JOURNAL OF CURRENT TRENDS IN CLINICAL MEDICINE & LABORATORY BIOCHEMISTRY

ORIGINAL ARTICLE

Bacteriological Profile in Post Operative Wound Infection; A Study at Puducherry

[1]Sreeramadasu Ramaiah*, [2]Ganesh Rathod, [3]A.Ilakkiya, [4]Kanagathara, [5]Prabhakar Reddy, [6]Naveenkumar. C

ABSTRACT

This study helps to find the pattern of microorganisms responsible for post operative wound infections and their antibiotic susceptibility profile was conducted. A 75 post operative wound cases were included. Among 94 post operative wound patients, 75 potential bacterial pathogens were isolated. Among them Staphylococcus aureus 33 (44%) predominated, followed by Escherchia coli 18 (24%), Klebsiella pneumonia 12 (16%), Pseudomonas aeruginosa 5 (6%), Proteus mirabilis 3 (4%), Serratia marcescens 2 (3%) Candida albicans 1 (1.5%) and other Enterobacteriaceae 1 (1.5%). Monomicrobial and Polymicrobial infection was observed in 60.8% and 39.2% patients respectively. Orthopedic surgery and gastrointestinal surgery was associated with an increased risk of infection due to Methicillin resistant Staphylococcus aureus and Escherichia coli respectively. The quinolones, ciprofloxacin and ofloxacin, should be used as frontline drugs in the management of surgical wound infections at the hospital.

KEY WORDS : Nosocomial infections, Surgical Infection Society (SIS), Post Operative wound infection, MDR hospital flora, Surgical site infection(SSI)

Introduction

In spite of the progress in surgery, surgical techniques and antibiotic prophylaxis [1-3], postoperative infections remain the commonest postoperative complications and one of the most frequently encountered nosocomial infections worldwide[4-5].

[1] Associate Professor of General Surgery,
[2]Associate Professor of General Medicine,
Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry.
[3] Tutor of Microbiology,
Sri Ramachandra Medical College and Hospital, Chennai.
[4]Research Assistant, Centre for Research,
[5]Professor of Biochemistry,
[6] Tutor of Microbiology,
Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry.

***Corresponding Author**
Dr. Sreeramadasu Ramaiah,
Associate Professor of General Surgery,
Sri Lakshmi Narayana Institute of Medical Sciences,
Osudu lake, Puducherry.
Email Id: drsramayya@gmail.com
Mobile No: +91 98 49 460248

The incidence of these infections has been estimated to be 15.45% and 11.32% by the Center for Disease Control and Prevention (CDC) USA and the UK Nosocomial Infection Surveillance respectively [6]. These infections lead to increase morbidity with the assoctiaed increase in cost of therapy [7]. The high incidence and prevalence of postoperative wound infections also result in increasing demand on the limited resources available to healthcare delivery eventually resulting in high degree of mortality [1,7].

As a result of these problems, routine surveillance for hospital acquired wound infections, including surgical wound infections, is recommended by both the CDC and the Surgical Infection Society in USA (SIS) [2,7]. Risk of wound infection varies with the type of surgery and surgical operations have been classified into, clean,

clean-contaminated, contaminated and dirty [8-9]. Contaminated wounds are traumatic wounds less than 6 hours old and wounds in which the inflamed upper gastrointestinal tract and obstructed urinary bladder are opened or spillage of contents occurs. The major classification of operative wounds based on degree of microbial contamination are clean wound, clean contaminated wound, contaminated wound and dirty or infected wound and the most common isolates in all types are Staphylococcus aureus, Pseudomonas aeruginosa, Proteus vulgaris, Escherichia coli, Klebsiella spp, Enterococcus spp [10].

We have designed and conducted the present study, involving the major surgical departments of a tertiary care teaching hospital in Puducherry in order to access:

1. The prevalence of aerobic bacterial pathogens in the post operative wound infection
2. The comparison the etiological agents of post operative wound infection in various surgical specialities and also understand the associated risk factors.

Materials and Methods

A study of bacteria isolated from infected wounds of patients in the department of orthopaedics and traumatology was conducted at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry.

The surgical services include general, orthopaedic, vascular, paediatrics, otolaryngology, genitourinary, obstetrics and gynaecology. Certain underlying conditions like anaemia, diabetes, and smoking may alter or decrease the immune status thus significantly increasing the risk of SSI.

Table. No. 1. 75 Isolates from 94 Patients with Post Operative Wound Infections

S. No	Microbial Pathogens	Number of isolates
1	Methicillin sensitive Staphylococcus aureus (MSSA)	10 (13.4%)
2	Coagulase negative Staphylococci (CONS)	8 (10.6%)
3	Methicillin resistant Staphylococcus aureus (MRSA)	15 (20%)
4	Escherichia coli	18 (24%)
5	Klebsiella pneumonia	12 (16%)
6	Pseudomonas aeruginosa	5 (6%)
7	Proteus mirabilis	3 (4%)
8	Serratia marcescens	2 (3%)
9	Candida albicans	1 (1.5%)
10	Other Enterobacteriaceae	1 (1.5%)

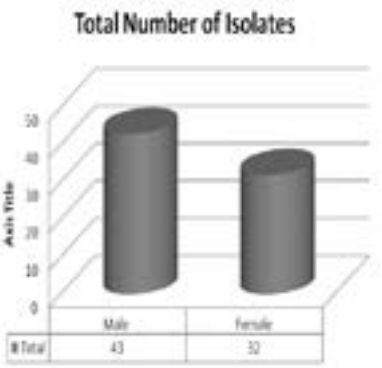
A dedicated infection control team under the leadership of the department of microbiology have been involved in the surveillance of SSIs. The sample size of 75 pus samples included in this study (April 2014 – June 2014). The inclusion criteria are pus swabs, aspirates from post operative wound infections and the exclusion criteria are wound swabs from trauma, burns, stitch abscess, episiotomy wounds and circumcision site. Two swabs or aspirates per patient were collected – one for gram staining and another for culture. After 24 hours of incubation, the isolates were identified by colony morphology, gram staining and biochemical tests [11]. Antibiotic sensitivity test (AST) by disc diffusion method was performed according to the CLSI guidelines for all isolates with the control strains of Escherichia coli ATCC 25922, Pseudomonas aeruginosa ATCC 27853 and Staphylococcus aureus ATCC 25923 [12-13].

Microbiological Profile

Among the 94 samples included, 65 (70%) had growth and 29 (30%) had no growth. About 75 isolates were possible with post

operative wound infections included in this investigation. The microbial pathogens isolated from the pus samples of post operative wound cases are summarized in Table 1. The AST performed with Meropenem, Linezolid, Vancomycin and Piperacillin/Tazobactum and Quinolones (Levofloxacin and Ciprofloxacin) drugs.

Results and Discussion



All the specimens obtained yielded growth of bacteria. A total number of 75 Isolates included, of which 43 were male (57%) and 32 were female (43%). Sensitivity of the isolates to different antibiotics varied and most isolates were multidrug resistant. In general, resistance to the β-lactam antibiotics was above 98% except for cephadroxil which showed a resistance of 91.5%. More than 70% of isolates were resistant to erythromycin, fusidic acid and trimethoprim. The staphylococcal pathogens were 100% sensitive to all the fluoroquinolones tested but the CONS had a susceptibility of 89.9% to ciprofloxacin. SSIs are mostly caused by MDR hospital flora. Superficial site infections are caused by contamination from skin which is easily colonized by hospital flora. Deep SSIs are caused by contamination from endogenous visceral flora or skin contaminants gaining entry and in fascia and muscles through incision or port sites[14-16].

Conclusion

The results of the above study exemplify that there is an increasing need for gaining knowledge about sensitivity and resistance, which varies in a geographical manner. The isolates from this study showed that Staph. aureus was the most isolated organism from the pus culture reports followed by E.coli and Klebsiella. All these organisms showed a very high sensitivity to Meropenem, Linezolid, Vancomycin and Piperacillin/Tazobactum and Quinolones (Levofloxacin and Ciprofloxacin). The drug administration should be maintained under the surveillance for both the pre and post operative surgery for the patient care.

References

1. Bowler PG, Duerden BI, Armstrong DG. Wound Microbiology and Associated Approaches to wound management. Clinical Microbiology Review. 2001; 14(2):244 –269.
2. Nichols RL. Current Strategies for Prevention of Surgical Site Infections. Curr Infect Dis Rep. 2004; 6(6):426- 434.
3. Surucuoglu S, Gazi H, Kurutepe S, Ozkutuk N, Ozbakkaloglu B. Bacteriology of surgical wound infections in a tertiary care hospital in Turkey. East Afr Med J. 2005; 82:331-336.
4. Tesfahunegn Z, Asrat D, Woldeamanuel Y, Estifanos K. Bacteriology of surgical site and catheter related urinary tract infections among patients admitted in Mekele Hospital, Mekele, Tigray, Ethiopia. Ethiopian Medical Journal. 2009; 47:117-122.
5. Ashby E, Haddad FS, O'Donnell E, Wilson AP. How will surgical site infection be measured to ensure "high quality care for all"? The Journal of Bone and Joint Surgery. 2010; 92(9):1294-1299.
6. Whitehouse JD, Friedman ND, Kirkland KB, Richardson WJ, Sexton DJ. The impact of surgical-site infections following orthopedic surgery at a community hospital and a university hospital: adverse quality of life, excess length of stay, and extra cost. Infection Control and Hospital Epidemiology. 2002; 3(4):183-189.

7. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection, Hospital Infection Control Practices Advisory Committee. Infection Control Hospital Epidemiology. 1999; 20(4):250-278.
8. Oluwatosin OM. Surgical Wound Infection: A General Overview. Annals of Ibadan Postgraduate Medicine. 2005; 3(2):26-31
9. Lilani SP, Jangale N, Chowdhary A, Daver GB. Surgical site infection in clean and clean-contaminated cases. Indian Journal of Medical Microbiology. 2005; 23:249-252
10. Amrita, S., Sheetal, R. and Narendra, N. Aerobic microorganisms in post operative infections and their antimicrobial susceptibility patterns. J. Clin. Diagn. Res., 2001.4: 3392-3399.
11. Forbes, A.B., Sahm, D.F. and Weissffeld A.S. Bailey and Scott Diagnostic Microbiology (12th ed): Lippicott, London. 2006.
12. Bauer, A.W., Kirby, W.M.M., Sherris, J.C. and Turck, M. Antibiotic sensitivity testing by a standardizing single disk method. Am. J. Clin. Pathol. 1966.45: 493-496.
13. NCCLS. Performance standards for antimicrobial disk susceptibility tests. Approved standard M2-A8. CCCLS. 2003.
14. Ramesh, A. and Dharini, R. Surgical site infections in a teaching hospital. Clinico, Microbiological and Epidemiological profile. Intern. J. Biol. Med. Res. 2012; 3: 2050-2053.
15. Rubin, R.H. Surgical wound infection: epidemiology, pathogenesis, diagnosis and management. BMC. Infect. Dis. 2006;6: 171-174.
16. Gottrup, F., Melling, A. and Hollander, D.A. An overview of surgical site infections: aetiology, incidence and risk factors. EWMA. J. 2005;5: 11-15.