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RESEARCH ARTICLE

PREOPERATIVE BACTERIOLOGICAL PROFILE AND ITS ANTIBIOTIC PATTERN OF CATARACT CASES PRESENTING IN A TERTIARY EYE CARE HOSPITAL IN SALEM

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ABSTRACT

Aim: To isolate and identify the bacterial isolates from preoperative cases presenting at an eye care hospital in Salem and determine its antibiogram pattern.
Method: Conjunctival swabs were obtained from 84 preoperative cases undergoing cataract surgery at Dr.Agarwal's Eye Hospital, Salem. The swabs were processed by standard methods. The bacterial isolates deemed significant by growth in culture media and positive for direct microscopic findings were taken for the study. The antibiotic sensitivity pattern was determined by Kirby-Bauer method.
Result: In this study the culture positivity accounted for 71(85%) cases and 13(15%) cases showed no growth. The predominant isolate was *Staph epidermidis* in 23(32.3%) cases followed by *Staph aureus* in 12(16.9%) cases. Non hemolytic streptococci accounted for 10(14%) cases followed by *Streptococcus pneumoniae* in 7(10%) cases . The gram negative isolates included *Acinetobacter spp* in 3(4.2%) cases, *Aeromonas spp* in 3(4.2%) cases and *Serratia spp* in2(3%) cases. In susceptibility testing, ciprofloxcin showed a wide coverage against 54(86%) of the 63 gram positive cocci and 5(63%) of the total 8 gram negative isolates. The coverage of sisomycin, tobramycin and ofloxcin against gram positive cocci tested were 73.01%, 65.07% and 60.01% respectively. All the isolates of gram negative bacilli showed resistance to ofloxcin. Ciprofloxacin, sisomycin and amikacin was the most effective antibiotics against *Aeromonas spp* in this study.
Conclusion: ciprofloxacin, sisomycin and tobramycin having a wide range of activity against both gram positive and gram negative organism indicating it as a potent antibiotic for preoperative cases.

INTRODUCTION

Cataract surgery is one of the most common surgical procedures performed in India (Javitt *et al.,* 1994). Ocular complications of this surgery are relatively rare. However, sometimes serious postoperative infection called endophthalmitis occur which causes severe loss of vision in the affected eye (Aaberg *et al.,* 1998; Lemley and Han, 2007). Postoperative endophthalmitis remains one of the most feared problems following intraocular surgeries (Callegan *et al.,* 2002). Gram-positive organisms are responsible for acute postoperative endophthalmitis in more than 90% of cases reported. More than half of these cases report *Staphylococcus epidermidis* as the frequent organism as they are found in abundance in the conjunctiva as normal flora (Srinivasan *et al.,* 1999). The role of conjunctival flora as a causative agent of endophthalmitis has been reported in many of the studies conducted earlier (Anand *et al.,* 2000). Topical antibiotics such as moxifloxacin, ciprofloxacin, gatifloxacin, ofloxacin, and levofloxacin can be used preoperatively for one to three days to reduce the load of microorganisms in the conjunctival flora, thus minimizing the contamination (Beigi *et al.,* 1997; Koss *et al.,* 2007; Miño de Kaspar *et al.,* 2008). Careful preoperative preparations can greatly influence the rate of potential microbial contamination during cataract surgery. Hence the present study was carried out to evaluate the preoperative bacteriological profile of cataract cases presenting in a tertiary eye care hospital in Salem and determine its antibiotic pattern to commonly administered antibiotics.

MATERIALS AND METHODS

The study population included 84 cataract patients who had cataract, undergoing cataract surgery following lens removal by intra ocular lens implantation at Dr. Agarwal's eye hospital,

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between 1st August 2010 to 31st October 2010. This study was approved by the institutional ethics committee for the enrollment of patients and proper consent was obtained from the patients on the consent form before enrolling them for the study.

Collection and processing of Conjunctival smear

A sterile cotton-tip swab moistened with sterile saline was rotated along the inferior tarsal conjunctiva while the lower lid was retracted. For each eye two swabs were taken. One swab was inoculated on to culture media by making two rows of "C" streaking on culture media namely Sheep blood Agar (SBA) and Brain Heart infusion Agar (BHIA). Another swab was smeared on to a clean, dust free glass slide and grams staining were performed. The swab was then broken off and placed in the Brain Heart infusion Broth (BHIB). The bacterial plates and broths were incubated at 37° C for 24-48 hrs. The culture was deemed to be significant if there was growth on more than one culture medium or if there was growth in one medium with direct microscopy positive for the particular organism isolated in culture. The bacterial isolates were identified by using the standard microbiological and biochemical test

Table I: Bacterial strains isolated from preoperative cataract cases

S.No	Organism	No of Isolates	% of Isolates
1	*Staph aureus*	12	16.9
2	*Staph epidermidis*	23	32.3
3	*Staph saprophyticus*	11	15.4
4	*Nonhaemolytic streptococci-*	10	14
5	*Streptococcus pneumoniae*	7	10
6	*Aeromonas*	3	4.2
7	*Serratia liquefacians*	2	3
8	*Acinetobacter*	3	4.2

Antibiotic susceptibility test by disc diffusion method

The antibiotic susceptibility testing for these bacterial isolates from preoperative cases was done following the method of Kirby Bauer disc diffusion method. A sterile cotton swab was dipped in the bacterial suspension and streaked in six directions over the surface of the Mueller hinton agar (MHA) plate to obtain a uniform growth. The antibiotic disc was placed immediately by using a sterile forceps in such as way that there was a distance of 1-2 cm between each disc. The plates were incubated immediately after keeping the disc under conditions where diffusion of the antibiotic and bacterial growth commences at the same time. Following overnight incubation, the diameters of the zone of growth around each disk were measured using the scale and the antibiotic pattern was ascertained by interpreting with the standard chart.

RESULTS

Among isolates (n=84) from eighty four patients, culture positivity accounted for 71(85%) cases and there were no growth of organism in 13 (15%) cases. Of the culture positive cases, gram positive cocci accounted for 63 (89%) cases and gram negative bacilli accounted for 8 (11.2%) cases. (Table1). *Staphylococcus epidermidis* was the predominant isolate accounting for 23(32.3%) cases followed by *Staph aureus* accounting for 12(16.9%) cases and *Staphylococcus saprophyticus* which accounted for 11(15.4%) cases. The streptococci accounted for 17 (24%) cases which include *Streptococcus pneumonia* for 7 (10%) cases and non-hemolytic streptococci for10 (14%) cases. Among Gram negative organism *Aeromonas spp* and *Acinetobacter spp* was the predominant isolates accounting for 3(4.2%) cases followed by *Serratia liquefacians* which accounted for 2 (3%) cases. Based on the results from susceptibility testing (Table 2), ciprofloxacin covered against 54(86%) of the 63 gram positive cocci isolates and was the most effective antibiotic against gram positive cocci. The coverage of ciprofloxacin against gram negative bacilli was 5(63%) of the total 8 tested isolates. The coverage of this antibiotic for *Aeromonas spp* was 2 (67%) of the 8 isolates. The coverage of sisomycin, tobramycin and ofloxcin against gram positive cocci tested were 73.01%, 65.07% and 60.01% respectively. All the isolates of gram negative bacilli showed resistance to ofloxcin. Tobramycin and Amikacin had a coverage against 2 (25%) and 1 (13%) of 8 gram negative bacilli isolates respectively.

Table 2. Susceptibility results of various bacteria from preoperative cataract cases to commonly used ocular antibiotics

Organisms	No of Isolate	No.Sensitive and % Sensitive							
		Cip	Ss	OF	Tb	Ak	Am	Cl	V
Staph aureus	12	10(83)	8(67)	8(67)	8(67)	6(50)	4(33)	6(50)	6(50)
Staph epidermidis	23	20(87)	14(61)	14(61)	14(61)	6(26)	6(26)	4(17)	4(17)
Staph saprophyticus	11	9(82)	9(82)	9(82)	9(82)	5(45)	4(36)	2(18)	2(18)
Nonhaemolytic streptococci	10	9(90)	9(90)	4(40)	5(50)	9(90)	5(50)	9(90)	9(90)
Streptococcus pneumoniae	7	6(86)	6(86)	3(43)	5(71)	6(86)	4(57)	6(86)	6(86)
Aeromonas	3	2(67)	2(67)	--	1(33)	---	2(67)	-----	-----
Serratia liquefacians	2	1 (50)	1(50)	------	------	-----	1(50)	-----	----
Acinetobacter	3	2(67)	2(67)	---	1(33)	1(33)	2(67)	-----	-------

Ciprofloxacin, sisomycin and amikacin was the most effective antibiotics against *Aeromonas spp* in this study and also showed good coverage against other gram negative organisms ie. *Acinetobacter*, and *Serratia liquefacians* as well. Amikacin, clindamycin, and vancomycin were also effective against *Staph aureus.*

DISCUSSION

The organism that causes ocular infection is generally exogenous and result from entry of organisms into the eye

during surgery. The sources of contamination include instruments and the infusion fluids. In addition to this, the conjunctival sac itself normally harbors several commensals. These indicate the importance of preoperative procedures in the prevention of post operative infections. Due to the importance associated with these studies in the prevention of post operative infections, an attempt was made in this study to isolate and identify the bacterial isolates from preoperative cases presenting at an eye care hospital.

This present study is a small case study conducted over a short period of three months comprising 84 cataract cases. In this study, the culture positivity accounted for 71(85%) cases similar to the observation made by *Arantes et al.,* 2006*,* which showed high percentage of culture positivity namely 86%. The gram positive cocci had a high frequency of contamination in conjunctival flora in this present study. The observations made in the present study correlates with the study of many workers which reported genus *Staphylococcus* as the predominant isolate and gram positive cocci showing high frequency of contamination in the conjuntival flora.. (Egger *et al*., 1994; Beigi *et al.,* 1997; Khosravi *et al.,* 2007). In this study, the antibiogram pattern showed ciprofloxacin, sisomycin and tobramycin showed a wide range of activity against both gram positive and gram negative organism indicating as a potent antibiotic for preoperative cases. The results of the previous studies have also shown a variety of topical antibiotics, including gentamicin, chloramphenicol and third-generation fluoroquinolones, as preoperative antibiotics (Barry *et al.,* 2006). However the results of this study suggest that sisomycin ciprofloxacin, ofloxcin and tobramycin can be used as preparative topical preoperative antibiotics in the prevention of post operative infections.

The resistance rates to antibiotics are growing with the dissemination and prolonged use of antimicrobial agents. Based on this, the characterization of bacterial ocular flora and its susceptibility pattern is highly justified, as it gives the surgeon a powerful tool to help in the choice of the most appropriate antibiotic to be used in the prophylaxis of ocular surgeries (Ta *et al.,* 2003). It should be kept in mind that these *in vitro* results do not always reflect the clinical response to antibiotics due to variety of reasons. However, these results do provide information that makes rationale- based decision in choosing an initial regimen for treatment of ocular pathogens.

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