International Journal of Health and Clinical Research, 2020;3(4):140-143 e-ISSN: 2590-3241, p-ISSN: 2590-325X

Original Research Article

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

Rajnish Kumar[1*], Prem Prakash[2], Nameer Faiz

[1]Senior Resident, Department of General Surgery, IGIMS, Patna, Bihar, India
[2]Associate Professor, Department of General Surgery, IGIMS, Patna, Bihar, India
[3]Senior Resident, Department of General Surgery, IGIMS, Patna, Bihar, India

Received: 28-06-2020 / Revised: 30-07-2020 / Accepted: 02-08-2020

Abstract

Aim: to assess the incidence and various co-morbiditiesassociated 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.

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]

**Correspondence*
Dr. Rajnish Kumar,
Senior Resident, Department of General surgery, IGIMS, Patna, Bihar, India.

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 fromFebruary 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

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][Table 3]

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.

Results and Discussion

Table 1: Demographic distribution of study subjects

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

Table 2: Distribution of surgical sites in study subjects

Surgical sites	N	%
Limb	71	49.3
Abdomen	56	38.9
Others	17	11.8
Total	**144**	**100.0**

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
Total	**144**	**100.0**

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
Total	**144**	**100.0**

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.

References

1. Agarwal, Kumar P, Agarwal M, Talat A. Epidemiology of Pseudomonas aeruginosa; post-operative wound sepsis. Indian J PatholMicrobiol. 1985;28:137-46.
2. Horan TC, Gaynes RP, Mrtone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections 1992: a modification of CDC definitions of surgical wound infections. Infect HospEpidemiol. 1992;13(10):606-8.
3. Subramanian KA, Prakash A, Shrinivas, Bhujwal RA. Post-operative wound infection. Ind J Surg. 1973;57-64.
4. Kamat US, Fereirra AMA, Kulkarni MS, Motghare DD. A prospective study of surgical site infections in a teaching hospital in Goa. Indian J Surg. 2008;70:120-4.
5. Anvikar AR, Deshmukh AB, Karyakarte RP, Damble AS, Patvardan NS, Malik AK, et al. A one year prospective study of 3280 surgical wounds. Indian J Med Microbiol. 1999;17(3):129-132.
6. Nichols RL. Current strategies for prevention of surgical site infections. Curr Infect Dis Rep. 2004;6(6):426-34.
7. Angue JR, Olila D. Drug sensitivity patterns of bacteria isolated from septic post-operative wounds in a regional referral hospital in Uganda. African Health Sciences. 2007;7(3):140-54.
8. Vidmer AE, Dangel M. Alcohol-based handrub: evaluation of technique and microbiological efficacy with international infection control professionals. Infect Control HospEpidemiol2004;25:207-9.
9. Berard F, Gandon J. Postoperative wound infections: the influence of ultraviolet irradiation of the operating room and of various other factors. Ann Surg1964;160:1-192.
10. Kampf G. The six golden rules to improve compliance in hand hygiene. J Hosp Infect 2004;56:S3-5.
11. Linani SP, N Jangali, A Chowadhary, G.B. Daver. Surgical site infection in clean and clean contaminated cases. Indian J of med Microbiol 2005; 23(4):249-252.
12. Alicia J, Mangram MD, Horan TC, Michel L, Chinstine PL, Willium R, et al. Guideline for prevention of surgical site infection. Infection Control Hospital Epidemiol. 1999;20(4):250-80.
13. Morris CD, Sepkowitz K, Fonshell C, Margetson N, Eagan J. Miransky J. et al. Prospective identification of risk factors for wound infection after lower extremity oncologic surgery. Ann SurgOncol. 2003;10:778-82.
14. Danchaivijitr S, Chokloikaew S. A national prevalence study on nosocomial infections 1988. J Med Assoc Thai 1989;72(suppl 2):1-6.
15. Santos KR, Fonseca LS, Bravo Neto GP, GontijoFilho PP. Surgical site infection: rates, etiology, and resistance patterns to antimicrobials among strains isolated at Rio de Janeiro University Hospital. Infection 1997;25:217-220.
16. Reichman DE, Greenberg JA. Reducing Surgical Site Infections: A Review. Rev Obstet Gynecol. 2009;2:212-21.
17. Patel SM, Patel MH, Patel SD, Soni ST, Kinariwala DM, Vegad MM, Surgical site infections: Incidence and risk factors in a tertiary

care hospital, Western India. Natl J Community Med. 2012;3:193-6.
18. Desa LA, Sathe MJ. Factors influencing wound infection (a prospective study of 280 cases). J Postgrad Med. 1984;30:231-6.
19. Ashby E, Davis MJ, Wilson AP, Haddad FS. Age, ASA and BMI as risk factors for surgical site infection measured using ASEPSIS in trauma and orthopaedic surgery. J Bone Joint Surg Br. 2012;94(4):58.
20. Kikkeri N, Setty H, Nagaraja MS, Nagappa DH, Giriyaiah CS, Gowda NR, et al. A study on surgical site infections and associated factors in a government tertiary care teaching hospital in Mysore, Karnataka. Int J Med Public Health. 2014;4(2):171-5.
21. Varsha S, Saikat B, Upendra L. Surgical site infections: a one year prospective study in a tertiary care center. Int J Health Sci. 2012;6:79-84.
22. Giles KA, Hamdan AD, Pomposelli FB, Wyers MC, Siracuse JJ, Schermerhorn ML. Body mass index: Surgical site infections and mortality after lower extremity bypass from the National Surgical Quality Improvement Program 2005-2007. Ann Vasc Surg. 2010;24:48-56.
23. Xue DQ, Qian C, Yang L, Wang XF. Risk factors for surgical site infections after breast surgery: A systematic review and meta-analysis. Eur J SurgOncol. 2012;38:375-81.

Source of Support:Nil
Conflict of Interest: Nil