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# **BACTERIOLOGICAL PROFILE IN POST OPERATIVE WOUND INFECTION; A STUDY AT PUDUCHERRY**

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# ABSTRACT

In surgical patients, infection is an important cause of morbidity and mortality. A prospective study to find the pattern of microorganisms responsible for post operative wound infections and their antibiotic susceptibility profile was therefore conducted. A 75 post operative wound cases were included thereby various potential bacterial pathogens isolated from 94 patients. 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.

## 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]. 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 attendant 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].

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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, cleancontaminated, 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, etc [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:

The prevalence of aerobic bacterial pathogens in



Table 1. Isolates of 75 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 pneumoniae	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%)

the post operative wound infection.

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 retrospective study of bacteria isolated from infected wounds of patients in the OPD of our hospital. 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.

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, ATCC 27853 Pseudomonas aeruginosa 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 samples 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  $\beta$ -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, 15, 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.

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