Section: Microbiology

Original Research Article

INCIDENCE AND RISK FACTORS IN SURGICAL SITE INFECTIONS ACROSS ALL SURGICAL SPECIALTIES AT A TERTIARY CARE HOSPITAL IN MADHYA PRADESH

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ABSTRACT

Background: The present study was conducted in order to ascertain the prevalence and risk factors for surgical site infections in all surgical specialties at a tertiary care hospital in Madhya Pradesh. **Materials and Methods:** The present study was a hospital-based cross-sectional study. Study was planned for the period of 2 year from 2022 to 2024. All SSI patients with clinical evidence of infection were included during the study period. Clinical specimens were collected aseptically from the surgical site from suspected patients with SSIs by adopting standard methods and were processed without delay using standard microbiological methods. **Result:** A total of 15935 emergency or elective surgeries were performed in various surgical departments of Index Medical College, Hospital and Research Centre, Indore. Among these, 150 cases were diagnosed with SSI, hence the SSI rate was 0.94% in our institute for that period. Out of 150 culture positive cases, 124 (82.7%) cases were reported from surgery department, 11 (7.3%) cases from Orthopaedics department and 15 (10%) cases from Obstetrics & Gynaecology department. **Conclusions:** Preventing these infections is strenuous; which necessitates a comprehensive array of precautions before, during, and after operative procedures to be followed. Additionally, gathering information on risk variables is helpful for identifying patients with high-risks, adjusting for interpatient variability, and analysing SSI outcomes across multiple subgroups.

INTRODUCTION

The Centers for Disease Control and Prevention, USA defines surgical site infections as those infections which are confined to the incisions and involving structures adjacent to the wounds that were exposed during operation within one month after a surgical operation or one year after implant surgery.[1] One of the most well-known infection linked to medical services worldwide is surgical site infection (SSI). According to a World Health Organization (WHO) research, up to one-third of patients who have had surgery are affected by surgical site infections (SSIs), which are more specific and common in low- and middle-income countries.[2]

According to recent studies, the SSI rate varies between 19.4% and 36.5% globally, whereas in India it spans between 2.6 and 23%.[3] A number of risk factors, such as a lack of adherence to safety protocols at the patient, procedure, hospital, or surgical team levels, increase the likelihood of SSIs related to surgical care in developing nations. As a result, developing countries are 2–20 times more likely than developed ones to get nosocomial infections. Surgical site infections, for example, have a pooled incidence of 5.6% and a pooled prevalence of 15.5% for HAI, which is much higher than the rates in developed nations (the USA and Europe).[2]

In Madhya Pradesh's Malwa region, very few studies were carried out regarding the concern. In order to ascertain the prevalence and risk factors for surgical site infections in all surgical specialties at a tertiary care hospital in the Malwa region, this study was conducted.

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MATERIALS AND METHODS

The Department of Microbiology at Index Medical College, Hospital and Research Center, Indore MP, collaborated with the Department of Surgery to undertake this hospital-based cross-sectional study. Study is planned for the period of 2 year from 2022 to 2024. A total of 150 SSI patients were recruited from the Department of Surgery undergoing any emergency or elective surgeries. All patients gave their written consent before the trial was conducted with Institutional Ethical Committee approval. All SSI patients with clinical evidence of infection were included during the study period. The study included all individuals and patients of both sexes who had superficial incisional surgical site infections from different surgical wards. Paediatric cases, cases taken for a second surgery at the same location for whatever reason, and patients already receiving antibiotics for another infection were all excluded. A proforma was created using the patient's demographic information, clinical information (such as the procedure name), risk factors, and other pertinent medical history.

Clinical specimens were collected aseptically from the surgical site from suspected patients with SSIs by adopting standard methods and were processed without delay using standard microbiological methods.[4] Statistical analysis was done using Microsoft excel 2016 (Microsoft Corp., USA).

RESULTS

A total of 15935 emergency or elective surgeries were performed in various surgical departments of Index Medical College, Hospital and Research Centre, Indore MP. Out of which SSI were detected in 150 patients. So the SSI rate was 0.94% in our institute.

As shown in table1, the maximum cases 37 (24.7%) of surgical site infections were reported in age group 41-50 years followed by 30 (20%) cases in age group of 21-30 years, 29 (19.3%) cases in age group of 51-60 years, 27 (18%) Cases in age group of 31-40 years, 14 (9.3%) cases in age group of 61-70 years, 10 (6.7%) Cases in age group of 10-20 years and 3 (2%) cases in age group of above 70 years.

As shown in table 2, Among 150 bacterial culture positive cases, 50 (33.3%) were female and 100 (66.6%) were male.

As shown in the figure, frequency of infection was found to be more among LAPAROTOMY surgeries as the percentage of infected patients was ranged from 30.7% followed by APPENDECTOMY 17.3%, HERNIOPLASTY 14%, CHOLECYSTECTOMY 8%, LSCS 8%, MRM (BREAST SURGERY) 4%, EXCISION 2.7%, ORIF WITH K WIRE 2.7%, MESH REPAIR 2%, ORIF WITH LCP 2%, HISTERECTOMY 1.3%. Nonetheless, the rate of infection in COLOSTOMY, ILEOSTOMY, ILEO-TRANSVERSE ANASTOMOSIS, IMIL NAILING, OOPHORECTOMY, POST TAH REEXPLORATION, SIGMOID COLOSTOMY, SIMS AMPUTATION, SPC, TAH, WOUND RESUTURING, were very less, since the percentage was found to be 0.7 %.

Out of 150 culture positive cases, 124 (82.7%) cases were reported from surgery department, 11 (7.3%) cases from orthopaedic department and 15 (10%) cases from obstetrics & gynaecology department.

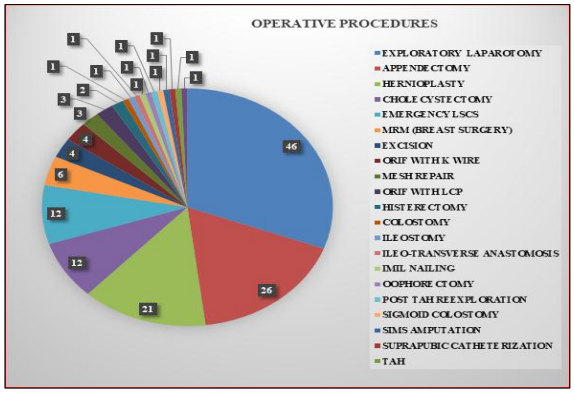

Figure 1: Operative procedures undergone by the cases with surgical site infections

Table 1: Age distribution of the surgical site infection cases

Age Group (Yrs)	Number	Percentage
10-20	10	6.7
21-30	30	20
31-40	27	18
41-50	37	24.7
51-60	29	19.3
61-70	14	9.3
≥70	3	2
Total	150	100

Table 2: Gender wise distribution of the collected surgical site infection cases

Gender	Number	Percentage
Female	50	33.3
Male	100	66.6
Total	150	100

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Table 3: Risk factors associated with SSI

Variable	Number	Percentage
Length of hospital stay		
0-6 DAYS	25	16.7%
7-14 DAYS	45	30%
>14 DAYS	80	53.3%
Surgery type		
ELECTIVE	57	38%
EMERGENCY	93	62%
Hair removal		
SHAVING	143	95.3%
Risk factors		
SMOKING	30	20
TOBACCO CHEWING	19	12.7
DIABETES	12	8
HYPERTENSION	14	9.3

DISCUSSION

The infection rate of surgical site infection varies greatly worldwide as reported by different authors, from different parts of the world. In the present study SSI rate was 0.94%. In the various research studies, the rate of SSI was observed varying from 1.2 % to 23.6 %.[5-10] While Studies conducted in Malwa region shows prevalence of SSIs from 5 –23.07%.[11-13]

The age group of 41–50 years old accounted for the highest number of surgical site infection cases in the current study—37, or 24.7%. As people age, they are more likely to develop SSI because of various risk factors, such as diabetes mellitus, co-morbid diseases, and immune system impairment. Other research found similar results, indicating a greater SSI rate among those over 40.[14-19]

In present study, males (66.6%) were affected more than females. The type of infected wounds that men bring to surgical departments and the higher frequency of male emergencies were the reasons for the rising incidence among men. This could also be because of the outdoor activities that make men more vulnerable to trauma. Similar findings were reported in other studies.[20-21]

In present study, 0ut of 150 culture positive cases, 124 (82.7%) cases were reported from surgery department (around 70% cases from abdominal surgeries), 11 (7.3%) cases from orthopaedic department and 15 (10%) cases from obstetrics & gynaecology department. Bhalodia et al,[19] Allegranzi et al,[22] also found that SSI rate were higher in abdominal surgeries.

Many factors were recorded as contributing to the SSIs risk. In present study, The SSI detected in patients having hospital stay 0-6 days was 16.7%, in patients with hospital stay of 7-14 days was 30% and in patients with hospital stay >14 days was 53.3%. The SSI detected in elective surgeries was 38%, in emergency surgeries was 62%. Hair removal by shaving was done in 95.3% patients. 20% patients were smoker, 12.7% were chewing tobacco, 8% were diabetic, 9.3% were hypertensive patients. Numerous aspects of the patient's surgical experience have been found to increase the likelihood of SSIs in a research by Abaynah et al,[2] The following factors were associated with a higher prevalence of SSIs: ASA class ≥III, contaminated wound procedure, post-operative hospital stay longer than 14 days, and co-morbid diseases such as anaemia and diabetes mellitus. Fifty (19.92%) of the participants in a research by Misha et al,[23] had one or more co-morbidities. The most prevalent ones were diabetes mellitus 6 (2.39%), respiratory disorders 7 (2.79%), psychiatric issues 7 (2.79%), and heart disorders 20 (7.97%). 24.3% of patients stayed in the hospital for more than seven days prior to surgery.

CONCLUSION

The current results appear to be in line with those of prior studies that identified certain risk factors for SSI. As a result, preventing these infections is difficult and necessitates a wide range of precautions before, during, and after operation. Additionally, gathering information on risk variables is helpful for identifying high-risk patients, controlling for variations in patient-level risk, and analysing SSI outcomes by subgroups.

Conflicts of interest: The authors declare no conflicts of interest.

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