VOLUME-9, ISSUE-5, MAY -2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

General Surgery

STUDY OF SURGICAL SITE INFECTIONS IN ELECTIVE LAPAROTOMIES-AN EXPERIENCE IN A TERTIARY CARE CENTRE

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ABSTRACT

Background: Post-operative surgical site infection is one of the common complications after laparotomy. The need for this study is to study the risk factors of surgical site infections in elective laparotomies, so that their incidence can be reduced in the future.

Materials And Methods: This is an Observational, prospective, institution based study. All patients undergoing various open abdominal surgical procedures from August 2018 to August 2019 in Department of General Surgery, RAJENDRA INSTITUTE OF MEDICAL SCIENCES, Ranchi were included in the study.

Results: The incidence of SSI was more in clean contaminated than clean cases(32% vs 12.34%), more days of pre-operative hospital stay than less days of pre-op hospital stay(24% vs 9.3%) , improper or no pre-op antibiotic prophylaxis than properly timed pre-op antibiotic prophylaxis(30% vs 10.46%).

Conclusion: High rate of SSI was attributed for various reasons such as increased pre-operative hospital stay, poor personal hygiene of the patient, poor bowel preparation in cases of colorectal and small bowel surgeries, increasing age of the patient and improper timing of pre-operative antibiotic administration.

KEYWORDS : Laparotomy, Infections, Abdominal operations

INTRODUCTION:

Post-operative surgical site infection is one of the common complications after laparotomy. Despite the introduction of less invasive procedures most common abdominal surgeries are performed as open surgeries. The sources of contamination are the microorganisms present in the patient's own skin, mucous membrane, inside the lumen of the viscera, or pathogens acquired from exogenous sources as from health personnel, operating room environment, tools and instruments. The need for this study is to study the risk factors of surgical site infections in elective laparotomies, so that their incidence can be reduced in the future.

AIMS AND OBJECTIVES:

The aim of this study is to study the incidence and various risk factors associated with surgical site infections, so that they can be prevented in the future.

MATERIALS AND METHODS:

This is a Observational, prospective, institution based study done in the department of general surgery, Rajendra Institute of Medical Sciences, Ranchi. All patients undergoing various open abdominal surgical procedures from August 2018 to August 2019 in Department of General Surgery, RAJENDRA INSTITUTE OF MEDICAL SCIENCES, Ranchi were included in the study. A series of 126 patients belonging to age group [10-90] who underwent elective laparotomy from different surgical units were included in the study. The CDC criteria was used for defining the type of surgical wound into class I (clean), class II (clean contaminated), class III (contaminated) and class IV (dirty wounds)Clinically patients are identified as having surgical site infections which was further confirmed by bacteriological examination. The SSI was further classified as Superficial Incisional SSI, Deep Incisional SSI and organ space SSI based of the CDC NNIS system.

RESULTS:

Out of 126 patients 21 patients (16.66%) suffered from surgical site infections of which 12 were males (9.52%) and 9 were females (7.14%). According to the age distribution, the SSI were more common in the patients of age 60-70 years followed by 50-60years followed by 40-50years.This shows that the rate of SSI increases with increasing age.

Table 1. The distribution of the patients suffering from surgical site infections according to age group.

AGE GROUP	TOTAL CASES	TOTAL CASES INFECTED	PERCENTAGE
10-20	9	1	11.11%
20-30	20	2	10%
30-40	28	4	14.28%
40-50	30	6	20%
50-60	14	3	21.42%
60-70	16	4	25%
70-80	6	1	16.66%
80-90	3	0	0
TOTAL	**126**	**21**	

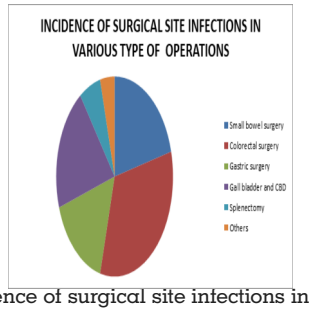

Chart 1. Incidence of surgical site infections in various types of abdominal surgeries.

The incidence of SSI was maximum in colorectal surgeries(33%) followed by small bowel surgeries(21%), surgeries involving gall bladder and CBD(20%), gastric surgeries(1.6%) followed by surgeries done for other diseases.(Chart 1)

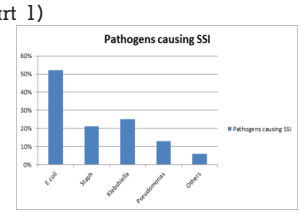

Chart 2. Percentage of each organisms cultured from SSI of 21 patients.

E.coli was the main pathogen isolated in the microbiological culture of the swab from surgical site infections followed by Klebshiella (in 25%) cases, staphylococcus sp.(in 21% cases), Pseudomonas (in 13 % cases) and other minor pathogens in 6% of cases. The reason may be attributed to that the majority of SSI were clean contaminated wounds occurring after bowel surgeries. Pre-operative hospital stay was a main factor which determined the occurrence if SSI. The rate of SSI increased proportionally with increasing pre-hospital stay of the patient. When the patients were divided into two groups as stayed in the hospital in the pre-op period for <3days and >3days, the former group showed an incidence of SSI (23%) which was much lower than the patients in the latter group (77%). This difference was statistically significant.

Antibiotics administered pre-operatively were effective in preventing the SSI. Among the total 126 patients, 86 patients received pre-operative antibiotic prophylaxis at the time of skin incision but the remaining 40 patients either did not receive pre-op prophylaxis or received the antibiotics in the ward before being shifted to the operation theatres. 9 patients (10.46%) of the former group and 12 patients (30%) of the latter group got infected.

DISCUSSION:

Overall SSI rate in this study was 23.80% in various abdominal surgeries.

Ketcham et al in the year 1962 studied the SSI rate in carcinoma patients who underwent laparotomy and found the SSI rate to be 14% and attributed this rate to the weak defense mechanisms in carcinoma patients.(1)

In India, different studies conducted at different places and times showed SSI rate to vary from 6.09 to 38.7 percent. (2,3,4)

Increased post-operative wound infection with increasing age has been reported by various health workers. The high rate of infection in older age may be due to poor antibody production with advancement of age as noted by Baumgartner (1934).(5)

Committee on wound infection in USA (1964) attributed this rise in post-operative wound infection to decline of cellular and humoral factors.

Duration of pre-operatic hospital stay also influenced the occurrence of SSI. Anvikar et al found that pre-operative hospital stay increased the risk of acquiring SSI by 1.76 percent which increases proportionally with the number of days of stay. The risk increased to 5 percent with pre-operative stay of one week in the hospital.(3)

In various studies, the rate of SSI was more in emergency laparotomies compared to elective laparotomies (6-9)

In a study, SSI rate was 11.53 % in clean wounds, 23. 33 % in clean contaminated wounds, 38.09 % in contaminated wounds and 57.14 % in dirty wounds (6)

Preoperative antibiotic prophylaxis helps greatly in reducing the incidence of SSI. Antibiotics given simultaneously along with the bacterial challenge (start of surgery) were highly effective (10). On contrast, delayed administration of antibiotics is of less value.

Hnatko et al (11) reported post operate wound infection in gastrectomies (8.9 %) , nephrectomies (7.7 %), cholecystectomy and exploration of common bile duct (4%).

CONCLUSION:

A comprehensive study on surgical site infections was performed in 126 patients who were operated on for various conditions on elective basis. Clean contaminated cases were associated with higher infection rate than clean cases. Colorectal surgeries followed by small bowel surgeries showed high rate of SSI. High rate of SSI was attributed for various reasons such as increased pre-operative hospital stay, poor personal hygiene of the patient, poor bowel preparation in cases of colorectal and small bowel surgeries, increasing age of the patient and improper timing of pre-operative antibiotic administration.

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