

EPIDEMIC KERATO-CONJUNCTIVITIS IN CEYLON*

BY

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EPIDEMIC kerato-conjunctivitis is the name given by Hogan and Crawford (1942) to a disease-complex that has been described by various authors as superficial punctate keratitis (Fuchs, 1889, 1901), sub-epithelial keratitis (Adler, 1889), macular keratitis (Reuss, 1889), and nummular keratitis (Dimmer, 1905). In Ceylon it has been, and still is, referred to as keratitis

superficialis tropica or Herbert's keratitis, though the bacillary theory of its causation put forward by Herbert (1931) has since been abandoned in favour of the view that it is a virus infection (Wright, 1930, 1937, 1944; Sanders, 1942; Sanders and Alexander, 1943; Sanders, Gulliver, Forchheimer, and Alexander, 1943). More recently, however, the work of Cockburn (1953, 1954) and Cockburn, Nikowsky, Robinson, and Cheever (1953) appears to cast some doubt on the presence of a specific virus as the aetiological factor.

The condition is referred to locally by the Sinhalese as 'mull-pola', a term rather descriptive of the flower-like designs on the cornea at one stage of the disease.

INCIDENCE

OCCUPATION.—In Ceylon the disease is to be found chiefly amongst the rural population of farmers and cultivators. Of this series of cases collected over a period of 2 years, 57 per cent. were paddy-cultivators (Table I). It is also

found amongst other workers on the land: farm-girls, gardeners, and even housewives who potter about in their little gardens.

TABLE I
OCCUPATIONAL INCIDENCE

Occupation	No. of Cases	
Paddy Cultivator	77	
Cinnamon Peeler	2	
Rubber Tapper	2	
Weaver	1	
Farm Girl	1	
Domestic	1	
Taxi Driver	1	
Estate Conductor	1	
Postal Messenger	1	
Clerk	1	
Teacher	2	
Doctor	1	
No Occupation	Females (over 21 yrs)	15
	Children (under 21 yrs)	28
Total	134	

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The disease is not limited to workers on the land. This series includes white-collar workers, and children from various grades of society (sons of doctors, teachers, and station masters) who do not work on the land except in so far as they play in their own home-gardens. The doctor who attends an eye-case is as liable to infection as the artisan.

SEASON.—Paddy cultivation is carried out throughout the year in Ceylon. There are two major harvesting seasons: the Maha crop sown in September and reaped in February–March, and the Yala crop sown in March–April and reaped in August, the former being the larger and more important. The land is ploughed and irrigated before the paddy is sown, and it is at this time when the cultivator turns over the land, either with the primitive ‘mammoty’ (a hand implement for digging up the earth), or with buffalo and plough, that he is liable to infection. The muddy water may splash directly into his eye, or he may be infected by finger contamination. The numbers seeking treatment at the Eye Clinic rose considerably during the early part of the season (Table II).

TABLE II
SEASONAL INCIDENCE

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
No. of Cases	9	11	9	3	15	16	2	7	11	23	12	16	134
Percentage ...	6·7	8·2	6·7	2·2	11·2	11·9	1·5	5·2	8·2	17·1	8·9	11·9	100

AGE.—As is to be expected in a primarily occupational disease, the condition is more often encountered amongst young adults, the breadwinners of the family. The appearance in children (already referred to), and in

TABLE III
AGE AND SEX DISTRIBUTION

Age Group (yrs)	Male	Female	Total	Percentage of Total
0–9	2	5	7	5·2
10–19	9	10	19	14·1
20–29	21	12	33	24·6
30–39	29	6	35	26·1
40–49	19	2	21	15·6
50–59	10	1	11	8·2
60–69	8	0	8	5·9
Total ...	98	36	134	100

women who have not ‘tended the fields’ strongly suggests an infection that can as easily spread by finger contamination. In this series, the youngest patient was a child of a little more than a year old, and at the other extreme were patients in the seventh decade of life (Table III).

SEX.—Male cases far exceed female cases. Apart from women who assist in the fields and are exposed to the same occupational

risks, school girls and 'stay-at-home' wives were possibly infected by finger contamination. The majority of the population in Ceylon is rural, and though one member of the family may become a white-collar worker or enter one of the professions, the rest of the family remains rural in outlook and habits of life. The well in the backyard, the kitchen garden, and the neighbouring paddy fields, all keep the family within a rural environment (Table III).

CLINICAL PICTURE AND NATURAL HISTORY

The usual cause is getting some mud or muddy water into the eyes while at work in the fields. A few days later the eye turns red and irritable with a fair amount of epiphora. Visual acuity is unaffected at this stage of conjunctival injection and irritation, and the victim is more likely to seek the usual home remedies or consult the local Ayurvedic physician.*

By the end of the week, the conjunctival injection has become a mild conjunctivitis causing a sticky eye in the mornings. The irritation has now increased, and loss of visual acuity is noticed. It is usually at this stage that the patient reports at the Clinic for treatment. A fine punctate keratitis is now apparent, the punctate areas appearing as rough points on the corneal surface interrupting the normal smoothness of the epithelium. Some of them have broken through the surface layers of the epithelium and may be stained. At a later stage, these 'spots' enlarge into dull, grey areas varying from 1 to 3 or 4 mm. in diameter. They are seldom larger unless the discrete spots have coalesced. Some appear as irregular haloes or flattened smoke-rings; these are usually subepithelial in position, and do not stain. Irritation has by now subsided, and the only complaint is that of visual loss. The eye is now more or less white, though only a week or two earlier it was red and sore, with rather swollen eyelids.

The final picture is one of several corneal opacities in a white eye, rather like the end-result of a mild phlyctenular keratitis once the corneal vascularity has subsided. The opacities remain for many years, if not indefinitely. Epidemic kerato-conjunctivitis in Ceylon is a blinding disease.

The progress of an untreated case is as follows:

- Stage 1.* Conjunctival injection with epiphora passing into a mild conjunctivitis.
- Stage 2.*—Fine keratic spots on the surface, increasing in size. Red sore eye without discharge. Visual loss.
- Stage 3.* Eye whitening. Obvious subepithelial grey areas. No irritation. Marked visual loss.
- Stage 4.* Coalescence of these areas. Opacities thicken. Macules appear. Eye white. Visual loss usually irremediable.

TREATMENT

In this series of 134 cases, various antibiotics were employed. Unfortunately, as is common amongst an ignorant and superstitious community,

* Ayurveda is the ancient system of medicine of the East that is firmly established in Ceylon, especially amongst the rural population; it is always resorted to in the first instance in preference to Western medicine.

treatment was not always persisted in, and after two or three visits the patients often fell back on ill-informed Ayurvedic practitioners or resigned themselves to their fate. Dramatic successes appear to indicate that a cure is likely if the case is treated steadily from a reasonably early stage.

Of the antibiotics employed in this investigation, aureomycin appeared to be the most satisfactory. When combined with local cortisone, it gave excellent results. Terramycin was used in a relatively few cases, with good results. Chloramphenicol was not so effective. The 'sulpha' drugs were also tried, in ointment form as well as in drops; these had a few successes (probably attributable to the combined Dionin), but the results were unsatisfactory as a whole. In all cases, patients were instructed to treat their eyes four times a day.

Cortisone, either as ointment four times a day or given subconjunctivally in doses of 10 mg. weekly, did not bring about a cure *per se*, but assisted in controlling the spread of the infection, and helped in removing the opacities.

When treated before Stage 3 had set in, recovery was usually complete within a week, and few corneal opacities remained. Treatment at Stage 3, however, was very protracted. The eye appeared to have adapted itself to the infection, and treatment was not always successful, though persistent efforts for from 4 to 6 months did restore vision to normality or near-normality in a few cases even at this late stage (Table IV).

TABLE IV
RESPONSE TO TREATMENT

Drug	No. of Cases	Successful		Unsuccessful	No Follow-up
		Fully	Partially		
Aureomycin	57	23	3	0	31
Terramycin	7	6	0	0	1
Chloramphenicol	57	9	9	3	36
Sulphacetamide Ointment	7	3	0	1	3
Drops	5	0	0	0	5
Cortisone alone	1	1	0	0	0

Fully successful = 6/6 or 6/9. Partially successful = less than 6/9. Unsuccessful = eye white, corneal nebulae present. Vision not improved, but condition static.

It would appear that before Stage 3, aureomycin alone should be employed to control the infection. By the end of the second week of treatment, cortisone as supplementary therapy should be introduced if any punctate areas are present. If the patient is first seen after this stage, when the eye is white and the inflammatory reaction has more or less subsided, the antibiotic and cortisone should be combined.

SUMMARY

Epidemic kerato-conjunctivitis is an occupational disease, found chiefly amongst the paddy-cultivators. It is also a blinding disease, whereas in the United Kingdom and Europe it is self-limiting.

Fortunately, if treated early, it responds to the common anti-viral drugs, aureomycin and terramycin, and to a lesser degree to chloramphenicol.

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