



Chasing Zero: The Drive To Eliminate Surgical Site Infections at a Tertiary Care Hospital

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ABSTRACT

Background and Objectives: Surgical site infection (SSI) is the most common complication following surgical procedures. The objective of this study was to undertake a pilot surveillance of Surgical Site Infections (SSI) in a tertiary care hospital, to study the Epidemiology and Microbiology of surgical wound infections in patients. **Materials and Methods:** All patients undergoing elective clean hernia operations in the Department of General Surgery during September 2013 were included in the present study. The medical records of the patients, operative notes, anaesthetic records and microbiology investigation data were reviewed. Information on operative procedure such as the type of operation, degree of wound contamination was also recorded. Medical records of discharged patients in the outpatient department and medical records of readmitted patients were also reviewed for evidence of infection that developed after hospital discharge. **Results:** Among 100 patients, there were no SSIs identified during September 2013, for an overall infection rate of 0%. There was no SSI found in elective hernia operations. After the bundle of interventions like Clippers instead of shavers were used for preoperative hair removal, Prophylactic Antibiotic Regimen, Individualized glucose monitoring and Postoperative normothermia were implemented, the elective patients in this study were free from SSI, giving the overall SSI rate of 0% for clean, elective hernia operations. **Conclusion:** Committed leadership, aggressive assurance of high compliance with multiple known interventions (SSI Bundle), transparency to achieve high levels of staff engagement, and centralization of critical surgical activities result in significant declines in SSIs with resulting substantial cost savings.

KEYWORDS

Surgical Site Infection (SSI), Pilot surveillance, Hernia operations, Prophylactic Antibiotic Regimen

Introduction

Surgical Infection is a preventable complication and efforts made to prevent this complication shall be the priority of every patient. Infection at or near surgical incisions within 30 days of an operative procedure, defined as Surgical Site Infection (SSI), contributes substantially to surgical morbidity and mortality. The incidence of SSI ranges from 2% to 5% for patients undergoing surgical procedures each year. SSI is considered one of the most important problems in the surgical wards. Although complete elimination of infection in surgical patients is impossible, a reduction of its incidence to a minimal acceptable level can result in great benefits for patients and would save economic resources. (1,2) The aetiology of surgical infection is multifactorial, and the necessity to reduce and control it requires surveillance as well as a hospital-wide effort, with institutional support and leadership.

Accordingly, the best strategy in controlling SSIs is in their prevention. This encompasses meticulous operative technique, timely administration of appropriate preoperative antibiotics, and a variety of preventive measures aimed at neutralizing the threat of bacterial, viral, and fungal contamination posed by operative staff, the operating room environment, and the patient's endogenous skin flora.(3,4)

Surgical Site Infections (SSI) account for 17% of HAIs. Surgi-

cal wounds are classified according to the level of contamination into Class I (Clean wounds), Class II (Clean-Contaminated wounds), Class III (Contaminated wounds) and Class IV (Dirty-Infected wounds). Clean wound is defined as an uninfected operative wound in which no inflammation is encountered and the alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Examples are herniorrhaphy and hepatectomy.

The objective of this study was to undertake a pilot surveillance of Surgical Site Infections (SSI) in a tertiary care hospital, to study the Epidemiology and Microbiology of surgical wound infections in patients.

Materials and Methods

Study population

Our hospital is a 1440-bed tertiary care public institution. Patients from Surgery Department who had elective operations for ventral hernia, inguinal hernia under the clean categories were included in the study. Operations under local anaesthesia, trauma patients, emergency operations, infected, contaminated and dirty operations and operations of anorectum, oropharynx, skin grafts, burns or scalds were excluded. All patients were followed up for 30 days after operations to identify and diagnose SSI.

All patients undergoing elective clean hernia operations in the Department of General Surgery during September 2013 were included in the present study. The medical records of the patients, operative notes, anaesthetic records and microbiology investigation data were reviewed. Information on operative procedure such as the type of operation, degree of wound contamination was also recorded. Medical records of discharged patients in the outpatient department and medical records of readmitted patients were also reviewed for evidence of infection that developed after hospital discharge.

SSI surveillance

SSIs are classified as either incisional or organ/space, with incisional SSIs being further sub classified as superficial (involving only skin and subcutaneous tissue) versus deep (involving underlying soft tissue). Patients with SSI were identified by both inpatient surveillance and post-discharge surveillance. First level of surveillance was the physical examination of the surgical site of all inpatients with SSI by our surgeons, surgical nurse clinicians, or infection control nurses. Second level of surveillance was the detection of outpatient SSI through post-discharge phone contacts to our patients or patient's primary care providers by our nurse clinicians or doctors. Outpatient SSI surveillance also included examination of the patients' wounds during follow-up visits. Post-discharge phone review of our patients also helped to minimize default follow up at the clinic. This process improves our SSI pick-up rate.

Medical records of all SSI patients were thoroughly reviewed and SSI was confirmed before classifying it according to the criteria of the Centres for Disease Control and Prevention [1].

Sample collection

Wounds were swabbed for microbiological analysis if a purulent discharge was present at the time of review. Microbiology results were interpreted in conjunction with the clinical information. A positive culture did not necessarily imply infection and a negative result might not necessarily exclude SSI.

Statistical analysis

Incidence of SSI was calculated by dividing the number of infections by the number of operations performed and then multiplied by 100. The frequency of the organisms identified as causative pathogens responsible for infection was calculated by dividing the number of isolates by the number of infections.

Results and Discussion

Among 100 patients, there were no SSIs identified during September 2013, for an overall infection rate of 0%. There was no SSI found in elective hernia operations. After the bundle of interventions like Clippers instead of shavers were used for preoperative hair removal, Prophylactic Antibiotic Regimen, Individualized glucose monitoring and Postoperative normothermia were implemented, the elective patients in this study were free from SSI, giving the overall SSI rate of 0% for clean, elective hernia operations. This allowed the staffs to see how their care could positively impact on the patient outcome and thus motivate them to continue the good practice.

While no set of prevention measures can be expected to eliminate the risk of SSI, recent studies indicate that surveillance and compliance with such measures can significantly reduce their incidence and impact.(5,6) Committed leadership, aggressive assurance of high compliance with multiple known interventions (SSI Bundle), transparency to achieve high levels of staff engagement, and centralization of critical surgical activities result in significant declines in SSIs with resulting substantial cost savings.

Conclusion:

The following conclusions were drawn:

1. Surveillance for SSIs is recommended for each center to determine the rate of SSIs, distribution of agent microorganisms, and antimicrobial sensitivities of microorganisms. Empirical treatment of SSIs should be conducted using these relevant

data.

2. In order to compare rate of SSIs with rates indicated in other centers and presented as national values, surveillance of SSIs should be performed in compliance with standard definitions.

3. Duration of preoperative hospitalization and stay in ICUs should be kept at a minimum to decrease rate of SSIs.

4. In patients specified as candidates for elective surgery, smoking should be stopped, problems that may require blood and blood product transfusions should be corrected, and distant infections, if any, should be treated prior to surgical operations.

5. In order to prevent development of SSIs, perioperative blood and blood product transfusions and number of drains should be kept at a minimum and unnecessary use of drains should be avoided.

6. In patients specified as candidates for surgical operations, antimicrobial prophylaxis should be administered based on appropriate indications, with an appropriate antimicrobial for an appropriate duration.

7. For the purpose of preventing SSIs, suitable operations should be performed laparoscopically.

8. Conventional wound classification and NNIS risk index may be utilized in prediction of SSIs.

9. Further long-term studies evaluating other factors in addition to the parameters indicated in this study are required to fully specify SSI risk factors and to prevent development of infections.

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