ORIGINAL RESEARCH

Assessment of Clinico- Pathological Profile of Surgical Site Infection After General Surgery Operations

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ABSTRACT
Aim: To assess clinico- pathological profile of surgical site infection after general surgery operations. **Methodology:** Eighty- two patients of surgical site infection of both genders were included. Risk factors of surgical site infections such as length of hospital stay, duration of surgery (in hours), type of procedure, wound classification, American Society of Anesthesiologists physical status score was recorded**. Results:** Out of 82 patients, males were 38 (46.3%) and females were 44 (53.7%). ASA grade I was seen in 1, grade II in 5, grade III in 30 and grade IV- VI in 46 patients. Age <50 years had 24 and >50 years had 58. Type of procedure was emergency in 52 and elective in 30. Duration of surgery was <1 hour in 22 and >1 hour in 60 cases. Length of hospital stay was <24 hours in 18 and >24 hours in 64. Wound type was clean- contaminated in 10, contaminated in 22 and dirty in 38 cases. The difference was significant (P< 0.05). **Conclusion:** Common risk factors for SSI was age >50 years, duration of surgery >1 hour, length of hospital stay>24 hours, dirty wound, emergency surgery and ASA grade IV- VI.
Key words: ASA grade, SSI, wound

INTRODUCTION

Surgical site infections (SSIs) are defined as infections occurring up to 30 days after surgery (or up to one year after surgery in patients receiving implants) and affecting either the incision or deep tissue at the operation site.[1]For surgical patients, SSIs are the most common nosocomial infection and they have been shown to be the leading cause of operation-related adverse events. The incidence of SSIs can be as high as 20% depending on the surgical procedure, the surveillance criteria used, and the quality of data collection. In many SSIs, the responsible pathogens originate from the patient's endogenous flora. Multiple risk factors for SSI have been identified can be compiled within three major determinants of SSI: bacterial factors, local wound factors, and patient factors.[2]

patient-related factors increasing the risk of an SSI include pre-existing infection, malnutrition, obesity, low serum albumin, elderly, smoking, and immunosuppression (diabetes mellitus, irradiation).[3] Surgery-related factors include contaminated surgeries, emergency surgeries, prolonged procedures, substandard sterilization, inadequate handling of

instruments, and inadequate antiseptic surgical site preparation.[4] Physiological conditions that predispose to an increased incidence of SSI include multi-trauma, hemodynamic instability, shock, massive blood transfusions during the procedure, and postoperative hypothermia, hypoxia, and hyperglycemia.[5]Other independent predictors of SSI include abdominal surgeries, contaminated or dirty procedures, and three or more diagnoses upon hospital discharge. Delayed recognition and inappropriate management of SSI increases the length of hospital stay and treatment cost. Patients with SSI have increased the risk of mortality when compared to those without SSI.[6] We performed this study to assess clinico- pathological profile of surgical site infection after general surgery operations.

METHODOLOGY

After considering the utility of the study and obtaining approval from ethical review committee, we selected eighty- two patients of surgical site infection of both genders. Patients' consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Risk factors of surgical site infections such as length of hospital stay, duration of surgery (in hours), type of procedure, wound classification, American Society of Anesthesiologists physical status score was recorded. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table I: Patients distribution

Total- 82		
Gender	**Males**	**Females**
Number (%)	38 (46.3%)	44 (53.7%)

Out of 82 patients, males were 38 (46.3%) and females were 44 (53.7%) (Table I).

Table II: Assessment of risk factors

Parameters	Variables	Number	P value
ASA grade	I	1	0.05
	II	5	
	III	30	
	IV- VI	46	
Age	<50 years	24	0.02
	>50 years	58	
type of procedure	Emergency	52	0.05
	Elective	30	
Duration of surgery (in hours)	<1 hour	22	0.001
	>1 hour	60	
length of hospital stay	<24 hours	18	0.001
	>24 hours	64	
Wound type	Clean	0	0.05
	Clean- contaminated	10	
	contaminated	22	
	Dirty	40	

ASA grade I was seen in 1, grade II in 5, grade III in 30 and grade IV- VI in 46 patients. Age <50 years had 24 and >50 years had 58. Type of procedure was emergency in 52 and elective in 30. Duration of surgery was <1 hour in 22 and >1 hour in 60 cases. Length of hospital stay was <24 hours in 18 and >24 hours in 64. Wound type was clean- contaminated in 10, contaminated in 22 and dirty in 38 cases. The difference was significant (P< 0.05) (Table II).

DISCUSSION

Healthcare-Associated Infections (HAIs) is a subject of great concern of the healthcare services.[7,8] Among the topographies of the HAIs, Surgical Site Infection (SSI) is directly related to surgical procedures, and is currently one of the most important among the HAIs. SSI leads to serious consequences, including increased costs due to its treatment and increased length of hospital stay.[9,10] The risk of death in patients with SSI is increased when compared to those who did not develop an infection. American Society of Anesthesiologists (ASA) index, which classifies patients according to their clinical condition, the wound class, which represents the classification of the surgical wound by the surgical team in terms of the potential presence of microorganisms and the duration of surgery are other factors.[11,12] We performed this study to assess clinico- pathological profile of surgical site infection after general surgery operations.

Our results showed that out of 82 patients, males were 38 (46.3%) and females were 44 (53.7%). Ansari et al[13] in their study the incidence of SSI and

predisposing risk factors were noted. The incidence of SSI was 8.84% (n=78). SSIs were more common in older participants (11.4% vs. 6.4%; p=0.009), in patients with more than 24 hour of preoperative hospital stay (11.2% vs. 64%; p=0.013), in procedures of longer duration (1.53 ± 0.35 vs 2.57 ± 0.17; p<0.0001), and in emergency surgeries (19.2% vs. 7.5%; p=0.0001). The combined incidence of SSIs in American Society of Anesthesiologists (ASA) index III and above was 37 (47.4%) and that in I and II was 41 (52.6%) (p<0.00001).

ASA grade I was seen in 1, grade II in 5, grade III in 30 and grade IV- VI in 46 patients. Age <50 years had 24 and >50 years had 58. Type of procedure was emergency in 52 and elective in 30. Duration of surgery was <1 hour in 22 and >1 hour in 60 cases. Length of hospital stay was <24 hours in 18 and >24 hours in 64. Wound type was clean-contaminated in 10, contaminated in 22 and dirty in 38 cases. Carvalho et al[14] estimated the incidence of surgical site infection in general surgeries. 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. Staphyloccocus aureus and Escherichia coli were identified.

Satyanarayana et al[15]determined the incidence of SSI in the abdominal surgeries and to identify risk factors associated with the development of SSI. All surgeries (1000 cases) where abdominal wall was opened were considered for the study. The overall surgical wound infection rate was 13.7%. The infection rate was more with emergency surgery (25.2%) when compared to elective surgery (7.6%). The surgical site infection rate increased as the risk index score increased from 0 to 3. SSI was more with early operative and post operative prophylaxis. There was definite correlation between the wound infection rate and the timing of prophylaxis.

Cheng et al[16] have proposed the following reasons: prolonged operative duration renders the incision to be exposed to the environment for a longer time. A prolonged procedure duration also predisposes incisions to tissue desiccation. As the surgery progresses, the tissue concentration of prophylactic antibiotics also decreases and may eventually become inadequate unless the dose is repeated. All these factors increase the risk of surgical site infection. Kaye et al[17]identified risk factors for surgical site infection (SSI) in older. Five hundred sixty-nine SSI cases were identified, and 589 uninfected controls were selected. In multivariate analysis, independent predictors of SSI included obesity (odds ratio (OR)=1.77, 95% confidence interval (CI)=1.34-2.32), chronic obstructive pulmonary disease (COPD) (OR=1.66, 95% CI=1.17-2.34), and a wound class classified as contaminated or dirty (OR=1.65, 95% CI=1.01-2.72). Having private insurance was associated with lower risk (OR=0.29, 95% CI=0.12-0.68).

CONCLUSION

Common risk factors for SSI was age >50 years, duration of surgery >1 hour, length of hospital stay >24 hours, dirty wound, emergency surgery and ASA grade IV- VI.

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