

## The incidence and the co-morbidities which affect the surgical site infection: a hospital based study

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### Abstract

**Aim:** to assess the incidence and various co-morbidities associated with surgical site infection. **Materials and Methods:** The study was carried out on 144 patients who underwent various surgeries in the Department of General Surgery of IGIMS, Patna, Bihar, India from February 2016 to December 2016. 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 144 patients, 24 developed surgical site infection. Among 24 patients, 13 were grade 3 and 11 were grade 4 type of infection. Surgical site infections were most commonly found among males, aged, diabetics, anaemic and hypertensive patients. **Conclusions:** The incidence of surgical site infection is high. Age, gender, diabetes, blood transfusion and prolonged hospital stay were the important risk factors for surgical site infections. So implementing proper antibiotic policies and infection control measures can reduce SSIs to great extent.

**Keywords:** Infection, Surgical site, Risk factors.

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### 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 carried out on 144 patients who underwent various surgeries in the Department of General Surgery of IGIMS, Patna, Bihar, India from February 2016 to December 2016. [Table 1] Predesigned protocol was used to collect the data. Surgical site infections were examined and graded [Table 2]. The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance. After explaining the purpose and

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details of the study, a written informed consent was obtained.

### Methodology

Surgical wounds were categorized as per CDC criteria.<sup>12</sup> 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][Table 3]

### Results and Discussion

#### Patient details

Detail clinical history regarding age, sex, co-morbid conditions, blood transfusion, antibiotic therapy and preoperative hospital stay[Table 4]. 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.

**Table 1: Demographic distribution of study subjects**

Age	N	%
<40	27	18.8
41-60	74	51.4
>60	43	29.9
<b>Sex</b>		
Female	41	28.5
Male	103	71.5
<b>Total</b>	<b>144</b>	<b>100.0</b>

**Table 2: Distribution of surgical sites in study subjects**

Surgical sites	N	%
Limb	71	49.3
Abdomen	56	38.9
Others	17	11.8
<b>Total</b>	<b>144</b>	<b>100.0</b>

**Table 3: Distribution surgical wound grading**

Surgical wound grading	N	%
Grade 1	83	57.6
Grade 2	37	25.7
Grade 3	13	9.0
Grade 4	11	7.6
<b>Total</b>	<b>144</b>	<b>100.0</b>

**Table 4: Distribution of co-morbidities in the study subjects**

Co-morbidities	N	%
Diabetes mellitus	51	35.4
Anemia	45	31.3
Hypertension	43	29.9
Others	5	3.5
<b>Total</b>	<b>144</b>	<b>100.0</b>

Healthcare-associated infections are frequent causes of morbidity and mortality in hospitalized patients. 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 16.6%. 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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