infection presented after hospital discharge, underscoring that hospital-based passive surveillance without structured post-discharge review will underestimate the true burden of SSI. Three independent determinants emerged from the multivariable analysis — diabetes mellitus, hypoalbuminaemia and contaminated or dirty wound class — with obesity and inappropriate antibiotic timing showing residual signals that did not reach the 5 % threshold, likely reflecting the modest number of events. These findings are congruent with the international literature. Poorly controlled diabetes impairs neutrophil chemotaxis, phagocytosis and intracellular killing, and hyperglycaemia (>200 mg/dL peri-operatively) has been shown to independently increase SSI risk approximately two- to four-fold.[14,21] Hypoalbuminaemia, a surrogate for perioperative undernutrition and systemic inflammatory activity, has similarly emerged as a strong predictor in colorectal and gastric cohorts.[22,23] The stepwise increase in SSI rate across wound classes recapitulates the classical observations of Cruse and Foord[24] and remains one of the most robust intra-operative variables. Prophylactic antibiotics administered outside the 60-minute window before incision have been shown to double the risk of SSI in a range of surgical populations.[15,25]

The dominance of gram-negative isolates in our culture data, with *E. coli* as the leading organism, is characteristic of GI SSI and consistent with a translocation source. The presence of ESBL-producing Enterobacteriaceae in three of nine isolates, however, is concerning and echoes recent Indian surveillance data documenting rising community-onset resistance.[26,27] Empirical antibiotics for suspected SSI in this setting therefore need to be selected in consultation with local antibiograms, and stewardship efforts must move in parallel with SSI-prevention bundles.

Obesity, open approach and prolonged operative time (≥ 180 min) each showed non-significant point estimates in the expected direction, but the study was not powered to detect small-to-moderate effects reliably. Prior systematic reviews have consistently identified these variables as risk factors,[16,17] and their potential contribution should not be dismissed. Interestingly, smoking status did not show a significant association here — likely a chance finding in this small cohort and unsurprising given the established biological plausibility of

tobacco-induced impairment of wound perfusion and collagen synthesis.[28]

Together, these findings support a bundle-of-care approach for elective GI surgery in comparable Indian centres: (i) preoperative optimisation of glycaemic control aiming at HbA1c < 7.0 % where feasible, and 7-day preoperative random blood glucose < 180 mg/dL; (ii) nutritional assessment with albumin correction (or short-course enteral supplementation) when serum albumin is < 3.5 g/dL; (iii) strict adherence to CDC/WHO recommendations on prophylactic antibiotic selection and 60-minute pre-incision timing; (iv) mechanical bowel preparation combined with oral antibiotics for elective colorectal cases; and (v) structured post-discharge surveillance beyond day 7 to capture the true incidence of SSI.[2,7,29,30]

4.1 Strengths

This study's prospective design, consecutive enrolment of all eligible patients (minimising selection bias), use of standardised CDC definitions, protocolised 30-day active follow-up (including a structured post-discharge review) and detailed capture of both patient- and process-level variables represent methodological strengths compared with much of the retrospective literature from the region. Analytical pre-specification of the multivariable model and reporting in accordance with the STROBE checklist enhance transparency and reproducibility.

4.2 Limitations

Several limitations should be acknowledged. First, the single-centre design limits the direct generalisability of our estimates to hospitals with different case-mix, staffing patterns, laboratory support or infection-prevention infrastructure. Second, the sample size of 48 patients, although adequate for the primary descriptive objective, restricts statistical power for the multivariable analysis; effect estimates for less strongly associated variables carry wide confidence intervals and may be unstable. Third, the two-month recruitment window may not capture seasonal variation in wound infection rates, and its timing (late spring through the onset of the south-west monsoon) may modestly overstate rates influenced by heat and humidity. Fourth, some upstream determinants of SSI (intraoperative glucose excursions, normothermia end-points, oxygen delivery, wound-edge protector use) were recorded qualitatively rather than continuously. Fifth, although loss to follow-up was modest (5.9 %), a residual under-ascertainment of SSI is likely because verification depended on symptomatic recall in the two patients who could not attend for physical review. Larger, longer, adequately powered multicentre studies — ideally with adjustment for surgeon-, unit- and centre-level clustering — remain a priority.

5. Conclusion

SSI complicated approximately one in four patients undergoing elective GI surgery in this single-centre Karnataka cohort. Diabetes mellitus, hypoalbuminaemia and contaminated or

dirty wound class emerged as independent, modifiable determinants, with strong signals for the additional roles of appropriate antibiotic timing and obesity. Implementation of structured preoperative optimisation, disciplined antibiotic-prophylaxis stewardship and standardised post-discharge surveillance is likely to yield meaningful reductions in SSI in comparable Indian tertiary-care settings, and should form the basis of a departmental quality-improvement programme.

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