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Otoscope - An Emerging Risk Factor of Otitis Media

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ABSTRACT

This study was performed to decide the colonization of otoscope with pathogenic microorganism, which is not sterilize appropriately and may exchange contamination to others. Ten otoscopes having a place with various specialists were tested by rubbing sterile soaked swab on the cones of otoscope, for bacteriological examination utilizing standard procedures. Out of ten otoscopes were analyzed, 9 (90%) were colonized with microscopic organisms. isolates incorporate *Staphylococcus aureus* 7 (70%), Staphylococcus epidermidis 1 (10%), Bacillus spp. 6 (60%), *Pseudomonas aeruginosa* 2 (20%) and Micrococcus spp. 1 (10%). Antimicrobial action of these bacterial segregates were additionally performed which uncover that all the Staphylococcus aureus detaches are methicillin resistant (MRSA). All the isolated bacteria show resistivity to surveyed anti-microbial with the exception of Ofloxacin. It is resulted from the study that otoscopes polluted with pathogenic microorganisms can go about as potential vector for the transmission of ear diseases. Along these lines, it is important to appropriately cleaned otoscope before inspect patient, to bring down the danger of transmission of disease.

Keywords: *Nosocomial infection, Pathogenic microorganism, Otoscope, Contamination, Staphylococcus aureus*

INTRODUCTION

The spread of nosocomial diseases from the contaminated hands of medicinal services laborers or from polluted therapeutic types of gear that are utilized by specialists, attendants and other health services specialists is an essential issue. Therapeutic gadgets, if not cleaned appropriately and used to other patient, may bring about transmission of disease from one patient to the next furthermore build the rate of multi drug resistant microscopic organisms around the world (Sanders *et al*, 2003, Madar *et al*, 2005, Whittington *et al*, 2009). Transmission of nosocomial disease was dictated by Center of Disease Control and Prevention, which recommend that disease transmission happen through contact, cleanliness, Compromised skin integrity, polluted surfaces item or medicinal gadgets, swarmed living condition and alluded as 5Cs of contamination transmission (Ragan *et al*, 2006, Maree *et al*, 2007). To control the transmission of contamination from restorative gadgets, disease control conventions are made yet these conventions are unreasonable (Mehtar *et al*, 1992, Wenzel *et al*, 2001). The use of these disease control conventions are low because of inadequate support from clinic organization and poor taking care of by specialists, attendants, and other wellbeing laborers (Saloojee *et al*. 2001).

Otoscope is a non basic gadget and it requires low level of disinfectant to slaughter pathogenic microorganism. Specialists use otoscopes to screen ear manifestations. Pathogens can join and set up themselves on the cones of otoscopes since cone comes into contact with ear exudates and the dividers of the ear waterway and makes conceivable the transmission of pathogen (Cohen *et al*, 1997). So it is vital to legitimately purify the medicinal gadget before utilizing to different patients to forestall transmission

of contaminations. In this manner normal cleansing routine of medicinal gadget is prescribed keep the spread of disease (Maryam *et al*. 2014).

The objective of our study is to identify the contamination of otoscope utilized by specialists as a part of private centers by performing bacteriological examination on the premise of standard system and to check antimicrobial vulnerability example of disconnected microorganism by utilizing business anti-toxins, the aftereffect of this technique give essential data, that could help being developed of convention for the best possible disinfection and upkeep of otoscope with a specific end goal to avoid otoscope related nosocomial contaminations.

METHOD

Setting: The study occurred between august 2015-janurary 2016 at Jinnah University for Women, situated in Karachi city of Pakistan.

Study Subjects: The study focused on included ENT Doctors of private facilities.

Inspecting and lab technique: Ten otoscopes were analyzed by soaking sterile swab in peptone water and after that rub the swab on earpiece of otoscope. inoculate the swab in tube containing peptone water and transport to the research center inside of 24 hours. The swabs then inoculate specifically onto Blood Agar, Mac Conkey Agar, Chocolate Agar and Mannitol Salt Agar and hatch it for 24 hours for 37C. The development was recognized by watching settlement morphology, gram recoloring, and biochemical testing as indicated by standard microbial strategies. Anti-microbial affectability testing was additionally performed by the Kirby-Bauer strategy utilizing business anti-infection agents.

RESULTS

An aggregate of ten otoscopes tests were analyzed, and have demonstrated that the 90% of the otoscopes were tainted with pathogen. The gram positive microorganisms isolates at a rate of 88.23% and gram negative microscopic organisms happen at a rate of 11.76%. These incorporate 15 isolates of gram positive microorganisms and 2 isolates of gram negative microbes. Commonness rate of debased otoscopes i.e *Staphyloccocus aureus* = 70%, *Staphylococcus epidermidis* =10%, Micrococcus spp. = 10%, Bacillus spp. =60% and Pseudomonas spp. =20%. The predominance rate of bacterial separates i.e *Staphyloccocus aureus* = 41.17%, *Staphylococcus epidermidis* =5.88%, Micrococcus spp. = 5.88%, Bacillus spp. =35.29% and Pseudomonas spp. =11.76% (Table: 1).

The antibiotic sensitivity testing was additionally performed, demonstrated that all the bacterial separates indicated distinctive vulnerability example to the utilized antibiotic (Table: 2). All the Staphylococcus aureus confined from the otoscope test were impervious to Oxacillin and alluded as Oxacillin Resistant *Staphylococcus aureus* (ORSA) and Vancomycin show transitional action against *Staphylococcus aureus* in this manner alluded as Vancomycin Intermediate Staphylococcus aureus (VISA), which are clinically critical segregates. Bacillus spp. show sensitivity to Bacitracin and Micrococcus spp. indicates affectability to Vancomycin. While both Micrococcus spp. what's more, Bacillus spp. show sensitivity to Rifampicin and Clarithromycin. All the bacterial separates indicated resistivity to Oxacillin and middle action against Streptomycin. While all detaches indicated sensitivity to Ofloxacin, accordingly it is considered as viable antibiotic against all contaminants.

Table I: Prevalence of Bacterial Isolates and Contaminated Otoscope:

BACTERIAL ISOLATES	NUMBER OF ISOLATES	
(n=17)		
No. (%)	OTOSCOPE SAMPLES	
(n =10)		
No. (%)		
Staphyloccocus aureus	7 (41.17%)	7 (70%)
Staphylococcus epidermidis	1 (5.88%)	1 (10%)
Bacillus spp.	6 (35.29%)	6 (60%)
Pseudomonas aeruginosa	2 (11.76%)	2 (20%)
Micrococcus spp.	1 (5.88%)	1 (10%)

Table II: Antibiotic Susceptibility Testing of Bacterial Isolates:

ANTIBIOTIC	CONC. CODE	ZONE DIAMETER (mm)				
		S.aureus	S.epider-midis	Bacillus	Micrococcus	Pseu-domonas
Oxacillin	OX	0mm	10mm	0mm	15mm	0mm
Bacitracin	B	0mm	0mm	15mm	0mm	0mm
Vancomycin	VA	10mm	0mm	10mm	20mm	0mm
Rifampicin	RA	15mm	15mm	20mm	15mm	0mm
clarithromycn	CLR	0mm	0mm	20mm	20mm	0mm
Streptomycin	S	18mm	15mm	15mm	13mm	15mm
Ofloxacin	OFX	25mm	25mm	25mm	30mm	20mm

DISCUSSION

This study was done to uncovered that otoscope are normally contaminated with different microscopic organisms and we found after this study 90% of the otoscopes were defiled with microorganism and go about as a vector of contamination. Comparative study was done in Brazil which demonstrates that 90% of otoscopes were found to contaminated with microorganisms (Cohen *et al*, 1997).

In our study gram positive microscopic organisms were all the more often disconnected at the rate of 88.23% as contrast with gram negative microorganisms which separated at a rate of 11.73% while in examination with past study the rate of gram positive microbes was 78.9% and gram negative microscopic organisms was 21.1 (Shiferaw *et al*, 2013). The expansion recurrence of gram positive isolates are because of direct contact of otoscope with human's ear skin and diminishing number of gram negative confine is because of short half life not over six hours in vitro (Nelson *et al*, 2006). The aftereffect of our study is comparative with the past study performed by Herman A Cohen *et al*, which likewise watched build gram positive microscopic organisms when contrasted with gram negative microbes (Cohen *et al*, 1997).

In our study ten otoscopes were analyzed which uncovered that 70% of otoscope contaminated with Staphylococcus aureus and our outcome was effortlessly equivalent to the study perform by Herman A Cohen *et al.,* which exhibited that 84.2% of the otoscopes are contaminated

with *Staphylococcus aureus* (Cohen *et al*, 1997).

In our study S. epidermidis was segregated at a rate of 10% from the otoscope which is low when contrasted with the past studies performed by Foteini Leontsini *et al*, Koksal et al., which were confine at a rate of 59.2% (Leontsini *et al*, 2013, Koksal *et al*, 2009, Roland *et al*, 2002). In both studies S. epidermidis show methicillin and multi-drug resistance and cause noscomial disease yet not known not outside ear contamination.

Bacillus spp., the Gram positive bacilli isolated in our work at a rate of 35.29% which is the second most astounding recurrence disconnected in our study. While in past investigation of Nigeria, Bacillus spp. segregated at most noteworthy recurrence (Maryam *et al* 2014).

Pseudomonas aeruginosa and Micrococcus spp. segregated from otoscope test at low level in our study. A study performed by Tahira Mansoor et al show that *Pseudomonas aeruginosa* (40%) trailed by *Staphylococcus aureus* was the most regular pathogen found in endless release of ear (Mansoor et al, 2009) and may contaminate the otoscope, amid the examination of ear.

In our study all the 41.17% of *Staphylococcus aureus* secludes show resistant to methicillin while study perform by Herman A Cohen *et al* analyzed 9.5% out of 21% *Staphylococcus aureus* detaches of otoscope show resistivity to methicillin and called as MRSA (Cohen *et al*, 1997). *Staphylococcus aureus* generally known not imperviousness to numerous anti-microbials, which is likewise seen in our study.

All the bacterial isolates and MRSA show imperviousness to anti-microbial aside from ofloxacin. In any case, study performed by Onanuga et al reported that MRSA demonstrate abnormal state of sensitive to ofloxacin (Onanuga et al, 2005). Our antimicrobial suseptibilty results show likeness with past study performed by Shiferaw T *et al.*, which demonstrated that ofloxacin was successful against all contaminants (Shiferaw *et al*, 2013). The advancement of anti-microbial resistance is troubling. The consequence of our study uncovered that otoscope go about as a vector in transmission of contamination and in addition anti-microbial resistance strain in the clinic environment.

CONCLUSION

The consequences of our study affirmed that otoscopes were polluted with microscopic organisms and in this manner can exchange pathogenic microorganism and nosocomial disease in patients. Moreover these confines show imperviousness to numerous business anti-infection agents. In this way, appropriate comprehension rule and preparing about sanitization of therapeutic types of gear ought to be given to specialists, to minimize the spread of nosocomial contamination. It is additionally important to empower the successful utilization of dispensable cones of otoscopes to evade transmission of pathogenic microorganism

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