BACTERIOLOGICAL STUDY OF ACUTE CONJUNCTIVITIS IN EGYPT WITH REFRENCE TO THE NORMAL CONJUNCTIVAL FLORA

THESIS

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BY

MOHAMED ABDEL GHANY BADER

SUPERVISED BY

DR . SHAKER KHEDR
ASSISTANT PROF. OF OPHTHALMOLOGY
AIN SHAMS FACULTY OF MEDICINE

DR . IBRAHIM KHALIL
ASSISTANT PROF. OF CLINC. PATH.
AIN SHAMS FACULTY OF MEDICINE

FACULTY OF MEDICINE

AIN SHAMS UNIVERSITY

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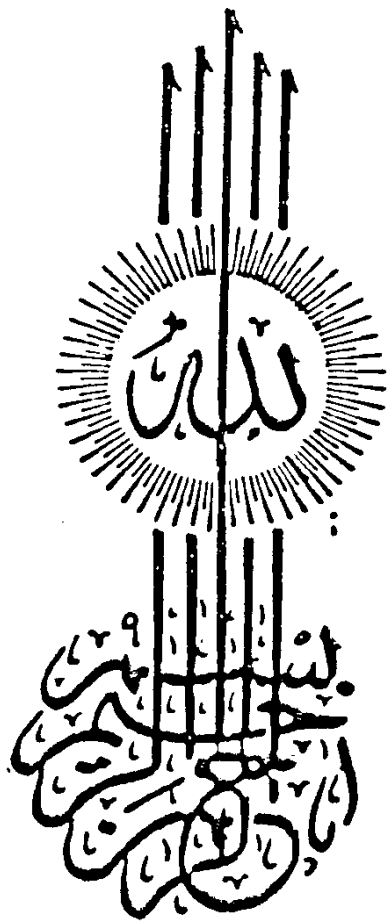

وَقُلِ اعْمَلُوا فَسَيَرَى اللّٰهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ

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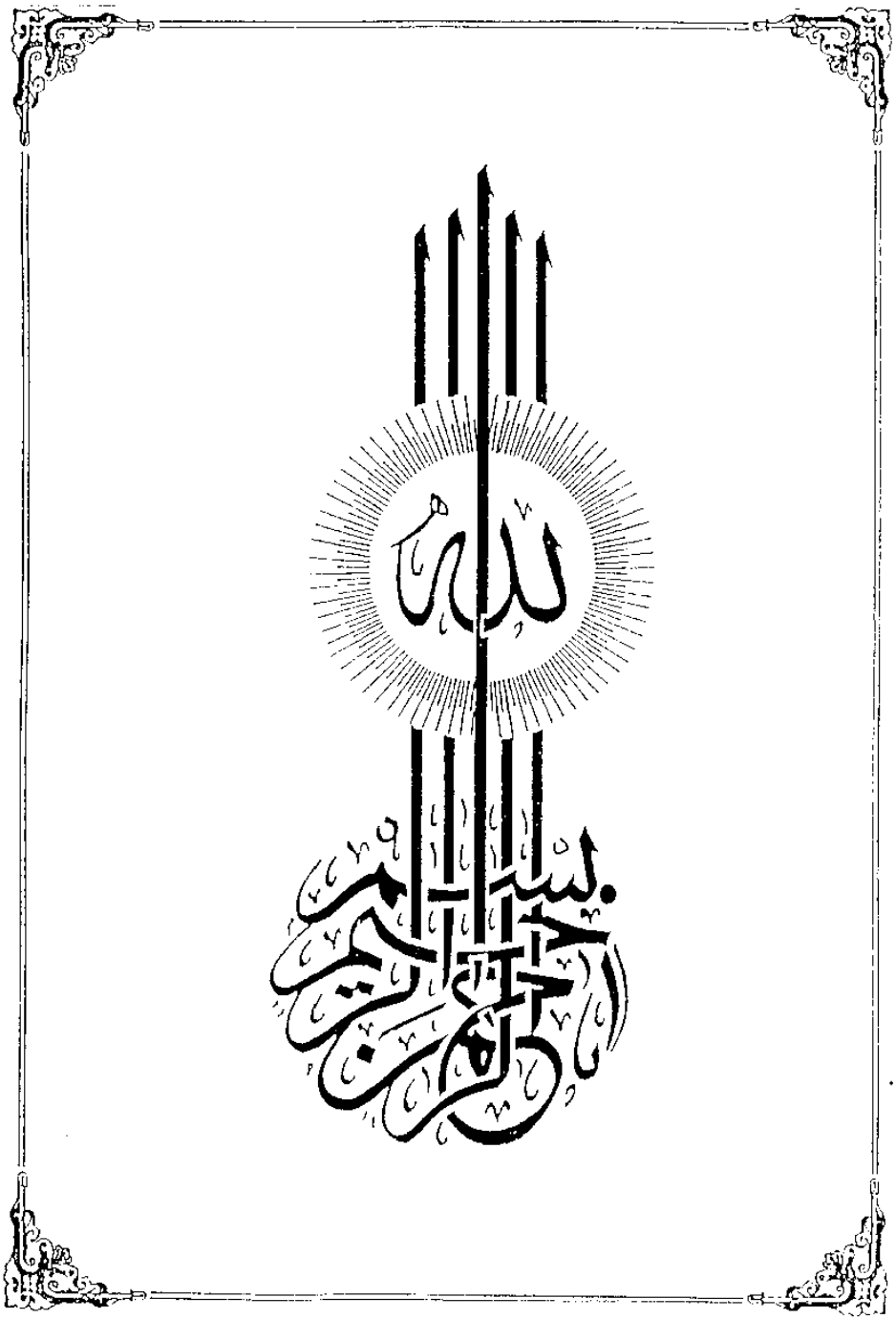

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Introduction

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1 - ACUTE BACTERIAL CONJUNCTIVITIS

Acute Bacterial Conjunctivitis is the commonest eye disease in Egypt as well as in the Middle East where it represents a major public health problem (Schmidt et al., 1962, and Nakhla et al., 1970).

The disease was known in Egypt since the era of the ancient Egyptians, and in the history of ophthalmology it is customary to regard Egypt as the historic birth place of Opthalmia, which flourished in the Valley of the Nile, as a very suitable hot bed for the causative organism (Kamel, 1979).

Although the socio - economic, educational and the sanitary standards are now changing much, yet the incidents of conjunctivitis in Egypt is still high. (Hassan and Mahfouz, 1973).

The eye because of it's location and opportunity for direct and indirect micro involvements, offers unique possiblities for opthalmologists and micro-biologists concerned with clinical and micro infections (Deborah et al., 1972). The Conjunctival affections form between 30% to 90% of eye diseases and most of them are of inflammatory origin (Quraishy and Ebenzer, 1971).

The chief threat of acute conjunctivitis lies in the corneal complications which may cause blindness (Nakhla et al., 1970. Said et al., 1971 and Bondok et al., 1984). In addition, it's associated inflammatory discharge, particularly of untreated

cases, may act as a vehicle for transmission of infection (Schmidt et al., 1962).

Al Hussaini; Nakhla and Shokir (1968) in Assiout studied the incidence and variation of causative organism in patients suffering from acute infective conjunctivitis under different seasonal and social conditions.

2- Normal Bacterial flora of the conjunctiva

Normal cnjunctiva of new born

El Gammal (1963) , in his study on the flora of the conjunctiva of the newly born, found that the common organism present: the staphyloccocus albus, c. xerosis and pneumococci (Vaginal contamination) while after the first week, a variety of organisms were present as B. coli, morax, staph. aureus, fungus even monilia.

Grunberger and Kofler (1954) carried out a simultaneous study of the vaginal flora of the mother and the eye flora of the newly born infant: they found that staphylococcus epidermidis, staphyloccous aureus, strepococci and sometimes Escherichia coli were transmitted to infant's eye during birth as the infant routinely picks up bacteria carried in the healthy vagina.

Source of Bacterial Ocular Flora

The conjunctivae of the eye ball and the cornea form a moist surface which is exposed to the air and upon which articles of dust and the germs which are conveyed through the air remain and adhere (Fuchs, 1911).

It is also in close connection with the skin and eyelashes (Gifford, 1945). Gowen (1934) made a study on the possible role the eye lids may play in maintaining the flora of the eye. He noted that the skin of the lower lid is found to be the source of contamination of the conjunctiva , for the staphyloccoci are

constantly being transferred form it to the lower lashes by the overlapping of the upper lash in blinking and thence to the conjunctivae.

Keilty (1930) found, in a comparison of conjuncitval and nasal florae, the same series of organisms, indicating that the source of infection was from the nose via nasolacrimal duct.

Hence the conjunctival sac is almost never free from germs and, indeed, it nearly contains the saprophytic organisms is found on the skin of the face, hence upper respiratory tract and often other organisms born by the air which may remain for a longer or shorter period of time.

It is surprising that so large a proportion of sterile conjunctivae should have been found by various authors (Foote (1896) 50% in children, 33% in young people, 30% in old people; Eyre (1897) 50 %). Still there can be no doubt that the number of organisms vary greatly (Eyre, 1897).

Normal Bacterial inhabitants of the conjunctival sacs

Lucic (1927) stated that statisitics of bacteria in the conjunctiva vary with the locality from which cases are drawn, and the methods used by the observer, but Segal (1972) found that cultures taken from individuals of all ages in many parts of the world have shown essentially the same findings.

According to Parsons (1904), Fox (1911), de Schweinitz (1924), Cason and Winkler (1954), Duke-Elder (1970), Jawetz (1972) and Topley and Wilson's the predominant

organisms are diphtheroids, staphylococcus epidermidis and staphylococcus aureus. Other organisms found this frequently are : pneumococci, streptococci, E.coli, B.proteus, diplococci, neisseriae, gram-negative bacilli (Moraxella), bacillus subtilis, C.pseudodiphtheriae, B.oerogenes and Ps.pyocyanea. Anaerobic lactobacilli are reported to predominate in conjunctival fluid (Haenel et al., 1958 a).

Bland in a comparison of the bacteriology of normal conjunctivae in Egypt and Germany gives the following figures at Bahtim : 65% staph. albus, C.xerosis 41%, staph.aureus 30%.

Mohamed et al., (1960), studied the bacteriology of the conjuctivae of 70 children in Qualyub district between the age of 6 months up to 12 years and found the following :

a) The streptococcus veridans and diplococcus pneumonia and even other types of the streptococcus producing alpha haemolysis.

b) The haemophilus group of organisms whether influenza or other types but not including the haemophillus Egyptuis (K.W.).

c) Corynbacterium group whether coryn.xerosis, pseudo dipheteria, or other types of diphteroids.

d) Moraxella whether lacunatus or other types.

e) Staph. aureus or epidermidis (albus).

f) Neisseria group including N. Catarrhalis or other types but not including N. Gonorrhoea.

g) Other bacteria such as sacrine, noguchia and unidentified

gram-negative bacilli resembling klebsiella.

Age incidence

Khoraza - Thomson (1935) found that the bacterial flora does not modify by the age of the subjects except for a rise in the incidence of diphteroids in those over 50. Pneumococci and green strepcocci occur most frequently in children under five.

Seasonal incidence

Locatcher-Khoraza and Gutierrez (1953-1968) showed that no difference in bacterial flora betweem healthy eyes of males and females and no seasonal changes in the carriage rate.

The results of 1.222 preoperative culture of non inflamed conjunctivae preformed during 17 months by Khoraza-Thompson (1935) showed no regular seasonal variation in the incidence of staphylococci or diphteroids.

The hemolytic streptococci appeared to be more frequent from Ocotber to May, and the pneumococci from December to August, but in both cases the numbers were too small to be conclusive.

Concomitance of bacteria in the two eyes

According to Allan Smith et al. 1969, the bacterial flora of the two eyes is similar. Regardless of the source of the organisms that colonize the eyes, the presence of an organism on one eye should suggest strongly that it is present on the other eye. The eyes are not randomly colonized, but are colonized at the same time and by the same organisms.

Defensive mechanisms of the eye against bacterial invasion

The Conjunctival sac is pracitcally never free from organisms, but owing to its relatively low tempreature due to exposure, evaporation of lacrimal fluid and moderate blood supply, bacteria do not readily propagate themselves. Moreover the tears are not a good culture medium, as they contain a bactericidal enzyme, lysozyme (Duke Elder 1970). Fleming and Allison (1927) found that tears have a high bactericidal power, capable of dissolving certain saprophytic cocci of a dilution of 1/40.000.

Gowen (1935) found that the characteristics of heamolytic streptococci introduced into the cojunctival sac of rabbits are definitely altered by the lacrimal secretion. These changes include loss of haemolytic quality, loss of pathogenecity and varying changes in colony and cell morphology.

Tears act principally in a mechinical manner, washing away deleterious agents and their products, because by the blinking movement of the lids the surface of the eye is swept at regular intervals and the tears together with the germs contained in them are carried into the nose. This can be shown if cultures of readily demonstrable non pathogenic bacteria, (e.g. the bacterium prodigiosum) are placed in the conjunctival sac. Soon these can be demonstrated in greater quantity in the nasal mucus while they disappear at the same rate from the

conjunctival sac (Fuchs, 1911).

Because of the mechanical action of blinking and washing by tears the conjunctival sac is sterile most frequently in the upper fornix and usually contaminated in the lower (Eyre 1897).

When, owing to deficient blinking, the drainage of tears is arrsted, the amount of germs contained in the conjunctival sac increasees. This amount is, therefore, greater in the morning than in the evening and is particularly apt to be increased by a bandage because the latter checks the movement of the lids (Fuchs, 1911).

Jona 1934, Linhart 1950 found that bandaging of the eyes does not only increase the number of organisms but also increase the virulence.

By increasing the germs, prolonged bandaging of the eye suffices of itself to produce a catarrh of the conjunctiva. This is noticeable if we bandage both eyes, if one eye is operated on we find that the non operated eye shows a catarrh. (Fuchs, 1911)

The mechanical trapping action of the eye lashes to catch fine particle of dust almost certainly has a protective function, since it is fairly well established that many airborne micro-organisms are carried on such dust motes (Halbert, 1972).

Pathogenic micro-organisms must multiply and invade tissues

inspite of the presence of normal flora but they are inhibited by inhibitory bacteria so frequently encountered in the ocular flora through the secretion of antibiotic substances (Halbert, 1972).

Factors influencing the number and variety of organisms

The normal conjunctiva always contain bacteria, a number of varieties having been isolated. Compartively few of them should be classified as at all pathogenic, but non pathogenic bacteria may become harmful if the tissuses in which they exist are bruised or irritated (de Schweinitz 1924).

Gelpke states that the conjunctival sac in ladies and girls of the upper social class in Germany is mostly sterile.

The climate plays a role in the variations of the organisms in 62% of healthy conjunctivae in Queensland (Gibson, 1951) or 95% in Egypt (Kamel, 1949) and is only 34% in England (Smith, 1954).

The prolific use of antibiotics has altered the flora in populations where in such drugs are in common use (Duke Elder 1965)

Smith (1954), stated that the bacterial flora has changed in the last 50 years with a decrease in the frequency of isolation of both pathogenic and non-pathogenic organisms, this is probably due, in part, to use of antibiotics.