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Prospective study on incidence of surgical site infections in patients undergoing major abdominal surgeries in our hospital

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Abstract

Introduction: There are two types of surgical site Infections – Major and Minor type. Major SSI is one in which there is significant quantity of pus spontaneously discharged or which needs a another surgical procedure to drain pus and also presents with signs of Acute Inflammation. Minor SSI is one in which there is pus discharge is small in amount or having infected serous fluid but without signs of Inflammation.

Aims and Objective: To study about incidence of SSI in patients undergoing Emergency Laparotomy.

Materials and Methods: Prospective observational study conducted in RMMCH, Chidambaram from September 2019 to November 2021.

Results: SSI seen in 239 patients out of 311, more in males when compared with females. SSI patients had Increased Morbidity and Increased length of stay in Hospital. Anaemic patients undergoing Laparotomy had Increased risk of surgical site Infection.

Conclusions: Patients with Surgical Site Infections had Increased Morbidity and Increased Length of Stay in Hospital. Much more care must be given to minimise the incidence of Surgical Site Infection.

Keywords: Surgical site infections, emergency laparotomy, risk factors

Introduction

SSI is defined as Post operative wound Presenting upto 30 days presenting after surgery if no prosthetic material is kept and upto 1 year if a prosthetic material is kept in the patient. Nosocomial Infection accounts for 20% among patients in Hospitals ^[1]. Nosocomial Infections has Increased Incidence in Surgical aspects and improvement had been made in practice of controlling infection and also better operating room ventilation, Methods of Sterilization, Techniques of Surgery and Accessibility of Antimicrobial Prophylaxis. In emergency Surgical Procedure, Risk of Infection is more. Risk of Wound Infection is affected by many Risk factors which includes Diabetes Mellitus, Hypothermia, Hypoxemia, Immunosuppression and Malnutrition ^[2,3].

SSI causes Increased morbidity and mortality and huge burden on cost of healthcare. The primary objectives of this study to find incidence of surgical site Infection in patients undergoing Major abdominal surgeries in our hospital ^[2].

Study design and participants

This is a prospective observational study in Raja Muthiah Medical college and Hospital, Chidambaram. The target population age group 14 – 85 years who underwent Emergency Laparotomy from September 2019 to November 30, 2021. Exclusion Criteria is patients below 15 years and above 80 years of age. SSI was diagnosed if it fulfills any one of below criteria – serous discharge from the wound, Purulent discharge from the wound, Purulent discharge with signs of acute inflammation and wound opened due to localized collection by surgeons. Data calculation done and studied. Ethical approval obtained from Institutional Ethical Committee.

Data Collection

1. Following are the variables included i.e Pre –operative risk factors such as Diabetes Mellitus, Immunosuppression, Smoking, BMI, Demographic Characteristics and pre-operative Haemoglobin and Albumin levels.

2. Following are the operative variables such as type of surgery, Duration of Surgery, Use of Prophylactic Antibiotic.
3. Outcome variable such as wound infection, ICU admission, Length of stay, Post operative Complications and death

Using centre for Disease control and Prevention and National Healthcare safety Network definition OF SSI (Table 1), wound assessment was done and patient followed upto 30 days in post op cubicle, ward and outpatient department.

Table 1: Surgical site infection classification according to the centers for disease control and prevention and national healthcare safety network¹

Superficial incisional SSI	Deep incisional SSI
Occurs within 30 d	Occurs within 30 d
Only skin and subcutaneous tissue	Deep soft tissues (fascial and muscle layers)
Patient has at least 1 of the following:	Patient has at least 1 of the following:
<ul style="list-style-type: none"> a. Purulent drainage from incision b. Organisms identified from wound c. Superficial incision that is deliberately opened by surgeon d. Diagnosis of SSI by surgeon 	<ul style="list-style-type: none"> a. Purulent drainage from deep incision b. An incision that spontaneously dehisces or is deliberately opened or aspirated by surgeon, with or without culture c. Abscess or other evidence of infection that is detected on gross anatomic or histopathologic examination, or imaging
And patient has at least 1 of the following: pain or tenderness, localized swelling, erythema or heat	And patient has at least 1 of the following: fever (temperature > 38°C), localized pain or tenderness

SSI = Surgical site infection

Statistical Analysis

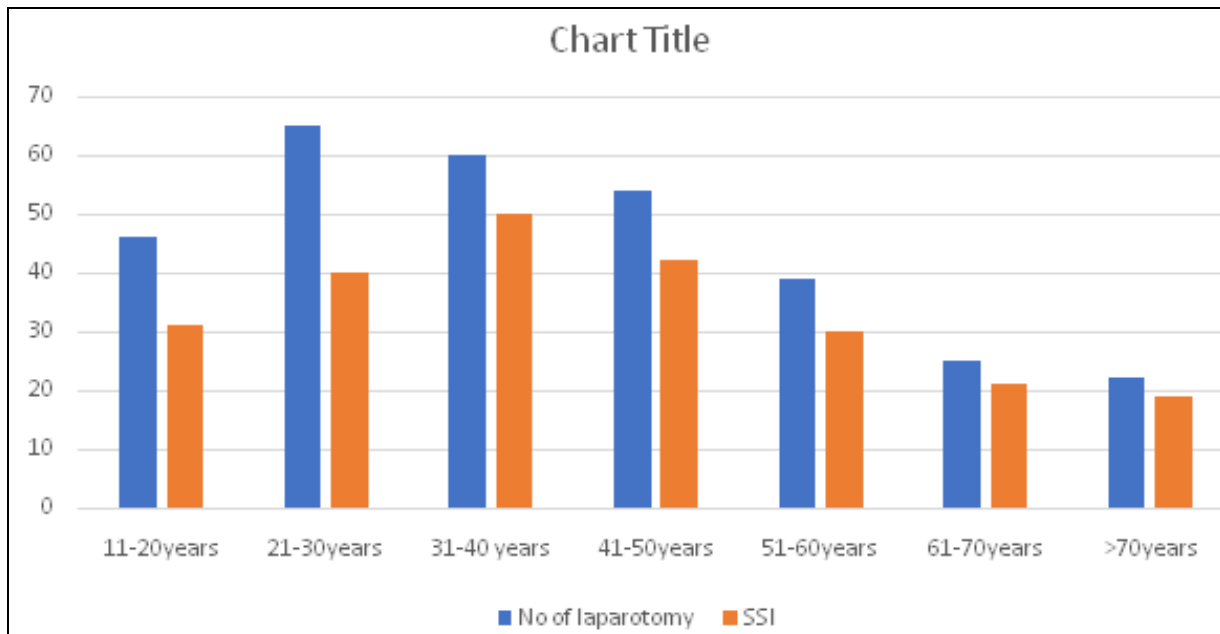
All values are converted to percentile. Tabulated Data in Microsoft Excel. Using SPSS, data analysis done.

Results

Out of 311 patients, 146 are males and 93 are females (M:F = 2:1). Age group 14 -85 years and mean age – 35.66 ± 12.57

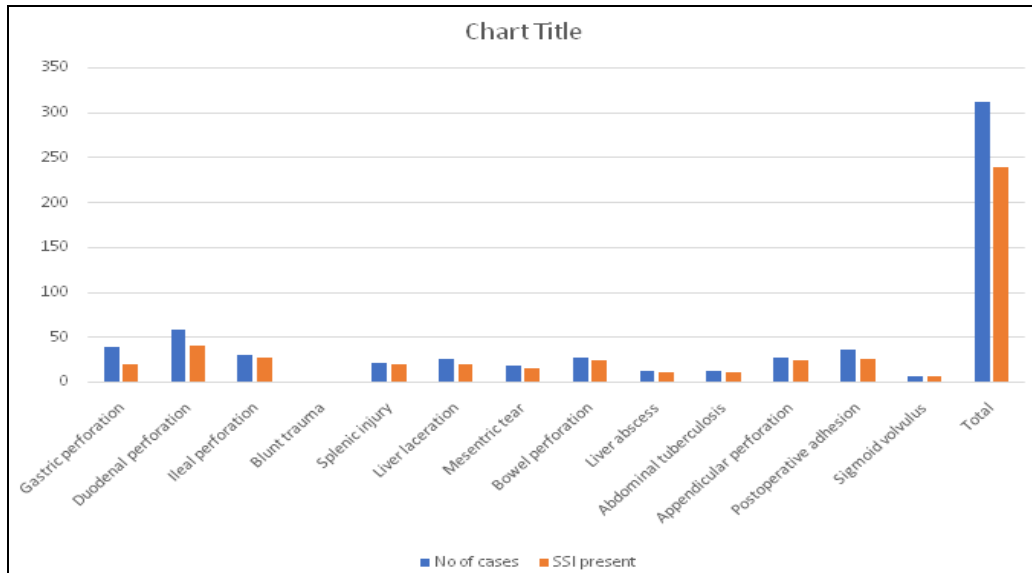
years. Pre operative Haemoglobin level was 3.2 – 15.3 g/dl (Mean 10.29 ± 1.71 g/dl).Haemoglobin concentration < 10 g/dl (Pre operative Haemoglobin) found in 102 patients (40.8%).

Relationships between age groups and incidence of Surgical Site Infection – Patient age group 31-50 years (42.7%) had increased incidence of wound infection.



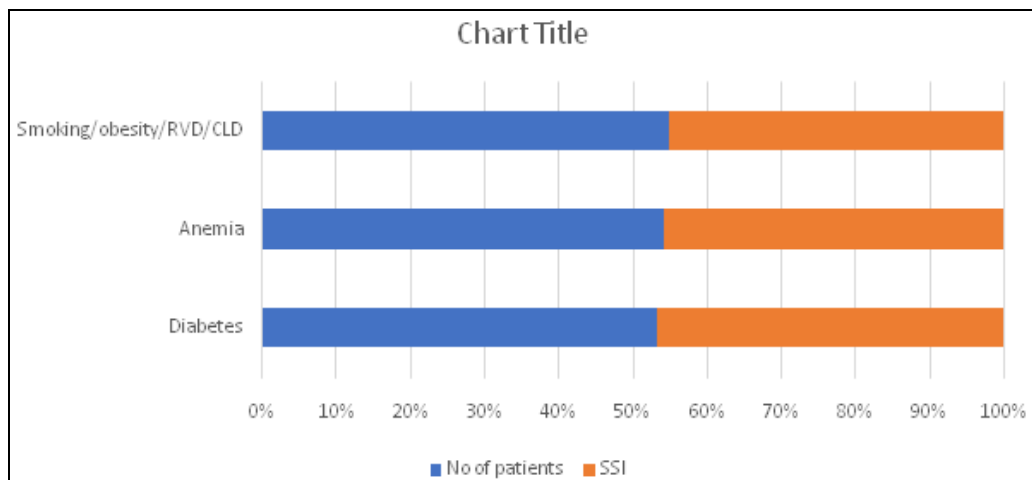
Graph 1: Incidence surgical site infection in patients undergoing emergency laparotomy

The Highest rate of SSI (50%) was in Ileostomy for Ileal perforation followed by Appendicular Perforation.



Graph 2: Emergency abdominal condition and SSI

SSI increased in rate in patients presenting late for emergency Surgeries after onset of symptoms.



Graph 3: Risk factors and SSI

Out of 311,159 patients had co-morbid conditions associated with the main surgical disease. Among the patients with Co-morbid disorders 146 people (91.8%) developed SSI [4].

Out of 311 patients, 239 had SSI (76.8%) and among 239 SSI Patients, Superficial SSI developed in 74 patients (30.9%) and deep SSI developed in 169 patients (69.03%). SSI on post operative day 3 developed in 186 patients (77.8%), 55 patients (23%) developed SSI on Post operative day - 5. 18 patients (5%) developed SSI on post operative day 7. SSI in 179 patients (74.8%) resolved by 9th - 11th day.

Discussion

Emergency Laparotomy for major surgical procedures is challenging concern for surgeons. -operative patient preparation and post operative care is vital for a successful outcome. If above two are affected outcome is poor irrespective of technique of surgery performed [6]. Post operative SSI is second most complication following Emergency Laparotomy surgeries and responsible for increased length of stay in Hospital and huge cost burden to patients and also toils towards increased morbidity.

SSI surveillance is important feedback to Hospital administration and every step must be taken by them to improve quality of care to patients to reduce SSI [5].

As documented in the previous literature, in our study overall rate of SSI was 76.8% which is higher. Whereas other literature of Rajesh K. abbey 25.43%, Satyanarayan 25.2%, and Murtaza *et al.* 21.6% but noted higher (38.1%) in the study of Adejumo *et al.* It was observed that rate of SSI in different age groups it was highest 58.9% in the literature of study done by Adejumo *et al.*

Patients in age group 31-50 years had increased incidence of SSI. Among sex of patient, Male to Female SSI Ratio is 2:1 Host factors, operating Environment, Patient co morbid condition, Time of presentation of patient to Hospital and duration of surgery were associated with rate of SSI [9, 11, 16]. The Highest rate of SSI (50.1%) was in case of Ileostomy and Appendicular Perforation [16].

The rate of SSI increased if patient presentation to Hospital from time of appearance of symptoms to operating time is increased. It was observed that, SSI rate was 19.9%, 28.9%, 42.7% and 70.2% when operation was Initiated <24 Hours, 24-48 hours,

48-72 hours and >72 hours respectively. The rate of SSI increased statistically very significantly with that of the duration of the operation^[9, 14, 16]. Previous studies have also assessed the influence of prolonged operating time as a risk factor for SSI.

Among the co morbid patients presenting with SSI, It was observed that 80 patients had Diabetes, 102 patients had anaemia^[11, 12] and 80 patients had smoking, CVA, CAD etc. SSI higher in Diabetic patients (45%) when compared with other patients having no Co morbid condition^[15].

Smoking delays the healing of SSI by causing local and systemic vasoconstriction. This results in tissue hypoxia and hypovolemia^[13].

Conclusions

Surgical Site Infection is the leading cause of post operative morbidity and increased length of stay in hospital^[7, 10, 13]. Proper surveillance must be made to decrease its incidence^[8].

References

- Horan TC, Andrus M, Dudeck MA. CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control*. 2008;36:309–32. [PubMed] [Google Scholar]
- Azoury S, Farrow N, Hu Q, *et al*. Postoperative abdominal wound infection epidemiology, risk factors, identification, and management. *Chron Wound Care Manage Res*. 2015;2:137–48. [Google Scholar]
- Aga E, Keinan-Boker L, Eithan A, *et al*. Surgical site infections after abdominal surgery: incidence and risk factors. A prospective cohort study. *Infect Dis (Lond)*. 2015;47:761–7. [PubMed] [Google Scholar]
- Lubega A. Incidence and etiology of surgical site infections among emergency postoperative patients in Mbarara regional referral hospital, South Western Uganda. *Res Pract*, 2017. Article ID: 6365172, 6.
- Burke JP. Infection control: A problem for patient safety. *N Engl J Med*. 2003;348:651-6.
- Liau KH, Aung KT, Chua N, Ho CK, Chan CY, Kow A, *et al*. Outcome of a strategy to reduce surgical site infection in a tertiary-care hospital. *Surg Infect (Larchmt)*. 2010;11:151-9.
- Anderson DJ. Surgical site infections. *Infect Dis Clin North Am*. 2011;25:135-53.
- Gaynes R, Richards C, Edwards J, Emori TG, Horan T, Alonso-Echanove J, *et al*. Feeding back surveillance data to prevent hospital-acquired infections. *Emerg Infect Dis*. 2001;7:295-8.
- Abbey RK, Mohan M, Malik N, Tiwari R, Nahar S. Surgical site infection in a rural teaching hospita of North India. *Int. J AdvInteg Med Sci*. 2017;2:11-6.
- Satyanarayana V, Prashanth HV, Basavaraj B, Kavyashree AN. Study of surgical site infections in abdominal surgeries. *J Clin Diag Res*. 2011;5:935-9.
- Adejumo AA, Nuhu M, Afolaranmi T. Incidence of and risk factors for abdominal surgical site infection in a Nigerian tertiary care centre. *Int. J Infect Control*. 2015;11:4.
- Giri S, Kandel BP, Pant S, Lakhey PJ, Singh YP, Vaidya P, *et al*. Risk factors for surgical site infections in abdominal surgery: A study in Nepal. *Surg Infect (Larchmt)*. 2013;14:313-8.
- Mawalla B, Mshana SE, Chalya PL, Imirzalioglu C, Mahalu W. Predictors of surgical site infections among patients undergoing major surgery at Bugando Medical Centre in Northwestern Tanzania. *BMC Surg*. 2011;11:21.
- Ikeanyi UO, Chukwuka CN, Chukwuanukwu TO. Risk factors for surgical site infections following clean orthopaedic operations. *Nigerian J Clin Pract*. 2013;16:443-7.
- Pomposelli JJ, Baxter JK, Babineau TJ, Pomfret EA, Driscoll DF, Forse RA, *et al*. Early postoperative glucose control predicts nosocomial infection rate in diabetic patients. *JPEN J Parenter Enteral Nutr*. 1998;22:77-81.
- Motie MR, Ansari M, Nasrollahi HR. Assessment of surgical site infection risk factors at imam Reza Hospital, Mashhad, Iran between 2006 and 2011. *Med J Islamic Rep Iran*. 2006;28:52.