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AEROBIC FLORA OF THE NORMAL HUMAN CONJUNCTIVAL SAC

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ABSTRACT.

PURPOSE: *The aim of this study was to evaluate the prevalence of conjunctival flora and identify its types in normal conjunctiva.*
METHOD: *This study was carried out by the Department of Pathology at Civil Hospital Hyderabad. The aim was to identify the presence of normal flora and distinguish the bacterial types, in population sample of 1000 subjects.*
Swabs were taken from conjunctiva of those patients who had no infection or redness in their eyes.
Culture media used were sheep blood agar, chocolate agar, MacConkeys agar, fungal media, mycobiotic agar and Sabouraud 4% dextrose agar.
The Gram-staining was done for each swab.
RESULTS: *There were 475 Males and 525 Females patients from which swabs were taken. Out of 1000 swab tests, 850 (85%) showed no growth, while 110 (10.1%) cases showed the presence of normal bacterial flora in the conjunctiva, whereas 40 (4%) cases showed presence of pathogenic organisms.*
In 110 cases of normal flora, we found Staphylococcus epidermis (54.5%) as predominant organism followed by Diphtheroids (23.6%).
No growth result indicates the absence of both useful flora as well as other pathogenic organism.
CONCLUSIONS: *In our study it was observed that amongst the normal conjunctival flora, Staphylococcus epidermidis was the most common organism and may produce endophthalmitis. Mixed cultures were also observed and some cases showed presence of pathogenic organisms with normal looking eyes,*
All these factors can lead to postoperative endophthalmitis. Hence prior elimination of pathogens is necessary to prevent postoperative endophthalmitis.
Bacterial culture test must be practice to achieve safe surgery thereby preventing postoperative endophthalmitis.

KEY WORDS: Aerobic Flora, Conjunctival Sac.

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INTRODUCTION

The term "normal microbial flora" refers to population of microorganisms that dwell within the eyes of healthy individuals. These microorganisms play an important and specific role in maintaining health and normal conjunctival function. These bacteria, when disturbed, can promptly re-establish themselves[1].

It was found that indigenous bacterial flora inhibits the establishment of foreign pathogenic bacteria by elaborating antibacterial substances and by competing for space and nutrients[1].

The presence of microorganisms in the normal human conjunctiva was established in the 19th century[2].

It is an established fact that gram-positive organisms, particularly coagulase-negative Staphylococci, and are the main residents of normal eye. They are the predominant cause of postoperative infections[3].

Despite minor geographic variations, various Staphylococcal species and Corynebacteria usually predominate amongst the flora. Streptococcal species and gram-negative bacilli are less frequent[4].

Predominant isolates recovered from the normal adult conjunctiva were Staphylococcus epidermidis, Staphylococcus aureus species, Streptococcus non-hemolytic and anaerobic Propionibacterium acnes, while Haemophilus Influenzae was common in children[5].

Bacterial infections are important group of ocular disease. The source of bacteria can be from conjunctival sac. Bacterial keratitis and bacterial endophthalmitis can result in severe visual impairment or even blindness. Thus it is vital to understand the role of commensals in these diseases.

There is scare published data available about normal conjunctival flora in Pakistani population. This study aims at identification of common bacteria within conjunctival sac, using culture and gram staining.

The purpose of this study is to compile data about the occurrence of bacterial flora and to isolate their types, in normal conjunctiva of Pakistan / Hyderabad patients.

MATERIALS AND METHODS

This study was carried out by the Department of Pathology at Civil Hospital Hyderabad from January to December 2008. The aim was to identify the presence of normal flora and distinguish the bacterial types, in population sample of 1000 subjects.

A prior consent was obtained before taking eye culture swabs from each subject. Swabs were taken from conjunctiva of those patients who had no infection or redness in their eyes. All precautionary measures were taken to avoid lid margin and eyelashes while taking the swab.

Swabs were taken from conjunctiva of each patient, using sterile Stuarts swabs, which were placed in Stuarts transport medium for onward transfer to microbiology laboratory. Swabs were streaked on culture media.

Culture media used were sheep blood agar, chocolate agar, MacConkeys agar, fungal media, mycobiotic agar and Sabouraud 4% dextrose agar.

The Gram-staining was done for each swab. Culture media were incubated at 37 degrees C to permit bacterial growth and held for 3 days to ascertain either "growth" or "no growth". Sabouraud 4% dextrose agar and mycobiotic agar were incubated at 25 degrees C and were held for 2 weeks to observe either growth trend.

RESULTS

There were 475 Males and 525 Females patients from which swabs were taken. Out of 1000 swab tests, 850 (85%) showed no growth, while 110 (10.1%) cases showed the presence of normal bacterial flora in the conjunctiva, whereas 40 (4%) cases showed presence of pathogenic organisms. (Table 1)

Out of 110 cases, which showed normal bacterial flora 46 were males and 64 were female. It was important to note that 40 (4%) of cases had pathogenic organism in normal looking eyes and out of these 14 were males and 26 were females. (Table 2)

TABLE 1 –
SWAB TEST REPORTS EVALUATION

Observation	No. Of Swab Test n (%)
No growth	850 (85%)
Normal flora	110 (10.1%)
Other pathogens	40 (4%)
Total	1000 (100%)

TABLE 2 –
SEX WISE DISTRIBUTION OF NORMAL FLORA & OTHER PATHOGENS

Sex	Normal flora n (%)	Other pathogens n (%)	Total n (%)
Male	46 (38)	14 (35)	60 (40)
Female	64 (52)	26 (65)	90 (60)
Total	110 (100)	40 (100)	150 (100)

TABLE 3 –
TOTAL NORMAL FLORA INDIVIDUAL SPECIES

Norma Flora	No of Subjects n (%)
Staphylococcus epidermis	60 (54.5)
Diphtheroids	26 (23.6)
Streptococcus non-heamolytic	8 (7.3)
Mixed culture	7 (6.4)
Moraxella	5 (4.5)
Staphylococcus coagulase negative	2 (1.8)
Neisseria species	2 (1.8)
Total	110

TABLE 4 –
THE NUMBERS AND PERCENTAGE OF MIXED CULTURE

Normal flora	Associate bacteria	Mixed cultures n (%)
Staphylococcus epidermis	Staphylococcus aureus	5 (4.5)
Staphylococcus epidermis	Diphtheroids species	2 (1.8)
	Total	7 (6.4)

In 110 cases of normal flora, we found Staphylococcus epidermis (54.5%) as predominant organism and Corynebacterium species (23.6%) as the second most common organism. The other isolated species were Streptococcus nonheamolytic (7.3%), Moraxella (4.5%), Staphylococcus coagulase negative (1.8%) and Neisseria species (1.8%). (Table 3)

Mixed cultures were observed in 7 cases (6.4%). Staphylococcus epidermis was observed as mixed with Staphylococcus aureus in 5 cases (4.5%), while in 2 cases (1.8) Staphylococcus epidermis was observed as mixed culture with Diphtheroids. (Table 4)

DISCUSSION

Hyderabad is the second largest city in sindh province with population of 2 million. There is lack of basic health and sanitary facilities in the city. Flora is either exogenous or endogenous in origin, which can be contracted from environment, physical contact or unhygienic habits of people. Unclean population serves to invite microorganisms through vectors and allow them to flourish on the skin, eyelids and mucous membranes. The aim of this study was to record actual data in this environmental condition. A randomized sample of 1000 normal looking eyes were subjected to bacteriological study, in order to investigate normal conjunctival flora along with its various types and any pathogens in normal looking eyes.

During the last half-century, many authors have studied bacterial flora residing within normal human conjunctival sac. All such

research reports show remarkable consistency across time and space. In most eyes, staphylococcus epidermidis along with diphtheroids were the common finding.

Starr and lally[4]observed no growth in 24% subjects while staphylococcus epidermis was found in 58% subjects. Other species were Diphtheroids 2%, and Haemophilus influenzae 2% in cultures from preoperative conjunctiva swabs.

In the study of bacterial conjunctivitis in UK, seal et al[6]studied 30 patients normal conjunctiva as control and they observed 30% no growth, while in 57% Staphylococcus epidermidis was isolated which is near to our data.

Perkin et al[7]found 70% Staphylococcus epidermidis in their study of normal conjunctiva as control subjects. Speaker et al studied the postoperative external bacterial flora in the pathogenesis of acute postoperative endophthalmitis of 26 cases. They isolated 69.2% Staphylococcus epidermidis at New York eye and ear infirmary.

Locatcher-Khorazo and Seegal[8]studied the normal flora of 10,000 healthy eyes and isolated Staphylococcus epidermidis 37%, Staphylococcus aureus 17%, Diptheroids 1%, combination of these three organisms 35% and miscellaneous growth in 9%.

Gritz et al[9]studied the conjunctival flora of 42 persons. They isolated Staphylococcus epidermidis in 54.8% and Diptheroids in 9.5% subjects.

Larkin and leeming[10] studied the normal ocular flora of 34 individuals and compared it with that of contact lens users. Staphylococcus epidermidis was the most prevalent species among healthy individuals.

Akhter jamal khan[11] studied the normal conjunctival flora in Karachi and obtained cultures from 800 patients. His results showed no growth in 89.1% cases, while growth was observed in 10.9% subjects. Normal conjunctival flora was present in 7.5%. Amongst the normal flora Staphylococcus epidermidis (57.7%) was the most common bacteria, followed by Diphtheroids sp (26.6%)

Shehla Rubab[12] compared the indigenous microbial flora of the eye to that found in conjunctival and corneal infections at Al-Shifa trust hospital at Rawalpindi. She found out that in the control group of 700 eyes, 34.3%, 120 patients showed microorganism growth. The microorganism detected included Staphylococcus epidermidis in 57.7%, Staphylococcus aureus in 22.5%, Streptococcus pneumoniae in 8.3% and Diphtheroids in 3.3% of cases.

CONCLUSION

In our study the female patients have higher percentage (52%) of normal conjunctival flora, than the males patients (38%). It was further observed that amongst the normal conjunctival flora, Staphylococcus epidermidis (54.5) was the most common organism. Although Staphylococcus epidermidis was one of the major normal flora of the eye but it has been evident that Staphylococcus epidermidis may produce endophthalmitis.

Mixed cultures were observed in 7 cases (6.4%). Staphylococcus epidermis was observed as mixed with Staphylococcus aureus in 5 cases (4.5%), while in 2 cases (1.8) Staphylococcus epidermis was observed as mixed culture with Diphtheroids. This can also lead to postoperative endophthalmitis. 40 (4%) cases showed presence of pathogenic organisms with normal looking eyes, which are able to produce postoperative endophthalmitis. Hence prior elimination of pathogens is necessary to prevent postoperative endophthalmitis.

Bacterial culture test must be practice to achieve safe surgery thereby preventing postoperative endophthalmitis.

A thorough understanding of the differences in the conjunctival flora of healthy eyes is essential for ophthalmologists. This knowledge can play an important role in interpretation of clinical culture results and in management of potential pathogens colonizing the ocular surface. It is also of particular concern when planning surgery since sterility at the time of surgery presumably decreases the frequency of postoperative infections.

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