



ORIGINAL RESEARCH PAPER

General Surgery

INCIDENCE AND RISK FACTORS OF ABDOMINAL SURGICAL SITE INFECTIONS AT NMCH SASARAM A RETROSPECTIVE STUDY

KEY WORDS: Abdominal surgical site infections; surgical site infections; risk factors for SSI.

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ABSTRACT

Introduction: Surgical site infections (SSI) remain a significant problem following an operation and the third most frequently reported nosocomial infections.

Objective: The current study was undertaken to identify incidence of SSI and the risk factors associated with it.

Material and Methods: The retrospective study was carried out on 200 surgeries.

Results and Conclusions: The overall infection rate was 15%. The SSI rate was 0% in clean surgeries, 9% in clean contaminated ones, 25% in contaminated ones and 53% in dirty surgeries. Female patients were affected more (25%) than the male patients (12.5%). The SSI rate increased with increasing age and it also increased significantly with the increasing duration of pre-operative hospitalization. The SSI rate was less in patients who received preoperative antibiotic prophylaxis. The SSI rate was significantly higher in emergency surgeries as compared to the elective surgeries. The infection rate was significantly higher as the duration of the surgery increased.

INTRODUCTION

Surgical site infections are those which occur as a result of a surgical procedure or those that require surgical interventions as a part of their treatment. These are characterized by a breach of mechanical or anatomical defense barriers. Mostly are associated with greater morbidity, significant mortality, and increased cost of care. Surgical site infections (SSI) remains to be one of the most frequent infectious complications following abdominal surgery.

Surgical site infections is defined as a wound infection that occurs within 30 days of an operative procedure or within a year if an implant is left in place and the infection is thought to be secondary to surgery.¹

The rates of SSI are much higher with abdominal surgery than with any other types of surgery, with several prospective studies indicating an incidence of 15-25% depending on the level of contamination.²⁻⁵

Numerous risk factors may contribute to development of SSI, but the most important and recognized factors as proposed by Centres for Disease Control and Prevention and National Nosocomial Infectious Surveillance System SSI risk index includes wound classification, American Society of Anaesthesiology (ASA) score and duration of the operation.

METHODOLOGY

(a) STUDY AREA:- Narayan Medical College and Hospital, Jamuhar, Sasaram

(b) STUDY POPULATION: Patients admitted in emergency and elective surgical wards of NMCH, Jamuhar

(c) STUDY PERIOD: 1 year duration, from 1st January 2019 to 31st December 2019

(d) SAMPLE SIZE : 200

(e) INCLUSION CRITERIA:

1. Patients undergoing abdominal surgeries either emergency or elective in NMCH, Jamuhar.

(f) EXCLUSION CRITERIA:

1. Patients of previous abdominal surgery.
2. Wound site previously affected.
3. Stich abscess cases.
4. Laproscopic abdominal surgery.

(g) STUDY DESIGN: Observational study

(h) SAMPLING TECHNIQUE: The medical charts of patient who are found to be eligible for the study will be reviewed and the data will be extracted using a data gathering form.

(i) TYPE OF INTERVENTION: Surgical

(j) METHOD OF FOLLOW UP: Post operative care and monitoring

(k) STATISTICAL ANALYSIS: All Data will be expressed as mean +/- SD for continuously distributed variables and in absolute numbers and percentages for the discrete variables.

ANY INTERVENTION TO BE CONDUCTED ON PATIENT: Yes

An elaborate study of these cases with regard to date of admission, history, clinical features of wound infection, type of surgery, emergency or elective, preoperative preparation and postoperative management is done till patient is discharged from hospital, and then followed up the patient on OPD basis for any signs of wound infection.

In history, presenting complaints, duration, associated diseases, coexistent infections at a remote body site, personal history including diet, smoking, and alcoholism were noted. Preoperative findings which include preoperative bath, skin preparation, type and time of preparation, preoperative antibiotics use were noted.

Operative findings noted which includes, type of incision, wound contamination, drain used and its type, and duration of operation.

Postoperative findings which included, day of wound infection, day of 1st dressing and frequency of change of dressing. Findings on the day of diagnosis of wound infection were noted which included fever, erythema, discharge type and its colour.

OBSERVATIONS

This study included 200 abdominal surgical patients, out of which 35 were infected. So the overall incidence of SSI is 15%.

Table 1: Incidence Of Abdominal Surgical Site Infection

TOTAL NO.OF PATIENTS	NO.OF CASES INFECTED	PERCENTAGE
200	30	15%

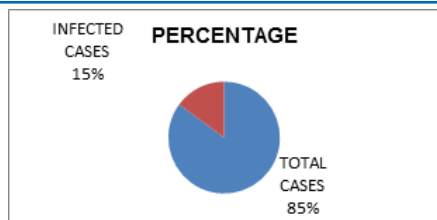


Table 2: Incidence In Relation To Sex

SEX	NO.OF CASES	INFECTED	PERCENTAGE
Males	150	18	12%
Females	50	12	24%

GRAPH PRESENTATION-

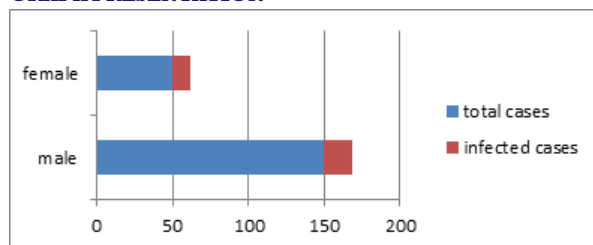


Table 3: INCIDENCE IN RELATION TO AGE GROUP

AGE GROUP	TOTAL CASES	INFECTED CASES	PERCENTAGE
0-10	22	2	9%
11-20	4	0	0
21-30	28	2	7%
31-40	34	10	29.4%
41-50	50	0	0
51-60	44	8	18%
61-70	14	6	43%
71-80	4	2	50%
Total	200	30	

Infection is more commonly seen among 61 to 70 year old patients with an incidence of 43% and also among 71 to 80 year age group and 31 to 40 years aged patients.

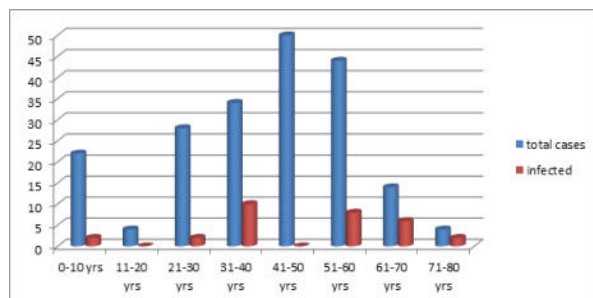


Table 4 – Incidence in relation to type of operation

TYPE OF OPERATION	TOTAL NO.OF CASES	INFECTED CASES	PERCENTAGE
EMERGENCY	50	23	46%
ELECTIVE	150	7	4.66%
Total	200	30	

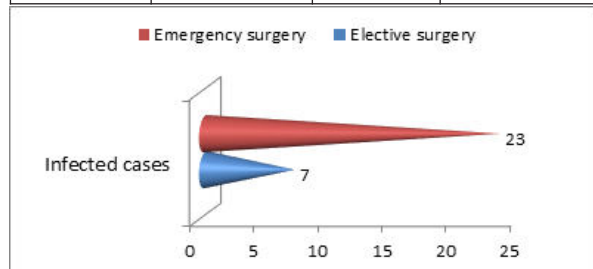
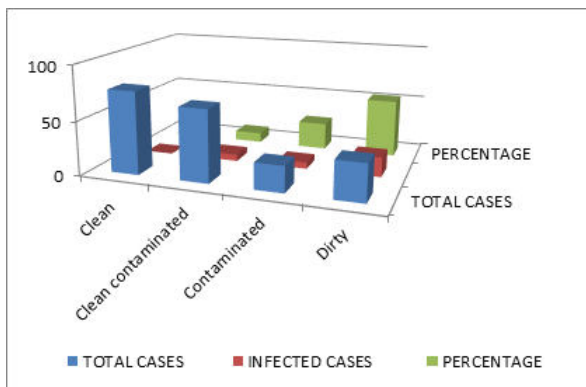


Table 5 : INCIDENCE IN RELATION TO TYPE OF SSI

TYPE OF SSI	TOTAL NO.OF CASES	INCIDENCE	PERCENTAGE
Clean	76	0	0
Clean contaminated	66	6	9%
Contaminated	24	6	25%
Dirty	34	18	53%
Total	200	30	



Out of 200 cases 38% were clean cases, 33% clean contaminated, 12% contaminated & 17% dirty cases. Among them clean cases had no infection, clean contaminated had incidence of 9%, contaminated cases had 25% & dirty cases had 53%. The overall incidence of infection was more in dirty cases.

RESULTS OF MY STUDY -

- Overall Incidence of abdominal SSI at NMCH, Sasaram is 15% .
- Out of 200 cases 38% were clean cases, 33% clean contaminated, 12% contaminated & 17% dirty cases. Among them clean cases had no infection, clean contaminated had incidence of 9%, contaminated cases had 25% & dirty cases had 53%.
- Majority patients of age group 41- 50 years which account for 25%.
- Longer duration of surgery, higher the infection rate.
- Use of drain increased infection rate.
- Use of cautery increased infection rate.
- Most cases had wound infection on 4th postoperative day.

DISCUSSION

The present study was conducted at NMCH, Jamuhar, in the Department of General Surgery. It was a retrospective study performed during the period of 1 year (2019) on a total of 200 cases who were operated for major abdominal surgery aiming to know the incidence and risk factors involved in the SSI. At NMCH, Jamuhar, Sasaram.

From January 2005 to December 2011, the International Nosocomial Infection Control Consortium (INICC) conducted a cohort prospective surveillance study on surgical site infections in 10 hospitals in 6 Indian cities. The results documented 1189 surgical site infections, associated with 28,340 surgical procedures (4.2%; 95% CI: 4.0-4.4).

Surgical site infections rates were compared with INICC and CDC National Healthcare Safety Network (CDC-NHSN) reports, respectively: 4.3% for coronary bypass with chest and donor incision (4.5% vs 2.9%); 8.3% for breast surgery (1.7% vs 2.3%); 6.5% for cardiac surgery (5.6% vs 1.3%); 6.0% for exploratory abdominal surgery (4.1% vs 2.0%), among others¹⁰. Prolonged preoperative hospital stay was found to be associated with higher rate of infection. Prolonged preoperative hospital stay leads to colonization with antimicrobial resistant micro organisms and itself

directly affects patient's susceptibility to infection either by lowering host resistance or by providing increased opportunity for ultimate bacterial colonization. Anvikar A.R.¹¹ and Lilani S.P.¹² also reported higher rate of SSI in patients with prolonged preoperative hospital stay. Study done by Lul Raka et al and M Florio et al also found E.coli as the most common organism associated with SSI.^{14,15}

INCIDENCE OF ABDOMINAL SSI –

The overall incidence of abdominal SSI in our study was 15%. The incidence rate in this study is well within the infection rates of 2.8% to 17% seen in other studies. Different studies from India at different places have shown the SSI rate to vary from 6.09% to 38.7%.⁶

A retrospective study was undertaken at the Department of General Surgery for a period of one year by A Kumar¹³. The rate of SSI was studied in relation to its type, the type of surgical procedure and elective vs emergency surgeries. The study revealed 12.5% prevalence of SSI in Department of General Surgery, RIMS. Among the 3 types, superficial incision SSI was most prevalent followed by deep incisional SSI and finally by organ/space SSI. The surgical procedure most commonly associated with SSI was exploratory laparotomy. An alarming 17.7% of SSI was associated with emergency surgeries as compared to 12.5% of elective surgeries.

The infection rate in Indian hospitals is much higher than that in other countries; for instance in the USA, it is 2.8% and it is 2-5% in European countries. The higher infection rate in Indian hospitals may be due to the poor set up of our hospitals and also due to the lack of attention towards the basic infection control measures.

SEX-

The rate of abdominal SSI was higher in females patients (24%) than the males (12%) in our study.

AGE-

The present study confirms the understanding that there is a gradual rise in Incidence of wound infection as age advances. The incidence showed a gradual rise from 7% in the 21-30 age groups to 43% in patients more than 60 years.

Likewise Cruse and Foord observed in their study that older patients are more likely to develop infection in Clean wounds than younger patient⁷.

The high incidence of 43% in patients above 60 years, in our study is perhaps due to decreased immune-competence and increased chances of co-morbid factors like Diabetes Mellitus, Hypertension, Chronic ailments like Asthma, Arthritis, and personal habits like Smoking and Alcoholism.

EMERGENCY/ ELECTIVE -

The SSI rate in elective surgeries was found to be 4.66%, which was found to increase to 46% in emergency cases. Our results are comparable well with the results obtained by other workers. Similar results were obtained in Mahesh C B et al⁶, 2010 for elective 7.61% and for emergency 21.05%. The high rates of infection in emergency surgeries can be attributed to inadequate pre operative preparation, the underlying conditions which predisposed to the emergency surgery and the more frequency of contaminated or dirty wounds in emergency surgeries.

TYPE OF SSI/ WOUND -

In our present study Out of 200 cases 38% were clean cases, 33% clean contaminated, 12% contaminated & 17% dirty cases. Among them clean cases had no infection, clean contaminated had incidence of 9%, contaminated cases had 25% & dirty cases had 53%. The overall incidence of infection was more in dirty cases. In a study done in 2005 by Seyd

Mansour Razavi⁸, at an Iranian hospital, they observed that out of the 802 participants in the study undergoing abdominal surgeries, they found clean wounds in 109 cases (13.6%), clean contaminated wounds in 214 cases (26.7%); contaminated wounds in 307 cases (45.8%); and dirty infected wounds in 112 cases (14%).

Mahesh C B et al⁶ in 2010 at bagalkot had SSI rate of 11.53% in clean surgeries, 23.33% in clean contaminated ones, 38.10% in contaminated ones and 57.14% in dirty surgeries.

The difference in the rates of SSIs between the clean and the clean contaminated wounds showed the effect of endogenous contamination and the difference in the rates of SSIs between the clean contaminated and the dirty wounds showed the effect of exogenous contamination. The endogenous or the exogenous contamination of the wounds by the organisms had a profound influence on the SSIs.

In a recent study done by M Siddique et al⁵ at a tertiary care hospital in April 2016, results showed a SSI rate of 11%. Risk factors associated with a higher incidence of SSI were found to be age (>55 years), diabetes mellitus (especially uncontrolled sugar in the perioperative period), immunocompromised patients (mainly HIV and immunosuppressive therapy patients), surgeon skill (higher in senior professors compared with junior residents), nature of the cases, (emergency surgeries), placement of drains, wound class (highest in dirty wounds), type of closure (multilayer closure), prolonged duration of hospital stay, longer duration of surgery (>2 hours), type of surgery (highest in cholecystectomy). The highest rates of causative organisms for SSIs found were Staphylococcus aureus, Escherichia coli and Klebsiella spp.

CONCLUSION

- Overall Incidence of abdominal SSI - 15%.
- Middle age group commonly involved.
- Emergency cases higher infection rate.
- Risk factors like anemia, diabetes, hypoproteinemia, RTI & UTI associated with increased wound infection rate.
- Pre operative antibiotic necessary in reducing SSI.

IMAGE GALLERY



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