Surgical Site Infection During a Two-Month Study Period: A Prospective Observational Study

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Abstract

Background

Surgical site infection (SSI) is one of the most common postoperative complications and contributes significantly to increased morbidity, prolonged hospital stay, and healthcare expenditure. Surveillance of SSI and identification of associated risk factors are essential for effective infection prevention and management.

Aim

To determine the incidence, clinical profile, microbiological pattern, and outcome of surgical site infections among postoperative patients during a two-month study period.

Material and Methods

This prospective observational study was conducted in the Department of Surgery in collaboration with the Department of Microbiology at a tertiary care hospital over a period of two months. A total of 50 postoperative patients were included and monitored for signs and symptoms of SSI. Wound samples from suspected cases were collected aseptically and processed for culture and antimicrobial susceptibility testing using standard microbiological methods. Demographic details, risk factors, microbial isolates, and treatment outcomes were analyzed.

Results

Out of 50 operated patients, 3 cases of surgical site infection were identified, resulting in an SSI incidence rate of 6%. Among the infected patients, two were males and one was female. Emergency surgical procedures accounted for two cases, while one case followed elective surgery. The most common clinical features included pain, redness, swelling, and purulent discharge from the surgical site. Microbiological culture showed Staphylococcus aureus in two cases and Escherichia coli in one case. Diabetes mellitus and prolonged surgical duration were identified as major associated risk factors. All patients responded well to culture-guided antibiotic therapy without major complications.

Conclusion

The present study demonstrated a relatively low incidence of surgical site infection. Staphylococcus aureus was the predominant pathogen isolated. Strict adherence to aseptic techniques, continuous surveillance, early diagnosis, and appropriate antimicrobial therapy are important measures for reducing SSI and improving postoperative outcomes.

Keywords

Surgical site infection, postoperative wound infection, *Staphylococcus aureus*, antimicrobial susceptibility, hospital-acquired infection, SSI.

Introduction

Surgical site infection (SSI) is one of the most common healthcare-associated infections contributing significantly to postoperative morbidity, prolonged hospital stay, increased healthcare costs, and patient discomfort. SSIs occur within 30 days after surgery or within one year in cases involving implants and may involve superficial tissues, deep tissues, or organ spaces. Despite advancements in sterilization techniques, antibiotic prophylaxis, and infection control measures, SSIs continue to pose a major challenge in surgical practice.[1]

The incidence of SSI varies depending on the type of surgery, patient-related factors, duration of operation, underlying comorbidities, and hospital infection control practices.[2] Common risk factors include diabetes mellitus, obesity, malnutrition, prolonged surgical duration, emergency procedures, and improper wound care.[3] Early identification of causative organisms and appropriate antimicrobial therapy are essential for reducing complications and improving patient outcomes.[4]

Among the microbial agents, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella* species are frequently implicated in postoperative wound infections.[5] Surveillance studies on SSI are important for monitoring infection trends, identifying risk factors, and guiding antibiotic stewardship programs.

The present study was conducted to evaluate the incidence, clinical profile, microbiological pattern, and outcome of surgical site infections during a two-month period in a tertiary care hospital.

Material and Methods

This prospective observational study was conducted in the Department of Surgery in collaboration with the Department of Microbiology at a tertiary care teaching hospital over a period of two months.

A total of 50 patients undergoing various surgical procedures during the study period were included. Patients of all age groups and both genders who underwent clean, clean-contaminated, contaminated, or emergency surgical procedures were enrolled in the study. Patients with pre-existing wound infections before surgery were excluded.

Postoperatively, all patients were monitored for signs and symptoms suggestive of SSI such as redness, swelling, pain, fever, tenderness, and purulent discharge from the surgical site. Clinical evaluation and wound examination were performed regularly during hospital stay and follow-up.

Samples from suspected infected wounds were collected aseptically using sterile swabs and transported immediately to the microbiology laboratory for culture and sensitivity testing. Bacterial identification was carried out using standard microbiological techniques, and antimicrobial susceptibility testing was performed according to CLSI guidelines.

Relevant demographic details, comorbid conditions, type of surgery, duration of hospital stay, microbiological findings, and treatment outcomes were recorded and analyzed.

Results

During the two-month study period, a total of 50 patients underwent surgical procedures and were followed for the occurrence of surgical site infection. Among them, only 3 patients developed SSI, giving an overall incidence rate of 6%. The remaining 47 patients showed satisfactory postoperative recovery without evidence of infection.

Among the three SSI cases, two patients were male and one was female. The age of affected patients ranged from 32 to 61 years. Two infections occurred following emergency surgical procedures, while one case was associated with elective surgery. The infected patients commonly presented with pain, redness, swelling, and purulent discharge from the surgical site. Fever was observed in two cases.

Microbiological culture of wound samples demonstrated bacterial growth in all three cases. *Staphylococcus aureus* was isolated in two cases, whereas *Escherichia coli* was isolated in one case. All isolates were subjected to antimicrobial susceptibility testing, and patients were treated with appropriate antibiotics according to culture sensitivity reports.

Associated risk factors identified among SSI patients included diabetes mellitus, prolonged duration of surgery, and poor nutritional status. Patients with SSI had relatively prolonged hospital stay compared to non-infected patients. However, all infected cases responded well to treatment, and no major postoperative complications or mortality were observed during the study period.

Out of these, only 3 patients developed SSI, indicating a low incidence rate during the study duration. The majority of the operated cases showed satisfactory postoperative wound healing without evidence of infection.

Among the 3 SSI cases, 2 patients were male and 1 patient was female. The age of affected patients ranged from 32 to 61 years. Two infections were observed following emergency surgical procedures, while one case occurred after an elective surgery. The average duration of hospital stay among SSI patients was longer compared to non-infected patients.

Clinically, all three patients presented with pain, redness, and purulent discharge at the surgical site. Fever was observed in two cases. Culture examination of wound swabs revealed bacterial growth in all three cases. The most commonly isolated organism was *Staphylococcus aureus* (2 cases), while *Escherichia coli* was isolated in 1 case. All patients received appropriate antibiotic therapy according to culture sensitivity reports and responded well to treatment without major postoperative complications.

The occurrence of SSI was higher in patients with associated risk factors such as diabetes mellitus, prolonged operative duration, and poor nutritional status. Despite the low number of infections, SSI contributed to increased hospital stay, additional antibiotic usage, and delayed wound healing in affected patients.

Table 1: Incidence of Surgical Site Infection (SSI) During Study Period

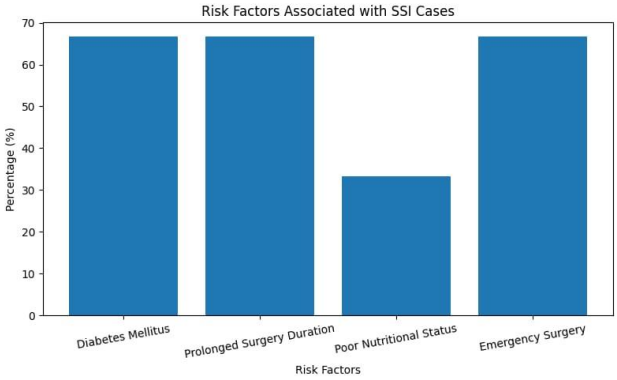
Total Operated Cases	SSI Cases	Non-SSI Cases	SSI Rate (%)
50	3	47	6.0%

Table 2: Demographic and Clinical Profile of SSI Cases

Case No.	Age (Years)	Gender	Type of Surgery	Clinical Features	Organism Isolated
1	32	Male	Emergency Surgery	Pain, redness, pus discharge	*Staphylococcus aureus*
2	61	Female	Elective Surgery	Fever, redness, discharge	*Escherichia coli*
3	48	Male	Emergency Surgery	Pain, fever, purulent discharge	*Staphylococcus aureus*

Table 3: Risk Factors Associated with SSI Cases

Risk Factor	Number of Cases (n=3)	Percentage (%)
Diabetes Mellitus	2	66.7
Prolonged Surgery Duration	2	66.7
Poor Nutritional Status	1	33.3
Emergency Surgery	2	66.7



Graph 1: Risk Factors

Table 4: Outcome of SSI Cases

Parameter	Observation
Average Hospital Stay	Increased compared to non-SSI patients
Antibiotic Therapy	Given according to culture sensitivity
Response to Treatment	Good recovery in all cases
Major Complications	None observed

Discussion

Surgical site infection remains a major concern in postoperative patient care despite improvements in aseptic techniques and antimicrobial prophylaxis.[6] In the present study, the SSI incidence was found to be 6%, which is comparable to several hospital-based studies conducted in developing countries.[7]

The low number of SSI cases observed in this study may reflect effective infection

control practices, proper sterilization measures, and rational antibiotic usage within the institution. Similar findings were reported by Kaye et al., who emphasized the importance of perioperative infection prevention measures in reducing SSI burden.[8]

In the current study, males were more commonly affected than females, and emergency surgeries showed higher association with infection compared to elective procedures. Emergency surgeries are often associated with inadequate preoperative preparation and increased tissue contamination, thereby increasing infection risk.[9]

The predominant isolate recovered was *Staphylococcus aureus*, followed by *Escherichia coli*. These findings are consistent with previous studies reporting *S. aureus* as the most common pathogen in postoperative wound infections.[10] The presence of *E. coli* particularly in abdominal surgeries may be attributed to contamination from endogenous gastrointestinal flora.[11]

Risk factors such as diabetes mellitus and prolonged surgical duration were observed among infected patients. Hyperglycemia impairs wound healing and immune response, making diabetic patients more susceptible to infection.[12] Prolonged surgeries also increase tissue handling and exposure to environmental contaminants, thereby increasing the risk of SSI.[13]

Although the number of infected cases was low, SSI resulted in increased hospital stay and additional antibiotic therapy, thereby contributing to increased healthcare burden. Early diagnosis, microbiological surveillance, and timely antimicrobial therapy remain essential for effective management and prevention of postoperative wound infections.[14]

Conclusion

The present study demonstrated a low incidence of surgical site infection during the two-month study period. *Staphylococcus aureus* was the most common bacterial isolate identified. Important associated risk factors included diabetes mellitus, prolonged surgery duration, and emergency surgical procedures. Continuous surveillance, strict adherence to aseptic precautions, rational antibiotic use, and early microbiological diagnosis are essential for minimizing SSI and improving postoperative outcomes.

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