

## Epidemic Keratoconjunctivitis

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Viruses are the smallest and simplest of all life forms and yet they have an enormous impact on humans. They cause serious diseases, many of which have been the scourges of humanity; throughout the history (1). The limited success and massive research programmes launched for their control highlight our limitations in dealing with many of these agents. Most of the viral human infections are of low pathogenicity, that they pose little threat to the healthy host.

Virus have been the keys to the unlocking of the intracellular processes and mechanics of the host cell itself because viruses are obligated to recruit parts of the host cell machinery for their replication. Because they are simple to manipulate genetically, they serve as tools to probe cell machinery. Viruses have been vital in the revelations of nucleic acid replication, gene structure, regulation, synthesis and processing of proteins and membranes, the nature of human immune response and the mechanisms of oncogenesis.

### Definition

Unilateral or bilateral red eye of sudden origin with foreign body sensations and follicular conjunctival hyperemia. Follicle formation is thought to be a local host response to an exogenous substance or agent leading to formation of sub-conjunctival prominent lymphoid follicles, classically they appear as elevated avascular yellowish to greyish white lesions of varying size from 0.2 - 2 mm in diameter.

### History

This starts initially as unilateral conjunctivitis of abrupt onset, but the second eye is also involved within a week frequently accompanied by preauricular lymphadenopathy. Acute follicular conjunctivitis due to adenovirus infections occurs by droplet transmission after 5-12 days of incubation period. Watery discharge, conjunctival hyperemia and follicles are the initial clinical features. They subside in 7-12 days, this is accompanied by a rise in circulating antibody titre to specific adeno- virus type involved and a complete immunity thereafter to reinfection with that type of adenovirus.

*Epidemic Krtatoconjunctivitis* - It is caused by adenovirus 8 and 19. Other serotypes found responsible include 1,2,3,4,5-11,13-19, 29-30, 32-37. Adenovirus 8 is more frequently seen in hospital acquired infections. Epidemics are common; sporadic cases do occur. Sub-clinical infections are also possible (2). It spreads during eye checkups & manipulations transmitted through contaminated fingers, tonometers and solutions. Adeno virus 19 is more common in infections spreading through relatives and close contacts.

### Clinical features

Many different viruses cause conjunctivitis and each produces a slightly different disease. Incubation period varies from 7-10 days. The onset is acute and presents as redness, watering and follicular conjunctivitis, with

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or without respiratory symptoms and with low grade fever (3). It is usually unilateral. Preauricular lymph node of the same side are enlarged and tender. About 1/3 of the cases show membrane formation followed by scarring of the conjunctiva. There may be papillary hypertrophy and sub conjunctival haemorrhage. Conjunctivitis lasts for 7-21 days and heals spontaneously. Other eye gets affected within 7-10 days after the involvement of the first eye and clinical course is always mild as compared to the first eye.

Corneal involvement sets apart EKC from other forms of adenovirus conjunctivitis. Adenovirus infections can result in 4 different types of keratitis.

Early epithelial forms of keratitis are probably caused by proliferation of live virus within the corneal epithelium. Where as later epithelial and sub-epithelial infiltrates are thought to represent sterile immunological reactions to retained viral antigen.

### Diagnosis

Viral conjunctivitis is extremely common and most common cause for visit to an eye casualty or doctor's office. The diagnosis can be made clinically so viral cultures and laboratory investigations are rarely undertaken. Diagnosis of viral conjunctivitis is made on clinical grounds only, although it is possible to culture virus from the conjunctiva during acute infections, the expenses and low recovery rate makes this as a rarely used tool. Many different viruses cause conjunctivitis and each produces a slightly different disease. Virus can be isolated on Hela or other tissue culture cells. Demonstration of rising titre of neutralizing antibody against type 8 adenovirus is useful. Fluorescent antibody staining technique for type 8 virus in corneal epithelial scrapping can be diagnostic. Confirmation of adenovirus infections can be done by means of immune dot blot test (IDBT) and virus culture. The rapid identification of adenovirus by IDBT enabled early institution of control measures thereby limiting the size of outbreak (4).

Cytological evaluation of adenoviral follicular conjunctivitis by Cyto brush was characterized by predominance of lymphocytes with little fibrin discharge. In addition two types of nuclear alterations were demonstrated i.e. intra nuclear inclusions and so called ground glass nuclear appearance. Ground glass nuclear appearance occurred more frequently than intra nuclear inclusions in patients with AFC. However presence of lymphocytes in conjunctival smears was useful criterion for making the differential diagnosis between herpetic and adenoviral infections. Thus in the absence of these three cellular changes i.e. ground glass nuclei, intra nuclear inclusions and lymphocytic background, infectious conditions other than AFC may be considered, regardless of the number of conjunctival cells present (5).

The enzyme linked immunosorbent assay, (ELISA) is adopted for detection of IgG antibodies against adenovirus hexon in the sera & tears of patients with eye diseases. The ELISA procedure is more sensitive than complement fixation test for the detection of anti-hexon antibodies. It allows the seroconversion to be seen in the course of the infection and convalescence period (6).

Polymerase chain reaction (PCR) using degenerate primers proved to have several advantages over current diagnostic techniques. It offers a considerable improvement in sensitivity over immunoassays and speed over tissue culture isolation and is a highly potential tool for the diagnosis of adenoviral ocular infections (7).

### Differential Diagnosis

It is difficult clinically to differentiate HSV conjunctivitis from adenoviral conjunctivitis in the acute stage, since the clinical features of adenoviral conjunctivitis are similar to those of HSV conjunctivitis. Early corneal lesions & preauricular lymphadenopathy were less frequent in HSV conjunctivitis than adenoviral conjunctivitis (8).

## Management

Therapy is mainly supportive. Antiviral agents are not found to be effective. Reassurance to the patient about full recovery of vision and total spontaneous resolution is important. Patient is warned about the highly contagious nature of this disease and necessary precautions like frequent washing of hands, using separate towel, avoiding direct contact with the people etc. Sunglasses, cold packs & topical vasoconstrictor (Naphzoline) provide some relief. Patient is instructed to keep the lid & lashes clean and free of mucus. Implementation of a formal set of infection control policy & procedure (ICPPs) can reduce the number of outbreaks of EKC and number of nosocomial infections in a large hospital. ICPPs include hand washing, instrumental disinfections medication distribution and employee furloughs. ICPPs proved to be an effective means to decrease the number of EKC outbreaks and nosocomially infected patients (9).

Treatment of epidemic keratoconjunctivitis with topical NSAIDs may be safer alternative than topical steroids (10). Topical human fibro blast interferon (Hu IFN-beta) 7.5 X 10<sup>5</sup> IU/ml. one drop 5 times a day in treatment of acute epidemic kerato conjunctivitis has shown promising results. Corticosteroids are not routinely recommended for the treatment of viral conjunctivitis as they do not shorten the natural course of the diseases.

## Prevention

Responsibility lies with the Ophthalmologist as most common mode of spread is during eye checkups. Hands should be washed between the examinations. All instruments especially tips of tonometers to be disinfected properly. Patients should be asked to stay away from public places for two weeks; patients are advised to use glasses, gloves and frequent hand washing while at work.

## Conclusion

Hospital acquired infection accounts for significant proportion of the cases. Multiple types of adenoviruses can be involved in a single outbreak. The standard viral culture technique may not be satisfactory in confirming/disproving infections when diagnosis is in doubt (11).

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