

FREQUENCY OF INFECTION IN DONOR EYES POST MORTEM*

A METHOD OF OBTAINING STERILE EYES FOR CORNEAL GRAFTING

BY

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THE use of corneal grafting has increased considerably in the last 15 years and it was therefore thought of interest to survey the frequency of infection and the bacterial strains found *post mortem* in the conjunctival sac and on the cornea in eyes suitable for use as donor eyes.

We have also investigated the possibility of reducing the frequency of infection by pre-treatment with antibiotics.

The normal bacteria of the cornea and conjunctiva have been the subject of several previous investigations. Fick (1887) published his findings in 85 conjunctival sacs in 57 individuals; 49 of the conjunctivae were normal and bacteria were found in 79.6 per cent. of them, 18.5 per cent giving a polymicrobial culture, and 12 per cent. being sterile. 36 conjunctivae showed evidence of chronic catarrh and all gave positive cultures.

Barfoed (1953) examined the bacterial flora in 501 normal conjunctivae; 34.1 per cent. gave a pure culture, 21.4 per cent. gave a polymicrobial culture, and 44.5 per cent. were negative. In 533 cases of acute conjunctival inflammation, bacteria were present in 86.3 per cent.

Rycroft (1956) found that 46 out of 107 donor eyes were infected.

Present Investigations

Material.—95 cadavers from the Copenhagen County Hospital, Gentofte, were examined during 1956–1959; all cadavers passing through the pathological department were included, whether a full *post mortem* examination was performed or not.

Method.—In the morning, *i.e.* 6 to 18 hours *post mortem*, the right eye was treated with an antibiotic while the left eye was left untreated and used as a control. 4 to 5 hours later a scraping was taken from the cornea and conjunctiva by means of a platinum loop, starting in the lower conjunctival fold

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and ending somewhere above the cornea. The scraping was spread on a blood-agar plate and cultivated at 37°C. for 24 hrs. After this the final culture was examined and the bacteria further classified at the Danish National Serum Institute.

Penicillin, chloramphenicol, Terramycin + Polymixin B, or Nebacetin drops were instilled very carefully by lifting the upper eyelid with the index finger, instilling some drops on to the cornea and spreading it into the conjunctival sac by lightly rubbing the eyelid, which was then carefully closed.

In twenty cases Ecomytrin ointment was placed on the cornea and dispersed over the eye by lightly rubbing the eyelid in the same way.

Results.—A positive culture was found in 55 of 63 untreated eyes (87.3 per cent.), the culture being polymicrobial in 24, and pure in the remaining 31. These figures seem to be somewhat higher than those found in the normal conjunctiva by Barfoed (1953), but this may be due to the particularly favourable conditions for bacterial growth which prevail at the time of death. The different strains isolated are shown in Table I with the results of cultures from treated and control eyes.

TABLE I
BACTERIA FOUND IN THE CONJUNCTIVAL SAC *POST MORTEM* IN TREATED AND UNTREATED EYES

Strains of Bacteria	Number of Eyes in which Bacteria were Found	
	Untreated	Treated
<i>Staphylococcus aureus</i>	18	13
<i>Escherichia coli</i>	6	5
<i>Corynebacteria</i>	15	13
<i>B. proteus</i>	4	8
Gram-positive diplococci	27	13
Gram-negative non-motile bacilli	4	0
Peritrichous (motile) Gram-negative bacilli Peritrichate (T. & W.)	1	1
<i>Klebsiella</i>	2	0
<i>Bact. anitratum</i>	2	1
<i>Streptococcus faecalis</i>	1	1
Others	3	3
Total	83	58

The results obtained by using various antibiotics is shown in Table II.

TABLE II
RESULTS IN 45 TREATED AND 55 UNTREATED EYES

Antibiotic	Number of Cadavers	Number of Eyes with Positive Cultures	
		Treated	Untreated
Penicillin	26	23	22
Chloramphenicol	19	15	17
Terramycin + Polymyxin B	4	4	4
Ecomytrin Ointment	7	0	7
Nebacetin	7	3	5
Total	63	45	55

In a further thirteen cadavers the eyes were treated with Ecomytrin ointment, and in all these eyes the cultures were negative.

Penicillin, chloramphenicol, and Terramycin + Polymyxin B instilled as eye-drops seemed to have little or no effect on the bacteria found *post mortem* in the conjunctiva and on the cornea.

To see whether this was due to the re-infection of the eyes during the *post mortem* examination which was performed between the treatment and the culturing, we tried examining 27 cadavers at some other time of the day. In these 27 cadavers both eyes were treated. The results are shown in Table III.

TABLE III
POSITIVE CULTURES IN 27 CADAVERS TREATED WITH ANTIBIOTICS

Antibiotic	Number of Eyes Treated	Number of Positive Cultures
Penicillin	8	3
Chloramphenicol	22	11
Nebacetin	24	0
Total	54	14

Our results indicate that Ecomytrin and Nebacetin have the greatest effect with the techniques employed.

Application

In 28 cases of corneal grafting Ecomytrin ointment was used as described as soon as possible after death, *i.e.* usually within 30 minutes. This ointment

is to be preferred because, apart from its antibiotic effect, it covers the cornea and conjunctiva and protects them against drying in case the eyelids do not stay shut. The eyes were enucleated by this sterile technique at the earliest 6 hours after death; and were stored in a 1·1 per cent. salt solution with chloramphenicol and Nebacetin at 4°C. In none of the 28 graftings was any infection found, and in all the eyes the culture was negative.

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