Original Research Paper

Volume-9 | Issue-12 | December - 2019 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Microbiology

# PREVALENCE OF WOUND INFECTIONS IN THE POST POSTOPERATIVE PATIENTS IN SAVEETHA MEDICAL COLLEGE HOSPITAL, CHENNAI

**R. Ahalya** — Department of Microbiology, Saveetha Medical College.

**Dr. P. A. T. Jagatheeswary*** — Professor, Department of Microbiology, Saveetha Medical College. *Corresponding Author

**ABSTRACT**

**AIM:** To study the prevalence of wound infections in the postoperative patients.

**INTRODUCTION:** Postoperative wound infections remain a major problem in health care facilities, resulting in extended length of stay, substantial morbidity and mortality, high cost and less frequent cause of death in the surgical patient.

**MATERIALS AND METHOD:** Out of 3730 patients, 25 patients were found to have postoperative infections and their data was assessed. Samples collected include wound swab, pus cells, and tissue cells. Specimens were labeled, kept in a thermo flask containing ice and transferred immediately to the laboratory for bacteriological examination.

**RESULT:** The present study showed SSI rate to be 0.8%. Out of 25 postoperative infections that was done 21 are found to be growth positive and remaining 4 are found to be growth negative. Out of 21 samples 13 were male and 8 were female. The most common organism found positive was Ecoli 38%.

**CONCLUSION:** Surgery site infections are common in males than females. E.coli was the most commonly isolated organism followed by Staphylococcus aureus and Pseudomonas aeruginosa. Prevention of SSI requires a multifaceted approach targeting pre-, intra-, and postoperative factors.

**AIM:** To study the prevalence of wound infections in postoperative patients in Saveetha Medical College, Chennai.

**KEYWORDS :**

## INTRODUCTION:

Hospital acquired infection (HAI) is a serious health hazard in India. WHO describes it as one of the major infectious disease that has a huge economic impact despite the advances in the control and prevention of nosocomial infections, they contribute significantly to the increasing rate of morbidity, mortality and value of care. It is estimated that surgical site infections develop in 2%-5% of the 16 million patients undergoing surgical procedures each year. Pathogens that cause SSI area unit non-heritable are acquired either endogenously from the patient's own flora or exogenously from contact with operative theatre personnel or the environment. However, the period of highest risk is during the time between the opening and closing of the operating site.

The most common types of nosocomial infections that could occur in a hospital set up are surgical site infections and other soft tissue infections, urinary tract, respiratory and blood stream infections .The site of infection may be limited to the suture line or may become extensive in the operative site and the infecting microorganisms vary, depending on the type and location of surgery, and antimicrobials received by the patient.Despite enhancements in operating theatre practices, instrument sterilization ways, better surgical techniques and infection prevention strategies, surgical site infections stay a significant cause of hospital-acquired infections and the rates are increasing globally even in hospitals that has modern facilities and standard protocols of surgical preparation and antibiotic prophylaxis.

Infection in a wound delays the healing process and may cause wound breakdown, herniation of the wound and complete wound dehiscence. Surgical site infections (SSIs) which account 17% of all health care-associated infections are the second most common infection next to urinary tract infection and result in greater lengths of stay and additional costs.

Global estimates of SSI have varied from 0.5% to 15% .Studies in India have consistently shown higher rates ranging from 23-28%.Nosocomial infections due to resistant organisms have been a problem with an increase in the incidence of Methicillin Resistant Staphylococcus aureus (MRSA), Vancomycin Resistant Enterococcus (VRE) and Pseudomonas aeruginosa.

In this context it becomes important to determine the prevalence of surgical site infections, assess the magnitude of the problem and provide a rationale to set priorities in infection control in the hospitals. Not many studies are done in India in this direction. Hence the present study had been undertaken.

## METHODOLOGY:

This was a retrospective study that was conducted at Saveetha medical college in Chennai. The study period was 6 months; from July to December 2018. Out of 3730 patients, 25 patients were found to have postoperative infections and their data was assessed. Samples collected include wound swab, pus cells, and tissue cells. Purulent materials were collected using sterile commercial cotton swabs aseptically and gently to avoid contamination of the specimens with normal microbial flora of the skin. Specimens were collected before redressing and administration of antibiotic therapy. Specimens were labeled, kept in a thermo flask containing ice and transferred immediately to the laboratory for bacteriological examination.

## INCLUSION CRITERIA:

Sample was collected from wound swab, pus cells and tissue cells of infected patients. Wound infection was fulfilled if any one of the following criteria was fulfilled: serous or non-purulent discharge from the wound, pus discharge from the wound, signs of inflammation (edema, redness, warmth, raised local temperature, fever >38°C, tenderness, induration) and wound deliberately opened up by the surgeon due to localized collection of serous.

## EXCLUSION CRITERIA

Blood, urine and sputum sample was excluded from collection.

Sample was excluded from patients have diabetic ulcer.

## CULTURE METHOD:

Post-operative wound swabs were used to inoculate blood agar, nutrient agar, chocolate agar plates and mannitol salt agar. These inoculated plates were incubated aerobically at optimum temperature 37°C for overnight (18-24 h).Plates were examined for growth of potential pathogens like Staphylococcus aureus, beta Haemolytic streptococci, Enterobacteriaceae, Pseudomonas aeruginosa, Acinetobacter species, Haemophilus influenzae, and Streptococcus pneumonia.

Susceptibility testing was done by the Kirby-Bauer disk-diffusion method.

## RESULT:

Out of the 25 specimens processed, growth was seen in 21 specimens, Escherichia coli being the most frequently isolated organism followed by Staphylococcus aureus, Pseudomonas aeruginosa, klebsiella pneumoniae, Streptococcus species, Acinetobacter baumannii and MRSA.

| S.NO | Growth positive | | | Growth negative | | |
|---|---|---|---|---|---|---|
| | Age | Sex | Unit | Age | Sex | Unit |
| 1 | 58yrs | F | Surgery | 38yrs | M | Surgery |
| 2 | 53yrs | M | Surgery | 51yrs | F | Ortho |
| 3 | 75yrs | M | OBG | 59yrs | F | Surgery |
| 4 | 48yrs | F | Ortho | 63yrs | M | Surgery |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | 21yrs | F | Surgery | | | |
| 6 | 30yrs | M | Surgery | | | |
| 7 | 60yrs | M | OBG | | | |
| 8 | 53yrs | M | Surgery | | | |
| 9 | 48yrs | F | Surgery | | | |
| 10 | 75yrs | M | Ortho | | | |
| 11 | 40yrs | M | Surgery | | | |
| 12 | 54yrs | F | Surgery | | | |
| 13 | 67yrs | F | Surgery | | | |
| 14 | 53yrs | M | Ortho | | | |
| 15 | 47yrs | M | Ortho | | | |
| 16 | 35yrs | F | Surgery | | | |
| 17 | 67yrs | M | Surgery | | | |
| 18 | 53yrs | M | OBG | | | |
| 19 | 39yrs | F | Surgery | | | |
| 20 | 47yrs | M | Surgery | | | |
| 21 | 54yrs | M | Surgery | | | |

**Table No.2 Percentage of each bacteria**

| Bacteria | No of bacteria | Percentage |
|---|---|---|
| E.coli | 8 | 38% |
| Staphylococcus aureus | 4 | 19% |
| Pseudomonas aeruginosa | 3 | 14% |
| Klebsiella pneumoniae | 2 | 10% |
| Streptococcus species | 2 | 10% |
| Acinetobacter baumannii | 1 | 5% |
| MRSA | 1 | 5% |
| Total | 21 | |

| | Antibiotic | Sensitivity | Resistance |
|---|---|---|---|
| **E.coli** | Ceftazidime | 4 | 4 |
| | Ciprofloxacin | 3 | 5 |
| | Piperacillin + Tazobactam | 7 | 1 |
| | Cefotaxime | 4 | 4 |
| | Amikacin | 8 | |
| | Cefoperazone + Sulbactam | 6 | 2 |
| | Gentamicin | 3 | 5 |
| | Cefoxitin | 5 | 3 |
| | Cefepime | 6 | 2 |
| | Imipenem | 7 | 1 |
| | Meropenem | 5 | 3 |
| | Ceftriaxone | 3 | 5 |
| | Co trimoxazole | 2 | 6 |
| | Erythromycin | 5 | 3 |
| | Tigecycline | 1 | 7 |
| | Ampicillin | 1 | 7 |
| | Ofloxacin | 7 | 1 |
| | Clindamycin | 7 | 1 |

| **Staphylococcus aureus** | Antibiotic | Sensitivity | Resistance |
|---|---|---|---|
| | Clindamycin | 3 | 1 |
| | Linezolid | 4 | |
| | Ceftazidime | 2 | 2 |
| | Erythromycin | 3 | 1 |
| | Vancomycin | 4 | |
| | Tetracycline | 4 | |
| | Cefoxitin | 4 | |
| | Gentamicin | 2 | 2 |
| | Co trimoxazole | 3 | 1 |
| | Ceftriaxone | 3 | 1 |
| | Ciprofloxacin | 4 | |
| | Ofloxacin | 3 | 1 |
| | Penicillin | 3 | 1 |

| **Klebsiella pneumonia** | Antibiotic | Sensitivity | Resistance |
|---|---|---|---|
| | Gentamicin | 2 | |
| | Amikacin | 2 | |
| | Piperacillin + Tazobactam | 2 | |
| | Ceftriaxone | 2 | |
| | Cefepime | 2 | |
| | Imipenem | 2 | |
| | Meropenem | 1 | 1 |
| | Cefoperazone + Sulbactam | 1 | 1 |
| | Ampicillin | | 2 |
| | Co trimoxazole | 1 | 1 |

| **Streptococcus Species** | Antibiotic | Sensitivity | Resistance |
|---|---|---|---|
| | Vancomycin | 2 | |
| | Linezolid | 2 | |
| | Gentamicin | 2 | |
| | Ampicillin | 1 | 1 |
| | Penicillin | 2 | |
| | Cefotaxime | 1 | 1 |
| | Co trimoxazole | | 2 |

| **Acinetobacter baumannii** | Antibiotic | Sensitivity | Resistance |
|---|---|---|---|
| | Colistin | 1 | |
| | Tigecycline | 1 | |
| | Ampicillin | | 1 |
| | Piperacillin + Tazobactam | | 1 |
| | Ceftriaxone | | 1 |
| | Cefoperazone + Sulbactam | | 1 |
| | Cefepime | | 1 |
| | Imipenem | | 1 |
| | Gentamicin | | 1 |
| | Ciprofloxacin | | 1 |
| | Co trimoxazole | | 1 |

| **Pseudomonas aeruginosa** | Antibiotic | Sensitivity | Resistance |
|---|---|---|---|
| | Piperacillin + Tazobactam | 3 | |
| | Ceftazidime | 3 | |
| | Cefoperazone + Sulbactam | 3 | |
| | Cefepime | 2 | 1 |
| | Imipenem | 1 | 2 |
| | Meropenem | 1 | 1 |
| | Gentamicin | 3 | |
| | Amikacin | 3 | |
| | Ciprofloxacin | 3 | |
| | Tigecycline | 2 | 1 |
| | Colistin | 2 | 1 |

| **Acinetobacter baumannii** | Antibiotic | Sensitivity | Resistance |
|---|---|---|---|
| | Colistin | 1 | |
| | Tigecycline | 1 | |
| | Ampicillin | | 1 |
| | Piperacillin + Tazobactam | | 1 |
| | Ceftriaxone | | 1 |
| | Cefoperazone + Sulbactam | | 1 |
| | Cefepime | | 1 |
| | Imipenem | | 1 |
| | Gentamicin | | 1 |
| | Ciprofloxacin | | 1 |
| | Co trimoxazole | | 1 |

| **MRSA** | Sensitivity | Antibiotic | Resistance |
|---|---|---|---|
| | 1 | Gentamicin | |
| | 1 | Vancomycin | |
| | 1 | Linezolid | |
| | 1 | Co trimoxazole | |
| | 1 | Erythromycin | |
| | | Penicillin | 1 |
| | | Ciprofloxacin | 1 |
| | | Cloxacillin | 1 |
| | | Clindamycin | 1 |

**DISCUSSION:**

Surgical site infections are the commonest complication in post surgical patients. The study shows that the infection is common in the age group of 41 to 60yrs. The present study shows the rate of surgical site infection to be 0.8% . Males have higher predominance of

infection than females. The commonest bacterial strain that was identified was E.coli n=8;38% followed by staphylococcus aureus n=4;19% Pseudomonas aeruginosa n=3;14% klebsiella pneumoniae n=2;10% streptococcus species n=2;10% Acinetobacter baumanni n=1;5% MRSA n=1;5%. E.coli is resistant to ciprofloxacin, Gentamicin, ceftriaxone ,CO trimoxazole, Tigecycline and Ampicillin. Klebsiella pneumoniae resistant to Merpenem, Ampicillin and Co trimoxazole. The research showed infection rate to be 12.5% in elective surgery and 17.7% in emergency surgery. This correlates to the findings of Anshul Kumar(6)* and Arpita Rai(7)*. The surgical site infection was found to be 11%(20)* . This correlates to the findings of AkhterMS, Verma R,Madhukar KP, Vaishampayan AR, unadkat PC. Another research shows SSI rate to be 14.33%(13)*, This correlates to the study of Dr. Anand Saxena, Dr. Mahendra Pratap Singh, Dr. Swagata Brahmchari, Dr. Malay Banerjee.The SSI in our hospital is low when compared with other research's .This is attributed to clean medical practices in operation theatres, proper pre and postoperative prophylaxis and good hospital hygiene.

## CONCLUSION

Surgical site infections are more common among men than in females. This can be explained by multiple risk factors in male such as cigarette smoking and alcohol consumption as they delay the wound healing process.

E.coli was the most commonly isolated organism followed by S.aureus and Pseudomonas.

The surgical site infection rate is found to be 0.8%.

The study reveals the prevalence and the risk factors associated with the infection. There could be reduction in the SSI rate by strictly following the pre and postoperative prophylaxis.

## REFERENCE


1. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection,1999. Hospital Infection Control Practices Advisory Committee. Infect Control Hosp Epidemiol. 1999;20(4):250.
2. Shahane V, Bhawal S, Lele U. Surgical site infections: A one-year prospective study in a tertiary care center. Int J Health Sci (Qassim). 2012;6(1):79- 84.
3. Raka L, Krasniqi A, Hoxha F, Musa R, Mulliqi G, Krasniqi S, et al. Surgical site infections in an abdominal surgical ward at Kosovo Teaching Hospital. J Infect Dev Ctries. 2007;1(3):337-41
4. Lilani SP, Jangale N, Chowdhary A, Daver GB. Surgical site infection in clean and clean-contaminated cases. Indian J Medical Microbiol. 2005;23(4):249-52.
5. Fiorio M, Marvaso A, Viganò F, Marchetti F. Incidence of surgical site infections in general surgery in Italy. Infect. 2006;34:310-4.
6. Ansul Kumar ,Department of Cardiothoracic and Vascular Surgery, RIMS, Ranchi, Jharkhand, India
7. Arpita Rai, Department of Oral Medicine and Radiology, Faculty of Dentistry, Jamia Millia Islamia, New Delhi, India
8. Reiffel AJ, Barie PS, Spector JA. A multi- disciplinary review of the potential association between closed-suction drains and surgical site infection. Surg Infect (Larchmt). 2013;14(3):244- 69.
9. Brandt C, Sohr D, Behnke M, Daschner F, Ruden H, Gastmeier P. Reduction of surgical site infection rates associated with active surveillance. Infect Control Hosp Epidemiol. 2006;27:1347-51.
10. Prospero E, Cavicchi A, Bacelli S, Barbadoro P, Tantucci L, D'Errico. Surveillance for surgical site infection after hospital dishcarge: a surgical procedure-specific perspective. Infect Control Hosp Epidemiol. 2006;27:1313-7.
11. Brandt C, Sohr D, Behnke M, Daschner F, Ruden H, Gastmeier P. Reduction of surgical site infection rates associated with active surveillance. Infect Control Hosp Epidemiol. 2006;27:1347-51.
12. Prospero E, Cavicchi A, Bacelli S, Barbadoro P, Tantucci L, D'Errico. Surveillance for surgical site infection after hospital dishcarge: a surgical procedure-specific perspective. Infect Control Hosp Epidemiol. 2006;27:1313-7.
13. Dr. Anand Saxena, Dr. Mahendra Pratap Singh, Dr. Swagata Brahmchari, Dr. Malay Banerjee. Dept. of General Surgery, L.N.Medical College & RC, Bhopal-462042 (MP) Dept of Microbiology, , L.N.Medical College & RC, Bhopal-462042 (MP)
14. Anusha S, Vijaya LD, Pallavi K, Manna PK, Mohanta GP,Manavalan R.An Epidemiological Study of Surgical Wound Infections in a Surgical unit of Tertiary care Teaching Hospital. Indian Journal of Pharmacy Practice, Volume 3, Issue 4; Oct – Dec 2010;8-13.
15. Mohamed Issa Ahmed. Prevalence of Nosocomial wound Infection among Postoperative patients and Antibiotics patterns at Teaching Hospital in Sudan. North Am J Med Sci; Jan 2012, Vol 4, Issue 1; 29-34.
16. Satyanarayana V. et al. Study of Surgical Site Infections in Abdominal Surgeries. Journal of Clinical and Diagnostic Research; 2011, October, Vol-5(5): 935-9.
17. Lilani SP, Jangale N, Chowdhary A, Daver GB. Surgical site infection in clean and clean-contaminated cases. Indian J Med Microbiol 2005; 23:249-52.
18. Patel Sachin et al. Surgical Site Infections: Incidence And Risk Factors In A Tertiary Care Hospital, Western India. National Journal of Community Medicine Vol 3 Issue 2 April-June 2012; 193-6.
19. Ercole FF, Starling CEF, Chianca TCM, Carneiro M. Applicability of the National Nosocomial Infections Surveillance System Risk Index for the Prediction of Surgical Site Infections: A Review. The Brazilian Journal of Infectious Diseases 2007; 11(1):134-41.
20. Akhter Verma,General surgery,Senior Resident,Verma R,General Surgery,Professor,Head of unit,Vaishamapayan AR,General Surgery,Lecturer,Unadkat PC,Medical student.