A STUDY OF SURGICAL SITE INFECTION AFTER GASTROINTESTINAL SURGERY

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Abstract

Background: Surgical site infection (SSI) is one of the most common complications of abdominal surgery. The goal of this study was to evaluate the surgical site infection in patients undergoing gastrointestinal surgery.

Methods: This prospective study was conducted on 100 patients of all age group and both sexes undergoing gastrointestinal surgery were analysed for surgical site infection.

Result: 42 (21.00%) developed SSI post operatively, 13 patients developed SSI in the period of 3–4 days postoperatively, 21 patients developed the infection in the period of 5–6 days postoperatively, and 8 developed the infection one week after the operation. Most of SSI cases (95.24%) were detected during hospital stay periods and the remaining cases were detected in the post-discharge follow-ups. Superficial SSI was the most common type of SSIs (92.86%).

Conclusion: The results showed a high prevalence of SSI among patients attending the gastrointestinal tract surgical unit and it was associated with the malignant diseases, intraoperative blood loss, intra-operative hypotension, presence of surgical drains, and long operative duration.

Keywords: Infection, Gastrointestinal, Surgery

Introduction

A surgical site infection (SSI) is a serious and costly complication resulting in prolonged hospital stay, increased antibiotic use, increased morbidity, and even mortality. SSIs affect up to 5% of surgical patients, with the highest rates being reported after gastrointestinal surgery. The negative effect that SSI has on patient safety depends partly on whether the infection is superficial or deep or whether it concerns organ or space, i.e. any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure. Since the risk of an SSI is amongst others associated with the degree of intrinsic microbial contamination of the surgical wound, wounds are classified into four wound classes.¹

Although there are global variations around the definition of an SSI, the European Commission classified SSIs into superficial incisional surgical site infection, deep incisional surgical site infection, or surgical site infection - organ/space, and the diagnostic criteria include the presence of one of the signs of infection (tenderness, swelling, reddening, and elevated skin temperature), purulent discharge from the incision site, and positive result of microbiological examination of material collected or after the surgical opening of the incision site.²

While the causes of SSIs are multi-factorial, recognized risk factors include the length of hospital stay, obesity, patient co-morbidities, duration and complexity of the surgery, and higher wound contamination classification. The Centers for

Disease Control and Prevention (CDC), classified wounds by their level of contamination as Clean: which are non infective operative wounds in which no inflammation is encountered, with no involvement of respiratory, gastrointestinal, genitourinary tract, and oropharyngeal cavity; Clean-contaminated: operative wounds in which either the respiratory, gastrointestinal or the genitourinary tract is entered under controlled conditions and with the only minor contamination, as resulted from operations involving the biliary tract, appendix, and oropharynx, provided no evidence of infection or a major break in sterile technique is encountered; Contaminated: fresh, accidental wounds, resulting from operations with major breaks in sterile technique or gross spillage from the gastrointestinal tract, and incisions in which acute, non purulent (free from pus) inflammation is encountered; and Dirty : old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera.³⁻⁴

Material and Methods

This prospective study was conducted in the Department of gastro- Surgery, Geetanjali Medical College & Hospital, Udaipur, Rajasthan. 100 patients of all age group and both sexes undergoing gastro-intestinal surgery were analysed for any operative and post-operative infection with 3 months follow up from date of operation.

Data Analysis:

Data was recorded as per Performa. The data analysis was computer based; SPSS-22 was used for analysis. For categoric variables chi-square test was used. For continuous

variables independent samples's *t*-test was used. *p*-value <0.05 was considered as significant.

Observations

In total, 200 patients were enrolled in the study, 114 females (57.00%) and 86 males (43.00%) with a mean age of 44.23 ±9.63 years.

Table 1: Features of patients with SSI

Variable		No of cases	Percentage
Type of SSI	Superficial	39	92.86
	Deep	2	4.76
	Organ	1	2.38
Timing of SSI relative to procedure	Day 3-4	13	30.95
	Day 5-6	21	50.00
	One week and after	8	19.05
When was SSI detected	During hospital	40	95.24
	After discharge	2	4.76

42 (21.00%) developed SSI post operatively, 13 patients developed SSI in the period of 3–4 days postoperatively, 21 patients developed the infection in the period of 5–6 days postoperatively, and 8 developed the infection one week after the operation. Most of SSI cases (95.24%) were detected during hospital stay periods and the remaining cases were detected in the post-discharge follow-ups. Superficial SSI was the most common type of SSIs (92.86%).

Table 2: Risk factors associated with developing an SSI

Variable	SSI present	SSI absent	p-value
Age in yrs	45.24±6.85	42.36±7.24	>0.05
Sex (M:F)	12:30	74:84	>0.05
BMI	23.26±2.61	22.46±1.84	>0.05
Diabetic	6(14.28%)	11(6.96%)	0.02
Intra-operative hypotension	14(33.33)	3(1.89%)	0.001
Duration of surgery more than 3 hours	10(23.80%)	11(6.96%)	0.001
Blood loss more than 500 ml	11(26.19%)	18(11.39%)	0.01
Malignant	8(19.05%)	14(8.86%)	0.01

Age, sex and BMI association with SSI was found statistically In significant.

Discussion

Reducing the risk of SSIs is dependent on identifying the risk factors as well as developing the needed measures for prevention and management.⁵ An artificial neural network analysis for prediction of SSIs showed that the interaction between the risk factors is complex and depicted that some factors, such as preoperative white blood cell count and wound classification, could be more important than other variables.⁶

The results of this study showed that 21.00% of the patients had SSI. Several risk factors were found to be significantly associated with the development of SSI including. Majority of the patients had superficial wound infections, which were discovered mostly during post-operative hospital stay with

drainage from the wound site 5–6 days post operatively. Those patients with SSIs were handled according to the standard guidelines and wound dressing twice per day was offered for patients with SSI.

The higher risk of acquiring SSI among patients with malignant diseases compared to patients with benign diseases is reasonable since malignancy is associated with weak immune system and vulnerability to various infections, and it is consistent with studies reported that SSI was observed in 30–60% of patients after colorectal cancer surgeries⁷. According to the standard guidelines, antibiotics prophylaxis should be given 60 minutes before the incision in most of types of antibiotics and doubling of the dose should be considered when the duration of operation exceeds 4 hours⁸⁻¹⁰

Conclusion

The results showed a high prevalence of SSI among patients attending the gastrointestinal tract surgical unit and it was associated with the malignant diseases, intraoperative blood loss, intra-operative hypotension, presence of surgical drains, and long operative duration.

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