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Isolation and antimicrobial susceptibility of bacteria from external ear canal of cancer patients at Shafa Cancer Hospital -Ahwaz

ABSTRACT

A bacteriological study of external ear canal was performed in 52 hospitalized cancer patients and 42 non hospitalized cancer patients at Shafa hospital, Ahwaz. Study was under taken to find out the normal flora changes in the external ear canals and to observe the prevalence of external otitis among these cancer patients. The control group consisted of 40 non-cancer patients.

We observed the following bacteria among hospitalized cancer patients. Staphylococcus Coagulase negative (51.9 %), *Staphylococcus aureus* (15.7%) and *Streptococcus pneumomiae* (11.9 %).

Similarly, among non hospitalized cancer patients, Staphylococcus Coagulase negative (45.2 %), *S. aureus* (9.5%) and *Streptococcus pneumomiae* (4.7 %).

Incidence of Staphylococcus Coagulase negative and Streptococci pneumoniae is higher in control group than that in cancer patients [Table 1].

We have concluded that cancer patients probably suffer from external otitis more frequently because of enhanced colonization by *S. aureus* ($P > 0.05$).

The antimicrobial susceptibility of these organisms to various antibiotics was determined by disk diffusion method using Muller Hinton agar. In hospitalized cancer patients Staphylococcus Coagulase negative was 25% and 85% resistant to Vancomycin and Penicillin G and in non hospitalized cancer patients, Staphylococcus Coagulase negative were 45% and 80% resistant to Vancomycin and Penicillin G. *S. aureus* of both the groups (hospitalized and non hospitalized) were sensitive Penicillin G. Similarly, both the groups were 55% and 50 % resistance to Vancomycin.

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INTRODUCTION

Otitis Externa is an infection of the external auditory canal (EAC) that can be divided according to the time course of the infection: acute, subacute, or chronic. Acute otitis externa (AOE) is a bacterial infection of the EAC, commonly referred to as "swimmer's ear" that can further be divided into preinflammatory and acute inflammatory stages. It is well known that organisms potentially pathogenic to the middle ear can be found in the EAC and causes the same.[1]

Clinical observations suggest that EAC, which is frequenting exposed to microbial pathogens actually is less disposed to infection than the middle ear cavity[2] but some investigators illustrated the poly-microbial nature of external ear canals may causes Otitis by organisms like *S. aureus*, *Peptostreptococcus spp*, *Pseudomonas aeruogenosis* and *Bacteroides spp*.[3-4]
Other workers also reported that the most commonly isolated pathogens are *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Other pathogens less commonly cultured include *Proteus mirabilis*, *Streptococci* species, coagulase negative *Staphylococci*, and various gram negative bacilli.[5-6]

Based on literature survey we aimed to observe the changes of the bacterial flora of external ear canal, to study the antimicrobial susceptibility testing and to find out why external Otitis occurs in cancer patients.

MATERIALS AND METHODS

Patients

A total of 52 hospitalized and 42 non-hospitalized cancer patients with age distribution of 2-60 years

old were selected for this study.

Bacterial strains

All bacterial strains used in this study were isolated from external era canal by swabs. The strains were identified by standard microbiological methods.[7]

Susceptibility testing

The bacterial strains were tested for resistance to antimicrobial agents by performing disc diffusion method using commercial discs (bioMerieux) according to the guidelines of the national committee for clinical laboratory standard.[8]

Statistical analysis

Data were analyzed using SPSS (Version 9) by Chi- square test.

RESULTS

Swabs from EEC were obtained from 52 hospitalized and 42 non hospitalized cancer patients from September 2004 through March 2005.

Staphylococci spp (coagulase negative), *S. aureus* and *Streptococcus pneumoniae* were the prominent isolates from external ear canal [Table 1].

The results from antimicrobial susceptibility tests showed *S. aureus* were resistant to CF from hospitalized patients. However, for the isolated *Streptococcus pneumoniae* the prevalence of resistance was highest towards penicillin G (75%) and least against Vancomycin (35%). Similarly, *S. aureus* isolated from non-hospitalized patients was resistant to CF. On the other hand, for the *S. pneumoniae* the prevalence of resistance was highest towards Penicillin G (75%) and least against vancomucin (25%) [Table 2].

Table 1: Prevalence of bacterial isolates from cancer patients and control group (%)

	S. coagulase negative	*S. aureus*	*S. pneumoniae*
Hospitalized patients	51.9	15.7	11.9
Non- hospitalized patients	45.2	9.5%	4.7%
Control group	66.5%	0.0	33.5%

Table 2: Percent antibiotic resistance of isolates

S. aureus	TE	V	CP	CF	CI	PG	CRO	AM
Hospitalized patients	100	55	100	85	100	61	75	90
Non-hospitalized patients	100	50	100	100	100	57	87	93
S. pneumoniae								
Hospitalized patients	0	35	100	85	55	75	40	85
Non-hospitalized patients	50	25	95	70	60	75	100	90
Control	25	25	15	25	75	35	25	90
CoNS								
Hospitalized patients	90	25	50	85	60	85	65	90
Non-hospitalized patients	85	43.5	32	62	45	80	50	95
Control	50	25	10	80	30	90	60	45

TE (Tetracycline), V (Vancomycin), CP (Caprofloxcin), C (Clendamycin) CE (Cephalotin), PG (Penicillin G), CRO (Ceftriaxone), AM (Amikacin)

DISCUSSION

Cancer patients are known to be immunocompromised and susceptible to various infections. Bacterial infections have emerged in the last decade as particularly devastating complications of cancer treatment because to increased resistance to drugs, including the emergence of bacterial strains that are resistant to all available antibacterial agents, has created a public health problem of potentially crisis proportions.[9]

The objective of this study was to observe the changes of the bacterial flora on external ear canal, the antimicrobial susceptibility testing and to find out why external Otitis occurs in cancer patients as otitis continues to be an important public health problem around the world.[1] EAC has its own bacterial flora and stays free of infection as long as its defense mechanisms are not disrupted.

We isolated *S*. coagulase negative, *S. aureus* and *S. pneumoniae* in the external ear canal of cancer patients. Our observation suggests that, although, external ear canal is less disposed to infections than the middle ear cavity, but colonization of these bacteria may cause otitis. Several investigators reported that the most common bacterial pathogens are *Pseudomonas spp, S. pneumoniae* which may causes otitis.[9-11] Similarly, Brosk *et al*[2] reported isolation of 73 bacteria from ear canals. Commonly recovered bacteria were *Pseudomonas spp*, *S. aureus*, *Proteus spp*, *Klebsiella pneumoniae*. Their findings demonstrated the poly-microbial bacteriology of ear canals related to Otitis in children. Our finding correlates with that of Juan K *et al*.[5]

CONCLUSION

We have concluded that cancer patients probably suffer external otitis more frequently because of enhanced colonization by *S. aureus* ($P > 0.05$). Further prospective studies are warranted for evaluating the role of *S. aureus* in this infection and the therapeutic implications of these findings.

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