ORIGINAL RESEARCH

Evaluation of Surgical Site Infections: An Institutional Based Study

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ABSTRACT

Background: The term "surgical site infection" (SSI) was introduced in 1992 to replace the previous term "surgical wound infection." SSIs are defined as infections that occur within 30 days after a surgical operation and affect either the incision or deep tissue at the operation site.Hence; the present study was conducted to evaluate incidence of surgical site infections.

Materials and Methods: The prospective observational study focused on 100 patients undergoing clean and clean-contaminated surgeries across various surgical departments. Patients admitted for elective or emergency surgeries falling under the category of clean or clean-contaminated procedures were included in the study, while contaminated or dirty (infected) surgeries were excluded. Data analysis was done using SSPS software.

Results: Of the total 100 patients who underwent surgery in the hospital, amongst them 6 (6%) developed SSI.Hence; the incidence of SSI was 6 percent.

Conclusion: Surgical Site Infections (SSIs) stand as a leading cause of nosocomial infections, exerting a substantial impact on patient health outcomes, including heightened morbidity, mortality, prolonged hospital stays, and increased treatment expenses.

Keywords: Surgical, Infection, Diabetes.

INTRODUCTION

The term "surgical site infection" (SSI) was introduced in 1992 to replace the previous term "surgical wound infection." SSIs are defined as infections that occur within 30 days after a surgical operation and affect either the incision or deep tissue at the operation site.[1,2] These infections may manifest as superficial or deep incisional infections or may involve organs or body spaces.[3]Despite improvements in infection control techniques and surgical practice, SSIs remain a major cause of morbidity and mortality and place substantial demands on healthcare resources.[3] Continual vigilance is thus required to minimize the incidence of such infections through a systematic approach that considers multiple risk factors related to the patient, the procedure, and the hospital environment.[4]

The epidemiology of SSIs is complex, with the incidence varying widely between procedures, hospitals, surgeons, and patients. The increasing use of minimally invasive (laparoscopic) surgery has led to decreased SSI incidence. For instance, laparoscopic procedures for cholecystectomy and acute appendicitis have shown significantly lower SSI rates compared to open procedures, possibly due to factors such as smaller incisions, earlier mobilization, reduced postoperative pain, preservation of immune system function, and decreased use of central venous catheters.[4,5]SSIs impose a substantial clinical burden. Patients with SSIs are more likely to require readmission to the hospital or intensive care unit (ICU) treatment and face a higher risk of mortality compared to those without such infections. This places additional strain on healthcare resources.[6] Hence; the present study was conducted to evaluateincidence of surgical site infections.

MATERIALS AND METHODS

The prospective observational study was conducted in department of General Surgery and department of

Orthopaedics and focused on 100 patients undergoing clean and clean-contaminated surgeries.

Patients admitted for elective or emergency surgeries falling under the category of clean or clean-contaminated procedures were included in the study, while contaminated or dirty (infected) surgeries were excluded.

The study collected demographic data, diagnostic criteria, associated risk factors, use of prophylactic antimicrobial agents, type and duration of surgery, clinical evaluation of the wound, laboratory data, and the history of pre-existing diseases, particularly diabetes. Data analysis was done using SSPS software.

RESULTS

Of the total 100 patients who underwent surgery in the hospital, amongst them 6 (6%) developed SSI as shown in figure 1. The surgical site infection (SSI) rates are broken down by different characteristics. When looking at the duration of surgery, it was observed that surgeries lasting less than 2 hours had an SSI/Total rate of 4.41%, while surgeries lasting 2 hours or more had a higher SSI/Total rate of 12.50%. In terms of the operation category, elective surgeries showed an SSI/Total rate of 6.25% while emergency surgeries had a higher rate of 45%. Finally, when considering associated risk factors, surgeries involving diabetic patients demonstrated the highest SSI/Total rate at 25%, whereas surgeries involving non-diabetic patients had a lower rate of 7.14%.

Figure 1: Incidence of SSIs.

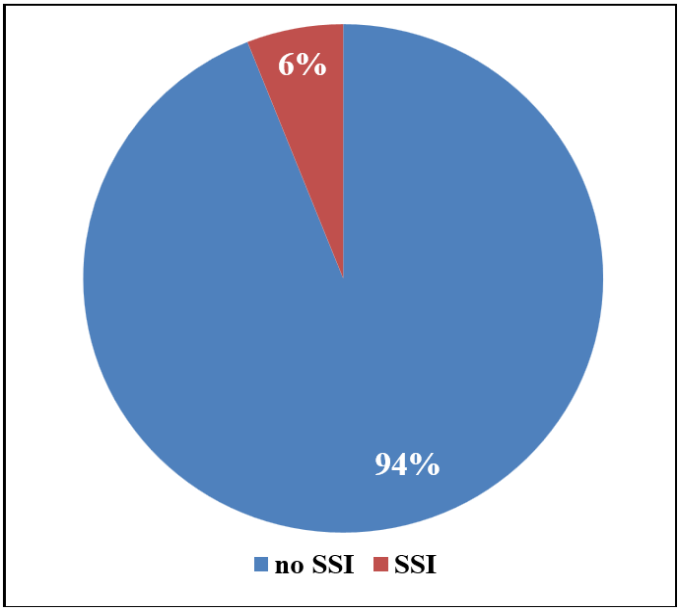

Table 1: Factors associated with SSIs.

Characteristics	SSI/Total	%
Duration of surgery(in hours)		
<2	3/68	4.41
≥2	4/32	12.50
Operation category		
Emergency	9/20	45
Elective	5/80	6.25
Associated risk factors		
Diabetic	4/16	25
Nondiabetic	6/84	7.14

DISCUSSION

Surgical Site Infections (SSIs) remain a prevalent challenge in healthcare, leading to increased patient harm; extended hospital stays, and elevated healthcare expenditures. Risk factors for SSIs encompass various aspects such as prolonged hospitalization, obesity, diabetes mellitus, and smoking.[7] The development of postoperative wound infections is influenced by a multitude of factors, with endogenous sources being a primary cause. Exogenous infections often stem from the nasal or skin flora of the surgical team, transmitted through inadequate sterilization practices in the operation theatre throughout the preoperative, intraoperative, and postoperative phases.[8]

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4.41%, while surgeries lasting 2 hours or more had a higher SSI/Total rate of 12.50%. In terms of the operation category, elective surgeries showed an SSI/Total rate of 6.25% while emergency surgeries had a higher rate of 45%. Finally, when considering associated risk factors, surgeries involving diabetic patients demonstrated the highest SSI/Total rate at 25%, whereas surgeries involving non-diabetic patients had a lower rate of 7.14%. Carvalho RLR estimated the incidence of surgical site infection in general surgeries at a large Brazilian hospital while identifying risk factors and prevalent microorganisms. The incidence of surgical site infection was 3.4%. The risk factors associated with surgical site infection were length of preoperative hospital stay more than 24 hours; duration of surgery in hours; wound class clean-contaminated, contaminated and dirty/infected; and ASA index classified into ASA II, III and IV/V. Staphylococcus aureus and Escherichia coli were identified. The incidence was lower than that found in the national studies on general surgeries. These risk factors corroborate those presented by the National Nosocomial Infection Surveillance System Risk Index, by the addition of the length of preoperative hospital stay.[9] Al-Mulhim FA et alassessed the prevalence of SSI in orthopedic practice and to identify risk factors associated with surgical site infections. All patients admitted to the orthopedic male and female wards between January 2006 and December 2011 were included in the study group. The data, which were collected from the medical charts and from the QuadraMed patient filing system, included age, sex, date of admission, type of admission (elective versus emergency), and classification of fractures. Analyses were made to find out the association between infection and risk factors, the $\chi 2$ test was used. The strength of association of the single event with the variables was estimated using Relative Risk, with a 95% confidence interval and $P < 0.05$. A total of 79 of 3096 patients (2.55%) were included: 60 males and 19 females with the average age of 38.13 ± 19.1 years. Fifty-three patients were admitted directly to the orthopedic wards, 14 were transferred from the surgical intensive care unit, and 12 from other surgical wards. The most common infective organism was Staphylococcus species including Methicillin Resistant Staphylococcus aureus (MRSA), 23 patients (29.11%); Acinetobacter species, 17 patients (21.5%); Pseudomonas species, 15 patients (18.9%); and Enterococcus species, 14 patients (17.7%). Fifty-two (65.8%) had emergency procedures, and in 57 patients trauma surgery was performed. Three (3.78%) patients died as a result of uncontrolled septicaemia. SSI was found to be common in their practice.[10]

CONCLUSION

Surgical Site Infections (SSIs) stand as a leading cause of nosocomial infections, exerting a substantial impact on patient health outcomes, including heightened morbidity, mortality, prolonged hospital stays, and increased treatment expenses.

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