

AUDIT OF SURGICAL SITE INFECTION AT NISHTAR HOSPITAL MULTAN

Dr. Maryam Saleem¹, Dr. Mehvish Kiran² and Dr. Hira Maryam^{*3}¹Shalamar Medical and Dental College, Lahore.²Shalamar Medical and Dental College, Lahore³Nishtar Medical University, Multan.***Corresponding Author: Dr. Hira Maryam**

Nishtar Medical University, Multan.

DOI: <https://doi.org/10.17605/OSF.IO/94MKD>

Article Received on 20/09/2018

Article Revised on 10/10/2018

Article Accepted on 31/10/2018

ABSTRACT

Objective: The purpose of study was to observe surgical site infection rate at Department of Surgery, Nishtar Hospital Multan. **Study Design:** It is an Observational / prospective study. **Place and Duration of Study:** This study was carried out at the General Surgery Unit of Nishtar Hospital Multan, from February 2017 to November 2017. **Materials and Methods:** Total of 1400 patients were included. Before conduction of study Ethical review committee permission was sought and access to patient data for follow up was obtained. Only those patients who completed follow up for 30 days were included, patient lost to follow up or deceased were excluded. All admitted patients undergoing elective surgery were included and categorized broadly into Abdominal Surgery, Surgery on Thyroid and Parathyroid, Breast Surgery and Perineal Surgery. Demographic data, wound type, comorbid factors, type of surgery, duration of hospital stay were noted on structured questionnaire. All Patient who underwent surgery were managed according to CDC recommendation for prevention of Surgical Site Infections.^[5] Wound condition was recorded daily using ASEPSIS score during hospital stay. All patients were given pre-operative prophylactic and postoperative antibiotics. Patients were followed up after discharge weekly for 30 days. In event of Surgical Site Infection wound swab or pus for culture and sensitivity was obtained and appropriate antibiotics according to sensitivity were given. Data was analyzed on SPSS version 22. Continuous variables like age and length of stay were displayed as mean and standard deviation. Percentages were calculated for categorical variable such as gender, type of procedure and co morbid factors. **Results:** A total of 1400 patients were enrolled in study out of which 195 patients were excluded due to loss of follow up or death, the remaining 1205 patients were studied among them 14.1% (n171) developed Surgical Site Infection (SSI). Rate of infection related to clean, clean contaminated, contaminated and dirty wounds was 1.5%, 3%, 8% and 25% respectively in studies conducted in developed world.^[1] Rate of surgical site infection in our study in clean, clean contaminated, contaminated and dirty wounds was 3.3%, 10.4%, 17.2% and 26.9% respectively. **Conclusion:** Frequency of surgical site infection in our study was comparable to developing countries but higher than developed countries.

KEYWORDS: Surgical Site, Infection Rate, Tertiary Care Hospital.

INTRODUCTION

Loss of protective barrier in form of skin makes patients undergoing surgery prone to infections. Surgical site wound infection is one of the most common nosocomial infection encountered in hospitals.^[1] To name a few problems associated with surgical site infections increasing health costs, prolonged hospital stay, re-admission, loss of patient confidence in physician.^[2,3] Pathogens that cause SSI are acquired either endogenously from the patient's own flora or exogenously from contact with operative room personnel or the environment. However, the period of greatest risk remains the time between opening and closing the operating site.^[3] College of Surgery National Surgical Quality Improvement Program.^[4] Surgical site infection according to CDC definitions is classified as Superficial

Incisional: involving skin and subcutaneous tissue under incision; Deep incisional primary: surgical site infection in primary incision involving muscle and fascia in a patient who has surgery performed by more than one incisions; Deep Incisional secondary: surgical site infection involving muscle and fascia in a secondary incision in a patient who had surgery performed by more than one incisions; Organ/ space related surgical site infection: involving any part of the body opened or manipulated during operation.^[5] Surveillance of Surgical site infection is needed to determine the burden of disease and to correct any significant deterrent to achieve lowest rates of SSI possible keeping view of ground realities. The purpose of our study is to assess frequency of Surgical Site infections in General Surgery ward and identify its risk factors.

MATERIALS AND METHODS

This study was conducted in General Surgery Unit Nishtar Hospital Multan over a period of one year, a total of 1400 patients were included. Before conduction of study Ethical review committee permission was sought and access to patient data for follow up was obtained. Only those patients who completed follow up for 30 days were included, patient lost to follow up or deceased were excluded. All admitted patients undergoing elective surgery were included and categorized broadly into Abdominal Surgery, Surgery on Thyroid and Parathyroid, Breast Surgery and Perineal Surgery. Demographic data, wound type, comorbid factors, type of surgery, duration of hospital stay were noted on structured questionnaire. All Patient who underwent surgery were managed according to CDC recommendation for prevention of Surgical Site Infections.^[5] Wound condition was recorded daily using ASEPSIS score during hospital stay. All patients were given pre-operative prophylactic and postoperative antibiotics. Patients were followed up after discharge weekly for 30 days. In event of Surgical Site Infection wound swab or pus for culture and sensitivity was obtained and appropriate antibiotics according to sensitivity were given. Data was analyzed on SPSS version 22. Continuous variables like age and length of stay were displayed as mean and standard deviation.

RESULTS

Total of 1205 patients who were studied gender distribution 492(40.82%) patients were male and

713(59.17%) patients were female according to procedure is shown in Table 1. Overall infection rate in our study across all procedure was 14.1%. Mean age of patients was 38.9 years \pm 14.3 years. Distribution of wound types in Abdominal Surgery 497(41.2%), Breast surgery 53(4.3%), Thyroid and Parathyroid 65(5.3%) and Perineal Surgery 575(47.6%) were given in Table 2. Rate of surgical site infection in different types of surgical patients was highest in perineal surgery 17.2%, followed by abdominal surgery 12.9%, breast surgery 3.9% and lowest in thyroid parathyroid surgery 3% as shown in Table 3. This shows perineal surgery with highest number of contaminated and dirty wounds had highest rate of surgical infection and breast, thyroid parathyroid surgery has lowest rate as these surgeries have mostly clean wounds. Rate of surgical site infection in clean, clean contaminated, contaminated and dirty wounds was 3.3%, 10.4%, 17.2% and 26.9% respectively as shown in table 4. All patients were receiving prophylactic antibiotics ceftriaxone and ciprofloxacin; but no statistical difference was observed in surgical site infection rate.

Mean length of hospital stay for all patients was 4.7 day \pm 2.04 days. Mean Length of hospital stay for Clean 3.948 days, Clean Contaminated 5.714 days, Contaminated 4.000 days and Dirty wound 5.875 days as shown in table 5.

Table No. 1: Gender Distribution in Surgical Site Infection.

S#	Gender	Abdominal Surgery	Breast Surgery	Thyroid and Parathyroid	Perineal Surgery	Total
1	Male	214(17.7%)	0	4(0.33%)	274(22.7%)	492(40.82%)
2	Female	283(23.4%)	53(4.3%)	61(5.0%)	316(26.2%)	713(59.1%)

Table No. 2: Wound Distribution in Surgical Site Infection.

S#	Wound	Procedure				Total N
		Abdominal Surgery N(%)	Breast Surgery N(%)	Thyroid and Parathyroid N(%)	Perineal Surgery N(%)	
1	Clean	0	53(4.3%)	65(5.3%)	0	118
2	Clean Contaminated	497(41.2%)	0	0	0	497
3	Contaminated	0	0	0	575(47.6%)	575
4	Dirty	0	0	0	16(1.3%)	16
	Total	497(41.2%)	53(4.3%)	65(5.3%)	591 (48.9)	1205

Table No. 3: Distribution of Sites in Surgical Site Infection.

Surgical Sites Infection	Abdominal Surgery N(%)	Breast Surgery N(%)	Thyroid and Parathyroid N(%)	Perineal Surgery N(%)
None	436(87%)	51(96.2%)	63(96.9%)	488(82.7%)
Present	65(12.9%)	2(3.9%)	2(3%)	102(17.2%)

Table No. 4: Distribution of Wounds in Surgical Site Infection.

Surgical Site Infection	Type of Wound			
	Clean	Clean Contaminated	Contaminated	Dirty
None	114(96.6%)	436(89.5%)	475(82.7%)	19(73%)
Present	4(3.3%)	51(10.4%)	99(17.2%)	7(26.9%)
Total	118	487	574	26

Table No. 5: Mean Duration of hospital stay (days) in different wounds.

Wound	Mean Duration (days)	No. of cases	Std. Deviation
Clean	3.948	116	1.0701
Clean Contaminated	5.714	497	2.7575
Contaminated	4.000	574	.0000
Dirty	5.875	18	4.0311
Total	4.728	1205	2.0449

DISCUSSION

Surgical site infection is one of the biggest problems in healthcare industry effecting surgical and it costs 1.4719 billion Euros.^[6] Rate of Surgical site infection has been progressively decreasing in developed world with rates reported as low as 2.6%.^[7] Rates of infection in laparoscopic procedures Cholecystectomy, colonic surgery appendectomy and gastric surgery are even lower 0.69%, 4.32%, 1.37%, 2.71%.^[8,9] Rates of infection in Pakistani tertiary care hospital at Karachi has been reported to be 7.32%.^[10] Prolonged preoperative hospital stay was found to be associated with higher rate of infection. Prolonged preoperative hospital stay leads to colonization with antimicrobial resistant micro-organisms and itself directly affects patient's susceptibility to infection either by lowering host resistance or by providing increased opportunity for ultimate bacterial colonization. Comparative analysis of studies reporting surgical site infections in Brazil 5.1% Philippines 7.8% and Nepal 7.3% are lower than any hospital in Pakistan this proves that more is to be done in prevention, risks assessment and management.^[11] When compared to other hospitals in our country reported rates of Surgical site infection in our study is higher (14.1%).^[10] Causative factors identified in studies conducted in our country are indiscriminate use of antibiotics leading to growth of resistant organisms, poor nutritional status of patient leading to poor wound healing, absence of barrier nursing and inadequate sterilization. Patient overcrowding in public sector hospitals leads to cross infection.^[12] The rate of SSI also varies from surgeon to surgeon. The skill and experience of surgeon directly affects the degree of contamination of the surgical site through breaks in technique or inadvertent entry in to a viscous. The skill of surgeon also affects the condition of surgical site and therefore its resistance to infection. In our study the rate of SSI was 19.6% in operations performed by junior doctors compared to rate in operations performed by senior consultants (12.9%). Anvikar A.R. 2 also reported higher rate of infection in operations performed by junior doctors.

No statistical difference was noted when surgical site infection rate was compared with age and co morbid factors.^[14] Cohen et al identified risk factors for surgical site infections as estimated blood loss over 1 litre (P=0.017), previous Surgical site infection (P=.012) and diabetes (P=0.050)^[15] and similar trend has been noted in our study. Duration of procedure and BMI has also been established as independent risk factors.^[16] Surgical site infection risk score calculation by Walraven et al have included patient factors like smoking BMI, operative factors like surgical urgency; increased ASA class; longer operation duration; infected wounds; general anaesthesia; performance of more than one procedure; CPT score, and co morbidities like peripheral vascular disease, metastatic cancer, chronic steroid use, recent sepsis in their predictive score.^[17]

CONCLUSION

Frequency of Surgical site infections is similar to developing countries but very much higher than developed countries with poor compliance to sterilization protocols, unabated use of antibiotics, and poor socioeconomic status of patients. No apparent surveillance protocols of SSI like American College of Surgery National Surgical Quality Improvement Program and absence of infectious disease specialist at most tertiary care public sector hospitals, result in higher Surgical site infection. Areas in need of attention are establishment of surveillance protocols and reporting system. Establishment of Clinical audit and review, judicious use of antibiotics.

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Pittet D, Harbarth S, Ruef C, Francioli P, Sudre P, et al. Prevalence and risk factors for nosocomial infections in four university hospitals in Switzerland. *Infect Control Hosp Epidemiol*, 1999; 20: 37-42.
2. Anvikar A.R., Deshmukh A.B., Karyakarte R.P., Damle A.S., Patwardhan N.S., Malik A.K., et al. A one year prospective study of 3280 surgical wounds. *Indian J Medical Microbiology*, 1999; 17(3): 129-132.
3. Edward S. Wong. Surgical site infections. In: C. Glen Mayhall, editors. *Hospital Epidemiology and Infection control*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 1999; 189-210.
4. Flavia F.E., Carlos E.F.S., Tania C.M.C., Mariangela C. Applicability of the National Nosocomial Infections Surveillance System Risk Index for the Prediction of Surgical Site Infections. A review. *The Brazilian J of Infectious Diseases*, 2007; 11(1): 134-141.
5. Robert Haley. Nosocomial infection in surgical patients: Developing valid measures of intrinsic patient risk. *The American J of Medicine*, 1991; 91(3B): 145-151.
6. Leaper D, van Goor H, Reilly J, Petrosillo N, Geiss H, Torres A, et al. Surgical site infection - a European perspective of incidence and economic burden. *Int Wound J.*, 2004; 1(4): 247-273.
7. Gaynes R, Culver D, Horan T, Edwards J, Richards C, Tolson J. Surgical Site Infection (SSI) Rates in the United States, 1992-1998: The National Nosocomial Infections Surveillance System Basic SSI Risk Index. *Clin Infect Dis.*, 2001; 33(s2): S69-S77.
8. Sattar I, Aziz A, Rasul S, Mehmood Z, Khan A. Frequency of infection in cholelithiasis. *J Coll Physicians Surg Pak*, 2007; 17(1): 48-50.
9. Gulácsi L, Kiss Z, Goldmann D, Huskins W. Riskadjusted infection rates in surgery: a model for outcome measurement in hospitals developing new quality improvement programmes. *J Hospital Infect*, 2000; 44(1): 43-52.