

## Importance of Conjunctival Swab Culture and Sensitivity Test Before Cataract Surgery

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### ABSTRACT

**Purpose:** To determine the spectrum of infectious-agent from conjunctival swab and antibiotic susceptibility. To observe the necessity of conjunctival swab culture and sensitivity prior to intraocular surgery as a preventive measure against post operative endophthalmitis in the socio-economic perspective of our country.

**Method:** A retrospective review of microbiological records of conjunctival swab was done for 22 months (From August 2000 to May 2002) in BSMMU, Dhaka, Bangladesh. We selected the culture positive cases for our study. Antibiotic susceptibility of these isolates was determined for fourteen ocular and systemic antibiotics.

**Result:** Among 209 attendant cases, 57 were culture positive. All of them were gram positive bacteria. Most of them were staphylococcus epidermis 47 (82.5%) others were staphylococcus aureus 5 (8.77%); streptococcus viridans 5 (8.77%). There was specific age variation also. All organisms were 100% sensitive to Chloramphenicol. Staphylococcus epidermidis, streptococcus viridans were 100% sensitive to Gentamycin and Ciprofloxacin, while staphylococcus aureus show 80% sensitivity. Organisms were least sensitive to Neosporin.

**Conclusion:** Commonest isolated organism from conjunctival swab is staphylococcus epidermidis (82.5%). All the organism shows full range of sensitivity and no resistance to chloramphenicol; also maximum sensitivity and no resistance to Gentamycin, Ciprofloxacin in our study group and from this it can be conclude that instead of doing random C/S for conjunctival swab we can give prophylactic broad spectrum antibiotic eye drop to sterilize conjunctival sac before surgery.

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### Introduction

There is a matter of debate that without patient's local and systemic abnormalities pre-operative conjunctival swab culture, randomly needed or not as a precaution against post operative bacterial endophthalmitis, specially in poor socio-economic background of Bangladesh. Traditionally pre-operative conjunctival swab C/S test done before cataract surgery. Now a days many center avoid this investigation because it is time consuming as well as expensive. Postoperative endophthalmitis is the most feared complication following ophthalmic surgery, because it frequently leads to permanent visual loss [1]. The prevalence of endophthalmitis is thought to be between 0.1% to 0.4% after cataract surgery [6,10].

The common source of intraocular contamination is conjunctival flora [2]. To minimize the risk of postoperative endophthalmitis, the number of bacteria left in situ (Conjunctival sac) should

be reduced to minimum [13]. So is there any importance to do preoperative conjunctival swab culture and sensitivity? To investigate the question we perform this retrospective study. In this study we pick up the culture positive cases and try to find out the commonest organism and their sensitivity level to various ocular and systemic antibiotics. Which can give us a clue whether we can avoid preoperative conjunctival swab culture & sensitivity test.

### Methods

This is a retrospective review study of Microbiological records of BSMMU. This study done in Collaboration with the department of Microbiology and Ophthalmology, Bangabandhu Sheik Mujib Medical University, Shahbag, Dhaka. We reviewed the recorded conjunctival swab culture of twenty two months (from August 2000 to may 2001) in the record book of microbiology department. A total 209 records we picked up only culture positive cases. 57(32.57%) were culture positive which were plotted in a data sheet. The data sheet include age and sex of patient; type of growth; pattern of growth whether it is profuse or moderate; Systemic and

Ocular antibiotic to which the organisms are sensitive; moderately resistant and resistant.

Investigation was performed to find out the commonest harbouring organism as well as other organism in conjunctival sac and their antibiotic susceptibility from data sheet. Try to get informations which can give us a clue to determine the importance of preoperative conjunctival swab culture and sensitivity test as a precaution against post operative endophthalmitis.

**Result**

Among 209 attendant cases; 57 were culture positive cases. 38 (66.66%) of them were male and 19 (33.33%) were female. For our study we divided the culture positive cases in to three age groups (Table-1). Group 1: age bellow 50 years includes 09 (15.78%) Patients; Group 2: age between 50-70 years includes 41 (71.923%) patients; and 07 (12.285%) patients included into group 3: age above 70 years. All the isolated cases were gram positive. Three gram positive bacteria were isolated. In total staphylococcus epidermidis were isolated from most of the cases 47 (82.5%); Staphylococcus aureus and streptococcus viridans were isolated from same number of cases 5(8.77%).

Table 2: Shows; In group-1 staphylococcus epidermidis isolated in 8 (88.88%) cases and 1 (11.11%) case show staphylococcus aureus. In group 2 staphylococcus epidermidis isolated in 35 (85.36%) cases, staphylococcus aureus isolated in 4 (9.756%) cases and streptococcus viridans isolated in 2 (4.878%) cases. In group 3 staphylococcus epidermidis isolated in 4 (57.14%) cases and streptococcus viridans isolated in 3 (42.85%) cases. An interesting age variation was observed in table-2; that is younger group (group-1) of patient show no growth of streptococcus viridans and older group (Group-3) show no growth of staphylococcus aureus.

Table-3 show pattern of bacterial growth; staphylococcus epidermidis show 30 (63.60%) moderate growth; 17 (36.04%) profuse growth and both staphylococcus aureus; streptococcus viridans show 3(60%) moderate growth 2 (40%) profuse growth.

Antibiotic susceptibility pattern showing in table-4. All organism show 100% sensitivity and no resistance to chloramphenicol as well as gentamycin, cipofloxacin cephalosporin, amikacin shows high level of bacteriological susceptibility.

Staphylococcus epidermidis were 100% sensitive to chloramphenicol, gentamycin, cipofloxacin; at least 36 (76.595%) susceptible to cephalosporin; 04 (8.51%) to amikacin; 13 (27.65%) to neosporin; 21 (44.68%) to tetracycline; 01 (2.127%) to doxycyclin; 17 (36.17%) to erythromycin; 22 (46.80%) to cloxacillin; 12 (4.255%) to neomycin and

azithrocin. Staphylococcus epidermidis shows no resistance to chloramphenicol, gentamycin, cipofloxacin moderate resistance to neosporin 5 (10.63%); tetracycline 4(8.51%); doxycycline 2 (4.25%); erythromycin 5 (10.63%); ampicillia 3 (6.38%); cloxacillin 3 (6.38%); neomycin 1 (2.127%). This organism show resistance to tetracyclin 06 (12.75%); doxycycline 03 (6.36%); erythromycin 10 (21.27%); and 47 (100%) to penicillin and ampicillis; 1 (2.127%) to cloxacillin.

Staphylococcus aureus was 5 (100%) sensitive to chloramphenicol; cephalosporin & at least 4 (80%) sensitive to gentamycin, cipofloxacin; 3(60%) sensitive to cloxacillin; 2 (40%) sensitive to neomycin and 1 (20%) sensitive to neosporin and erythromycin. This organism also show 4 (80%) resistance to tetracycline, erythromycin, cloxacillin, penicillin.

Streptococcus viridans show 5 (100%) susceptibility to chloramphenicol; gentamycin, cipofloxacin; cephalosporin; amikacin 2 (40%) sensitive to ampicillin; 1 (20%) sensitive to erythromycin & neomycin. This organism 1 (20%) mederately resistant to cloxacillin and 4 (80%) resistant to cloxacillin; 3 (60%) resistant to erythromycin; 2 (40%) resistant to tetracycline.

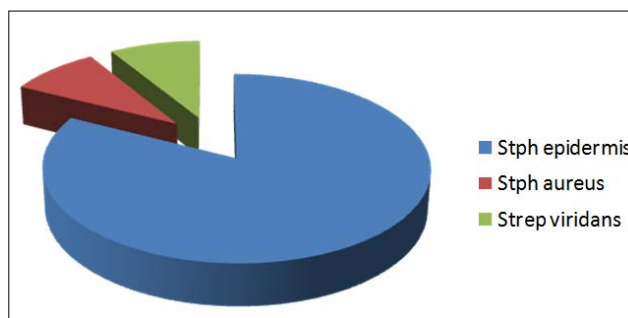


Figure 1: Bacteriological findings in total

Table 1: Distribution of age among culture positive cases

Group	Age (Year)	Frequency	Percent
01	<50	09	15.78
02	50-70	41	71.923
03	>70	07	12.285
Total		57	100

Distribution of sex among culture positive case

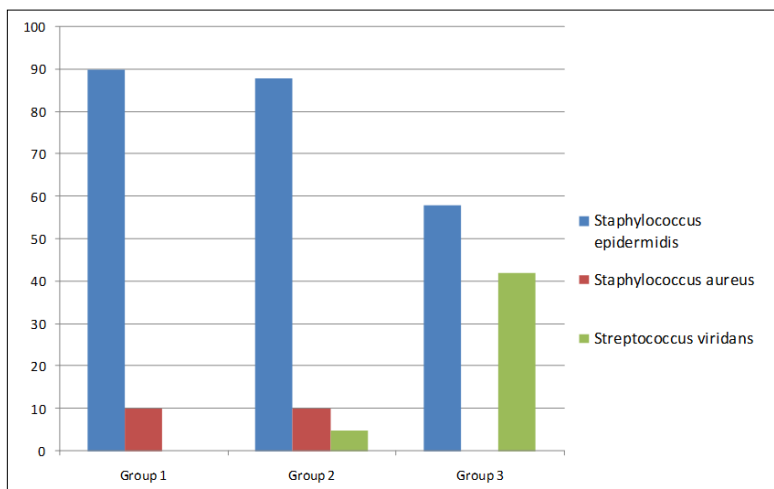
Male : 38 (66.66%)  
 Female : 19 (33.33%)  
 Total : 57 (100%)

Table 2: Bacteriological findings of the sample from different age group

Bacteria Isolated	Group-1 no (%)	Group -2 no (%)	Group - 3 no (%)	Total No no (%)
Gm (+) ve				
Stph epidermidis	8 (88.88%)	35 (85.36%)	4 (57.14%)	47 (82.45%)
Stph aureus	1 (11.11%)	4 (9.756%)	--	5 (8.77%)
Strep viridans	--	2 (4.878%)	3 (42.85%)	5 (8.77%)
Stph Pyogen	--	--	--	--
Stre Pneumo	--	--	--	--
Gm (-) ve	--	--	--	--

**Table 3: Pattern of bacterial growth**

Pattern of bacterial growth	Staphylococcus epidermidis no (%)	Staphylococcus aureus no (%)	Streptococcus viridans no (%)	Total (%)
1. Moderate growth	30 (63.60%)	3 (60%)	3 (60%)	36 (63.157)
2. Profuse growth	17 (36.04%)	2 (40%)	2 (40%)	21 (36.842)
Total	47 (100%)	5 (100%)	5 (100%)	57 (100)



**Figure 2:** Bar graph showing bacteriological findings in different age groups

**Table 4: Antibiotic susceptibility Pattern**

SN	Antibiotic	Organism Susceptible no (%)			Organism Moderate resistant no (%)			Organism resistant no (%)		
		Stap epidermidis	Stap aureus	Strep Viridans	Stap epidermidis	Stap aureus	Strep Viridans	Stap epidermidis	Stap aureus	Strep Viridans
1	Chloramphenicol	47 (100%)	05 (100%)	05 (100%)	--	--	--	--	--	--
2	Gentamycin	47 (100%)	4 (80%)	05 (100%)	--	--	--	--	--	--
3	Ciprofloxacin	47 (100%)	4 (80%)	05 (100%)	--	--	--	--	--	--
4	Cephalosporin	36 (76.595%)	5 (100%)	05 (100%)	--	--	--	--	--	--
5	Amikacin	04 (8.51%)	1 (20%)	05 (100%)	--	--	--	--	--	--
6	Neosporin	13 (27.85%)	1 (20%)	1 (20%)	5 (10.63%)	--	--	--	--	--
7	Tetracyclin	21 (44.68%)	--	--	4(8.51%)	--	--	06 (12.75%)	4 (80%)	2 (40%)
8	Doxycyclin	01 (2.127%)	--	--	2 (4.25%)	--	--	03 (6.36%)	--	--
9	Erythromycin	17 (36.17%)	1 (20%)	1 (20%)	5 (10.63%)	--	--	10 (21.27%)	4 (80%)	3 (60%)
10	Ampicilin	--	--	2 (40%)	3 (6.38%)	--	--	47 (100%)	--	--
11	Cloxacillin	22 (46.80%)	3 (60%)	--	3 (6.38%)	--	1 (20%)	1 (2.127%)	4 (80%)	4 (80%)
12	Penicillin	--	--	--	--	--	--	47 (100%)	4 (80%)	--
13	Neomycin	02 (4.255%)	2 (40%)	--	1 (2.127%)	--	--	--	--	--
14	Azythrocin	02 (4.25%)	--	--	--	--	--	--	--	--

**Discussion**

Post operative endophthalmitis is the most devastating complication and threatening to visual out come after cataract surgery. The prevalence of endophthalmitis is thought to be between 0.1% and 0.4% of cataract operation [7,10]. The causative bacteria for infectious postoperative endophthalmitis are Staphylococcus epidermidis; Staphylococcus aureus and gram negative bacteria like Pseudomonas; Proteus; E coli; Klebsiella [14].

These organisms are mostly in other word fully sensitive to many broad-spectrum topically used antibiotic like chloramphenicol, gentamycin, ciprofloxacin. According to our study among 209 attendant cases 57 were culture positive. Only gram positive bacteria were isolated. We found *staphylococcus epidermidis in most of the cases 47 (82.5%)*. Others are staphylococcus aureus and streptococcus viridans; each of them are isolated from 5 (8.77%) cases. All three organisms show full range of (100%) sensitivity but no resistance to *chloramphenicol*. The commonest organism, staphylococcus epidermidis as well as streptococcus viridans were 100% & staphylococcus aureus was at least 80% sensitive to commonly used drug like *gentamycin, ciprofloxacin*.

To cephalosporin, Staphylococcus aureus and streptococcus viridans were 100%, staphylococcus epidermidis was 76.595% sensitive and they show no resistance. Another common drug is neosporin to which staphylococcus aureus and streptococcus viridans were 20% sensitive; but no resistance except moderate resistance to staphylococcus epidermidis (10.63%) So from our result it is obvious that the commonly used topical broad spectrum antibiotics are sufficient to control the colonization of organism in the conjunctival sac that may be an infectious factor for post operative endophthalmitis [2].

In fact cataractous eye with out any periocular infective condition such as blepharitis, daeryocystitis not likely to need conjunctival swab culture and sensitivity test. And these periocular infection should be corrected before any elective intervention by using proper antibiotic.

Actually according to many authors, most of the risk factors for post operative endophthalmitis are induced during surgery like complicated surgery, prolong surgery; wound complication; extracapsular versus intra capsular surgery; ECCE versus phaco emulsification; capsule rupture; vitreous loss; anterior vitrectomy, amount of instrumentation; excessive manipulation of the eye, contaminated IOL and certain types of IOL etc [3,10].

So the author suggest that to minimize the risk, the surgeon carefully prepare the surgical field with an antibacterial agent (like povidone iodine 5%) and adhere to sterile technique [1,2]. We have large cataract backlog according to national blindness survey (1999-2000) it is 4,30,000 – 6,00,000 and cataract incidence is 8,500 – 1,25,000 per year in our country.

More over most of our people coming from abroad and also from low socio-economic condition. Pre-operative conjunctival swab culture and sensitivity test is a time consuming as well as expensive procedure. Bacteriological culture needs 48-72 hours. So a cataract patient with out other problem like watering, discharge, redness, periocular infective foci do not need to go through this conjunctival swab culture and sensitive test.

### Conclusion

In conclusion we acknowledge the help of the department of pathology, BSMMU. Although this is a retrospective study and lacking of many information like association of infection or use of antibiotics etc we have found three gram positive bacteria. Staphylococcus epidermidis is the commonest (82.5%) bacteria; other two are staphylococcus aureus and streptococcus viridans. All these organisms are fully sensitive and no resistance to chloramphenicol, which is available locally used antibiotic.

To other commonly used antibiotics like ciprofloxacin; gentamycin; organism show high level of sensitivity and no resistance in our study group. So in spite of all limitation like lack of information, unicentral & short period study; we can draw a conclusion that without doing random culture and sensitivity for conjunctival swab prophylactic broad-spectrum antibiotic eye drop is sufficient to sterilize conjunctival sac prior to cataract surgery.

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