BACTERIOLOGY OF HEALTHY CONJUNCTIVAE IN MALAYSIANS

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INTRODUCTION

The eye harbours bacteria from the time of birth throughout life. Owing to its antibacterial properties, the normal conjunctival flora plays a significant role in the defence against superficial ocular infections. In view of its protective action as well as its probable role in causing ocular disease under certain circumstances, the study of the normal flora and its pattern of antibiotic susceptibility could provide useful information in the prevention and treatment of post-surgical infections. While several such surveys have been reported from various parts of the world, no data is available for the Malaysian population.

This survey seeks to establish the pattern of bacterial flora in healthy conjunctivae of Malaysians. In addition, the bacterial flora of a non-diabetic population was compared to that of a diabetic population to see if there were any differences.

MATERIALS AND METHODS

Conjunctival swabs were obtained from 200 non-diabetic and 50 diabetic subjects attending the Ophthalmological and Diabetic clinics of the Universiti Kebangsaan Malaysia. None of the subjects had evidence of ocular infections nor had they used any eye medication during the previous two months.

Cotton swabs moistened with sterile normal saline were used. It was passed back and forth twice over the greater part of the lower conjunctiva. Care was taken not to touch the eyelid or eyelashes. The swab was then inoculated onto two blood agar, one chocolate agar and one MacConkey agar plates. A fresh swab was used for the other eye.

All inoculated plates were sent to the Bateriology laboratory for incubation and further processing. One blood agar and the MacConkey plate were incubated aerobically while the chocolate plate was incubated in a candle jar. The other blood agar plate was incubated anaerobically using the GasPak disposable anaerobic system (BBL). The incubation temperature was 37°C. The plates were read after 48 hours and again after a further 72 hours of incubation. All isolates were identified in the usual manner. Antibiotic susceptibility was determined using a standardised disk test.[1]

RESULTS

Table I shows the age and sex distribution of the subjects.

Among the 200 non-diabetic subjects, no bacteria was isolated from 139 (69.5%). Of the remaining 61 subjects, bacteria was isolated from one eye in 26 and from both eyes in 35. Of the 96 positive cultures, 69 were pure growths and 27 mixed growths.

The types of organisms isolated are summarised in Table II. *Staphylococcus epidermidis* was the

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TABLE I

AGE AND SEX DISTRIBUTION OF SUBJECTS

Age group (yrs)	Normal		Diabetic	
	Male	Female	Male	Female
10 – 20	8 (3)	9 (0)	0 (0)	1 (1)
21 – 30	59 (19)	47 (7)	1 (1)	2 (1)
31 – 40	19 (12)	28 (11)	4 (2)	2 (0)
41 – 50	5 (2)	6 (3)	9 (6)	8 (4)
51 – 60	6 (4)	8 (0)	10 (6)	5 (3)
61 – 70	3 (0)	2 (0)	4 (4)	4 (3)
Total	100 (40)	100 (21)	28 (19)	22 (12)

Number of positive cultures in parenthesis.

TABLE II

TYPES OF ORGANISMS ISOLATED FROM HEALTHY CONJUNCTIVAE

Organism	Non-diabetic	Diabetic	Total (%)
S. epidermidis	59	40	99 (52.6)
Corynebacterium sp.	43	18	61 (32.4)
S. aureus	7	4	11 (5.9)
Acinetobacter sp.	5	2	7 (3.7)
Propionibacterium sp.	3	0	3 (1.6)
Others*	7	0	7 (3.7)
Total	124	64	188 (100.0)

*Others – *Strep* sp. 3; *Micrococcus* sp. 2 yeasts 2.

most common bacterial isolate (52.6%), followed by *Corynebacterium* sp. (32%), and *Staphylococcus aureus* (5.9%). There were five cultures of *Acinetobacter* sp which was the only gram-negative bacillus isolated. Yeasts were isolated from both eyes in one patient and there were three isolates of anaerobic bacteria which were all *Propionibacterium* sp.

Among the diabetic subjects, growth was obtained in 31 (62%). The organisms isolated are also summarised in Table II. Again *S. epidermidis* was the most common, followed by *Corynebacterium* sp. and *S. aureus.*

A significant proportion of *S. epidermidis* (48.5%) were resistant to penicillin. Resistance to tetracycline was also common. The majority of *S. epidermidis,* however, remained sensitive to chloramphenicol and gentamicin. Resistance to these antibiotics among the *Corynebacterium* sp. was not common. All staphylococcal isolates were found to be sensitive to methicillin. All isolates in this survey were sensitive to gentamicin.

DISCUSSION

Infections of the outer eye have been attributed to agents such as bacteria, viruses and rickettsia. In a large survey involving 10,271 individuals between 1952 – 1968, Locatcher-Khorazo and Gutierres found *S. epidermidis, S. aureus* and diphtheroids to be the most commonly isolated organisms from the normal conjunctival sac. They did not find any significant variation with regards to sex, age and season.[2] Similar studies from around the world including China and Japan[2] as well as the present survey confirm these findings.

We were disappointed in the low rate of isolation of anaerobes in this survey. Although Locatcher-Khorazo and Gutierres did not isolate any anaerobes, more recent studies have shown that anaerobes, in particular *Propionibacterium* sp. are common in the conjunctival flora.[3,4] We feel that the apparent absence of anaerobes in our survey is due to technical deficiencies rather than a true low prevalence.

Diabetic subjects when compared to non-diabetics had more positive cultures. Between 3–40% of normal subjects showed an absence of growth, and this apparent absence may be due to the fact that bacterial counts are low in normal conjunctivae and the variation in the figures is a reflection of the different sensitivities of isolation procedures. Although the number in the diabetic group is too small for any generalisation, the findings of more positive cultures in our diabetic subjects seem to suggest that the conjunctival bacterial population in diabetics may be higher than that of nondiabetics. Further studies are required to confirm this. Certain immune mechanisms have been found to be deficient in

diabetics[5] and it would be interesting to find out if this deficiency has resulted in their apparent failure to limit the numbers of bacteria in their conjunctivae.

Surgical intervention in the diabetic eye has become more frequent in recent years and longer operative procedures are considered to be associated with increased risk of post-surgical infections. A higher incidence of positive cultures in our healthy diabetics' eyes thus appear quite relevant in this respect.

Penicillin, tetracycline, chloramphenicol and gentamicin are common topical agents used by ophthalmologists in Malaysia, but resistance to penicillin and tetracycline among conjunctival flora appears to be fairly common. Hence for empirical therapy, we would suggest chloramphenicol or gentamicin.

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