Isolation contaminated bacteria from aqueous solution Of contact eye lenses

Abstract

Background: Contact lenses have been widely used as an alternative to spectacles both in developed and non-developing countries. However, under certain circumstances, adverse responses can occur during contact lens wear and several microorganisms including bacteria, fungi, and free living amoebae—can cause several eye infections. This study was aimed to isolate contaminated bacteria from eye lenses solution.

Method: The samples were collected from solution bottles of eye lenses with the help of sterile cotton tipped swabs that were pre- moistened with sterile normal saline, then sample directly cultured on solid media. All samples were inoculated on to blood agar, MacConkey's agar were incubated at370C for 24-48 h, Cultureswere considered negative if no growth was detected within 48 hours of incubation. Bacterial culture obtained was identified using Gram's staining, on the basis of culture diagnosis by growing on media and performing biochemical test.

Result: A total of 150 samples from aqueous solution of contact eye lenses used to isolate bacteria from it. Out of these sample 84 bacteria were isolated from aqueous solution while 66 were without growth. The most frequent isolated bacteria was pseudomonas. aeurogenosa 39(46%) followed by Stapylococcus.epidermidis 27 (32%) then Staphylococcus. aureus12 (14%) and Esherichia.coli 6(7%) respectively which is significant result (*P.Value*0.005).

Conclusion: The study revealed that contact lenses solution under investigation contain difference type of bacteria and the pseudomonas bacteria is more frequent one furthermore the contact lenses which multiple use and also user which not was hing their hand have difference type of bacteria growth.

Introduction:

Contact lenses have been widely used as an alternative to spectacles both in developed and non-developing countries **(Üstüntürk, M et al 2012).** With increasing use of soft contact lenses for cosmetic or therapeutic purposes the incidence of contact lens induced infections is also increasing. Lack of compliance and poor hygiene towards lens care is strongly associated with microbial contamination and has been proved to result in eye infections **(Szczotka-Flynn LB er al 2010, Stapleton F et al 2008)**. However, under certain circumstances, adverse responses can occur during contact lens wear and several microorganisms--including bacteria, fungi, and free living amoebae--can cause several eye infections in wearers. Extended wear of contact lenses is the major risk factor of eye infections such as microbial keratitis, besides contaminated contact lens storage case, contaminated lens care solutions, and inaccurate contact lens handling **(Üstüntürk, M et al 2012).**

Microbial keratitis is one of the serious complications of contact lens use and if not treated timely, may result in permanent visual damage to the cornea. In developed countries, the incidence of contact lens associated keratitis has been increased up to 30 per cent of all keratitis cases **(Whitcher JP et al 2003, Mah-Sadorra JH 2005**). A major factor that may be responsible for the development of keratitis among contact lens users is the microbial contamination of their lens care system. The lens care system includes the ophthalmic solution, lens cases and lenses used by the contact lens wearer **(Huang E 2001).** Furthermore, several reported cases of such ocular infections have been implicated to be due to lens care system contamination. This may be attributed to improper cleaning of the contact lenses as well as the presences of contamination in the other items of lens care system. Contamination of the lens cases or lens care solutions would most likely contaminate the contact lenses **(Huang E 2001).**

In study done in Brazil by **Correa et al 2018**, they used different type of eye lenses solution and their most bacteria isolated was pseudomonas.aeurognos. Another study done in china by **Xiaojun Hu et al 2020,** the most isolated contaminated bacteria were Serrita spp. Study done in Egypt which showed that the most isolated organisms were *Staphylococcus epidermidis* **(Jihan A et al**

2017). There is also study done by in India their sample size was 200 and the most frequently isolated contaminant was *Staphylococcus aureus* **(Deeksha V.et al 2013).**

The present study was planned to isolate contaminated bacteria from eye lenses contact solution in addition to determine the most contaminated bacteria in eye lenses solution.

Material and Method:

This is was a descriptive cross sectional study, carried out at Khartoum state in al-yarmouk College. From October to December 2020, the required information include: age, reasons of using eye lenses, the quality of eye lenses, washing of hand before wearing the lenses was collected by using questionnaire. Ethical Permission were obtain from College of Medical Laboratory Science, National University Administration, people who use eye lenses was informed by purpose of the study and they were agreed to be a part of study.

Laboratory Identification

Sample collection and processing

The samples were collected from solution bottles of eye lenses with the help of sterile cotton tipped swabs that were pre- moistened with sterile normal saline. The sample of lens care solution was directly cultured on solid media as a drop. All samples were inoculated onto blood agar, MacConkey's agar were incubated at 37^{o}C for 24-48 h, Cultures were considered negative if no growth was detected within 48 hours of incubation. Bacterial culture obtained was identified using Gram's staining, on the basis of culture diagnosis by growing on media and performing biochemical tests including catalase, coagulase, and oxidase.

4. Result:

A total of 150 samples from aqueous solution of contact eye lenses used to isolate bacteria from it. Out of these sample 84 bacteria were isolated from aqueous solution while 66 were without growth. (Table 1) The most frequent isolated bacteria was pseudomonas.aeurogenosa 39(46%) followed by S. epidermidis 27(32%) then S.aureus 12(14%) and E.coli 6(7%) respectively which is significant result (P.Value 0.005) (table 2). In this study the user which washing

their hands without detergent soap before wearing the contact lenses was found 40 (51%) with one isolated type of bacteria and the user which not washing their was found 38(49%) have difference type of bacterial growth. (Table 3) In this study the age of study population was divided into two group (18-22) (23- 26), Study revealed a correlation between age and most isolated bacteria and the p value was (0.000) (figure 1) In this study most of eye lenses were used for cosmetic (96.7%) while (3.3%) used for medical purpose, the study revealed there is a correlation between uses of lenses and most isolated bacteria and the p value was (0.002) (Figure 2) Most of eye lenses were original (94%) while the rest were fake (6%), the study revealed there is a correlation between the quality of lenses and most isolated bacteria and the p value was (0.001) (Figure 3)

Table (1): Distribution of isolated bacteria among study population

Number of sample	**Number of non-isolated (%)**	**Number of isolated (%)**	**Total**
150	66(44%)	84(56%)	150(100%)

Table2: Frequency of isolated bacteria among study population:

Organism	**Frequency (%)**	***P.value***
Pseudomonas.aeurogenosa	39(46%)	**0.005**
S.epidermidis	27(32%)	
S.aureus	12(14%)	
E.coli	6(7%)	

Table(3):Distribution of the isolated bacteria according to the wash of hands

Figure1distribution of most isolated bacteria in eye lenses solution

Number	Wash hands		Without wash	
	%	Number of Bacteria	%	Number of bacteria
	40(51%)	40	38(49%)	44
Total	40(51%)	40(48%)	38(49%)	44(52%)
p.value	**0.006**		**0.004**	

Figure2.correlation between age and most isolated bacteria

Figure3. correlation between uses of lenses and most isolated bacteria

Figure 4: correlation between the quality of lenses and most isolated bacteria

Discussion:

Contact lens are widely use around world for cosmetic and medical propose, the solution that used to safe lenses from drying and could be contaminated if the quality of solution was weak or if the technique of wearing the lenses was a wrong .

The microbiological profile of bacterial contaminant the contact eyelenses aqueous solution in this study showed that *pseudomonas.aeurognosa* were the commonest pathogens, the study revealed there is a high incidence of contamination with bacteria in eye lenses solution specially to female how wearing the eye lenses

without was hing their hands and without wearing their lenses under aseptic technique.

The present study was similar to study done in Brazil by (**Correa et al 2018)** they used different type of eye lenses solution and their most bacteria isolated was*pseudomonas.aeurognos*whiledisagreewithstudydoneinchinaby**XiaojunHuetal 2020**,the sample size were 107 and the most isolated contaminated bacteria were Serrita spp.

The present study disagrees with study done in Egypt by (**Jihan A et al 2017**) the sample size was 50 and the most isolated organisms were Staphylococcus epidermidis. Also the present study disagree with study done by **(Deeksha V.et al 2013)** in India their sample size was 200 and the most frequently isolated contaminant was *Staphylococcusaureus.*

Conclusions

The study revealed that contact lenses solution under investigation contain difference type of bacteria and the pseudomonas bacteria is more frequent one further more the contact lenses which multiple use and also users which not washing **So this study recommended that** daily examine of the aqueous solution of contact eye lenses to detect in change in color or turbidity addition to prevent long wearing of contact eye lenses, washing Hands before wearing contact eye lenses, lastly the contact eye lenses is consider single use.

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