# Bacteriological Profile of Post-Operative Wound Infection

**Subrata Roy**
Padmashree Dr. D. Y. Patil Medical College, Hospital & Research Centre (Pune)

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**ABSTRACT :**

Postoperative wound infection is a severe problem in the surgical specialties, which can cause mortality, morbidity and economic burden. In most post-operative SSIs the causative pathogens originate from endogenous flora of the patient's skin, mucous membranes or hollow viscera. Objectives of the present study were to study the frequency of various types of bacteria.

The study was carried out in general ward of the North Indian hospitals. The samples from the 50 post-operative patients were evaluated for the study. Samples were taken from the patients during the period of surgical wound dressing before the wound was cleaned with antiseptic solution. The swab was inoculated onto plates of MacConkey agar and 5% Sheep blood agar by rolling the swab over the agar and streaked. These plates were incubated at 37° C for 24- 48hours.

The present microbiological study has determined the commonest bacteria responsible for the post-operative wound infectons. There was predominance of commonly isolated bacterial species were *S. aureus, P. aeruginosa and E. coli.*

Key-words: Postoperative wound, Bacteriological profile, *S. aureus, P. aeruginosa* and *E. coli.*

## INTRODUCTION:

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Surgical site infections can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material.

Surgical site infection (SSI) is defined as an infection occurring within 30 days after a surgical operation (or within 1 year if an implant is left in place after procedure) and affecting either incision or deep tissues at the operation site. These infections may be superficial or deep incisional infection or infections involving organ or body space [1]. Postoperative SSI is among the most common problems for patients who undergo operative procedures and the third most frequently reported nosocomial infection in the hospital population [1]. Postoperative surgical site infections are associated with increased morbidity, mortality, prolonged hospital stay and increased economic costs for patient care [2].

There has been advance in SSI control practices which include improved operating room ventilation, sterilization methods, use of barriers, surgical technique and availability of antimicrobial prophylaxis. Despite, these SSIs remain common causes of morbidity and mortality due to emergence of antimicrobial resistant pathogenic bacteria [1]. This is partly contributed by inappropriate use of surgical antimicrobial prophylaxis [3]. SSIs can be reduced by appropriate use of surgical antimicrobial prophylaxis. In hospital practice 30- 50% of antibiotics are prescribed for surgical prophylaxis and 30-90% of this prophylaxis is inappropriate [4]. This inappropriate use increases selection pressure favouring emergence of pathogenic drug resistant bacteria [3] which makes the choice of empirical antimicrobial agents more difficult and hence increasing the risk of post-operative wound infections.

In most post-operative SSIs the causative pathogens originate from endogenous flora of the patient's skin, mucous membranes or hollow viscera [1]. The most commonly isolated bacterial pathogens are *S. aureus,* Enterobacteriaceae, Coagulase Negative Staphylococci (CoNS), Enterococci and Pseudomonas aeruginosa [5, 6]. Although the pathogens isolated depend on the surgical procedure involved, recent reports have documented an increasing proportion of Gram positive rganisms and decrease in number of Gram negative organisms associated with SSIs [1]. Furthermore, there is an increase in incidence of SSIs attributed to antimicrobial resistant pathogenic bacteria like methillin resistant Staphylococcus aureus (MRSA) [2, 7] and Vancomycin resistant Staphylococcus aureus.

Bacterial contamination of the surgical site is a prerequisite for SSIs. Following contamination the risk of development of SSIs will depend on several factors, the most important ones being the dose and virulence of the pathogens, and host defense mechanisms [1]. The risk of SSIs increases if the surgical site is contaminated with more than 105 organism per gram of tissue [8]. The dose required for infection can even be lower if a foreign body such as suture is present at the site [1].

Virulence of bacteria depends on the ability to produce toxins and other substances that increase their ability to invade the host, produce tissue damage or survive within the host cells. For example Gram negative bacteria con-

***Corresponding author:**
**Dr. Subrata Roy**
MBBS, MS, General Surgery,
Assistance Professor,
Padmashree Dr. D. Y. Patil Medical College, Hospital & Research Centre (Pune)

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tain endotoxin or Lipopolysaccharide (LPS) which is the most potent microbial mediator implicated in the pathogenesis of sepsis and septic shock. LPS triggers the release of procoagulant factors and inflammatory mediators such as cytokine which may initiate systemic inflammatory response syndrome and cause multiple systemic organ failure [9]. Some bacteria produce polysaccharide capsule, which inhibit phagocytosis which is a critical host immune response following bacterial contamination [1]. When incision is made invariably it impairs first line of defenses between the environmental microbes and internal host environment, therefore the exposed tissues are at risk of contamination with endogenous patient's flora [1]. Exogenous contamination may also occur from operating room environments, surgical teams and instruments.

The common type of infections occurs are wound infections after surgery. This is responsible for the longer hospital stay. This hospital stay intern results in the more cost of the treatment. Also this additional treatment results in the antimicrobial resistance. Most of these infections are superficial and readily treated with a regimen of local care and antibiotics.

The previous knowledge of the infection and the causative organism will help to decide the antibiotic selection along with the there resistance [10].

The highly observed organism is the Staphylococcus causing wound infections. The incidence of MRSA (Methicillin Resistant Staphylococcus aureus) in India ranges from 30-70%. The incidence of nosocomial infections which are caused by MRSA continues to increase; therefore, the importance of their detection, especially for treatment and epidemiological purposes arises [11].

**Objective:**

The study was carried out to know frequently isolated bacterial microorganism in the post-operative wound infections.

**Methodology:**

The study was carried out in general ward of the North Indian hospitals. The samples from the 50 post-operative patients were evaluated for the study. The ages of the patients are in the 20-50 years. The surgical operative procedures are done in such patients and showing Surgical site infection is the main inclusion criteria of the enrolled patients. Samples were taken from the patients during the period of surgical wound dressing before the wound was cleaned with antiseptic solution.

The swab was inoculated onto plates of MacConkey agar and 5% Sheep blood agar by rolling the swab over the agar and streaked. These plates were incubated at 37° C for 24-48hours [12].

**Result & Discussion:**

Table 1 : Organism Detected in Culture

| Organism Observed | Number of Patients |
|---|---|
| Acinetobactor spp | 2 |
| Citrobacter spp. | 1 |
| Diphtheroids | 2 |
| E.coli | 8 |
| Enterococcus | 3 |
| Klebsiella | 3 |
| P.aerugenosa | 12 |
| S.aureus | 19 |
| Total | 50 |

Table 1 shows the type of organism detected in the pus culture and number of incidence in the study. Out of the 50 patients S.aureus is observed in maximum number of patients i.e. in 19 patients pus culture. After this the major prevalence of P.aerugenosa and E.coli is found.

Advances in control of infections have not completely eradicated this problem because of development of drug resistance [13]. The surveillance of nosocomial infections with an emphasis on antimicrobial audit will reduce the risk of postoperative wound infections [11].

The three most commonly isolated bacterial species were S. aureus, P. aeruginosa and E. coli. Similar staphylococcal wound infection has been reported by Siddiqi et al [14], Mohanty et al [15] and by Vidhani et al [16].

Predominance of Staphylococcus aureus in surgical site infection is also consistent with reports from Lilani et al in [2001-2002] [17] reported that Staphylococcus aureus was the commonest isolate from the postoperative wound infections.

**Conclusion:**

The postoperative wound infection is the commonest nosocomial infection only after the urinary tract infection. The present microbiological study has determined the commonest bacteria responsible for the post-operative wound infectons. There was predominance of commonly isolated bacterial species were S. aureus, P. aeruginosa and E. coli. Hence the study concludes that the strict majors needs to be taken to avoid such post-operative wound infections. Also the treatment of this may leads to the antibiotic resistance. The data in the present study may be useful in the for choosing the effective therapy against the isolates from postoperative infected wound.

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