EPIDEMIC CONJUNCTIVITIS IN SINGAPORE IN 1970 AND 1971*

By K. H. Lim and M. Yin-Murphy

SYNOPSIS

An outbreak of acute conjunctivitis of rapid onset assumed epidemic proportions in Singapore in 1970 never encountered in the country previously. The clinical features of the disease were unlike those of minor outbreaks of epidemic keratoconjunctivitis due to adenoviruses that had been reported in the country. Viral isolates recovered from conjunctival scrapings and from a throat gargling in 1970 were not adenoviruses. While characterization of the isolates was being undertaken another epidemic occurred in the country in 1971. It is still not yet established whether the two epidemics are of the same aetiology. It is possible that a virus, or more than one virus, other than adenovirus, can cause acute conjunctivitis and has given rise to the two epidemics.

An outbreak of acute conjunctivitis of rapid onset assumed epidemic proportions in Singapore in 1970 never encountered in the country previously (Lim and Yin-Murphy, 1971). At its peak during September to October, 1970, 60, 118 cases were reported from the Government Outpatient Services, according to returns from 27 Government Outpatient Dispensaries.

Negative findings of bacterial cultures of conjunctival swabs from unselected cases in early September, supported by the presence of predominantly mononuclear cells suggested that the disease, of rapid onset, was due to viral infection.

EPIDEMIC OF 1970

Lim and Yin-Murphy (1971) studied 55 consecutive patients at the height of the epidemic from September 18th to 24th and reported that in the majority of patients both eyes were affected. Nearly half presented with lid swelling, muco-purulent discharge and pre-auricular glands enlargement when examined within 1 to 2 days of onset. A quarter of the patients had associated upper respiratory symptoms. Subconjunctival haemorrhages were also seen (Table 1).

The clinical features were unlike those observed by Singh and Yin-Coggrave (1962) and Yin-Coggrave and Loh (1963) during the epidemic keratoconjunctivitis (E.K.C.) outbreaks in Singapore in 1960 and 1962. It was also noted that the sudden onset of infection, the high infectiousness of the disease, the acute conjunctivitis and rapid recovery, and the epidemic proportions of the outbreak were unusual features. Moreover, haemorrhagic features were observed and keratitis or iritis frequently encountered in E.K.C. was rarely seen.

VIRAL ISOLATES OF 1970

Thirty cytopathogenic agents were isolated from 55 conjunctival scrapings and 1 from a single throat gargling when inoculated in HeLa-cell cultures. These isolates did not react with group specific adenovirus immune sera by the complement fixation (CF) test (obtained from Borroughs and Wellcome). None of the isolates were neutralized by adenovirus Types 1 to 18 immune sera, which include types known to cause epidemic conjunctivitis (obtained from the Department of Health, Education and Welfare, C.D.C., Atlanta).

SEROLOGY

Eighteen single and 35 paired acute and convalescent sera were tested for adenovirus CF antibodies. Twelve of 18 single sera had CF titres ranging from $\frac{1}{2}$ to $\frac{1}{32}$ whilst the remaining 6 were negative. Thirty-four of the 35 paired sera had CF titres of $\frac{1}{2}$ to $\frac{1}{32}$ in the acute sera while one was negative. Eighteen of the 34 positive sera showed a two fold rise in CF antibody titres. The four fold or greater CF antibody rise characteristic of an acute adenovirus infection was not detected.

EPIDEMIC OF 1971

While further characterization of the isolates was being undertaken to establish their taxonomical

*Presented at the Fourth Congress, Asia Pacific Academy of Ophthalmology, held in Auckland, New Zealand, on April 13, 1972.

Ophthalmic Unit, Outram Road General Hospital, Singapore.
K. H. LIM, M.B., D.O., F.R.C.S.I., A.M., Ag. Senior Ophthalmic Surgeon and Head.

Department of Bacteriology, University of Singapore.
M. YIN-MURPHY, M.A., Ph.D., Dip. Bact., Senior Lecturer.

TABLE I

EPIDEMIC CONJUNCTIVITIS IN SINGAPORE

Clinical Features	1970 Analysis of 55 Cases		1971 Analysis of 159 Cases	
	No. of Cases	Per 100	No. of Cases	Per 100
Sex				
Male	35	64	104	64
Female	20	36	55	35
Age				
Under 10 years	2	3	4	2·5
11 - 20 years	12	22	53	33
21 - 30 years	18	30	32	20
31 - 40 years	15	27	31	20
41 - 50 years	7	18	20	12·5
51 - 60 years	0	0	17	10·6
Over 60 years	0	0	2	1·2
Contact				
Home	30	55	106	66
Office	10	18	13	8
Factory	1	1·8	2	1·2
Hospital	3	5	6	3·8
School	6	11	5	3
Nil	5	9	27	17
Upper Respiratory Symptoms	13	23	53	33
Laterality				
Both	39	70	133	83
Right	8	15	15	9
Left	8	15	11	7
Lid swelling (ptosis)	25 (2)	45	50 (2)	32
Mucopurulent discharge	22	40	47	30
Conjunctivitis				
Mild	13	23	48	30
Severe	36	65	106	66
Subconjunctival haemorrhages	6	11	6	3·8
Keratitis	2	3	56	35
Iritis	3	5	6	3·8
Lymphadenitis of Pre-Auricular Glands	28	51	101	63

position (Yin-Murphy, 1972) another outbreak of acute conjunctivitis was seen in the country in 1971. From June through December, 1971, 38, 156 cases were reported from the Government Outpatient Services, according to returns from 27 Government Outpatient Dispensaries.

The presenting clinical features resembled the epidemic of 1970 although keratitis and iritis were more frequently encountered.

DISCUSSION

Thirty conjunctival scrapings obtained under similiar conditions during the epidemic of 1971 have thus far failed to produce cytopathogenic effect in the same HeLa-cell line used for virus isolation during the 1970 outbreak. Serological tests will be carried out to ascertain whether the two epidemics are of the same aetiology. Nonetheless, while it was ascertained that the epidemic of 1970 was not caused by adenovirus, the taxonomical position

Fig. 1. Inflammatory mechanical ptosis. (Case No. V 54147).

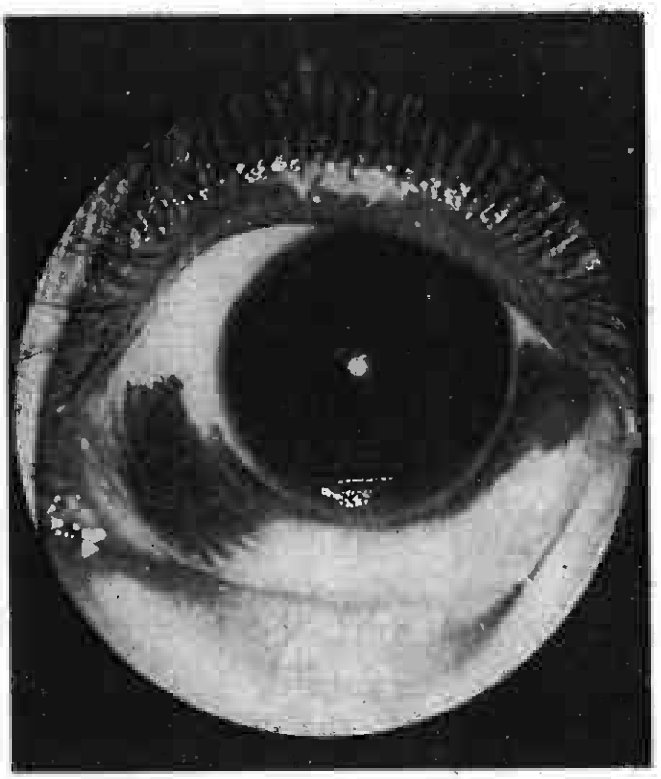

Fig. 3. Subconjunctival haemorrhages. (Case No. V 73009).

Fig. 2. Acute conjunctivitis showing hyperaemia, oedema, globe congestion and circumcorneal flush. (Case No. V 100262).

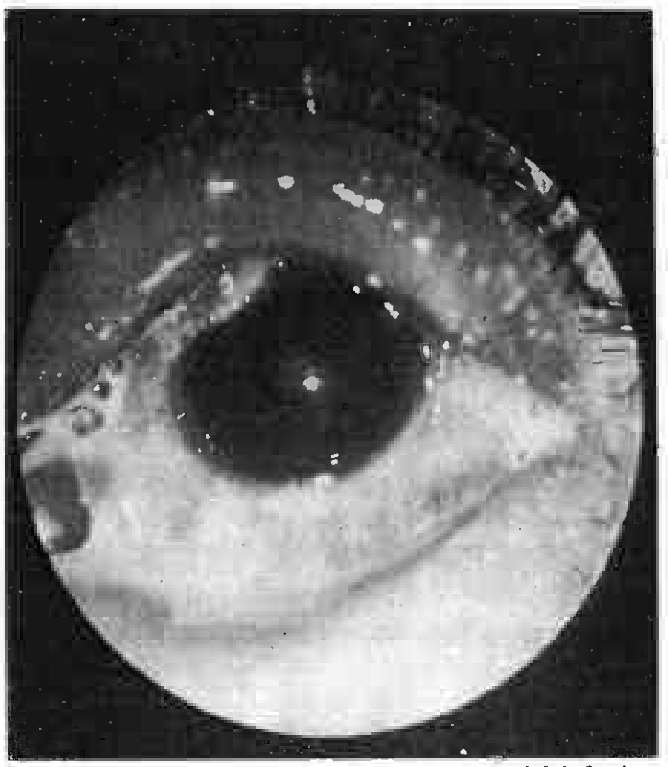

Fig. 4. Mucopurulent discharge due to bacterial infection (Case No. V100227).

of the viral isolates has not been established. It is possible that a virus, or more than one virus, other than adenovirus, can cause acute conjunctivitis and has given rise to the two epidemics.

Notification to the World Health Organization was made in June, 1971 from the Department of Bacteriology, University of Singapore, on the epidemic of 1970. It is interesting to refer to a notice in the W.H.O. Weekly Epidemiological Record of 17th December, 1971 (W.H.O., 1971) which reports that:—

"EPIDEMIC CONJUNCTIVITIS

A number of episodes of acute conjunctivitis in epidemic form have been observed since 1969 in countries on the western coast of Africa and in southern Asia.

All these episodes appear to have certain common features, as follows: relatively high attack rates; acute ocular symptomatology, accompanied by lymphadenopathy with frequent sub-conjunctival haemorrhages, rarely accompanied by mild and transient punctate epithelial keratitis; spontaneous resolution in a few days without any sequelae.

In some instances the epidemics have resulted in temporary incapacitation of significant segments of the population.

The condition appears to be easily differentiated from epidemic keratoconjunctivitis (caused by adenovirus type 8) on clinical grounds because of the absence of systemic symptoms, of the rare and temporary involvement of the cornea and of the frequency of sub-conjunctival haemorrhages. Evidence concerning the possible etiological agent is very scanty. Adenoviruses other than type 8 have been incriminated in some instances on the basis of virus isolation and complement fixing tests. It cannot be excluded, however, that the few isolates obtained had no specific etiological role. The demonstration of a rise in antibodies to specific viruses would be of more value."

FOOTNOTE

Since then, the virus which caused the epidemic outbreak of acute conjunctivitis in Singapore in 1970 has proved to be an ether and acid resistant R.N.A. virus of less than 25 nm. by Yin-Murphy (1972). A significant correlation between the virus and patients' serological response was found. Until such time when the taxonomical position of the virus is established, it is suggested that the virus be referred to as the "Singapore Epidemic Conjunctivitis (1970) Virus."

ACKNOWLEDGEMENTS

We wish to thank Professor Lim Kok Ann for helpful criticism of this paper and Miss P. H. Tan for technical assistance. This work is part of a thesis (K. H. Lim) for the Doctorate of Medicine to be submitted to the University of Singapore.

REFERENCES

1. Lim, K. H. and Yin-Murphy M.: "An Epidemic of Conjunctivitis in Singapore in 1970." Singapore Medical Journal, 12, 247-249, 1971.
2. Singh, K. and Yin-Coggrave, M.: "Clinical and Viral Studies of Cases of Epidemic Kerato-conjunctivitis in Singapore." Medical Journal of Malaya, 17, 12-17, 1962.
3. Yin-Coggrave, M. and Loh, R. C. K.: "Isolation of Adenovirus from Cases of Epidemic Kerato-conjunctivitis in Singapore." American Journal of Ophthalmology, 55, 575-583, 1963.
4. Yin-Murphy, M.: "An Epidemic of Picornavirus Conjunctivitis in Singapore." South East Asian Journal of Tropical Medicine and Public Health, 3, 303-309, 1972.
5. World Health Organisation: "Epidemic Conjunctivitis." W.H.O. Weekly Epidemiological Record, 46, 530, 1971.