



Epidemic Adenovirus keratoconjunctivitis in the South of Saudi Arabia

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Abstract

To document an outbreak of epidemic adenovirus keratoconjunctivitis (AKC) in southern Saudi Arabia in 2013, its influence in the presentation of the community. To describe a series of adenovirus keratoconjunctivitis cases. Observational non-comparative case series selected from an ongoing prospective series. Two hundred and fifty (250) cases examined at a corneal specialty practice in Abha, southern Saudi Arabia between Jan - October 2013, who presented with signs of AKC on slit-lamp examination, were included in the study. The ages of affected patients ranged from 2 to 50 years, but most were between 18 and 35 years old. 250 patients presented a pattern of characteristic epidemic keratoconjunctivitis. In 150 cases, sub-corneal epithelial infiltrates were observed for a period of more than six months. In 40 cases, sub-epithelial infiltrates faded over 2 months. Topical corticosteroids can accelerate the regression of sub epithelial infiltrates. Keratitis was not seen in patients less than ten years of age. AKC was diagnosed from its typical clinical features. The major sequelae are sub epithelial infiltrates, which are difficult to treat. Multiple treatments have been tried for this disease, but none of them seems to be completely effective. Prevention is the most reliable way to control this contagious infection.

Keywords: Adenovirus, Keratoconjunctivitis, Epidemic.

INTRODUCTION

There are 51 serotypes of human adenoviruses (Ads), which are divided into six subgenera (A–F) based on biochemical, immunological, and morphological criteria (de Jong et al., 1999; Shenk, 1996). Among them, subgenus D consists of 32 serotypes including Ad8, Ad19, and Ad37, the main agents of epidemic keratoconjunctivitis (EKC), and Ad9 and Ad15, which cause acute follicular conjunctivitis (Kemp and Hierholzer, 1983). Epidemic keratoconjunctivitis (EKC) is a highly contagious infectious disease that mainly involves the surface of the eye. It is caused by adenoviruses that are highly resistant to environmental influences and are transmitted from person to person by way of infectious secretions, mainly as tear fluid. EKC

occurs around the world in all age groups and at all times of year (Adloch et al., 2010). The incubation period of the disease is about one week. Persons with EKC suffer from an intense foreign body sensation, pain, pre-auricular lymphadenopathy, oedema of the eyelids, subconjunctival haemorrhage, reduced visual acuity, and often a general feeling of being unwell. Tarsal pseudo-membranes, which consist of necrotic tissue and fibrin on an intact epithelial surface, can be seen in acute fulminant disease. EKC is sometimes followed by the development of corneal sub-epithelial opacities, called nummuli, which may persist for months and are difficult to treat (Sundmacher et al., 2001; Bohringer et al., 2008). The aim of this study is to document an outbreak of

epidemic adenovirus keratoconjunctivitis (AKC) in southern Saudi Arabia in the first 10 months of 2013, its influence in the presentation of the community.

MATERIALS AND METHODS

Observational non-comparative case series selected from an ongoing prospective series. We observed epidemic keratoconjunctivitis outbreaks in southern Saudi Arabia between Jan – October 2013. The 250 patients in this study were selected on the basis of characteristic symptoms and signs among those referred to the External Eye Disease Clinic at Abha Eye Specialty Hospital. These included tearing, foreign body sensation, conjunctival hemorrhage, pain, photophobia, blurred vision, subepithelial corneal infiltrates, pre-auricular lymphadenopathy and pseudo-membranes. A complete ocular examination, including best-corrected visual acuity (BCVA) evaluation using the standard Snellen projector chart, slit-lamp biomicroscopy, corneal sensation and applanation tonometry using a handheld portable tonometer (Tono-pen XL applanation tonometer, Medtronic, Jacksonville, FL) was performed at every visit. All patients had complete examinations weekly for one month, then monthly until the end of the follow-up period. Symptoms and clinical signs observed with a Haag Streit 900 slit-lamp were recorded. None of the eyes had a history of glaucoma or retinal disease. Topical corticosteroids (Vexol 1 %, Rimexolone, Alcon Inc., Fort Worth, TX, USA) was given to all patients three times a day and tapered according to the clinical response. Topical Vigamox (moxifloxacin HCl 0.5%, Alcon Inc., Fort Worth, TX, USA) was also given to all patients four times a day to guard against secondary bacterial infection and tapered according to clinical response. Physical supportive measures such as ice-cold bandages have also been advised. Membrane peeling was done for all patients who developed conjunctival pseudo-membrane to hasten resolution.

RESULTS

The ages of these patients ranged from 2 to 50 years, but most were between 18 and 35 years old. 250 patients presented a pattern of characteristic epidemic keratoconjunctivitis. Signs and symptoms were compatible with viral conjunctivitis. All patients had symptoms described above. The most prevalent signs were follicular conjunctivitis (100%), conjunctival chemosis (76.8%) and subepithelial infiltrates (76%) (Table 1)

170 of the 250 patients (68%) had enlarged pre-auricular lymph nodes at the first visit. In 74 patients this was unilateral and lasted only one week. In the rest of patients (n=96) bilateral pre-auricular lymphadenopathy

persisted for two to three weeks. No glands were visibly enlarged, and no submandibular or cervical lymphadenopathy was observed. Pseudo-membranes were reported in 72.8 % of cases. It developed seven to 14 days after the onset of infection. Pseudo- membranes appeared as clots of exudates firmly adhered to the upper and/or lower tarsal conjunctiva. It was possible to separate them from the underlying conjunctiva without damaging the epithelium by means of peeling, producing minor bleeding, if any. Subepithelial infiltrates involving the visual axis were observed in up to 76% of cases causing photophobia and deterioration of visual acuity in these patients. In 150 cases, sub-corneal epithelial infiltrates were observed for a period of more than six months. In 40 cases, sub-epithelial infiltrates faded over 2 months and small faint residual nebulae apparent in the superficial layers of the corneal stroma. Topical corticosteroids can accelerate the regression of subepithelial infiltrates. Keratitis was not seen in patients under ten years of age. The visual acuity returned to normal in all patients with corneal involvement except for 5 patients who had suffered a massive superficial keratitis, and whose visual acuity remains at 6/18 in the affected eye. None has the corneal sensation been reduced. In all cases, ocular tension was within normal limits during the entire follow-up period. Steroid-induced ocular hypertension was not noted in any eyes. Adenoviral keratoconjunctivitis was reported in both eyes in up to 70 % of cases.

DISCUSSION

Epidemic adenovirus keratoconjunctivitis (EKC) outbreaks have been reported in Southern Saudi Arabia, with a peak incidence in the summer. Outbreaks with almost similar symptoms and signs were reported in other countries (Akiyoshi et al., 2011; Adhikary et al., 2004; Aoki et al., 2008; Engelmann et al., 2006 and Ishiko et al., 2008). In the current study, EKC was diagnosed from its typical clinical features, so there was no need for laboratory confirmation that can be expensive, time consuming and require special laboratories. In doubtful cases, laboratory tests might be helpful to confirm the diagnosis. The available tests are antigen detection, nucleic acid detection, electron microscopy, cell culture tests and Rapid Pathogen Screening. Nucleic acid detection with the aid of nucleic acid amplification techniques, such as the polymerase chain reaction (PCR), is the diagnostic test of choice for EKC because of its high sensitivity, high specificity, and rapidity (Sambursky et al., 2007). In the current study, EKC showed no relation to sex, ethnic origin, or social status. A low topical steroid was given to delay or prevent the development of corneal infiltrates and hasten its resolution. Topical steroids were given also to prevent symblephara, corneal scarring and permanent vision

Table 1. Clinical manifestations

Signs or symptoms	Number of cases	Average cases (%)
Tearing	250	100
Foreign body sensation	250	100
Pain	250	100
Photophobia	250	100
Blurred vision	250	100
Conjunctival hemorrhage	99	39.6
Preauricular lymphadenopathy	170	68
Subepithelial infiltrates	190	76
Pseudo-membranes	182	72.8
Conjunctival chemosis	192	76.8
Follicular conjunctivitis	250	100

impairment. The appearance of subepithelial infiltrates is an additional frequent complication which can be observed in up to 76 % of cases. They are considered to be pathognomic of adenoviral infection and generally appear when the conjunctivitis begins to resolve. These infiltrates have been presumed to represent an immune response to suspected adenoviral antigens deposited in corneal stroma under Bowman's membrane (Fite Chodosh, 1998). If the infiltrates involve the visual axis, photophobia and visual acuity loss can occur and, if untreated, they resolve within a period that can vary between weeks and months.

As there is no efficient antiviral treatment, prophylaxis is essential to control the infections caused by this pathogen. Washing of hands and disinfection of instruments do not appear to be sufficient to control the propagation of AKC outbreaks (Nauheim et al., 1990 and Yamazaki et al., 2011). A prospective study demonstrated that the application of a hospital infection control protocol against adenovirus can diminish the incidence of epidemic outbreaks and isolated adenoviral conjunctivitis cases through a four year period (Gottsch, 1996). Hospitalized patients with AKC should be isolated, and outpatients with AKC should be treated separately from other patients at the end of the day. Ophthalmologists should always wear gloves when examining patients and should disinfect the hands, instruments, and surfaces thereafter. EKC is thus the most common viral disease of the eye and causes major economic losses by keeping patients away from work.

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