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Determining the incidence and the co-morbid conditions which influence surgical site infection (SSI): an observational study

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Abstract

Objective: The present study was designed to find out the incidence and various co-morbid conditions associated with surgical site infection.

Methods: The study was carried out on 148 patients who underwent various surgeries in the Department of General Surgery of Government Hospital Sarwal, Jammu, India. A predesigned protocol was used to collect the data. Surgical site infections were examined and graded. Data was analyzed by SPSS.20 software.

Results: Among 148 patients, 26 developed surgical site infection. Among 26 patients, 16 were grade 3 and 10 were grade 4 type of infection. Surgical site infections (SSIs) were most commonly found among males, aged, diabetics, anaemic and hypertensive patients.

Conclusions: The incidence of surgical site infection is high. Age, sex, diabetic, blood transfusion, prolonged hospital stay are the important risk factors for SSIs. So implementing proper antibiotic policies and infection control measures can reduce SSIs to great extent.

Keywords: Infection, surgical site, wound, diabetes

Introduction

According to National nosocomial infections surveillance report, surgical site infections (SSIs) are the 3rd most frequently reported nosocomial infections [1-3]. WHO reported nosocomial infections are one of the major infectious diseases having large economic impact.^{4,5} The pathogens that causes SSIs can be a part of the patients normal flora or from the hospital environment [6, 7].

In the past few years, important advances have been achieved in the field that may have had an impact on the reduction of SSIs [8]. These include more effective surgical sterilization procedures, laminar flow, high-efficiency particulate absorbing (HEPA) filters, ultraviolet radiation, air renewal, humidity control, differential temperature and air pressure, particle count, surface colony count and antibiotic prophylaxis [9, 10].

Apart from the aseptic techniques, antimicrobial drugs, sterilization, surgical site infections continue to be a major problem in all-surgical departments in the hospital.¹¹ According to National nosocomial infections surveillance report, SSIs are the 3rd most frequently reported nosocomial infections [2, 3]. The influence of all these factors is not clear, to our knowledge, very few studies have examined the link between multiple factors and SSI. Hence the aim of this study was to determine prevalence and the various factors which influence surgical site infection (SSI).

Materials and Methods

Study Design

A Prospective clinical study was conducted among 148 patients attended the Department of General Surgery of Government Hospital Sarwal, Jammu, India.

Ethical approval and Informed consent

The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical

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clearance. After explaining the purpose and details of the study, a written informed consent was obtained.

Methodology

Surgical wounds were categorized as per CDC criteria [12]. Surgical wounds were graded on the following scale: Grade 1 = normal healing, Grade 2 = suture line erythema <1 cm, Grade 3 = suture line erythema > 1 cm, Grade 4 = purulent discharge [13].

Patient details

Detail clinical history regarding age, sex, co-morbid conditions, blood transfusion, antibiotic therapy and preoperative hospital stay. All the samples were processed as per standard microbiological protocol.

Statistical Analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 19 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages.

Results

Table 1: demographic distribution of study subjects

Age	N	%
<40	26	17.6
41-60	78	52.7
>60	44	29.7
Sex		
Female	42	28.4
Male	106	71.6
Total	148	100

Table 2: distribution of surgical sites in study subjects

Surgical sites	N	%
Limb	76	51.4
Abdomen	54	36.5
Others	18	12.1
Total	148	100

Table 3: distribution surgical wound grading

Surgical wound grading	N	%
Grade 1	88	59.5
Grade 2	34	22.9
Grade 3	16	10.8
Grade 4	10	6.8
Total	148	100

Table 4: distribution of co-morbidities in the study subjects

Co-morbidities	N	%
Diabetes mellitus	54	36.5
Anemia	45	30.5
Hypertension	43	29.0
Others	6	4.0
Total	148	100

Discussion

Healthcare-associated infections are frequent causes of morbidity and mortality in hospitalized patients. In contrast to more developed countries, where device-associated infections predominate, resource-limited countries often report surgical-site infections (SSIs) as the most common healthcare-associated infection because use of invasive devices is less frequent in

these settings. The impact of SSIs on patient morbidity and mortality has been well documented in many regions of the world [14, 15].

The rate of SSI varies hospital to hospital. In the present study the infection rate was 17.60%. The incidence of surgical site infection (SSI) varies from 2.5% to 41.9% [16, 17].

Age is one of the main factors to increase the SSI rate. In the present study surgical site infection was mostly found in above 40 age group patients. The findings were comparable with other study reports [18]. High SSI rates more in older age group due to co-morbid conditions and poor immune response [19].

In our study higher proportion of males developed SSI compared to females. Similar findings reported by Kikkeri N *et al.* and Varsha S *et al.* showed in their study SSI proportion among males and females were almost similar [20, 21].

Co-morbid conditions like hypertension and diabetes, hypertension and anemia were the important risk factors for SSI. In this present study infection rate was higher in diabetes patients. This was found in agreement with the previous studies [22, 23].

Conclusion

The results of this study emphasize the need to account for local factors when assessing SSI risk. However, there were several local factors that should be taken into account to improve patient outcomes. Appropriate postoperative wound care is also necessary and further strengthening of basic infection control in the hospital to improve the hospital environment is also required. Another important intervention will be required to encourage surgeons to use appropriate antibiotic prophylaxis and to stop using antibiotics soon after surgery.

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