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INCIDENCE OF SURGICAL SITE INFECTION IN ELECTIVE VERSUS EMERGENCY ABDOMINAL SURGERY IN VIMSAR, BURLA

General Surgery

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ABSTRACT

To evaluate the incidence of Surgical Site Infection (SSI) and to study various factors and organisms associated with SSI in both elective and emergency abdominal surgery.

Materials and methods This is a prospective study conducted in Department of General Surgery in VIMSAR, Burla. Two groups of patients having 60 patients each group were selected with in a time period of 24 months. All indoor patients who were operated by means of elective and emergency surgery in Department of General Surgery are included and patients having co morbid conditions and previous pre-existing infections or septic focus in abdomen were excluded. The surgical site was inspected daily for frank pus discharge, discharge of serosanguinous fluid, edema, local rise of temperature. Increased TLC count and body temperature was also monitored.

Results Incidence of Surgical Site Infection in elective abdominal surgery was found to be 6.6% whereas it is 30% in emergency abdominal surgery in our study. Total incidence of SSI is 18.3%.Commenest organism causing wound infection was staphylococcusaureus(40.9%) followed by Escherichia Coli(22.7%).

Conclusion Incidence of SSI is more in emergency abdominal surgery similar to other studies but need more attention to few predisposing factors for improvement.

KEYWORDS

SSI, elective surgery, emergency surgery

INTRODUCTION

Surgical site infection refers to an infection in the post operative period within 30 days of surgery involving the incision, deep space or organ accessed at the time of surgery. Surgical site infections (SSIs) are a costly and potentially preventable source of morbidity, representing the most common cause of hospital-acquired infection in the surgical population.[1]

According to centre for disease control(CDC) SSI are classified as:
(1)superficial incisional
(2)deep incisional
(3)organ or space SSI

Based on NNIS system reports, SSIs are the 3rd most frequently reported nosocomial infection, accounting for 14-16% of all nosocomial infections in hospitalised patients.[2] Retrospective data have indicated that antibiotics are not indicated for prophylaxis of open abdomen[3]. Host factors contribute importantly to the risk of surgical site infection includes Increased age[4] Obesity, Malnutrition, Diabetes mellitus.[5] Research has shown that surgical techniques,skin preparation, timing and method of wound closure are significant factors that influence the incidence of surgical site infection.

Objective:

Primary objective

To compare the incidence of SSI in elective and emergency abdominal surgeries

Secondary objectives

- To determine which organism is commonly associated with SSI in each case.
- to study various factors responsible for SSI/
- TO study the antibiotic sensitivity of various organisms in SSI.

METHODOLOGY:

This study was conducted in VSS Institute Of Medical Science and Research,Burla,Odisha,India during December 2018 to October 2020(24 months). All indoor patients who are operated by means of elective and emergency surgery in department of general surgery, VIMSAR, Burla were taken.60 patients in each group were taken for this study.

SAMPLE SIZE ESTIMATION

- Sample size is calculated based on data (prevalence for qualitative data and standard deviation, mean for quantitative data) from a published clinical trial done comparing the CSE and epidural block alone. The calculated sample size is 60 in each group with 80% power, and 5% level of significance.
- For qualitative data

Formula is sample size = $\frac{2(Z\alpha/2 + Z\beta)2\ P(1-P)}{(p1 - p2)} = 58$

p1 =prevalence in gr 1
p2 =prevalence in gr 2

INCLUSION CRITERIA:

1. Patients undergoing various abdominal surgeries in dept. of General Surgery, VIMSAR, Burla.
2. Patients having healthy skin at the incision line in pre operative period.

EXCLUSION CRITERIA:

1. Patients having diabetes, hypertension or other debilitating diseases.
2. Patients with established infection prior to surgery or septic focus in abdomen

RESULTS:

Total number of cases studied in the present study was 120.Incidence of SSI was 22(18.3%).SSI in clean wound is (13.8%) and in clean contaminated wound is (25%).The incidence rate of SSI in elective abdominal surgery is (6.6%) where as it is (30%) in emergency abdominal surgery.Incidence of SSI is more in geriatric age group (age>40years) i.e 19.6% and lowest in children(16.6%).similarly it is high in low socio economic status patients(20%) as compared to high socio economic status patients(15.5%).SSI is more in patients having low haemoglobin and low serum albumin.Patients having haemoglobin <8gm% is having SSI rate of 36.3% which is 11.5% in patients having haemoglobin >12gm%.patients having albumin level <3.5gm/dl are having SSI rate of 34.2% as compared to 11.7% patients having albumin level 3.5-5.5gm/dl.Staphylococcus aureus was found in 40.9% cases followed by E.Coli(22.7%).

Table - 1 Incidence Of Ssi In Relation To Total Case

TOTAL NO .OF CASE	NO.OF CASES INFECTED(SSI)	PERCENTAGE OF SSI
120	22	18.3

Table-2 Incidence Of Ssi In Relation To Type Of Wound

SL. NO	TYPE OF SURGICAL WOUND	NO.OF CASE OPERATED	NO OF SSI	PERCENTAGE OF SSI
1	Clean	72	10	13.8
2	Clean contaminated	48	12	25.0
	TOTAL	120	22	

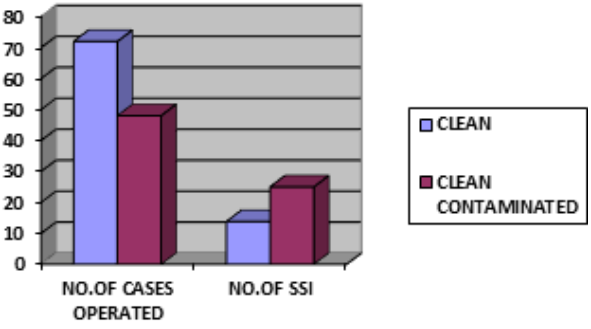


Table-3 Incidence Of Ssi In Relation To Emergency & Elective Abdominal Surgery Ssi

Sl.NO	TYPE OF SURGERY	NO.OF CASE	NO.OF SSI	PERCENTAGE OF
1	Elective	60	4	6.6
2	Emergency	60	18	30.0
	Total	120		

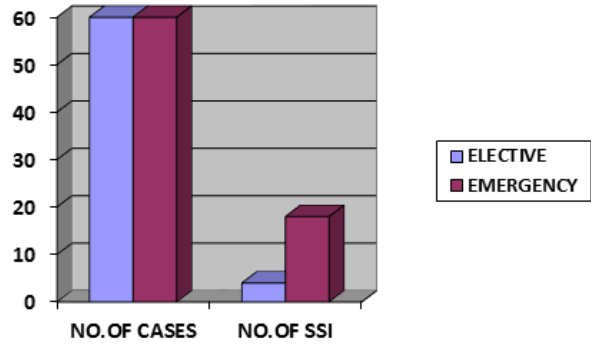


Table-4 Showing Incidence Of Ssi In Different Age Group

SL. NO.	AGE GROUP	NO.OF CASES	NO.OF SSI	PERCENTAGE
1	0-15 years	24	4	16.6
2	16-40 years	35	6	17.1
3	Above 40 years	61	12	19.6
	Total	120	22	

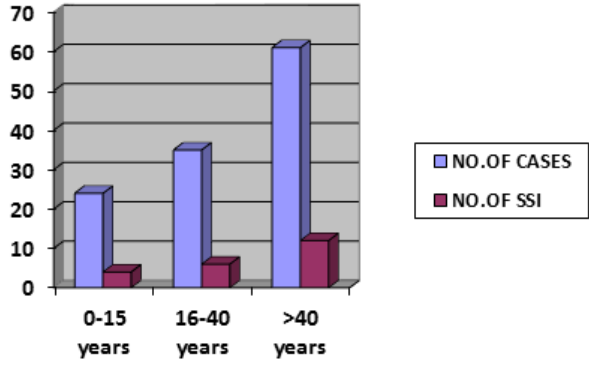


Table-5 Showing The Incidence Of Ssi According To Economical Status

ECONOMICAL STATUS	CASES OPERATED	SSI	PERCENTAGE
BPL	75	15	20.0
APL	45	7	15.5
TOTAL	120	22	

Table- 6 Showing Incidence Of Ssi In Relation To Patient's Hemoglobin Level

SL.NO.	Hb(gm%)	NO.OF CASES	No.OF SSI	PERCENTAGE
1	<8	22	8	36.3
2	8-12	72	11	15.2
3	>12	26	3	11.5
	Total	120	22	

Table- 8 shows that the incidence of SSI was more in the anaemic patients. Out of 22 cases with Hb < 8 gm % , 8 patients I.e 36.3 % has developed SSI.

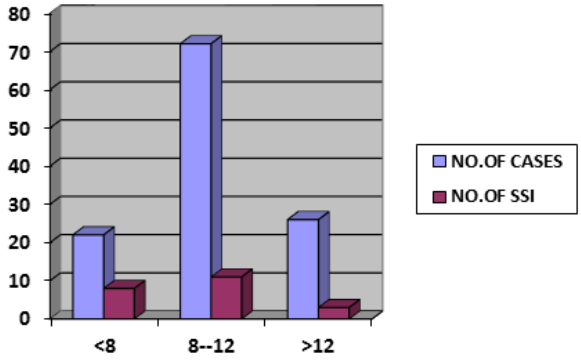


Table - 7 Showing Incidence Of Ssi In Relation To Serum Albumin Level

SL.NO.	SERUM.ALBUMIN (Gm/dl)	NO.OF CASES	NO.OF SSI	PERCENTAGE
1	3.5-5.5	85	10	11.7
2	<3.5	35	12	34.2
	Total	120	22	

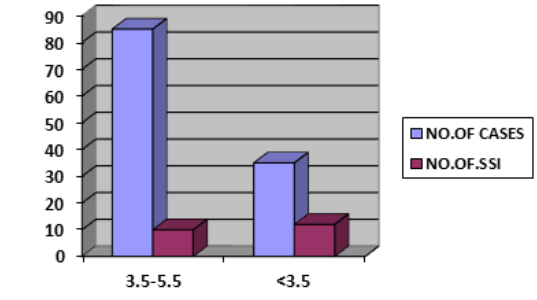


Table-8 Incidence Of Bacterial Flora From Pus Swab Of Ssi

ORGANISMS	NO.OF SSI	POSITIVE CASES	PERCENTAGE
Staph.aureus	22	9	40.9
E.coli	22	5	22.7
Klebsiella	22	4	18.1
Ps.aeruginosa	22	3	13.6

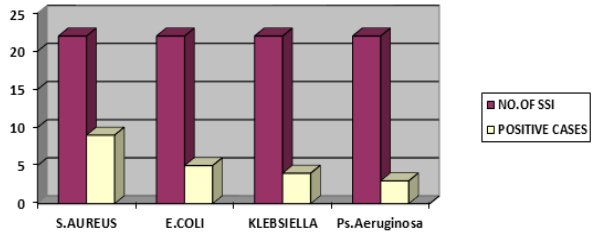
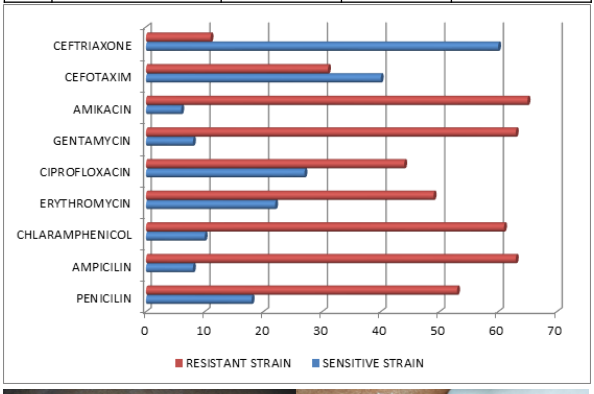


Table-9 Antibiogram Of Different Strain Of Staph.aureus

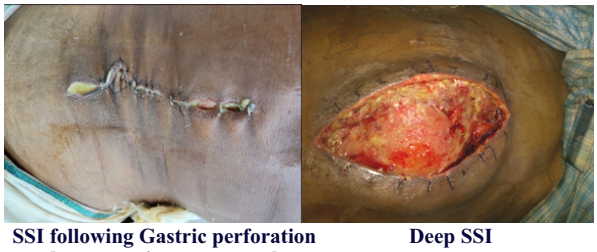
SL. NO.	DRUGS	SENSITIVE STRAINS	RESISTANT STRAINS	% SENSITIVE
1	Penicillin	19	59	24.35
2	Ampicillin	10	66	15.15

3	Chloramphenicol	12	64	15.78
4	Erythromycin	24	52	31.57
5	Ciprofloxacin	29	47	38.15
6	Gentamicin	8	68	10.52
7	Amikacin	11	65	14.47
9	Cefotaxime	42	34	55.26
8	Ceftriaxone	63	14	82.89



Superficial SSI following cholecystectomy

SSI following elective appendectomy



SSI following Gastric perforation due to carcinoma stomach

Deep SSI

In this study it was observed that the incidence of SSI Varied in relation to different age group. The incidence of SSI was highest in age group above 40 yrs (19.6 %) and lowest in age group between 0 to 15 years (16.6 %) (Vide table - 1) It was reported by Beitsch P. Et al[6] (1995) ,Claeson BE et al (1990)[9] ,Sharma et al (1986)[16], Daig M et al (1976). Cruse PJ et al(1973)[10][11] that extremes of age is a risk factor for influencing the incidence of SSI .Davidson[12], Smith and Snylie in their survey found that in otherwise healthy patients the most important factor to contributing to high incidence of SSI to be patient age more than 60 years. The finding of incidence of SSI in relation to age in this study corroborates with the findings of others .

The rate of SSI was found to be more (20.0%) in people living below poverty line (Table-2). It was 15.5% in persons living above poverty line. The incidence of SSI is more in people living below the poverty line was due to other associated factors like nutritional status, personal hygiene and metabolic state.

It was observed from the present study that the incidence of SSI was more in the anaemic patients and patients having low plasma protein level The incidence of SSI was 36.3% in patients having Hb less than 8 gm% as opposed to 11.5% in patients with Hb more than 12gm% . It was observed that the rate of SSI was found to be 34.2% in whom serum albumin was below standard as opposed to 11.7% in whom the level of serum albumin was within the standard limit .(Table 9) Ellis LM et al[13], Brown I.W. et al 1996)[7], Huss et al (1998) reported in their study that serum protein calorie malnutrition is crudely associated with most operative nosocomial infections. The incidences of SSI in relation to the nutritional status of the patients corroborates with the findings of others .

The pus culture from 22 cases of SSI showed that there were 9 strains of Staph.aureus (40.9 %). 5 strains of E. Coli (22.7 %) and 4 strains of Klebsiellla(18.1%) and 3 Ps. aeruginosa each (13.6%) In the present study, Staph. aureus was the main pathogenic organisms causing infection, followed by E.coli Similar observation was made by many others. NNIS system (CDC, 1996)[14] reported that Staph. aureus is the commonest organism associated with SSI (20%) followed by coagulase negative staphylococci (14%) and E. coli (12%). Ronald Lee Nicholas (2001)[15] in his study reported that in gastrointestinal surgery the polymicrobial aerobic and anaerobic flora closely resembling the normal endogenous micro flora of the surgically resected organ are most frequently found pathogens. Antibiotic sensitivity test carried out in the entire pathogenic organisms showed highest microbial activity with Ceftriaxone (82.89%) and cefotaxime (55.26 %) .Most of the organisms were resistant to Gentamycin (10.5%)

CONCLUSION:

To reduce the number of infection, the study of nasal flora of the patient is highly essential. Isolation and culture sensitivity of pathogenic organisms of nasal carrier may suggest the proper use of antibiotics in the post-operative period. As it is hardly possible to separate the sources of infection from carriers, they should be refrained from touching the wound and to observe maximum precaution to avoid droplet infection. Inspite of the use of the prophylactic antibiotics and maintaining the strict protocol of asepsis, SSIs are still a risk for many abdominal surgeries and represents burden of disease for both healthcare services and patients in terms of morbidity, mortality and economic cost. Although an SSI rate of zero may not be achievable, continued progress in understanding the biology of infection at surgical site and consistent application of proven methods of preventions will further reduce the frequency and morbidity associated with SSI Researchers have been shown that modified surgical technique skin preparation , timing and method of wound closure, enhanced oxygen delivery, better core body temperature control and rigorous blood glucose control are significant factors that can influence the incidence of SSI. In the era of accountability and rapid technical development, surgeons should consider all these risk factors before, during and after surgery to decrease SSI to minimun medicolegal issues.

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