

Assessment of Ocular Microbial Flora in Diabetic and Non- Diabetic Subjects Undergoing Cataract Surgery

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Abstract

Background: The aim is to assess ocular microbial flora in diabetic and non- diabetic subjects undergoing cataract surgery. **Subjects and Methods:** One hundred two adult patients were scheduled for cataract surgery. Fasting blood sugar (FBS), random blood glucose (RBG) and glycated hemoglobin level (HbA1c) was evaluated. Those with diabetes were kept in group I and healthy were kept in group II. Ocular flora was assessed in both groups. **Results:** Our results showed that Group I had 32 males and 30 females and group II had 24 males and 16 females. Group I comprised of 42% positive and 58% negative and group II had 20% positive and 80% negative microbial culture. Microorganism found to be staphylococcus coagulase-negative 24% in group I and 9% in group II, staphylococcus coagulase-positive 1% in group I and 4% in group II, Klebsiella 1% in group I and 2% in group II, staphylococcus epidermidis 6% in group I and 4% in group II, Enterobacter 0% in group I and 1% in group II and fungi in 10% in group I. **Conclusion:** Gram-negative bacteria, Klebsiella and Staphylococcus epidermidis were found to be higher in the conjunctival flora in diabetic patients as compared to healthy subjects.

Keywords: Bacterial flora, Staphylococcus epidermidis, diabetics, Microorganism.

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Introduction

Bacterial normal flora is a group of microorganisms seen mostly in healthy eye. These are normal commensal of eye helping in maintaining health and performing conjunctival function.^[1] Among all, coagulase negative staphylococci are found in abundance in a healthy eye.^[2] They have tendency to regrow even after disturbance. In case of low individual immunity, these normal commensals are threat for the eyes by becoming pathogenic. They can cause post-operative infections.^[3]

There are numerous conditions in which normal flora of eye get changed. The most common conditions are subjects wearing contact lenses, immunosuppressive disorders, newborns etc.^[4] The main metabolic disorders such as diabetes mellitus affects immune system and lessens the efficient function against infections.^[5] Hyperglycaemia is the leading cause of diabetic retinopathy, cataracts, glaucoma and cornea damage.^[6] Post-operative endophthalmitis is relatively more in diabetics.^[7] Numerous studies have been done so far depicting higher level of gram- positive bacteria in eye of diabetes

patients as compared to healthy subjects.^[8,9] Considering this, we performed present study among those visiting to ophthalmology department for cataract surgery. The level of microbial flora was determined among those based on their diabetic status.

Subjects and Methods

A sum total of one hundred two adult patients visiting to the department of ophthalmology for cataract surgery were enrolled in the study. Exclusion criteria comprised of patients with corneal and conjunctival disorders, those with immunosuppressive diseases and on ophthalmic medicine were excluded.

Data pertaining to patients were recorded. All were scheduled for cataract surgery. Fasting blood sugar (FBS), random blood glucose (RBG) and glycated hemoglobin level (HbA1c) was evaluated. Those with diabetes were kept in group I and healthy were kept in group II. An expert ophthalmic surgeon performed all surgeries. The conjunctival swabs were obtained by moistened sterile cotton tipped applicators following all

standardized precautionary measures from both eyes and sent to the laboratory. The swabs were inoculated in Tryptic Soy Broth (TSB) at 37°C for 6 hours. Gram staining was performed using broth and cultured in blood agar and Eosin methylene blue and thioglycollate broth. All the creatures were assessed by normal microbiological techniques. Results were tabulated and analysis was performed by spreading data in MS excel sheet. The level of significance was set below 0.05.

Results

Table 1: Patient distribution

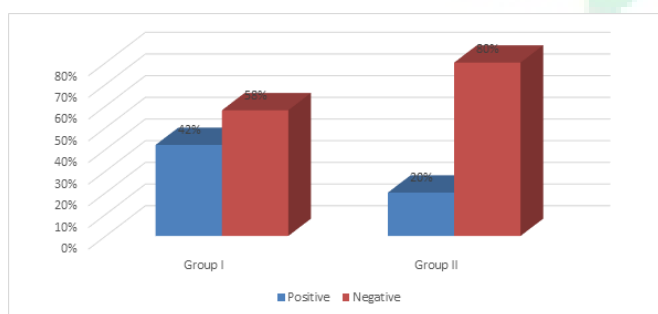
Groups	Group I (Diabetes)	Group II (Healthy)
M:F	32:30	24:16

Group I had 32 males and 30 females and group II had 24 males and 16 females [Table 1].

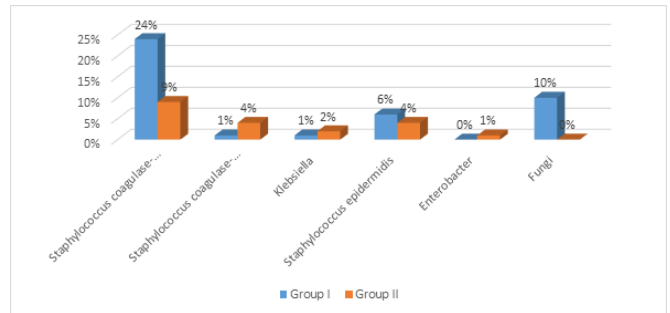
Table 2: Microbial culture in both groups

Microbial culture	Group I	Group II	P value
Positive	42%	20%	<0.05
Negative	58%	80%	

Group I comprised of 42% positive and 58% negative and group II had 20% positive and 80% negative microbial culture. A significant difference was observed ($P < 0.05$) [Table 2, Figure 1].



Microorganism found to be staphylococcus coagulase-negative 24% in group I and 9% in group II, staphylococcus coagulase-positive 1% in group I and 4% in group II, Klebsiella 1% in group I and 2% in group II, staphylococcus epidermidis 6% in group I and 4% in group II, enterobacter 0% in group I and 1% in group II and fungi in 10% in group I. The difference was significant ($P < 0.05$) [Table 3, Figure 2].



Discussion

Eye infection is seen in all age groups. Prolonged eye infection can be the reason of blindness and visual impairment.^[10] The chances are more in immunocompromised adults of both genders.^[11,12] Ocular flora that may pose difficulty in diabetes comprise of Staphylococcus aureus and coagulase negative Staphylococcus etc. Surgical management is necessary in patients having cataract with history of diabetes.^[13,14] Research demonstrate that diabetic patients are more prone to get ocular infection. Cultures obtained from diabetic patients are relatively positive.^[15,16] The major pathogens causing diabetic retinopathy is Staphylococcus saprophyticus. In present study we assessed ocular microbial flora in diabetic and non-diabetic subjects undergoing cataract surgery.

Our results showed that Group I had 32 males and 30 females and group II had 24 males and 16 females. Group I comprised of 42% positive and 58% negative and group II had 20% positive and 80% negative microbial culture. Soleimani et al,^[17] conducted a study among 380 diabetic and non-diabetic patients undergoing cataract surgery of both genders. Results showed that frequency of Staphylococcus coagulase-positive in diabetic was 0 and in non-diabetic patients was 6. There were 17 cases of funguses in diabetic and 1 in non-diabetic patients. The level of Klebsiella, Staphylococcus coagulase-negative and Staphylococcus epidermidis in diabetic patients were higher than non-diabetics.

We found that Microorganism found to be staphylococcus coagulase-negative 24% in group I and 9% in group II, staphylococcus coagulase-positive 1% in group I and 4% in group II, Klebsiella 1% in group I and 2% in group II, staphylococcus epidermidis 6% in group I and 4% in group II, enterobacter 0% in group I and 1% in group II and fungi in 10% in group I. In a study performed by Noche et al,^[18] it was found that 82.5% diabetics and 40% non-diabetics had a positive culture. Staphylococcus epidermidis, Bacillus, and Pseudomonas aeruginosa were significantly higher in diabetics as compared to non-diabetics. 80-100% diabetics had resistance of Staphylococcus Coagulase-negative strains for Oxacillin and Trimethoprin-Sulfamethoxy. Healthy individuals revealed higher Bacillus, Staphylococcus epidermidis, and Staphylo-

Table 3: Isolated microorganism in both groups

Microorganism	Group I	Group II	P value
Staphylococcus coagulase-negative	24%	9%	<0.05
Staphylococcus coagulase-positive	1%	4%	<0.05
Klebsiella	1%	2%	>0.05
Staphylococcus epidermidis	6%	4%	>0.05
Enterobacter	0%	1%	>0.05
Fungi	10%	0%	<0.05

coccus saprophyticus flora. Diabetics showed 80-100% resistance for Oxacillin, Cefixime and Penicillin. A positive culture was more frequently found in diabetic participants with a difference for the composition and antibiotic susceptibility compared to healthy people. Suto et al,^[19] in their study found that the level of Staphylococcus coagulase-positive were higher in diabetic patients as compared to non-diabetic patients.

Venkatraman et al,^[20] in their study on 103 type II diabetics determined conjunctival bacterial flora in Type II diabetics. It was found that positive conjunctival cultures in controlled was seen in 22 diabetics (21.8%) and 78 uncontrolled (27.3%). They found no association between duration of diabetes, glycemic control and positive cultures among type II diabetics. Bilen et al,^[21] suggested that the conjunctival flora in diabetic patients differ from that in non-diabetic patients and also diabetic patients are more prone to post-operative endophthalmitis.

Conclusion

Gram-negative bacteria, Klebsiella and Staphylococcus epidermidis were found to be higher in the conjunctival flora in diabetic patients as compared to healthy subjects.

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