

Experience with Surgical Site Infection and Its Prevalence at a University Hospital

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Abstract

Aim: To determine the factors, intensity, causative organism, of surgical site infection at a university hospital

Study Design: A cross-sectional study

Place and Duration: This Study was conducted at People's University of Medical and Health Sciences Nawabshah Pakistan from January 2019 and February 2020

Methodology: Overall, 120 patients were enrolled in this study. After the loss of 10 patients, 110 were examined statistically. A total of 62.25% of this population were male patients and the remaining 37.75% were female. All post-operative cases who acquired infection of the wound during their stay of one month in the hospital were included in this study. This study followed a pus culture protocol as well as a sensitivity report for each participant.

Results: A total of 112 patients suffered from surgical site infection (SSIs). All these patients had an average age of 32.0 +7 years. Laparotomy, Pyelolithotomy, prostatectomy, and appendectomy were shown to have the highest rates of Surgical Site Infection, considering 72% of all infections. The number of patients having several comorbidities was 45 (46.8%). Gram-positive organisms accounted for 66% of cases, whereas Gram-negative organisms accounted for 46% of cases.

Conclusion: Wound infection is greatly inclined by a pre-existing medical disease, lengthy operating duration, wound class, and wound contamination. The spread of resistant microorganisms can be prevented by using an aseptic technique before and after surgery

Keywords: Surgical site infection. Postoperative, gram-positive organisms, gram-negative organisms

Introduction

Surgical site infections (SSIs) are defined as infections occurring up to 30 days after surgery (or up to one year after surgery in patients receiving implants) and affecting either the incision or deep tissue at the operation site. SSIs have always remained a major public health concern and a hot topic around the world. Infections of the skin or subcutaneous tissue of the incision (49 percent) are superficial, organ space infections (33 percent) are infections of any part of the anatomy, and deep infections (18 percent) are infections of the fascia and muscle layers.

The rates of Surgical Site Infection range from 2.6 percent to 41 percent globally. [1, 2] SSIs are those complications that patients get after their surgery that leave a major impact on the patient's death, morbidity, and additional treatment costs. Periodic surveillance and providing surgeons with feedback on the occurrence of SSIs and associated causes, according to the WHO and other global research, can reduce surgical site infections by up to 50 percent. [3, 4] Hospitals are having the most advanced and standard preoperative preparations and antibiotic prophylaxis policies. Even in this situation, the infections and rates are rising globally. [5]

Serious SSIs almost doubled the patient's chance of death following surgery, not merely increasing morbidity and mortality. The following actions have been identified as SSI risk reduction methods. Bathing the patient before surgery is a must. Using a clipper to remove hair instead of a razor. Adequate skin preparation for the patient. Surgical hand preparation that is appropriate for the procedure and antibiotic prophylaxis with the best possible results.

This study was conducted to determine the pattern, predictors, and rate of Surgical Site infection (SSIs) in the surgical ward of a tertiary care hospital. The findings will be a great help to organizations that are governmental and non-governmental as well as the surgeons and other people working in various hospitals so that they can control SSIs.

Methodology:

This study covered all instances in which the incision site of surgery developed any degree of wound infection during admission or afterward, but within 30 days of the operation. Permission was taken from the ethical review committee of the institute. Relevant surgeons monitored postoperative patients on a weekly basis for the next four weeks at our institute. Wound infection cases were chosen and recorded during follow-up, and they were included in this study. According to Surgical site infection protocols, if patients required postoperative wound care, they were readmitted to surgical wards for their treatment. At first, the antibacterial therapy going on was stopped for 3 days and a sample of pus was sent for testing of sensitivity and culture. According to the results of the sensitivity report, the antibiotics were restarted. Meanwhile, aseptic dressings were used to control the wound on the local level. Each wound's final outcome was recorded, and statistics were generated.

All cases included in this study had classified wounds into classes as well as degrees. Due to their high rate of morbidity and mortality, patients with very infected and unclean wounds, as well as critical patients with significant illnesses such as cancer and septicemia, were not included in this study.

Results

After the loss of 10 patients, 110 were examined statistically. A total of 62.25% (68) of this population were male patients and the remaining 37.75% (42) were female. The ratio of Male to

females is 1.6:1. The average age was 32.0 +7 years. Most of the patients were from rural areas (73.6 percent) and a small number of patients were from urban areas (26.3 percent). A total of 36 patients were normal weighted and 32 patients were overweight. Patients who were underweight were 34 and only 7 were obese.

A total of 44 patients had comorbidities like diabetic mellitus, and respiratory and cardiovascular diseases and 8 of them had miscellaneous diseases.

Most of the patients were under ASA score of II i.e. 64 (58.1 percent). The percentage of patients that had less than 7 days of hospital stay is higher than those who took more than seven days of stay.

. In present the overall infection rate remained at around 12.88%. SSI was found to be more common in appendectomy, emergency exploratory laparotomy, Pyelolithotomy, open prostatectomy and accounting for 68 percent of all infections observed. In our current series of patients, the rate of SSIs is shown to be lowest in clean wounds such as treatments for thyroid, breast, and hernia disorders, ranging from 2 to 7.5 percent. In clean wounds, the SSI rate is 5.26 percent, whereas, in infected wounds, it is 50.1 percent. The SSI rate in clean surgical wounds was at 23.6 percent, whereas it was reported at 44.5 percent in clean-contaminated wounds, but it was lower in contaminated wounds (31.81 percent). The degree of SSI was also shown to be proportional to the nature of the wound, with 14.62 percent in clean incisions, 42 percent in clean-contaminated wounds, and 43.38 percent in contaminated incisions. There were 61 cases of first-degree surgical site infections, 26 of second-degree SSIs, 10 third-degree surgical site infections, and 6 fourth-degree surgical site infections.

Microbiological Investigation SSI is as, 76 swabs were microbiologically separated for diverse aerobic and anaerobic organisms from 96 SSI cases. Various bacterial isolates recovered from SSI patients are depicted in the following results. *Staphylococcus aureus*, 14.78%, of which 26% were methicillin-resistant *Staphylococcus aureus* (MRSA). *P. Aeruginosa* accounted for 12.88%, of which 22% were multidrug-resistant strains (MDR). *Klebsiella* spp. accounted for 8.89 percent, *E. coli* for 8.21 percent, and *Streptococcus* for 7.57 percent (4 groups A and 3 *S. mitis*). Coagulase deficiency was found in 5 people (8.56 percent). 17.6 percent of the *Staphylococcus*. *Enterobacter* spp. was found in 5 (7.57%). *Enterococcus faecalis* was found in 5 cases (6.26 percent). *Nocardia* spp. accounted for 2 (1.6 percent). *Acinetobacter* spp. accounted for 2 (3.31 percent). *Pepto streptococcus* and 38.6 percent *Bacteroides* spp. were found in 11 patients with anaerobic infection.

Overall, Gram-positive organisms accounted for 56% of the study, while Gram-negative organisms accounted for 44%, and their antibiotic susceptibility demonstrated a significant level of resistance to routinely used antimicrobial drugs., Cefotaxime, and Ceftriaxone were among the most resistant medications against gram-positive pathogens, whereas amoxicillin-clavulanate, ciprofloxacin, and linezolid were among the most effective antimicrobial agents. The most prevalent sensitive drugs were piperacillin/tazobactam, meropenem, ceftriaxone, and chloramphenicol, while gram-negative pathogens were resistant to tetracycline, ampicillin, cefuroxime, and gentamicin.

Discussion

We investigated many parameters connected to post-operative surgical site infection (SSIs) in this study and found some fascinating facts and figures. Due to differences in ethnicity, circumstances, and medical building setting, the overall results were compared with similar domestic and foreign study studies, with minor modifications.

In our study, 110 individuals got SSI out of 799 patients who underwent various surgical procedures, giving an overall incidence rate of 12.88%. The rate of infection varies from hospital to hospital, surgeon to surgeon, and individual to individual. [6]

It ranges from 2 percent to 42.88 percent in our current study. SSI rates have been shown to range from 6.09 percent to 37.8 percent [7] in numerous studies from various locations, including 6.5 percent to 9.294 percent in a few domestic studies. [8, 9] The SSI rate was found to be higher in developing nations, such as Africa (20.5%) [10], and much lower in industrialized countries, such as China (5.9%), [11] South Korea (2.2%), [12] and the United States (1.5%). [13] The separation and recognition of the causal representative were our first concerns in this investigation, followed by the specific antibiotic employed to control and treat SSI. *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *E. coli*, and *Klebsiella* spp. were the most common causative organisms. [5, 14, 15] *S. Aureus* is the most frequent infection linked to SSI, according to the CDC. *Staphylococcus aureus* (*S. aureus*) was the most common antibody, followed by *Escherichia coli* and Coagulase Negative *Staphylococcus*, according to a study conducted in Bangalore. [16]

Surgery that lasts a long time raises the chance of SSI. [17, 18] Early diagnosis of bacterial infections and selection of appropriate antibiotics in opposition to the organism is essential for the management of patients with SSI. The current findings revealed 54 percent positive and 46 percent of negative organisms. It is equivalent to other SSI investigations conducted in different countries. [19, 20]

Conclusion Wound infection is greatly inclined by a pre-existing medical disease, lengthy operating duration, wound class, and wound contamination. The spread of resistant microorganisms can be prevented by using an aseptic technique before and after surgery.

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