Volume 4 (3), 2016, Page-1160-1165
CODEN (USA)-IJPRUR, e-ISSN: 2348-6465

PHS Scientific House
PHARMAHEALTHSCIENCES

International Journal of Pharma Research and Health Sciences

Available online at www.pharmahealthsciences.net

Original Article

Assessment of Bacterial Contamination on Contact Lenses among Medicos

M Anitha*, P Mathivathani, K Ramya, M Vijay, J Hema priya

Department of Microbiology, Shri Sathya Sai Medical College & Research Institute, Thiruporur, Sri Balaji Vidyapeeth University, Tamil Nadu, India.

ARTICLE INFO

Received: 17 May 2016
Accepted: 10 Jun 2016

ABSTRACT

The aim of the study was conducted to evaluate the bacterial contamination in contact lens among female Medical students. A total of 44 bacterial isolates were identified from 50 samples and remaining 6 samples found to have no growth. Contact lenses samples were collected from the contact lens wearers in SSSMC & RI, Thiruporur. The samples were cultured in different media. The organisms were identified by performing different biochemical tests and antimicrobial susceptibility test in accordance to standard protocols. The common isolates were *Pseudomonas aeruginosa* (23%), followed by *Staphylococcus aureus* (18%),*E.coli*(16%),*Citrobacter koseri* (11%), *Acinetobacter baumannii* (11%) *Klebsiella Pneumoniae* (9%),*Micrococci spp* (7%)and least was found to be *Proteus mirabilis* (5%).In our study the most common isolated bacteria in contact lens was *Pseudomonas aeruginosa*. Prevention of bacterial contamination of contact lens can reduce the risk of developing ocular infections

Keywords: Contact lens infections, Bacterial strains, Contamination.

1. INTRODUCTION

A contact lens is a corrective, cosmetic or therapeutic lens usually placed on the cornea of the eye. About 125 million people use contact lenses worldwide (2%) including 28-38 million in the United States and 13 million in Japan. People choose to wear contact lens for various reasons. Many consider their appearance to be more attractive with contact lens than with glasses, less affected by wet weather, do not steam up, and provide a wider field of vision. Contact lenses are thin,

Corresponding author *
M Anitha
Department of Microbiology, Shri Sathya Sai Medical College & Research Institute, Thiruporur, Sri Balaji Vidyapeeth University
Email: animalar03@gmail.com

curved plastic disks designed to cover the cornea of the eye. But studies show that contact lens wearers are more likely susceptible to higher rate of conjunctival infections and serious corneal infections than non–wearers.[1]

It is world wide, approximately 100 million people use contact lenses as an alternative to spectacles (1.6%). As the contact lens market continues to grow, public health issues associated with contact lenses have increased importance. Infectious keratitis is the most devastating complication of contact lens wearer and may result in permanent visual loss from corneal scarring or perforation.[2]

The inconvenience of wearing the conventional spectacles had led to the development of plastic corrective contact lenses (CL) worn directly over the cornea to improve vision. The use of contact lenses (CL) had increased remarkably because of its optical , occupational and cosmetic advantages.[3]

Contact lenses are a safe and effective mode of vision correction and today's industry offers wearers the choice of continuous wear, overnight orthokeratology, frequent replacement or daily disposable lenses among others. However, despite these options, including different care and maintenance systems, there are still features of contact lenses that could be improved such as possible microbial contamination.[4]

Corneal infection is localized corneal excavation due to hypoxia and then subsequent disruption. A corneal ulcer starts when a bacteria infects an area of breakdown in the corneal surface. The surface may breakdown forming a small corneal abrasion, due to routine lens use. It is characterized by red, painful eye with discharge and perhaps poor or reduced vision. Occasionally a white spot is observed on the cornea of the involved eye. Presence of foreign body in the eye leads to dry eyes. It is commonly reported in soft lens wearers. Microbial keratitis has become an increasingly important problem in recent years.[1]

Bacterial keratitis (corneal ulcer) is a sight-threatening contact lens complication.[5] Either untreated or severe bacterial keratitis may result in perforation and endophthalmitis. Wearing contact lens (CL) is the main risk factor, and sleeping with contact lenses is the major risk factor among contact lens wearers.[6]

The cornea is constantly challenged by microbes, either from the normal flora of the conjunctiva and skin or from the environment. Fortunately, the surface of the cornea is protected by highly efficient natural defense mechanisms in the tear film. In association with tear film, blinking action of the eyelid prevents attachment, and wipes microorganisms from the eye surface. Due to these protective mechanisms keratitis is a rare disease and usually results from injury or surgery. The presence of contact lens interferes with the ocular protective mechanisms and causes corneal trauma, dry eye, etc.[7]

Apart from that, microbial contamination of contact lens care product is a major problem for contact lens wearers. Other factors related with contact lens uses, such as duration of using contact lenses, frequency of cleaning of contact lens, change of contact lens also reported to have the effect of microbial contamination of contact lens.[8, 9]

In this study, different corneal samples have been examined to the study of microbial colonization of contact lens.

2. MATERIALS AND METHODS

The samples were collected from the contact lens wearers among female Medical students.

During January 2016 and March 2016 in SSSMC & RI. We have obtained signed consent form from all the Medicos who are all participated in this study.

Samples collection:

Contact lenses samples were collected by using sterile cotton swabs moisturized with normal saline solution. These samples were processed by using microbial techniques. These isolates were identified by microscopy, culture methods and biochemical tests.

Microscopic examination:

The microscopic examination of the samples was made by Gram's staining

Culture methods:

The swabs were incubated in brain heart infusion tubes and incubated for 24 h at 37°C. According to MacFaddin (2000), [10] sub cultures were done on blood agar, MacConkey agar and nutrient agar and were incubated at 37°C for 24 h.

Bio-chemical tests:

Biochemical tests were performed to identify the pathogens, including catalase, coagulase, oxidase test, IMVIC tests and sugar fermentation according to Lancette and Tatini (1992).[11]

***Antibiotic sensitivity test*:**

Antibiotic sensitivity was done by modified Kirby Bauer method (Mackie and McCartney, 1996).Antibiotic disks used to check the antibiotic sensitivity of gram positive and gram negative bacteria.[12]

3. RESULT

Table 1: Bacteria isolated from the contact lens

Bacterial growth	Number of isolates	Percentage
Growth	44	88%
No Growth	6	12%
Total	**50**	

Table 2: Bacterial strains isolated from contact lens

Organisms isolated	Number of organisms isolated	Percentage%
Pseudomonas aeruginosa	10	23
Staphylococcus aureus	8	18
E.coli	7	16
Citrobacter koseri	5	11
Acinitobacter baumannii	5	11
Klebsiella Pneumoniae	**4**	**9**
Micrococci spp	**3**	**7**
Proteus mirabilis	**2**	**5**

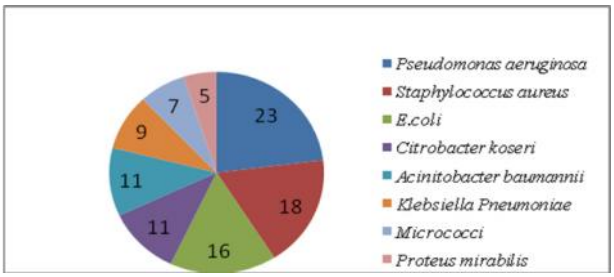

Fig 1: Distribution of bacterial growth on conact lens

In this study, a total of 50 samples were collected from female Medical students who are wearing contact lens. The commonest age group in our study was 19 to 25 years. The duration of the study was 3 months from Jan 2016-March 2016, examined at SSSMC & RI. Out of the 50 contact lenses collected from all subjects, 44(88%) samples were contaminated and remaining 6 (12%) samples showed no growth as shown in the Table1.

Table 2 depicts bacteria trapped in contact lens. The samples were cultured in different media. Pure cultures of the organisms were obtained by culturing them in their significant media. The microorganisms were identified by performing different biochemical tests and antimicrobial susceptibility test. The findings of this study showed that eight various species of Gram positive and Gram negative bacteria.

The most commonly isolated bacteria was *Pseudomonas aeruginosa*(23%), followed by *Staphylococcus aureus*(18%),*E.coli*(16%),*Citrobacter koseri*(11%), *Acinetobacter baumannii*(11%)*Klebsiella Pneumoniae*(9%),*Micrococcispp*(7%)and finally least bacteria *Proteus mirabilis*(5%) were identified in contact lens infection as shown in the Figure 1.

4. DISCUSSION

Recent statistics showed that around 140 million people wear contact lens and the number of contact lens wearers is increasing globally (Stapleton et al).[13]

In this study group, *Pseudomonas aeruginosa* (23%), followed by *Staphylococcus aureus* (18%),*E.coli*(16%),*Citrobacter koseri*(11%), *Acinetobacter baumannii*(11%)*Klebsiella Pneumoniae*(9%),*Micrococci spp* (7%) and *Proteus mirabilis*(5%) were isolated from the contact lenses. The occurrences of *S. aureus*, *Citrobacter spp* and *Enterobacter spp* in the contact lenses used in this study is in agreement with Sankaridurg et al. [14] and Brooks et al. [15]

This study also correlate with the previous results of Salha H. Met al., who reported the occurrence of *P. aeruginosa* and *Acinetobacter spp* in the contact lenses. [16] We reported that *Pseudomonas aeruginosa* was the most common contaminant of contact lenses. This is proved by many research workers, Supriya. S et al also reported the most common bacterial isolates was *Pseudomonas aeroginosa* (28.57%), *E. coli* (14.28%), coagulase positive *Staphylococcu*s (7.14%) and *Klebsiella pneumonie*. This is in corroborate with our findings. [17]

Like our findings, *Staphylococcus aureus* are often the next most commonly identified causative organisms.[18-20] This study showed that bacteria are major causes of infection and diseases in human contact lens.

It is obvious that sharing contact lenses can result in the spread of microorganisms that can severely damage the eyes, and contact lenses can spread infectious diseases. Therefore, people should only wear contact lenses prescribed specifically for them by a qualified eye care professional. Bacterial contamination is often associated with ocular infection and inflammation during extended wear of contact lenses.[21]

5. CONCLUSION

In our findings the most common bacteria that contaminate contact lenses was *Pseudomonas aeroginosa*. This is due to bacterial adhesion to contact lenses that has clearly involved in the production of several adverse responses during contact lens wearing. Hence it is proved in many studies that *P. aeruginosa*is the one usually adhering to lenses in greater numbers than other strains. Therefore the possibility of bacterial contaminants of contact lens are common, but it can be minimized by contact lens wearers by maintaining proper cleaning protocols, lenses to be changed at regular intervals in case of irritation and good hygienic conditions should be maintained. This study provides information on bacterial contaminants of the contact lens wearer those who have managed poorly. Prevention of bacterial contamination of contact lens can reduce the risk of developing ocular infections.

6. ACKNOWLEDGEMENTS

We would like to thank the Medicos who have actively participated in helping us to complete the project in a successful manner without any delay and the Management for providing us all the possible facilities to proceed the project with all needs.

7. REFERENCES

1. Kayitha Bala Durga Devi, Dr. Dhurjeti Sarvamangala, Dr. Upadhyayula Surya Narayana Murthy et al., Contact Lens Infections. A Microbiological Survey and Study international journal of plant animal sciences 2011; 1(3): 78-84.
2. Holden B A , Sweeney D F, Sankaridurg P R, Carnt N, Edwards K, Stretton S. Microbial keratitis and vision loss with contact lenses. Eye contact lens 2003; 29(Suppl. 1): s131-4.
3. Michael Osita Emina, Faustina Kemdinum Idu. Bacteria and parasites in contact lenses of asymptomatic wearers in Nigeria, J Optom 2011; 4(2):69-74.

4. Weisbarth, R. E., Gabriel, M. M., George, M., Rappon, J. et al., Creating antimicrobial surfaces and materials for contact lenses 2007;33: 426-9.
5. Sharma S, Tanej a M, Gupta R, et al., Comparison of clinical and microbiological pro les in smear-positive and smear negative cases of suspected microbial kerat it is. Indian J Ophthalmol. 2007; 55: 21-25.
6. Mark Eltis, Contact-lens-related microbial keratitis, case report and review, J Optom. 2011; 4(4):122-127.
7. Brightbill F G. Central cornea ulcers. Am. J. Opthalmol 1972; 4: 331-337.
8. Mondino B J, Weissman BA, Farb M.D & Pettit T H. Corneal ulcers associated with daily wear and extended wear contact lenses. Am. J. Opthalmol. 1986; 102:58-65.
9. Weissman B A, Remba M.J & Fugedy. Result of the extended wear contact lens survey of the contact lens section of the American Optometric Association. Am. J. Optometric Assoc 1987; 58: 166-71.
10. MacFaddin JF. Biochemical Tests for Identification of Medical Bacteria, 3rd ed., Lippincot Williams & Wilkins, US, 200; pp. 912.
11. Lancette GA, Tatini SR. *Staphylococcuss aureus*. In: eds Vanderzant, C.and Splittstoesser, D. F. (eds.). Compendium of methods for the microbiological examination of foods. Washington: Amer. Pub. Health Assoc., 1992; pp 533-550.
12. Mackie and McCartney. Practical medical microbiology. Elsevier publications, 14th edition, 1996; pp.152-155.
13. Stapleton F, Keay L, Edwards K, Naduvilath T, Brain G & Jacobs, R. Studies of contact lens-related microbial keratitis in Australia and New Zealand: new learning. Eye Contact Lens 2007; 33: 354-357.
14. Sankaridurg PR, Sharma S, Willcox M, Naduvilath TJ, Sweeney DF and Holden, B.A. Bacterial colonization of disposable soft contact lenses is greater during corneal infiltrative events than during asymptomatic extended lens wear. Journal of Clinical Microbiology 2000; 38: 4420-4424.
15. Brooks GF, Butel, J S and Morse SA. Adelbergs Medical Microbiology (22nd Edition) Appletion and Lange, New York,2001; 179-193.
16. Salha H. M. Al-Zahran. Bacteria isolated from contact and non contact lens and antibiotic susceptibility patterns of isolated Pseudomonas aeruginosa , African Journal of Microbiology Research 2012; 6(47): 7350-7356.
17. Supriya S. Tankhiwale, Sonali Dwidhmuthe and N. S. Tankhiwale. Risk factors and microbial colonization of soft contact lens storage cases and conjunctiva of asymptomatic lens users IJAMBR 2015; 3: 31-35 .
18. Houang E, Lam D, Fan D, Seal D. Microbial keratitis in Hong Kong: relationship to climate, environment and contact-lens disinfection. Trans R Soc Trop Med Hyg 2001; 95:361-7.
19. Green M, Apel A, Stapleton F. Risk factors and causative organisms in microbial keratitis. Cornea 2008; 27:22-7.
20. Alexandrakis G, Alfonso EC, Miller D. Shifting trends in bacterial keratitis in south Florida and emerging resistance to fluoroquinolones. Ophthalmology 2000; 107:1497-502.
21. Willcox M.D.P, Harmis N.Y., Holden B.A. Bacterial populations on high- Dk silicone hydrogel contact lenses: the effect of length of wear in asymptomatic patients.Clinical and Experimental Optometry 2002; 85: 172-175.

Conflict of Interest: None

Source of Funding: Nil