

Unusual type of epidemic conjunctivitis in Ghana

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An unusual type of epidemic conjunctivitis swept through Ghana between June and October, 1969. The clinical features of all the cases were uniform and exhibited marked deviations from the epidemic conjunctivitis usually seen in other parts of the world. The rapid spread and course of the condition were also remarkable, and our failure to detect any of the usual causative organisms encouraged us to make closer observations. This detailed study revealed many noteworthy ophthalmological features.

General features of the epidemic

A general review of the epidemic has already been published (Chatterjee, Quarcoopome and Apenteng, 1970).

An acute haemorrhagic conjunctivitis developed within a few hours after the initial symptom of irritation. Severe pain, marked swelling of the lids, lacrimation, and serous discharge followed. Conjunctival follicles and enlarged pre-auricular lymph glands were frequent. The disease was highly contagious and 8,981 cases were seen at the clinic in August, 1969. It had a self-limiting course of 7 to 10 days with gradual subsidence. None of the patients had corneal involvement or other complications. Conjunctival swabs were bacteriologically negative in 75 per cent. of cases. Conjunctival scraping did not show inclusion bodies (TRIC agent). Initial attempts to isolate adenovirus in the scrapings were not successful (Chatterjee and others, 1970).

Detailed analysis of subconjunctival haemorrhages

A total of 13,664 cases was seen at this clinic from June to October, 1969. From the beginning of the disease all showed subconjunctival haemorrhages associated with conjunctival inflammation. These haemorrhages, which constituted the most characteristic feature of the disease, varied from one or more minute pin-point petechia to large blotches of frank haemorrhage. The bulbar conjunctiva near the upper fornix was invariably the initial site of the lesion, which later spread to the whole of the upper half of the bulbar conjunctiva and to a variable extent to the lower fornix. Although conjunctival injection was present the haemorrhages were far more pronounced and did not correspond to the severity of the congestion. It was remarkable that no relationship could be detected between the amount of haemorrhage and the degree of chemosis or lid oedema. Indeed, some cases had the appearance of a traumatic subconjunctival haemorrhage with conjunctival congestion. One would have thought that the haemorrhages were due to rubbing the eyes because of the initial foreign body sensation, but the haemorrhage continued to increase during the first 48 hours or so. From the 5th day resorption began, and complete absorption took place in the majority of cases by the 7th to 10th day. This speedy absorption of the haemorrhage was unexpectedly rapid.

Other clinical features

These were studied in detail in 250 cases, 178 of which were examined within 24 hours of onset and the rest within 48 hours. All were new cases. People of all ages and both sexes were affected, the youngest being a week-old baby. The results are set out in Table I.

Table I Clinical features in 250 cases of conjunctivitis

Clinical features	Incidence of positive findings	
	No.	Per cent.
(1) Hyperaemia/congestion of upper fornix/upper half of bulbar conjunctiva with or without inflammation of lower fornix	250	100
(2) (i) A few minute petechiae near upper fornix only (in some cases only one or two pinpoint petechiae were noted)	46	18
(ii) Gross haemorrhages in upper half of bulbar conjunctiva	189	75
(iii) Haemorrhage extending to lower fornix	15	6
(3) Follicles on lower palpebral conjunctiva	153	61
(4) Enlarged pre-auricular lymph glands (one painful)	156	64
(5) Uniocular affection (six returned later with both eyes involved; nine did not return)	15	6
(6) Corneal involvement	—	—
(7) Pharyngitis	—	—
(8) Fever (history)	—	—
(9) Serous discharge	192	76
(10) Mucopurulent discharge	58	23

Laboratory investigations

Certain cases were selected from the above for aetiological investigations (Table II).

Table II Results of aetiological investigations in selected patients

Investigation	No. of cases examined	Result
(1) Conjunctival swab culture on blood agar and chocolate agar	57	40 no growth 17 <i>Staph. pyogenes</i> 3 <i>B. coli</i>
(2) Conjunctival swab for microscopical examination	14	Preponderance of necrotic epithelial cells with polymorphs and mononuclear cells
(3) Everted upper lid to take conjunctival scraping for microscopical examination (a few follicles were noted in each patient at the two corners of the everted lid)	12	No inclusion body (TRIC virus) found
(4) (i) Conjunctival scraping for viral culture on human amnion	8	No growth or cytopathy detected
(ii) Conjunctival swabs for viral culture on chick embryo	15	No growth or cytopathy detected
(iii) Conjunctival scrapings for viral culture on other various cell lines (HeLa cells and monkey kidney cells)	19	No positive result
(5) Complement-fixation test with stock group antigen of known varieties of adenovirus against acute serum and 3 weeks' convalescent serum	16	None convincingly positive in any significant dilution or in increasing titre
(6) Direct inoculation of discharge on to rabbit conjunctiva	2	No result in 4 weeks

Discussion

The main variation from usual types of epidemic conjunctivitis was the presence of sub-conjunctival haemorrhage in all cases. "Epidemic haemorrhagic conjunctivitis" would therefore be an appropriate name for this condition. An epidemic of such a predominantly haemorrhagic conjunctivitis has not, to our knowledge, been reported before.

Haemorrhage can occur in any case of severe inflammation, especially in purulent and mucopurulent conjunctivitis due to pneumococcus and haemophilus infections (Duke-Elder, 1964; Lyle, Cross, and Cook, 1968), but in our cases the discharge was serous and these pathogenic organisms could not be grown in cultures on blood or chocolate agar in

70 per cent. of cases (Table I, 9 and 10; Table II, 1). This result was convincing enough to exclude a bacterial origin. 30 per cent. of cases grew *Staphylococcus pyogenes*, but we considered this to be a secondary infection.

Absence of pharyngitis and fever (Table I, 7 and 8) and absence of TRIC virus from conjunctival scrapings (Table II, 3) differentiated the condition from trachoma, inclusion conjunctivitis, pharyngo-conjunctival fever, and Béal's conjunctivitis.

A virus is known to be capable of producing inflammation of the haemorrhagic type as in epidemic haemorrhagic fevers (Adams and Maegraith, 1966) and haemorrhagic small-pox (Nelson, 1964). Conjunctival haemorrhages have also been found in epidemic kerato-conjunctivitis, caused by an adenovirus (Hogan, 1957; Allen, 1966). Ormsby, Fowle, and Doane (1957) found two isolated cases of acute follicular conjunctivitis with subconjunctival haemorrhage in Toronto in 1954. They also noted that pseudomembrane and subconjunctival haemorrhage were frequently found in cases of epidemic kerato-conjunctivitis without corneal opacity. These facts brought us back to the idea that the present epidemic could have been due to a virus infection. Moreover, two of our patients returned with typical punctate keratitis during the follow-up period (4 months).

We were, however, unable to detect a virus in the swabs and scrapings (Table II, 4 and 5). No cytopathological changes were detected in any of the cultures attempted. Complement-fixation tests by stock adenovirus antigens with serum from acute cases and also after 3 weeks' convalescence produced no evidence of adenovirus infection. The inoculation of rabbit eyes also failed to produce any inflammation (Table II, 6).

The clinical features strongly suggested that the epidemic was caused by a variant of an adenovirus of epidemic kerato-conjunctivitis, which produced subconjunctival haemorrhage instead of corneal involvement; the epidemic spread, follicle formation, preauricular lymphadenopathy, and serous type of discharge are typical of adenovirus infections, but there was no fever or pharyngitis.

Conclusions and summary

In a large epidemic of a haemorrhagic conjunctivitis which swept over Ghana from June to October, 1969, the presence of subconjunctival haemorrhages in all cases and the absence of corneal involvement, fever, and pharyngitis were unusual features. Bacterial infection was excluded and the known strains of adenovirus could not be detected.

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