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Isolation, characterization and antimicrobial activity of bacteria isolated from post-operative wounds

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ABSTRACT

The development of post-operative sepsis is an important event that cannot always be prevented. During surgery the percentage of organism isolated will be only in minimal range or completely absent but there is a chance of acquiring infection after post-operative surgery. In present study the wound swab from patients about 50 Nos were collected during surgery and after post-operative surgery in duplicates. The predominant isolates were found only in Post-operative wound. They are *S aureus, Proteus mirabilis, Pseudomonas aeruginosa*where as during surgery only *E. coli* was observed and these isolates were further subjected to antimicrobial activity. All the isolates were mostly sensitive to antibiotics and the resistant pattern was observed minimum and none of the MDR strains were observed in our study.

Key words: wound sample, surgery, post-operative, bacterial isolates, MHA

INTRODUCTION

Post-operative infectious complications area frequent cause of morbidity and mortality in surgical patients. The four most common sites of postoperative infection are surgical wounds, lungs, urinary tract and intravascular devices. The incidence varied from surgeon to surgeon, hospital to hospital, one surgical procedure to another (Ronald, 1993). The majority of the post-operative wound infections are uncomplicated, involving only the skin and subcutaneous tissue. Infrequently they progress to become necrotizing infections, which may involve the fascia and muscle. The usual clinical presentation of uncomplicated wound infection includes local incision pain, tenderness, swelling, redness and increased warmth and elevated body temperature which most often begin between the four and eight post-operative day. The microbial cases of surgical wound infection are virtually always endogenous to the patient; they vary according to surgical procedure. At least 4 factors may affect the organisms causing surgical wound infection. In the present study 50 clinical samples were collected in duplicates after post-operative surgical wound infection at the time of surgery (50 Nos). The bacteria were isolated and antibiogram pattern of determined by Kirby Bauer method to determine the presence of MDR strains.

MATERIALS AND METHODS

Collection of Sample–50 different clinical samples were collected in duplicates from patients in the operation theatre undergoing surgery at the time of closing of wound after operation. Subsequently specimens were taken in the post operative period at the time of dressing from the same patients. Sample were collected in sterile container and transported to the laboratory using transport medium and process immediately.

Preliminary Examination Of Clinical Samples–A surgical wound samples were collected to Gram staining, motility and inoculated on basal, differential and selective medium. Further it was subjected to biochemical reaction and the organism was confirmed.

Antibiotic susceptibility testing –The isolated strain were subjected to Kirby Bauer disc diffusion method to determine the antibiotic resistant pathogen by inoculating on MHA plate and comparing the inoculums turbidity by Mac FarLands standard No.1.

RESULTS AND DISCUSSION

Isolation and Characterizationof Organism Isolated During Surgery and Post-Operative Wound Infection: The isolated organism from the wound sample were characterized based on the preliminary examination and confirmed by Bergy Manual Of Determinative Baceteriology such as *Staphylococcus aureus, Pseudomonas aeruginosa, Proteus mirabilis, Escherichia coli.* At the time of surgery only *Escherichia coli* (2%) was observed whereas after post-operative condition the organism isolated were *Pseudomonas aeruginosa, Proteus mirabilis*and *Escherichia coli.*(Table 1, Figure 1).

Antibiogram Pattern: A high degree of resistance was observed for Pencillin (33%), Ampicillin (33%), Amoxycillin (17%), Tetracycline (17%), Chloramphenicol and Erythromycin (66%) with *S. aureus* isolates. However 100% sensitivity was observed with Ciprofloxacin, Vamcomycin, methicillin and Gentamycin. For *Pseudomonas aeruginosa*, resistance was observed with pencillin, Ampicillin (33%), Amoxycillin (33%) but the strains were sensitive to Impinemem and Meropenem. In case of the Proteus mirabilis and E coli 100% sensitivity was observed towards Ciprofloxacin, Pencillin, Amikacin, Gentamycin.

The post-operative sepsis rate as reported by different workers all over the world as deferred considered dispute elaborate persceptive studies employing rigrous statistical record (kernodle, 1995). Comparism of infection rate between different hospital situated in different parts of the world is often fallacious and misleading (Hunt, 1981). Therefore from the work of various workers it may be inferred that incidence of wound infection varied from hospital to hospital and within a hospital from time to time depending upon the post-operative infection (Cohen, 1964). A satisfactory explanation for the high incidence of wound infection in patients having an abdominal operation is not available. Such that procedures are frequently extensive and subject to contamination are obvious and not operatively helpful. The initial hours after bacterial contamination are a decisive period for the establishment of infection in surgical patients post-operative factors can contribute to surgical wound infections, but the infection itself usually does not manifest until days later. In the pre-antibiotic era, *Staphylococcus sp*. was found to be the most common pathogen in wound infection worldwide. Basedon the available reports from Indian studies (Tripathy and Roy, 1984).

Staphylococcus aureus was found to be organism most frequently isolated from surgical wound infections. This correlates well with our results, where we report an isolation rate of 12%. However, on the whole Gram-negative organism predominated – *Eschericia coli* (10%), *Pseudomonas aeruginosa* (6%) and Proteus mirabilis (4%), (Andhoga, 2002).

In our study isolates from the surgical wounds during and after surgery were subjected to antimicrobial activity by Kirby Bauer's method. The strains were resistant and sensitive to various drugs but did not show any multidrug resistant pattern. But all the strains show sensitive to Imipenem and Meropenem antibiotic (Eswaranathan, 1992).

Table.1.Isolation and characterization of organism isolated during surgery and post-operative wound infection

Organism Isolated	Post-Operative Wound (50 Samples)	At The Time Of Surgery (50 Samples)
Staphylococcus aureus	12%(6)	-
Pseudomonas aeruginosa	6%(3)	-
Proteus mirabilis	4%(2)	-
Escherichia coli	10%(5)	2%(1)

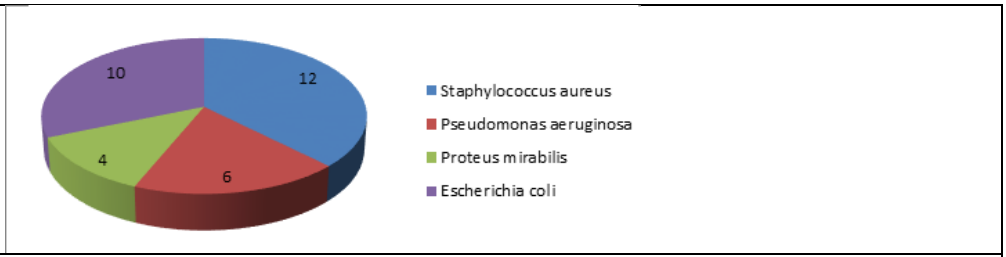

Fig.1.Isolation percentage from post-operative wound infection

CONCLUSION

The development of post-operative wound sepsis is an important event that cannot always be prevented but it can be minimized by aseptic conditions, judicious use of prophylactic antibiotic and variouspreventive measures.

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