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Antibiotic susceptibility pattern of Bacterial Strains Isolated from surgical or Non surgical lesions

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Absrtact

The study aimed to screen the bacterial pathogens present in surgical or non surgical wounds pus and to determine their antibiotic sensitivity and resistance pattern against 12 frequently used commercial antibiotics as Amikacin (AK10) *Staphylococcus aureus* (64.29%), Bacitracin (B10) *Escherichia coli*(27.77%), Cefotaxime (CTX) *S.aureus* (33.33%), Chloromphenicol (C) *Pseudomonas aeruginosa(36.36%),* Cefatexin *(CN) P.aeruginosa (36.36%),* Ciprofloxacin *(CIP) S.aureus* (66.67%), Gentamicin (GEN10) *E.coli (61.11%),* Novobiocin *(NV) S.aureus* (60.0%), Ofloxacin (OF) *K.pneumonia (60.0%),* Pefloxacin *(PF) S.aureus* (60.00%), Tetracycline (TE) *K.pneumonia (60.0%),* Tubramycin *(TOB) K.pneumonia (60.0%).* In this present study high antibiotic sensitive shows *S.aureus* highly sensitive against seven antibiotic such as Amikacin (AK10) , Cefotaxime (CTX),Ciprofloxacin (CIP), Novobiocin (NV) and Pefloxacin (PF). So commonly used surgical or non surgical antibiotic treatment.

Keywords Prevalence, susceptibility, wound, bacteriology and antibiotics.

INTRODUCTION

In spitefulness of technological advances that have been made in wound organization, wound contamination has been regarded as the most common nosocomial disease [1,2]. Wound is a break in the skin and the exposure of subcutaneous tissue subsequent loss of skin integrity which provides a moist, warm, and nutritive atmosphere that is favorable to microbial colonization and proliferation [3,4]. Surgical or nonsurgical wound infection basically means wound infection after surgical or nonsurgical. Wound can be measured infected if purulent material is observed without the confirmation of a helpful culture.

Infection in a wound delays healing, causes wound breakdown, dehiscence prolongation of hospital stays, increased trauma care and treatment costs [3,5]. Bacteriological studies have also shown that wound infection is universal and that the bacteria types present vary with environmental location, bacteria resident on the skin, clothes at the site of wound, at the time between wound and examination [6]. The virulence and invasiveness ability of the organisms have been reported to influence the risk of infection, but the physiological state of the tissue in the wound and the immunological reliability of the host seem to be of equal significance in determining whether infection occurs [7].

The management of wound infections has become more challenging due to prevalent bacterial resistance to antibiotics and to a greater incidence of infections caused antibiotics susceptibility showed that most of the isolates were highly resistant to the antibiotics highly sensitive such as Amikacin (AK10) *s.aureus* (64.29%), Bacitracin (B10)*E. coli*(27.77%), Cefotaxime (CTX) *S.aureus* (33.33%), Chloromphenicol (C) *P.aeruginosa*(36.36%), Cefatexin (CN) *P.aeruginosa* (36.36%), Ciprofloxacin (CIP) *S.aureus* (66.67%), Gentamicin (GEN10) *E.coli* (61.11%), Novobiocin (NV) *S.aureus* (60.0%), Ofloxacin (OF) *K.pneumonia* (60.0%), Pefloxacin (PF) *S.aureus* (60.00%), Tetracycline (TE) *K.pneumonia* (60.0%), Tubramycin (TOB) *K.pneumonia* (60.0%).highly senstive but highly sensitive to treatment in the field like sanitization of the wounds and early antibiotics administration prior to hospitalization.

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S.aureus highly sensitive against seven antibiotic such as Amikacin (AK10) , Cefotaxime (CTX),Ciprofloxacin (CIP), Novobiocin (NV) and Pefloxacin (PF) This is more than other bacteria highly sensitive.The knowledge of the causative agents of surgical or nonsurgical wound infection will be therefore helpful in the selection of empiric antimicrobial therapy. Epidemiological the microbial agents causing surgical or nonsurgical wound infections in private healthcare are limited. Thus, this necessitated this research in which the objective was to study the prevalent bacteria in surgical or nonsurgical wound infection and their susceptibilities to commonly given antibiotics.

MATERIALS AND METHODS

Collection of samples

Purulent materials were collected aseptically with the aid of sterile swab sticks from Forty (50) patients with surgical or nonsurgical wounds at Tamil Nadu, Kerala in India. The samples were properly labeled indicating the source, date, time of collection, sex, age of patients and the samples were transported in cooler boxes to the Microbiology Laboratory for bacteriological investigations within 4 – 6 h of collection.

Bacterial Isolation and Identification

Culture plates of Eosin Methylene Blue Agar (Oxoid. UK), MacConkey Agar (Oxoid), Nutrient Agar (Oxoid), Blood Agar (Oxoid), and Mannitol Salt Agar (Oxoid) were used. The swab sticks used for the collection of the samples were streaked directly on the labeled agar plates and incubated at 37°C for 24 hrs. After incubation, cultures were examined for significant growth.

Subcultures were then made into plates of nutrient slant, Nutrient agar and incubated for another 24 hrs. The primary identification of the bacterial isolates was made based on colonial appearance and pigmentation.

Biochemical tests were performed to identify microbes that could not be characterized by morphology; colour or type of colony after gram's staining. Biochemical tests applied were standard catalase test, citrate utilization, coagulase, oxidase, Voges-Proskauer, Indole production, motility, nitrate reduction and mannitol. Characterization and identification of the isolates was done using the methods of Cowan (1985), Fawole and Oso's (1988) and Cheesbrough (2004).

Antibiotic sensitivity testing

In vitro susceptibility of the organisms to the antibiotics was determined using Bauer disk-diffusion technique (Bauer *et al.,* 1996) (Commercially available antibiotics discs containing the following (concentration in g) Gentamycin (Gen 50), Chloramphenicol (C),Tetracycline (TE), Ciprofloxacin (CIP), Ofloxacin (OF),Amikacin (AK10),Bacitracin (B10), Cefotaxime (CTX) , Cefalexin (CN),Novobiocin(NV),Pefloxacin(PF),Tobramycin(TOB) were used. Zones of inhibition after incubation were observed and the diameters of inhibition zones were measured in millimeters using a caliper.

The analysis of the measurement as sensitive, halfway and resistant was made according to manufacturer's standard zone size interpretive manual. The intermediate readings were measured as sensitive for the estimation of the data.

Data arrangement

Graphs were used for data the presentation to show antibiotic susceptibility profile of each of the surgical or non surgical wound pathogens isolated.

Table 1. Occurrence of Bacterial isolates in at surgical or nonsurgical wound infection.

Microbes	Total number isolated	% of isolates
Escherichia coli	18	37
Staphylococcus aureus	14	29
Pseudomonas aeruginosa	11	22
Klebsiella pneumonia	5	10
Candila	1	02
Total	49	100

Table :2 Antibiotic sensitive for commercial antibiotic

S.No	Commercial Antibiotic	*Escherichia coli*	*Staphylococcus aureus*	*Pseudomonas aeruginosa*	*Klebsiella pneumonia*	*Candila*
1	Amikacin (AK^{10})	44.44	64.29	36.36	60	100
2	Bacitracin (B^{10})	27.77	26.67	18.18	20	100
3	Cefotaxime (CTX)	27.77	33.33	0	0	0
4	Chloromphenicol (C)	22.22	20	36.36	20	100
5	Cefatexin (CN)	27.77	26.67	36.36	20	0
6	Ciprofloxacin (CIP)	44.44	66.67	45.45	40	100
7	Gentamicin (GEN^{10})	61.11	40	45.45	60	100
8	Novobiocin (NV)	22.22	60	27.27	20	100
9	Ofloxacin (OF)	33.33	40	45.45	60	0
10	Pefloxacin (PF)	55.55	60	27.27	40	0
11	Tetracycline (TE)	33.33	40	36.36	60	100
12	Tubramycin (TOB)	38.88	26.67	18.18	60	100

Result and Discussion

A total number of 50 patients with surgical or nonsurgical wounds during the study period were made up of 28 males and 22 females. The ages ranged from 18 to 75 and above were considered. Total 32 subjects were outpatient and 18 patients were in patients. Surgical or nonsurgical wound sample was collected from fifty of the patient's obsevered (88.0%) with 49 isolates comprising *S. aureus* (29%), *P.aeruginosa* (22%), *K. pneumoniae* (10%) and *E. coli* (37 %) (Table 1). Thirty nine patients had a single organism isolated; while the remaining three had two organisms isolated and only one candida (2%) organization was isolated. There was six patients (12%) who had a sterile culture with no organisms isolated.

The results of the antibiotics susceptibility showed that most of the isolates were highly resistant to the antibiotics highly sensitive such as Amikacin (AK10) *s.aureus* (64.29%), Bacitracin (B10) *E.coli* (27.77%), Cefotaxime (CTX) *S.aureus* (33.33%), Chloromphenicol (C) *P.aeruginosa(36.36%),* Cefatexin (CN) *P.aeruginosa* (36.36%), Ciprofloxacin (CIP) *S.aureus* (66.67%), Gentamicin (GEN10) *E.coli* (61.11%), Novobiocin (NV*) S. aureus* (60.0%), Ofloxacin (OF) *K. pneumonia (60.0%),* Pefloxacin (PF) *S. aureus* (60.00%), Tetracycline (TE) *K. pneumonia (60.0%),* Tubramycin (TOB) *K. pneumonia* (60.0%).highly sensitive but highly sensitive to treatment in the field like sanitization of the wounds and early antibiotics administration prior to hospitalization.

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these wounds is limited by the absence of systematic study and the paucity of patients cultured as the cultures are not usually taken prior to, or even after the initiation of antimicrobial therapy. The microbiological analysis revealed that *S. aureus* was the leading etiologic agent of wound infection and the results obtained in this study is similar to reports obtained in, India, Thailand and Japan (Basak *et al.,* 1992; Mashita *et al.,* 2000).

The emergence of resistant organisms in surgical wound infections can lead to higher treatment costs and prolongation of hospital stay with serious consequences in infection control especially in developing countries. Most of the wound infections were polymicrobic in nature and in most cases, associated with *S. aureus* and other microorganisms

CONCLUSION

The isolation of both gram positive and gram negative bacteria from the surgical or nonsurgical wound supports the need to obtain culture specimens from infected surgical accident wounds for microbiological evaluation and antibiotic susceptibility determination, so that adapted chemotherapy can be prescribed and this will facilitate successful wound management but also assist in the control of antibiotic.

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