Original Research Paper

Volume - 11 | Issue - 07 | July - 2021 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Surgery

"PREVALENCE OF RISK FACTORS FOR SURGICAL SITE INFECTION IN TERTIARY CARE CENTRE PATNA „

Dr. Abhay Kumar Senior Resident, Department of General surgery IGIMS Patna.

Dr. Kunal Kumar* Senior Resident, Department of General surgery IGIMS Patna. *Corresponding Author

ABSTRACT **Background:** The present study was aimed at obtaining the incidence of susrgical site infection and determining various risks the factors influencing the Surgical site infection (SSI) requires evidence of clinical signs and symptoms of infection rather than microbiological evidence alone. SSIs generally affect the superficial tissues, but some more serious infections affect the deeper tissues or other parts of the body manipulated during the surgical procedure.About 5% of patients posted for surgery develop surgical site infections (SSIs), which may cause much morbidity and may sometimes mortality. Treatment of SSIs imposes a substantial financial burden on the health care system. Patients who develop SSI are more likely to spend 60% more time in an Intensive care unit (ICU), they are 5 times as likely to be readmitted and their mortality rate is twice of non-infected patient. But to great surprise 40- 60% of these infections are preventable.

Material And Methods: A total of 500 patients who had undergone surgical procedure at the teaching hospitalwere studied prospectively. A total of 464(92.8%) elective surgical patients and 36(7.2%) emergency surgical patients were included in the study.Patient information gathered from the data chart, treatment chart and from ward rounds in the hospital. All patients were followed up from the time of admission until the time of discharge and 30 days postoperatively to inspect the incidence of SSI. Wound infection was diagnosed. SSI diagnosed was divided into three categories: Superficial incision SSI, Deep incision SSI and Organ/space SSI. SSI is considered if an infection occurred within 30 days after the operation, if no implant is left in place SSI was considered.

Conclusion: Risk index provide information about potential risk factors for development. higher incidence of SSI with increasing age of the patient.it was observed that to prevent SSI prophylactic antibiotics should be initiated within one hour before surgical incision.

KEYWORDS : SSI, Surgery, Superficial incision SSI, Risk factors

INTRODUCTION

Surgical site infections are commonest nosocomial infections after urinary tract infections (UTI), responsible for increasing cost substantial morbidity and occasional mortality,pathogens that cause ssi are acquired either endogenously from the patients own flora or exogenously fromcontact with operative room personnei or the environment. Skin is generally colonised by a wide range of microorganisms that could cause infection. Surgical site infection (SSI) requires evidence of clinical signs and symptoms of infection rather than microbiological evidence alone. SSIs generally affect the superficial tissues, but some more serious infections affect the deeper tissues or other parts of the body manipulated during the surgical procedure.operative procedure related risk factors, nature of surgery.

The majority of SSIs become evident within 30 days of an operative procedure and most often between the 5th and 10th postoperative days. If a prosthetic implant is used, SSIs of the deeper tissues may occur several months after the surgical procedure[i]. About 5% of patients posted for surgery develop surgical site infections (SSIs), which may cause much morbidity and may sometimes mortality. Treatment of SSIs imposes a substantial financial burden on the health care system[ii]. There are advances in infection control practices which includes improved operating room ventilation, sterilization methods, barriers, surgical techniques, and availability of antimicrobial prophylaxis[iii, iv]. Education regarding these prevention strategies of SSI must be interdisciplinary and is essential for the implementation and adoption into day to day practice.

For this guidance from physicians, nurses, and senior leadership is required to affect SSI rates positively. Senior leadership should also place emphasis on the value and benefits of SSI reduction, including the patient positive outcomes[v].

Despite these preventive measures, SSIs remain a substantial cause of morbidity and mortality among operated and hospitalized patients. This can be explained by the emergence of antimicrobial- resistant bugs and the increased numbers of surgical patients who are elderly and/or have a wide variety of chronic, debilitating, or immunocompromised or other underlying diseases. Also there is increased numbers of prosthetic implant and organ transplant operations performed in the surgery department[vi].

The incidence of SSI is a serious threat to the patient's health and life, and also imposes a substantial economic burden on the patient's family and society[vii]. Patients who develop SSI are more likely to spend 60% more time in an Intensive care unit (ICU), they are 5 times as likely to be readmitted and their mortality rate is twice of non-infected patient. But to great surprise 40-60% of these infections are preventable. The present study was carried out to study the prevalence of SSI in the Department of Surgery.

MATERIALAND METHODS

This study was carried out prospectively at the Department of Surgery at Indira Gandhi Institute of Medical Sciences Patna Bihar.

Study Population

A total of 500 patients who had undergone surgical procedure at the teaching hospital were studied prospectively. Patients admitted to the hospital for more than 1 day were included, while outpatients and those who had surgery elsewhere before referral to our hospital were excluded. A total of 464(92.8%) elective surgical patients and 36(7.2%) emergency surgical patients were included in the study.

The elective surgical procedures included hernioplasty, cholecystectomy, gastrectomy,mastectomy, resection anastomosis of bowel, hemorrhoidectomy, fistulectomy, parotidectomy and thyroidectomy. The commonly performed surgeries under emergency conditions were resection anastomosis of bowel and exploratory laparotomy.

Survey Method

Patient information gathered from the data chart, treatment chart and from ward rounds in the hospital. All patients were followed up from the time of admission until the time of discharge and 30 days postoperatively to inspect the incidence of SSI[ix]. Details that were recorded included the type of surgery by wound class, type and duration of operation, antimicrobial prophylaxis if given, drain used, preoperative and total hospital stay after surgical procedure.

Diagnostic Criteria

Wound infection was diagnosed if any of the following criteria were fulfilled:

- Serous or non-purulent discharge from the wound with signs of inflammation;
- Oedema, redness, warmth, raised local temperature, fever >38ºC, tenderness, induration;
- Serous or purulent wound deliberately opened up by the surgeon due to localized collection. Stitch abscesses were excluded from the study.

SSI diagnosed was divided into three categories[x]:

- Superficial incision SSI,
- Deep incision SSI and
- Organ/space SSI

SSI is considered if an infection occurred within 30 days after the operation, if no implant is left in place SSI was considered.

Statistical Analysis

All of the data were checked and analysed with Statistical Package for the Social Sciences version (SPSS) 19.0 software. Descriptive statistics, including count and percentage, were used to describe the demographic characteristics of the subjects.

RESULTS

In the present study 500 patients were included of which 464(92.8%) were elective surgical patients and 36(7.2%) were emergency surgical patients. Total SSI cases were 41 (8.2%) of which 29 (70.7%) were identified in elective surgery cases and 12 (29.3%) were observed in emergency surgery superficial incision SSI was most prevalent 25 (61%) followed by deep incisional SSI 11(26.8%) and then by organ/space SSI 5(12.2%).

Table 1: Types Of SSI

Types of SSI	Elective surgery		Emergency surgery	%	Total	%
Superficial	17	41.	8	19.	25	61.
incision SSI		5%		5%		0%
Deep	8	19.	3	7.3	11	26.
incisional		5%		%		8%
SSI						
Organ/spac	4	9.8	1	2.4	5	12.
e SSI		%		%		2%
Total	29	70.	12	29.	41	
		7%		3%		

Table 2: Baseline Characteristics Of The Patients

Parameters	Elective surgery	Emergency surgery
Age years (Mean± SD)	52.4±7.48	56.2± 6.78
Male (%)	296 (63.8%)	29 (80.6%)
Female (%)	168 (36.2%)	7 (19.4%)
BMI (Body mass index) (Mean± SD)	28.7 ±2.45	27.6 ± 2.89
Prophylactic antibiotics	404 (87.1%)	30 (83.3%)
SSI rate	29/464 (6.25%)	12/36 (33.33%)

Mean age in elective surgery group was 52.4±7.48 and in emergency surgery group was 56.2± 6.78. In elective surgery group there were 296 (63.8%) male and 168 (36.2%) female. In emergency group there were 29 (80.6%)male and 7 (19.4%)female. Prophylactic antibiotics were given to 404 (87.1%) in elective surgery group and 30 (83.3%) in emergency surgery group. SSI rate observed in elective surgery group was 29/464 (6.25%) while in emergency surgery group was 12/36 (33.33%).BMI (Body mass index)in elective surgery group was 28.7 ±2.45and in emergency surgery group was 27.6 ± 2.89.

Table 3: Comparison Of Various Risk Factors For SSI.

Variable	No of SSI	P value
Age		
<60 years	16/231 (7.4%)	P = 0.2736
>60 years	25/269 (10.2%)	
Diabetes		
Yes	31/156 (19.9%)	P < 0.0001
No	10/344 (2.9%)	
Total hospital stay		
< 5 days	18/289 (6.2%)	P = 0.0585
> 5 days	23/211 (10.9%)	
Antibiotic prophylaxis given		
Yes	27/198 (13.6%)	P = 0.0003
No	14/302 (4.6%)	

DISCUSSION

SSIs are the second most common type of adverse events occurring in hospitalized patients after surgery and are one of the most common surgical complications[xi].The incidence of SSI differs widely from hospital to hospital and from one geographic location to anothe[i].Total SSI cases were 41 (8.2%) in our study. In a study by Devjani de et al. SSI was identified in 121 (24.2%) out of 500 patients which was higher than our study.

In this study 29 (5.8%) SSI were identified in elective surgery cases and 12 (2.4%) were observed in emergency surgery superficial incision SSI was most prevalent 25 (61%) followed by deep incisional SSI 11(26.8%) and then by organ/space SSI 5(12.2%). In a study by et al showed the SSI rate of 12.5% for elective surgeries and 17.7% for emergency surgeries. Among the 3 types, superficial incision SSI was most prevalent (215 cases) followed by deep incisional SSI (169 cases) and finally by organ/space SSI (111 cases)[6]. The rate of SSI in elective surgery of this study was comparable to other studies done in developing countries[xiv].

The present study showed higher incidence of SSI with increasing age of the patient, SSI in patients less than 60 years was 16/231 (7.4%) as compared to >60 years age 25/269 (10.2%). Increased age is associated with various predisposing factors like diabetes, anemia, immunosupression which could be attributed to this trend of increasing incidence of SSI with increasing age[6]. In this study there was a significant correlation between existing diabetes and incidence if SSI. Similar results were observed in a study by Cheng K et al they also observed an association was found between the age of surgicalpatients and SSI, they suggested that patients aged over 75 years (5.6%) were more likely to develop SSI than those under the age of 75 years (3.0%). In the present study incidence of SSI was higher when antibiotic prophylaxis was not given. 27/198 (13.6%) when antibiotic prophylaxis and 14/302 (4.6%) without antibiotic prophylaxis. To prevent SSI use of prophylactic antibiotics should be initiatedwithin one hour before surgical incision. Prophylactic antibiotics should be discontinued within 24 hours of surgery completion.

The rate of ssi also varies from surgeon to surgeon the skil and experience of surgeon directly affects the degree of contamination of the surgical site through breaks in technique or inadvertent entry in to a viscous.These infections reduce patients' quality of life and account for 3.7 million excess hospital days and more than 1.6 billion dollars in excess costs annually in United State of America.

CONCLUSION

SSI is the index of the health care system. Present study showed higher incidence of SSI with increasing age of the patient.it was observed that to prevent SSI prophylactic antibiotics should be initiated within one hour before surgical incision.Proper assessment of risk factors that predispose to SSI and their modification may help in reduction of SSI rates.

REFERENCES

1. National Collaborating Centre for Women's and Children's Health (UK). Surgical Site Infection: Prevention and Treatment of Surgical Site Infection. London: RCOG Press; 2008 Oct. (NICE Clinical Guidelines, No. 74.) 3
2. Cheadle WG. Risk factors for surgical site infection. Surg Infect (Larchmt). 2006;7Suppl 1:S7-11.
3. Castro Pde T, Carvalho AL, Peres SV, Foschini MM, Passos AD. Surgical-site infection risk in oncologic digestive surgery.Braz J Infect Dis. 2011 Mar-Apr; 15(2):109-15.
4. Kim BD, Hsu WK, De Oliveira GS Jr, Saha S, Kim JY. Operative duration as an independent risk factor for postoperative complications in single-level lumbar fusion: an analysis of 4588 surgical cases.Spine (Phila Pa 1976). 2014 Mar 15; 39(6):510-20.
5. Anderson DJ, Podgorny K, Berríos-Torres SI, et al. Strategies to prevent surgical site infections in acute care hospitals: 2014 update. *Infect. Control Hosp Epidemiol.* 2014;35(6):605-27.
6. Kumar A, Rai A. Prevalence of surgical site infection in general surgery in a tertiary care centre in India. IntSurg J 2017;4:3101-6.
7. Boltz MM, Hollenbeak CS, Julian KG, Ortenzi G, Dillon PW. Hospital costs associated with surgical site infections in general and vascular surgery patients. Surgery. 2011 Nov; 150(5):934-42.
8. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection,1999. Hospital Infection Control Practices Advisory Committee. Infect Control HospEpidemiol. 1999;20(4):250.
9. Mawalla B, Mshana SE, Chalya PL, Imirzalioglu C, Mahalu W. Predictors of surgical site infections among patients undergoing major surgery at Bugando Medical Centre in Northwestern Tanzania.BMC Surg. 2011 Aug 31; 11():21.
10. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol. 1992;13(10):606-8.
11. Maier S, Körner P, Diedrich S, Kramer A, Heidecke CD.Definition and management of wound infections. Chirurg. 2011 Mar; 82(3):235-41.
12. Duque-Estrada EO, Duarte MR, Rodrigues DM, Raphael MD. Wound infections in pediatric surgery: a study of 575 patients in a university hospital.PediatrSurg Int. 2003 Aug; 19(6):436-8.
13. Devjani De, Saxena S, Mehta G, Yadav R, Dutta R. Risk factor analysis and microbial etiology of surgical site infections following lower segment caesarean section. InternationalJournalofAntibiotics. 2013;2013:283025.
14. Raka L, Krasniqi A, Hoxha F, Musa R, Mulliqi G, Krasniqi S, et al. Surgical site infections in an abdominal surgical ward at Kosovo Teaching Hospital. J Infect Dev Ctries. 2007;1(3):337-41
15. Cheng K, Li J, Kong Q, Wang C, Ye N, Xia G. Risk factors for surgical site infection in a teaching hospital: a prospective study of 1,138 patients. Patient Prefer Adherence. 2015;9:1171–1177.
16. Salkind AR, Rao KC. Antibiotic prophylaxis to prevent surgical site infections. Am FamPhy. 2011;83(5):585- 90.
17. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol. 1992;13(10):606-8.