



## Bacteriological profile of Surgical site infection of post operative Orthopaedic cases in a tertiary care centre – A Prospective study

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### ABSTRACT

**Introduction-** In the era of scarcity of hospital beds at tertiary care centres, surgical site infection constitutes a major hurdle in optimally utilising the health resources. Surgical site infection increases the length of hospitalisation as well as cost of treatment.

**Aim-** The aim of present study was to study the bacteriological profile of surgical site infection in a tertiary care centre.

**Material and Methods-** 58 samples with sterile cotton swab sticks were taken from Post operative Orthopaedic patients clinically suspected of having surgical site infection in a tertiary level Medical College in Ambala. The specimens were subjected to staining and cultures. The isolates were identified by standard microbiological techniques.

**Results and Observations-** Out of 58 cases with suspected SSI, 30 cases showed positive cultures. A total of 33 organisms were isolated from 30 positive wound samples with 39.3% showing isolated gram positive, 42.4% showing growth of gram negative and 18.1% showing mixed bacterial growth.

**Conclusion-** The rate of surgical site infection, bacteriological and Epidemiological profile closely resembled that of other similar studies done in Indian subcontinent. Key measures before and after surgical procedures may be helpful in decreasing the incidence of surgical site infections

**KEYWORDS :** Nosocomial infection, Surgical wound, Bacteriological profile, Infection control.

### INTRODUCTION

Post operative wound infections are a major burden on the healthcare services leading to an increase in the duration of hospitalisation, cost of treatment, morbidity and mortality [1, 2]. Most of these infections are hospital acquired and their bacteriological profile varies across various hospitals [3]. Lack of standardised criteria for diagnoses presents a challenge to monitor the global epidemiology of surgical site infections. In addition, emergence of high antimicrobial resistance among bacterial pathogens has made the treatment of SSIs a challenging task [4].

US centre for disease control (CDC) defines any post operative wound infection as surgical site infection. This is further defined as: Superficial SSI involving skin and subcutaneous tissue, Deep SSI involving fascia and muscles and organ specific SSI. Primary Surgical wound infections means the ones arising during the surgical procedure itself owing to poor operating room conditions, poor soft tissue handling. Whereas Secondary wound infection arises in post operative cases from sources in the Wards or as a result of some complications (6).

Primary wound infections are more serious and usually appears within 5- 7 days after index surgery. Epidemiology of these infections closely follows that of Indigenous flora, that of a member of operating team or to some environmental sources in the operation theatre (8).

The virulence of the organism causing infection, physiological state of soft tissues and host immunity plays an important role in determining the risk of Infection(7). The host variables include the state of hydration, nutrition, existing medical co morbidities and pre, intra and post op care received. It has been estimated that each patient with a surgical site infection will require an additional 6.5 days in hospital which almost doubles the cost of hospitalisation (13).

The emergence of poly antimicrobial resistant strains of hospital pathogens has also presented a challenge in the provision of good quality care. That is why it is of utmost importance that identity of

the causative organism and targeted antibiotic supplemented with debridement of devitalised tissue be done to control any untoward complication.

Wound swabbing is the most common sampling method used throughout the United Kingdom, although its clinical value has been questioned by various authors (10). In purely financial terms, a negative wound swab costs between 20 -30 \$ and each requested sensitivity testing costs an additional 10\$. Quantitative analysis using Wound biopsies may result in recognition of the amount of bacterial burden but is usually not done on routine basis.

Once a SSI is confirmed, the main objective usually is to reduce rather than eradicate the bacterial burden within the wound margins. There have been advances in SSI control practices including better operating room ventilation, surgical part preparation protocols, careful tissue handling and using minimally invasive techniques wherever feasible, use of surgical barriers and antibiotic prophylaxis.

The present study aims to know the bacterial profile of post operative wound infection in orthopaedic cases at MMIMSR, Ambala. The purpose is to identify key areas of breach in surgical barriers and apply this knowledge to limit surgical site infections.

### MATERIAL & METHODS

A cross sectional study was conducted in liaison with the department of Microbiology at MMIMSR. The duration of study was one year. Patients who developed wound infection after surgery were included in this study. Patients with wound infection prior to surgery were excluded from this study. Ethical clearance from Institutional review committee was obtained prior to starting this study.

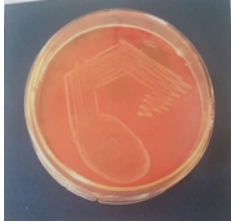
Wound swabs were subjected to microbiological analysis by gram's staining and culture. All specimens were inoculated on 5% blood agar and Mac Conkey agar plates and incubated overnight at 37degree Celsius. The isolates were identified by standard microbiological techniques. All identified organisms were

subjected to antimicrobial susceptibility testing.

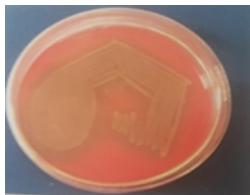
## RESULTS & OBSERVATIONS

A total of 58 wounds were swabbed out of which 30 (51.7%) came out positive. 80 % of patients were in the age group of 21 – 60 years with male dominance. 89 % of the swab samples showed presence of pus cells while 51.7% came positive for bacterial growth. 39% of swabs showed growth of pure gram positive while 42.4% showed pure gram negative bacterial growth with the rest showing mixed growth.

Of the gram positive bacteria, *Staphylococcus aureus* was the most frequently isolated bacteria



**Figure 1 - Growth of *S. Aureus***



**Figure 2 - Growth of *P. Aeruginosa***

Of all the gram negative bacteria, *Pseudomonas aeruginosa* was the most frequent gram negative one to be grown out of wound swabs on culture. The growths on Culture media were subjected to antibiotic susceptibility testing. Almost all gram positive cocci were sensitive to Vancomycin. On the contrary, gram negative bacteria were all sensitive to Piperacillin Tazobactam and Imipenem.

## DISCUSSION

Surgical site infections are defined as infection occurring at the surgical site within 30 days of the index surgery. It accounts for 15 % of all Nosocomial infections. These infections complicate the illness, increase patient discomfort and delayed rehabilitation. The development of wound infection depends on the multitude of factors and usually it is difficult to predict, which wound will get infected.

The present study was conducted on 58 patients of post operative wound infection over a period of one year in the Orthopedics ward. The rate of wound infection in this study (51.7%) was comparable to other studies viz Alok et al (53.11%), Neelima et al (59.59%)

Demographic profile of the patient is essential for the collection of Epidemiological information thereby potentiating the diagnosis and thus treatment. In the present study, the maximum number of patients were in the age group of 21-40 years which is in accordance with Raza et al (2), Kumari et al and Jeena amatya et al (15). The male preponderance in this study may be related to increased external environment exposure in males as compared to females.

This study highlighted the importance of swabbing the postoperative suspicious wounds and subjecting the specimens to identify the causative organism and its sensitivity pattern as only 30 out of 58 patients who showed post operative wounds were positive for significant bacterial colonisation requiring either change in the primary post operative antibiotic regime or increasing the duration and frequency of drug administration. Hence concluding the importance of remaining vigilant to reduce the incidence of Post operative infection and starting targeted antibiotic regimen for

early and effective control of infection.

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