

## **Analysis of outbreak of viral epidemic kerato-conjunctivitis in a teaching hospital**

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### **Abstract:**

Background : Because of seasonal increase of epidemic keratoconjunctivitis infecting several medical personnel and their family members medical personnel need awareness of the disease. Simple hygienic measures can decrease the number of infected.

Methods: We have studied the EKS cases attending Ophthalmology OPD from December 2021 to June 2022.

Results: A total of 100 patients were studied. Equally prevalent in both males and females. Superficial punctate keratitis was seen in three fourths of patients. Conjunctivitis was seen in 26% and stromal infiltrates in 8%. Disease was unilateral in 83%. Overall complications occurred in 16%. Nummular keratitis in 10%, corneal opacities in 5% and uveitis in 1%. Visual acuity disturbances were seen in 16% of patients after 4 weeks.

Conclusion: Epidermal keratoconjunctivitis occurs seasonally. Caused by adenovirus. Hygienic measures can decrease the spread among medical personnel.

**Key Words:** EKC :Epidemic Keratoconjunctivitis, Adeno Virus, Nummulker Keratitis, Uveitis, Corneal Opacities, Visual acuity.

### **BACKGROUND**

Epidemic keratoconjunctivitis (EKC) is a disease affecting the ocular surfaces caused by the Adenovirus. Out breaks of EKC were reported in hospitals and schools worldwide<sup>1</sup>. Similar out breaks were occurring every year in our teaching hospital in which staff and students were affected. It was more common in the hostellers and their contacts. Sudden spurt of cases in few months of every year was observed. This study was conducted to evaluate one such outbreak. 100 cases of clinically diagnosed Epidemic Kerato Conjunctivitis were included in the study during August to October 2021.

### **AIMS AND OBJECTIVES**

To report the outbreak of EKC occurring in our teaching hospital

To document the ocular manifestations and treatment modalities to prevent complications

To determine the risk factors responsible for spreading of the disease

To create awareness about hygienic measures and to educate the staff about disinfection procedures to limit the outbreak

## **INTRODUCTION**

EKC is a highly contagious but self-limiting infection of the ocular surface, caused by Adenovirus which is a double stranded DNA virus. Serotypes 8,19 and 37 are most commonly associated with EKC<sup>2</sup>. It is transmitted via droplets or direct contact in crowded conditions like hostels, hospitals and schools.

Common symptoms are foreign body sensation, defective vision, redness, watering, photophobia, swelling and itching. Signs are lid edema, conjunctival follicles, papillae, petechial haemorrhages and superficial punctuate keratitis. Subepithelial infiltrates leading to persistent corneal opacities called nummuli lasting for one or two months may occur in few cases. Preauricular lymphadenopathy and reduction in corneal sensations are also associated. Incubation period is 8 days. Virus is shed from the inflamed eye for one to two weeks in the infective phase. Patients can spread the disease even before the onset of symptoms. Acute phase heals in 3 to 6 weeks. As EKC is a highly contagious condition early diagnosis in the early stage is essential to prevent the epidemics.<sup>3</sup>

Diagnosis is mainly by clinical examination by slit lamp biomicroscopy. This condition should be differentiated from other types of conjunctivitis like bacterial, allergic and toxic.

Treatment: As it is a self – limiting condition only symptomatic treatment with lubricant eyedrops is advised. In acute phase only antibiotics were used to prevent secondary infection. Usage of steroids in acute phase is controversial as it may lead to increased viral load and longer duration of shedding of virus. Soft steroids like Fluorometholone(0.1%) and Loteprednol (0.3%) eye drops in tapering dose was used in cases with severe photophobia, corneal involvement involving the pupillary area. Antiviral agents like Gancyclovir(0.15%) eye gel was used in severe nummular keratitis.<sup>4</sup> In severe cases povidone iodine ( 0.5%) was useful. After instilling topical anaesthesia drops like paracaine, few drops of 0.5% Povidone iodine eye drops were instilled in the eye and the surrounding skin on the eye lids and later saline wash is done. Patients complained of stinging sensation .<sup>5,6</sup> In cases with persistent subepithelial infiltrates Cyclosporine 0.05% eye drops were useful.<sup>7</sup>

As there is not effective drug treatment for EKC, preventing the spread of the disease by strict hygienic measures is important.<sup>8</sup> Disinfection of surfaces, door knobs, slit lamp, tonometer heads using viricidal agents is important. Usage of gloves by doctors prevents the spread of disease. Patients are educated about the importance of hand wash and were advised to avoid eye rubbing, not to share hand towels and eye cosmetics to limit the outbreak.

## **MATERIALS&METHODOLOGY:**

Source of the subject: Patients attending Ophthalmology OPD.

Sample size and duration: 100 patients over a period of 3 months

Clearance was obtained from the Institutional Ethics Committee, informed consent were taken from the participants of the study.

### **Inclusion criteria:**

Patients having conjunctivitis and keratitis associated with redness and watering.

### **Exclusion criteria:**

Patients with previous corneal opacities, Lagophthalmos, Severe dry eye cases, Red eye due to other causes, Vernal keratoconjunctivitis.

### **METHODOLOGY:**

Detailed history was taken about duration of onset of symptoms, history of contact with persons with red eye. Best corrected visual acuity (BCVA) was documented by Snellens chart. Slit lamp examination was done. Fluorescein staining was done in cases with corneal involvement. Corneal sensations were tested. Presence of Pre auricular lymphadenopathy was noted. Necessary treatment was given and patients were reviewed at the intervals of 1, 2 and 4 weeks. Visual acuity and slit lamp examination was repeated at each visit.

### **RESULTS**

Table 1: AGE DISTRIBUTION (in years)

<20	21- 40	41- 60	61 - 70	TOTAL
42	49	8	1	100

Table 2: GENDER DISTRIBUTION

MALES	FEMALES	TOTAL
48	52	100

Table 3: LATERALITY

UNILATERAL	BILATERAL	TOTAL
83	17	100

Table 4: CLINICAL SIGNS

CONJUNCTIVITIS	KERATOCONJUNCTIVITIS	TOTAL
16	84	100

Table 5: VISUAL ACUITY

BCVA	NO. OF PATIENTS			
	At the time of presentation	1 <sup>ST</sup> WEEK	2 <sup>ND</sup> WEEK	4 <sup>TH</sup> WEEK
6/6	73	57	48	89
6/9- 6/12	25	39	42	6
6/18-6/24	2	4	10	5
	100	100	100	100

Table 6: COMPLICATIONS


NUMMULAR KERATITIS	CORNEAL OPACITIES	FILAMENTARY KERATITIS	UVEITIS	PSEUDO MEMBRANE
10	5	1	1	2

Complications like nummular keratitis were seen in 10 cases, out of which 5 cases healed after 4 weeks, 5 cases had persistent corneal opacities even after 4 weeks. Pseudomembranes were noted in two patients. Uveitis was noted in one patient. Filamentary keratitis was noted in 1 case.

### Discussion:

EKC is a highly contagious disease of Adenoviral origin. In a 21-year surveillance study of Adenoviral conjunctivitis in Japan in which 1454 cases were analysed by Koki Aoki et al. Adenovirus serotypes 8, 19, 37 were found to cause severe conjunctivitis<sup>2</sup>.

In another study conducted by Koki Aoki et al, clinical features of 102 patients of suspected adenovirus conjunctivitis were reviewed.<sup>3</sup> Human Adenovirus DNA in the samples from these patients was detected by polymerase chain reaction (PCR), but in our study diagnosis was based only on clinical examination. No confirmatory tests were conducted.

In our study most of the patients were students, staff nurses and consultant doctors. Case control study conducted by Duoli et al, 331 cases of acute conjunctivitis probably of EKC origin were reported in two schools in South west China.<sup>9</sup> They concluded the necessity to monitor the pathogens causing acute conjunctivitis. Peaks of epidemics were seen during summer season in a study conducted by Anthony V Das and Sayan Basu peaks were seen towards the end of summer season.<sup>10</sup> In our study outbreaks were observed in the months of August and September.

In a study conducted by D Cheung et al, 38 confirmed cases of Adeno virus were included in which 22(67%) had presented with unilateral disease.<sup>11</sup> In our study 83% were unilateral cases. A retrospective hospital based study conducted by Antony Vipin Das, which included 21196 cases, reported unilateral cases of 53.4%.<sup>12</sup> In our study, 83% were unilateral cases. In this study, the common presenting symptoms were redness followed by watering. Similar presenting complaints were noted in our study. Pre-auricular lymphadenopathy was noted in 7% of cases. In our study 12% of cases had preauricular lymphadenopathy. In this study corneal involvement is seen in 38% but in our study corneal involvement was seen in 74%.

In a study conducted by Mohanty Gayatree 78 cases were evaluated.<sup>13</sup> In this study 100% cases had corneal involvement. In our study corneal involvement was seen in 74% of cases.

	Antony V.Das et al.	Mohanty Gayatree et al.	Our study	
Sample size	21196	78	100	
Unilateral cases	53%		83%	
Preauricular lymphadenopathy	7%		12%	
Corneal involvement	38.2%	100%	74%	
SPK	26.3%	83.3%	74%	

Corneal edema	0.9%		3%	
Filaments	0.4%		1%	
Chronic course beyond 1month	0.5%	9%	3%	

Hospital acquired EKC infection can also cause complications like nummular keratitis were prevented by earlier detection and treatment with steroids and antivirals.<sup>1,5,11</sup> Mohanty in their study stated that use of steroids and gancyclovir 0.15% gel lead to more rapid improvement of symptoms of EKC.<sup>4</sup> The use of topical 0.05% cyclosporine A is described in certain studies for patients with subepithelial corneal infiltrates who are nonresponsive to topical steroids.<sup>7</sup> In our study low dose steroids like Fluomethalone and Loteprednol, Gancyclovir eye gel and Cyclosporine 0.05% eye drops were used in cases with severe photophobia, corneal involvement in the pupillary area and in cases with nummular keratitis.

Randomized control study (RCT) conducted on 150 cases of EKC (Hutter) reported better clinical results in patients treated with povidone iodine.<sup>6</sup> Certain studies have described the use of topical dexamethasone and povidone iodine. In our study we have used 2.5% povidone iodine eye drops in cases with nummular keratitis and persistent stromal infiltrates. After instilling paracaine eyedrops, few drops of povidone iodine were instilled in the conjunctival sac and on the eyelids. Saline wash was done after 1 min. Patients complained of severe stinging sensation.

Study conducted by Mohanty Gayatree.<sup>13</sup> described the complications associated with EKC like subepithelial infiltrations, pseudo membranes, corneal opacities, tylosis. In our study we had complications which included uveitis, pseudomembranes, corneal opacities and persistent stromal haze.

In a Randomized control study conducted by Birthe Meyer et.al., 316 cases of EKC were studied in Germany.<sup>8</sup> Prevention and control of EKC by early detection, hygienic measures was stated. Concluded that as there is no effective treatment, hygienic measures in hospitals and doctors offices are of utmost importance. Spread by doctors by shaking hands with the patients may contribute to the spread of EKC.<sup>14</sup>

In our study we have counselled all the patients about hygienic measures to be taken to prevent the spread of the disease. Regular usage of gloves, disinfection of the surfaces and slit lamps was followed. This has reduced the number of cases in the following year.

Limitations of the study:

No confirmatory laboratory investigations like conjunctival cytology and PCR were done.

The diagnosis was mainly based on clinical examination.

## Conclusion

Increase in the awareness about this condition lead to decrease in the number of EKC cases in the following year. Patients should be counselled about proper hygienic measures to be taken. Disinfection of surfaces with virucidal disinfectants is important.

Why this study is important.

EKC is the most common cause of red eye. Patients suffer with a lot of discomfort, foreign body sensation and defective vision. Some patients feel a lot of anxiety about the long duration of symptoms and fear of permanent visual problems. Some patients have to take leave of absence due to severe symptoms and due to fear of spreading the disease. Proper counselling to the patients is needed to explain the course of the disease, precautions to be taken to reduce the spread of the disease. Increasing awareness about the disease will reduce the number of infected.

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