

An Observational Study Of Incidence Of Surgical Site Infections In General Surgeries

Dr. Divyakant Harshukhbhai Barot

3rd Year Resident, Department Of Surgery, Gujarat Cancer Society Medical College, Hospital And Research Center, Ahmedabad

Dr. Navinchandra K. Vaghela

Associate Professor, Department Of Surgery, Gujarat Cancer Society Medical College, Hospital And Research Center, Ahmedabad

Dr. Shashank C. Desai

Hod & Professor, Department Of Surgery, Gujarat Cancer Society Medical College, Hospital And Research Center, Ahmedabad

Dr. Darshan Patel

Assistant Professor, Department Of Surgery, Gujarat Cancer Society Medical College, Hospital And Research Center, Ahmedabad

Abstract:

Objectives: This study analyzed the incidence of surgical site infections in general surgeries.

Method: The present study was conducted at General Surgery Department Gcs hospital, Ahmedabad. A observational study of 100 cases that have undergone abdominal surgery in GCS hospital and were followed up from the day of operation to 30 days after operation.

Results: Incidence of SSI: The overall infection rate for a total of the 100 cases was 12.00%. 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%.

Conclusion: Our study reveals that though SSIs have been widely studied since a long time, they still remain as one of the most important causes of morbidity and mortality in surgically treated patients.

Keywords: SSI: Surgical Site Infection

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I. Introduction

Criteria For Defining A Surgical Site Infection (Ssi)

Superficial Incisional SSI:

Infection occurs within 30 days after the operation and infection involves only skin or subcutaneous tissue of the incision and at of the following:

1. Purulent drainage, with or without laboratory confirmation, from the superficial incision.
2. Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
3. At least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness,
4. Diagnosis of superficial incisional SSI by the surgeon or attending physician.

Do not report the following conditions as SSI:

1. Stitch abscess (minimal inflammation and discharge confined to the points of suture penetration).
2. Infected burn wound.
3. Incisional SSI that extends into the fascia and muscle layers (see deep incisional SSI).

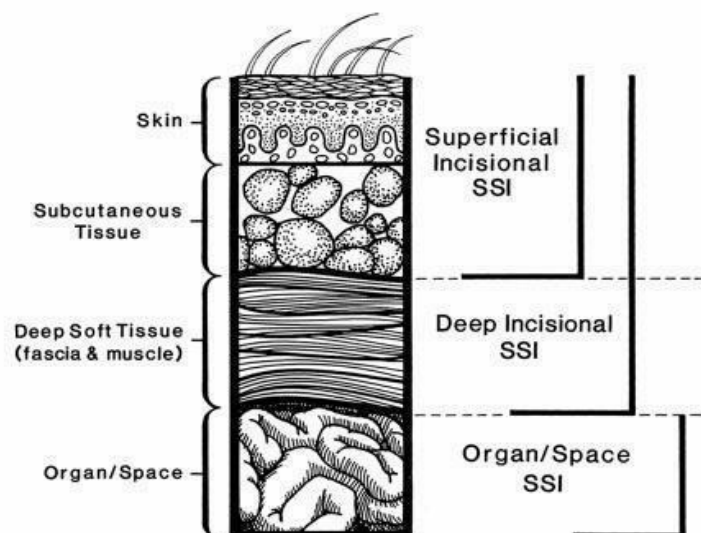
Deep Incisional SSI:

Infection occurs within 30 days after the operation if no implant is left in place or within 1 year if implant is in place and the infection appears to be related to the operation and infection involves deep soft tissues (e.g., fascia and muscle layers) of the incision and at least one of the following:

1. Purulent drainage from the deep incision but not from the organ/space component of the surgical site.
2. A deep incision spontaneously dehisces or is deliberately opened by a surgeon when the patient has at least one of the following signs or symptoms: fever ($>38^{\circ}\text{C}$), localized pain, or tenderness, unless site is culture-negative.
3. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
4. Diagnosis of a deep incisional SSI by a surgeon or attending physician.

Organ/Space SSI: Infection occurs within 30 days after the operation if no implant is left in place or within 1 year if implant is in place and the infection appears to be related to the operation and infection involves any part of the anatomy (e.g., organs or spaces), other than the incision, which was opened or manipulated during an operation and at least one of the following:

1. Purulent drainage from a drain that is placed through a stab wound into the organ/space.
2. Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space.
3. An abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
4. Diagnosis of an organ/space SSI by a surgeon or attending physician.



Surgical Wound Classification:

Class 1: Clean:

An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. *Operative incisional wounds that follow nonpenetrating (blunt) trauma* should be included in this category if they meet the criteria.

Class 2/Clean-Contaminated:

An operative wound in which the respiratory, alimentary, genital, or urinary tracts are entered *under controlled conditions* and without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.

Class 3/Contaminated:

Open fresh and accidental wounds. In addition, operations with *major breaks in sterile technique* (e.g., open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, nonpurulent inflammation is encountered are included in this category.

Class 4/Dirty-Infected:

Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

Research Questions:

- What are the factors associated with SSI in General surgeries?
- What is the prevalence of SSI in General surgeries?

Aims And Objectives:

- To access the prevalence of SSI in General surgeries
- Observation of factors associated with SSI in General surgeries

II. Methodology

Source Of Data:

- The material for the present study was obtained from patient's undergone General surgeries in Department of surgery ,Gujarat cancer society Medical College , hospital and Research center , Ahmedabad from 1st January 2024 to 30th june 2024
- Surgical site were considered to be infected according to the definition by NNIS.
- Patients who volunteered after thorough explanation about the merits and de merits of the procedure, 100 Patients were included in the Study Who Fulfill the Inclusion Criteria.

Inclusion Criteria:

- Age: < 60 years.
- Sex: Male and female.
- Patient undergoing exploratory laparotomy for peptic ulcer perforation (PUP), complicated acute appendicitis (appendicular perforation), small bowel obstruction (SBO) , traumatic and non-traumatic perforation of small and large bowel GI malignancy, penetrating abdominal injuries and other General surgeries.

Exclusion Criteria:

- Patient lost to follow up.
- Patients not giving consent to be part of the research.
- Patients who were unable to receive sensitive antibiotics.

Technique:

- An elaborate study of these cases with regard to date of admission, history, clinical features , 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 abdominal skin culture, nasal swab for culture for commensals, preoperative antibiotics use.
- Operative findings which include, 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 colour and the exudates was collected from the depth of the wound using sterile cotton swab and was sent to microbiology department for culture and sensitivity.

Procedure In Laboratory:

In the microbiology department, the swabs were inoculated onto blood agar plate, McConkey's agar plates and nutrient broth. Inoculated media were incubated aerobically at 37 0 C for 24-48 hrs



Infected Post Operative Wound

Infected Post Operative Wound with Pus Discharge



III. Results

Table No. 1: Sex Wise Distribution

In our study among 100 patients, 70 patients were males and 30 patients were females. Among them 9 male patients (12.85 %) and 3 female patients (10.00 %) are found to develop Surgical Site Infections who had undergone gastrointestinal surgeries.

Sex	Total patients	Infected patients	Percentage
Male	70	9	12.85 %
Female	30	3	10.00 %

In my study 70% cases were males and remaining were females.

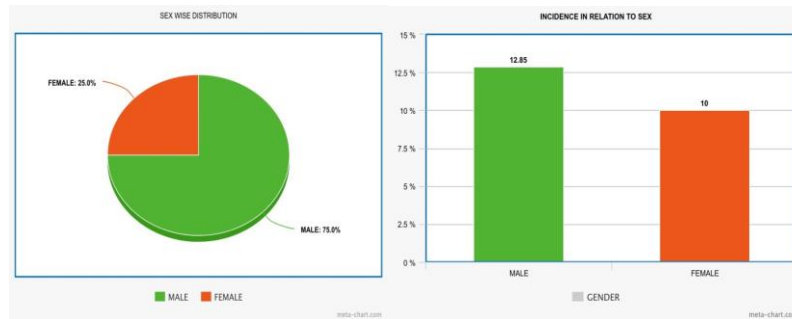


Table No.3: Duration Of Surgery

In our study 100 patients who underwent General surgeries among them 12 patients found to develop SSI. Incidence of SSI is high 16.67 % (5 out of 30 cases) in patients where total duration of surgery was more than two hours. However incidence of SSI appears to be relatively low (10.00 %) (7 out of 70 cases) in patients where surgery was lasted for less than 2 hours.

Duration Of Surgery	Total No Of Cases	Infected Cases	Percentage
Less Than 2 Hours	70	7	10.00 %
More Than 2 Hours	30	5	16.67 %

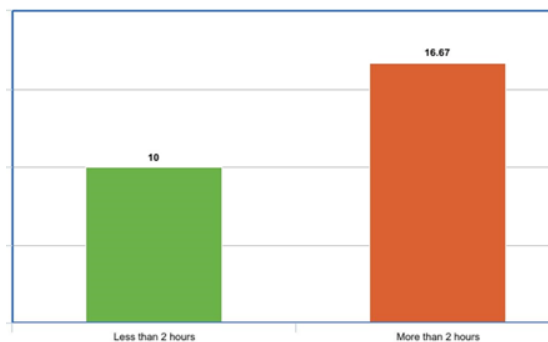


Table No.4: Plan Of Surgery

In our study among 100 patients, 68 patients were undergone elective surgery and 32 patients were undergone emergency surgeries. Among them 7 patients (21.85 %) who had undergone emergency surgeries and 05 patients (7.35%) who had undergone elective surgeries are found to develop Surgical Site Infections who had undergone general surgeries.

Plan Of Surgery	Total No Of Cases	Infected Cases	Percentage
Elective	68	05	7.35 %
Emergency	32	07	21.85 %

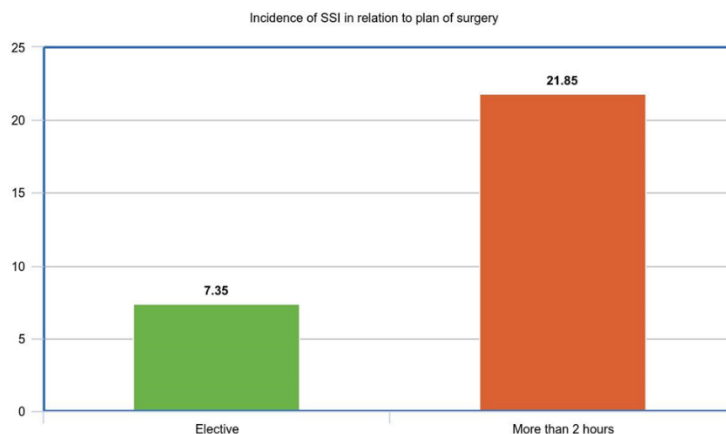


Table No.5: Causative Organism

In our study among 100 patients, 12 patients were found to develop Surgical Site infection, among them we further divided the causative organism causing SSI.

Name of the organism	No of cases	Percentage
Pseudomonas	5	41.67 %
Klebsiella	3	25.00%
E. coli	2	16.67 %
Streptococcus	01	8.33%
Acinetobacter	01	8.33%

In our study among 100 patients, 12 patients were found to develop Surgical Site Infection, among them we further divided the causative organism causing SSI.

In our observation Pseudomonas appears to be the most common (5 out of 12 cases) (41.67%) causative organism followed by Klebsiella (3 cases out of 12) (25. 00%), E coli (2 out of 12 cases)(16.67%) , Streptococcus (1 out of 12) (8.33%), Acinetobater (1 cases out of 12) (8.33%).

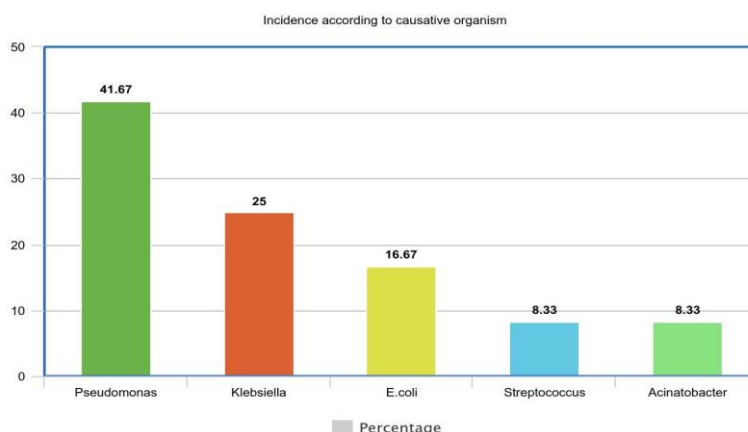
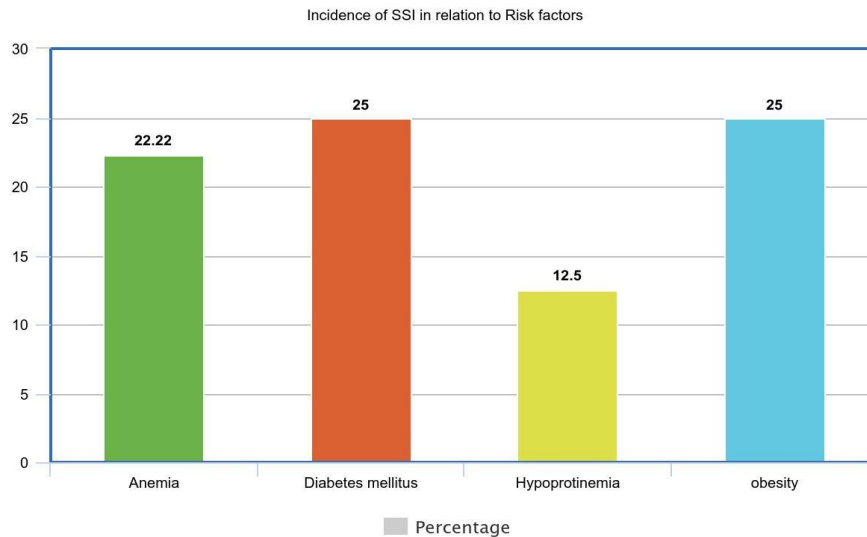


Table No.6: Risk Factors

In our study among 100 patients, 12 patients were found to develop Surgical Site Infections, among them the incidence of SSI increases as the patient's with various risk factors, who had undergone general surgeries.

Risk factor	Total cases	Infected cases	Percentage
Anemia	18	4	22.22 %
Diabetes mellitus	12	3	25.00 %
Hypoproteinemia	8	1	12.50 %
Obesity	16	4	25.00 %

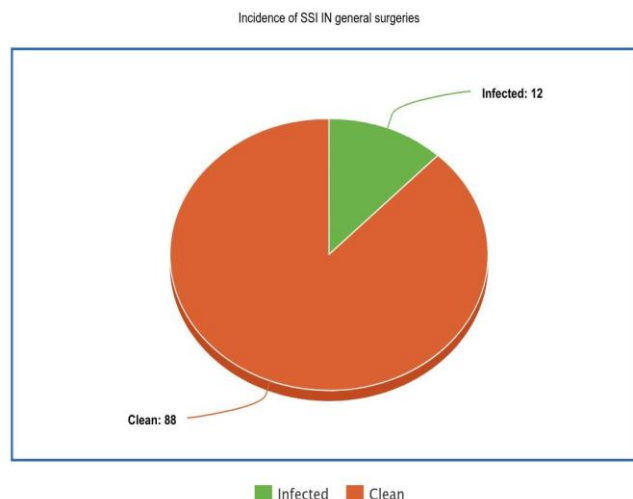


In our study among 12 infected patients, incidence of SSI appears to be increased in with risk actors as follows: Incidence is 22.22 % (4 out of 18) in patients with anemia, Incidence is 25.00 % (3 out of 12) in patients with Diabetes, Incidence is 12.50 % (1 out of 8) in patients with Hypoproteinemia and Incidence is 25.00 % (4 out of 16) in patients with anemia.

IV. Results

In our study among 100 patients, 12 patients were found to develop Surgical Site Infections who had undergone general surgeries.

TOTAL NO OF CASES	INFECTED CASES	PERCENTAGE
100	12	12.00 %



This study included 100 General surgical patients, out of which 12 were infected.
So the gross incidence is 12.00 %.

V. Discussion

The present study was conducted at General Surgery Department GCSMCH . This is a observational study of 100 cases that have undergone General surgery in GCS hospital and were followed up from the day of operation to 30 days after operation.

Incidence of abdominal SSI The overall infection rate for a total of the 100 cases was 12.00%.

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%¹²¹.

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 hospitals and also due to the lack of attention towards the basic infection control measures.

VI. Conclusion

- Incidence of surgical site infections is 12 %.
- Emergency cases has high infection rate.
- Risk factors like anemia, diabetes mellitus, hypoproteinemia, & obesity are associated with increased wound infection rate.
- Longer the duration of surgery, more is the wound infection rate.
- Pseudomonas being the most common organism isolated in the study.

The following methods are recommended for further reducing infection.

- Regular surveillance and feedback of results to surgeons, presumably influencing surgical technique.
- Reducing the pre-operative stay to minimum.
- Minimizing the length of operation.
- Avoiding wound drains. If this is not possible, using a closed drainage system and removal of drains as soon as possible.
- Ensuring that the patient is as fit as possible.
- Using a good surgical technique.
- Encouraging efforts in reducing the known risk factors to a bare minimum in elderly patients.
- Proper collection and transport of samples from the surgical site, immediately on suspicion of infection.
- Awaiting antibiotic sensitivity test results for appropriate antibiotic therapy, to avoid emergence of resistant strains.

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