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Indian Journal of Clinical and Experimental Ophthalmology

Journal homepage: www.ijceo.org

Original Research Article

An epidemic of viral keratoconjunctivitis in the patients attending tertiary care hospital in north Karnataka: A hospital based cross-sectional study

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ARTICLE INFO

Article history:
Received 06-12-2023
Accepted 09-07-2024
Available online 30-12-2024

Keywords:
Conjunctivitis
Redness
Discharge
Awareness
Personal hygiene

ABSTRACT

Background: Epidemic keratoconjunctivitis (EKC) is a highly contagious infection of the ocular surface. It affects all ages and socioeconomic groups.The main purpose of this study is to identify the cluster of conjunctivitis and control its spread to prevent a large community outbreak.

Materials and Methods: The data was collected from the 200 patients of all age group and any sex who came with complaints of redness, watering, discharge, foreign body sensation, and pain in the eyes. Informed consent was taken. The detailed history regarding the occupation and history of recent contact was noted. The visual acuity, slit lamp examination was done and patients were categorised according to the severity of conjunctivitis. The patients were treated with topical medications and followed up after a week.

Results: In this study of 200 participants, majority of them (44.5%) belong to 16-25 years age group. The mean age was reported as 30.4 years. Based on occupation 59% were students. 15.5% population had history of travel. On assessing the severity of conjunctivitis, 45% of the cases had mild to moderate conjunctivitis and 55% of the cases had severe conjunctivitis. The conjunctivitis was found to be severe among students of 16-25 years of age. Among these students, history of contact was noted in the hostels followed by classrooms.

Conclusion: Education and awareness regarding early identification of cases is most important. Strict personal hygiene measures and prompt isolation of cases should be done to prevent similar outbreaks of epidemic keratoconjunctivitis. In our study all the patients recovered completely with good visual prognosis.

1. Introduction

The conjunctiva is a transparent, lubricating mucous membrane that lines the underside of the eyelid and the surface of the globe (palpebral conjunctiva and bulbar conjunctiva respectively). Conjunctivitis is inflammation or infection of the conjunctiva. It may be infectious or non-infectious.[1] Infectious conjunctivitis can be bacterial, viral, fungal, chlamydial and parasitic. Causes of non-infectious conjunctivitis are allergens, toxicities and irritants.[1] Conjunctivitis is the most common cause of red eye in primary care centre.[1]

Epidemic keratoconjunctivitis (EKC) is defined as any clinically suspected case of conjunctivitis, characterized by redness of the eye with symptoms of pain, irritation, foreign body sensation associated with watering or discharge.[2] Adenoviral eye infections can present in a variety of ways, from conjunctivitis, which frequently resolves on its own, to keratitis, which can last for a long time. Similar to disease severity, disability can range from mild to severe. Direct contact or droplet spread both are possible.[3] Acute conjunctivitis refers to symptom duration of 3 to 4 weeks

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https://doi.org/10.18231/j.ijceo.2024.118

from presentation, whereas chronic is defined as symptoms lasting for more than 4 weeks.[1]

Adenovirus serotypes Ad 5, 8, 11, 13, 19, and 37 frequently result in epidemic keratoconjunctivitis (EKC), which is known to cause severe conjunctivitis.[4] Conjunctivitis is primarily diagnosed clinically, though laboratory tests may be recommended when symptoms persist. Outbreaks of conjunctivitis are frequent. These acute viral conjunctivitis outbreaks can have a negative impact on society and the economy. They are most frequently observed in schools, dormitories, hospitals, and public areas.[1] We observed a cluster of cases with conjunctivitis coming to Ophthalmology OPD in the month of June. We have studied 200 cases of acute adenoviral keratoconjunctivitis cases in our study.

2. Materials and Methods

This hospital-based cross-sectional study was conducted on 200 patients who presented to a tertiary care hospital in North Karnataka between June 2023 and August 2023. The patients who came with symptoms of redness, watering, discomfort, itching, and foreign body sensation were included in the study. Informed consent was taken from these patients.

Patients with scleritis, episcleritis, uveitis and glaucoma were excluded from the study.

The patients with above symptoms were examined thoroughly. Visual acuity, torch light examination and slit lamp examination were done. The signs of acute conjunctivitis like lid edema, discharge or matting of eyelashes, conjunctival congestion, petechial haemorrhages over tarsal conjunctiva or subconjunctival haemorrhages were noted. Cornea was examined for signs of keratoconjunctivitis.

The age group of the patients, history of occupation, history of exposure in school, colleges or hostels, work place was noted. The history of travel or any contact with the patient diagnosed with acute conjunctivitis or the articles used by the patient like sharing face towels, soap, bedding, pillows, eye drops with patients; the frequency of eye rubbing per day, etc. is noted.

We sent conjunctival swab of few patients with severe conjunctivitis which were negative for the bacterial growth.

3. Results

In our study there were 200 participants. These cases were reported between June 2023 and August 2023. Among them 97 (48.5%) were males and 103 (51.5%) were females. Most of the study participants (44.5%) belong to age group of 16-25 years followed by 26-55 years (26%), ≤15 years (15.5%) and >55 years (14%). The mean age of the study participants was reported as 30.4 years.

Table 1: Characteristics of the study population

Variables	Frequency	Percentage
Age group		
≤ 15 years	31	15.5
16-25 years	89	44.5
26-55 years	52	26.0
> 55 years	28	14.0
Gender		
Female	103	51.5
Male	97	48.5
Occupation		
Student	118	59.0
Others	82	41.0
Probable place of contracting infection		
Hostel/home	101	50.5
School/College	39	19.5
Work place	36	18
Not known	24	12
History of travel		
Present	31	15.5
Absent	169	84.5

Among the 200 cases, 118 (59%) were students and the rest 41% were occupationally engaged as farmers, housewife, staff nurse, business, shop keeper, etc. notably 15.5% of cases gave positive history of travel. Among these 118 (59%) students, history of contact was noted in the hostels (hostels of medical institute) followed by classrooms and college which are 39 (19.5%).

Table 2: Proportion of cases with different presenting symptoms

Presenting symptoms	Frequency [#]	Percentage
Redness	200	100
Watering	87	43.5
Discharge	141	70.5
Papillae/Follicles	148	74
Lid edema	144	72
Keratitis	63	31.5

On assessing the presenting symptoms among the cases with conjunctivitis, redness was reported among all the cases, followed by watering in 87 (43.5%) cases, discharge in about 141 (70.5%) cases, papillae/follicles in about 148 (74%) of cases, lid edema in 144 (72%) of cases and keratitis i.e. superficial punctate keratopathies (SPK's) in 63 (31.5%) of cases.

On assessing the severity of conjunctivitis, 45% of the patients had mild to moderate conjunctivitis and 55% of the patients had severe conjunctivitis. The conjunctivitis was found to be severe among students of 16-25 years of age (46 cases). Most of these students are the residents of the hostel.

Based on the presenting symptoms and detailed clinical examination, we diagnosed these cases as epidemic viral keratoconjunctivitis.

Table 3: Association between clinical parameters and severity of conjunctivitis

Variable	Severe conjunctivitis	Mild to Moderate conjunctivitis	Total	P value
Age group				
≤ 15 years	15 (7.5)	15 (7.5)	31 (15.5)	0.530
16-25 years	46 (23)	43 (21.5)	89 (44.5)	
26-55 years	32 (16)	20 (10)	52 (26)	
> 55 years	17 (8.5)	11 (5.5)	28 (14)	
Gender				
Female	64 (32)	39 (19.5)	103 (56.5)	0.037*
Male	46 (23)	51 (25.5)	97 (48.5)	
Occupation				
Students	61 (30.5)	57 (23.5)	118 (59)	0.260
Others	49 (24.5)	33 (16.5)	82 (41)	
Probable place of contracting infection				
Hostel/home	62 (31)	39 (19.5)	101 (50.5)	0.252
School/College	19 (9.5)	20 (10)	39 (19.5)	
Work place	19 (9.5)	17 (8.5)	36 (18)	
Not known	10 (5)	14 (7)	24 (12)	
History of travel				
Present	22 (11)	9 (4.5)	31 (15.5)	0.052
Absent	88 (44)	81 (40.5)	169 (84.5)	

*Significant

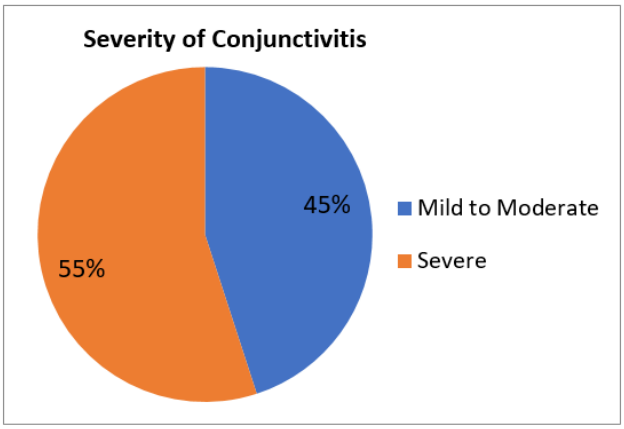

Figure 1: Proportion of cases based on severity of conjunctivitis

Figure 2:

4. Discussion

The outbreaks of conjunctivitis usually go unreported in routine disease surveillance system, unless it draws the local media attention. In order to stop a widespread outbreak in the population, it is essential to identify the conjunctivitis cluster and stop its spread.[5]

According to Li D et al., Killerby ME et al., Reilly S et al. and Richmond S et al., since 1980s, EKC epidemics caused by HAdV-8 have been documented worldwide. In hospitals, iatrogenic ophthalmic transmission was the main cause of epidemics. The adenovirus may survive for a number of weeks in the environment, remain contagious on surfaces for up to a month, and withstand standard disinfectants. Epidemiological studies of various EKC outbreaks in the large ophthalmic clinics and hospitals have shown stringent hand-washing, disinfection of instruments and proper medical waste disposal techniques only are not sufficient to prevent the hospital transmission during an outbreak. This epidemic can only be brought under control when patients are strictly quarantined.[2,6–8] According to

our study also to prevent transmission of cases during the outbreak, patients were strictly advised to quarantine and use the prescribed medications.

According to Madurapandian Y et al. and Crum NF et al., congregational environments like hostels, religious gatherings, and social events encourage the spread of diseases that are conveyed through droplets.[5,9,10] In our study, the disease spread is most commonly seen among medical institute hostel students and at workplace.

According to Madurapandian Y et al. and Elnifro EM et al., adenovirus is the most common pathogen that causes conjunctivitis, which is identified clinically. The most effective ways to find adenoviruses are viral isolation and cell culture. In developed countries, viral DNA is found using rapid diagnostic kits and polymerase chain reaction (PCR) for adenovirus laboratory confirmation. Due to their high cost, these techniques are hardly used in India.[5,11,12] In our study, we have observed clinically that, most common conjunctivitis is adenoviral with varying intensities in all the age groups.

According to Li D et al., Killerby ME et al. and Viney KA et al., majority of the EKC outbreaks show two or more peaks, spaced at different intervals of time. According to the previous studies, iatrogenic EKC outbreaks can occur anytime of the year, and school EKC outbreaks were seen most often between May and October. Previous studies have shown that acute conjunctivitis is most common in summer.[2,6,13,14] In our study the outbreak is seen mostly from June-August 2023.

Muller et al. reported adenovirus-related EKC outbreak at a hospital-affiliated ophthalmology clinic.[15] According to our study, this adenovirus-related EKC outbreak is seen among students, especially students residing at medical institute hostels.

According to Li D et al., Killerby ME et al. and Viney KA et al., the clinical manifestations of epidemic keratoconjunctivitis and course of disease were different due to the variations in the virulence, observation time, sample sizes and influence of the observer. The patients in these studies had some common manifestations of viral conjunctivitis, and also the common characteristics of EKC, like follicular hyperplasia, pre-auricular lymphadenopathy, pseudo-membrane formation, corneal involvement and blurred vision.[2,6,13] In our study patients with symptoms of redness, watering, discomfort, itching and foreign body sensation and who have severe congestion, papillae, follicles, subconjunctival haemorrhages and keratitis i.e. superficial punctate keratopathy.

We have treated all the patients with mild potent steroids and antibiotic combination like Loteprednol with Tobramycin and Fluorometholone with Tobramycin eye drops. All the patients improved significantly with these medications. We also advised for strict quarantine to all the patients especially for those staying in hostels.

5. Conclusion

In our study the epidemic keratoconjunctivitis was most frequently seen among the students. Education and awareness regarding early identification of the cases is most important. Our study strongly recommends strict personal hygiene measures and prompt isolation of cases to prevent similar outbreaks of epidemic keratoconjunctivitis. In our study all the patients recovered completely with good visual prognosis.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Alfonso SA, Fawley JD, Lu XA. Conjunctivitis. *Prim Care*. 2015;42(3):325–45.
2. Li D, Zhou JN, Li H, He CY, Dai QS, Li XL, et al. An outbreak of epidemic keratoconjunctivitis caused by human adenovirus type 8 in primary school, southwest China. *BMC Infect Dis*. 2019;19(1):624.
3. Cheung D, Bremner J, Chan JTK. Epidemic kerato-conjunctivitis–do outbreaks have to be epidemic? *Eye (Lond)*. 2003;17(3):356–63.
4. Maurya RP, Kumar A, Tiwari K. Epidemic keratoconjunctivitis : An overview. *IP Int J Ocul Oncol Oculoplast*. 2023;9(2):53–5.
5. Madurapandian Y, Rubeshkumar P, Raju M, Janane A, Ganeshkumar P, Selvavinayagam TS, et al. Case report: An outbreak of viral conjunctivitis among the students and staff of visually impaired school, Tamil Nadu, India, 2020. *Front Public Health*. 2022;10:978200.
6. Killerby ME, Stuckey MJ, Guendel I, Sakthivel S, Lu X, Erdman DD, et al. Notes from the Field: Epidemic Keratoconjunctivitis Outbreak Associated with Human Adenovirus Type 8 - U.S. Virgin Islands, June-November 2016. *MMWR Morb Mortal Wkly Rep*. 2016;66(30):811–12.
7. Reilly S, Dhillon BJ, Nkanza KM, D'Souza AM, Taylor N, Hobbs SJ, et al. Adenovirus type 8 keratoconjunctivitis–an outbreak and its treatment with topical human fibroblast interferon. *J Hyg (Lond)*. 1986;96(3):557–75.
8. Richmond S, Burman R, Crosdale E, Cropper L, Longson D, Enoch BE, et al. A large outbreak of keratoconjunctivitis due to adenovirus type 8. *J Hyg (Lond)*. 1984;93(2):285–91.
9. Crum NF, Barrozo CP, Chapman FA, Ryan MA, Russell KL. An outbreak of conjunctivitis due to a novel unencapsulated Streptococcus pneumoniae among military trainees. *Clin Infect Dis*. 2004;39(8):1148–54.
10. Quadri SA. COVID-19 and religious congregations: Implications for spread of novel pathogens. *Int J Infect Dis*. 2020;96:219–21.
11. Elnifro EM, Cooper RJ, Klapper PE, Yeo AC, Tullo AB. Multiplex polymerase chain reaction for diagnosis of viral and chlamydial keratoconjunctivitis. *Invest Ophthalmol Vis Sci*. 2000;41(7):1818–22.
12. Kaufman HE. Adenovirus advances: new diagnostic and therapeutic options. *Curr Opin Ophthalmol*. 2011;22(4):290–3.
13. Viney KA, Kehoe PJ, Doyle B, Sheppeard V, Roberts-Witteveen AR, Semirli H, et al. An outbreak of epidemic keratoconjunctivitis in a regional ophthalmology clinic in New South Wales. *Epidemiol Infect*. 2008;136(9):1197–206.
14. Gottsch JD. Surveillance and control of epidemic keratoconjunctivitis. *Trans Am Ophthalmol Soc*. 1996;94:539–87.
15. Muller MP, Siddiqui N, Ivancic R, Wong D. Adenovirus-related epidemic keratoconjunctivitis outbreak at a hospital-affiliated

ophthalmology clinic. *Am J Infect Control*. 2018;46(5):581–3.

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Cite this article: Salimath S, Birajdar NJ, Gour S. An epidemic of viral keratoconjunctivitis in the patients attending tertiary care hospital in north Karnataka: A hospital based cross-sectional study. *Indian J Clin Exp Ophthalmol* 2024;10(4):672-676.