

Etiological cause of Secondary Infection in Acute Conjunctivitis Epidemic at Regional Eye Hospital, Warangal

K. Vijay Kumar¹, G R Bharath Kumar², Anthony Vipin³

¹Professor, ²Assistant Professor, ³Postgraduate Student, Department of Ophthalmology, Kakatiya Medical College, Warangal, India.

Address for correspondence: Dr G R Bharath Kumar, Assistant Professor, Department of Ophthalmology, Kakatiya Medical College, Warangal, India.

Email: drbhasha@yahoo.com

ABSTRACT

Background: The aim of this study was to investigate the various etiological causes of secondary infection in acute conjunctivitis epidemic

Materials & Methods: Prospective study of 100 patients with acute conjunctivitis presented to Govt Regional Eye Hospital Warangal. Age, sex occupation, residence, eye effected were noted. The patients were subjected to conjunctival swabbing with 2 swabs, each one for smear and staining and other for culture. For isolation and identification of organisms various culture media are used.

Results: This series comprises of 100 patients with acute conjunctivitis. Out of 100 patients maximum incidence that is 33% of the affected patients were between 20-30 years. Male were 54% and females were 46%. 28% of the patients were Housewives, with 77% of the infection acquired from an affected family member. No geographic predisposition was found and 41% belonged to Warangal. 59% of the patients had involvement of both the eyes, and 78% had Moderate severity. 21% of the cases had 100% of the family members being affected. The most common complaints were Redness, Watering of the eyes.

The smears revealed either No organism, / Gram -ve Diplococci / Gram +ve Bacilli / Gram +ve Cocci/Gram +ve diplococci / Gram -ve Bacilli / Diphtheroids. In the cultures, 7 of them grew Proteus with an average CFU / mL of 17 and 4 grew Diphtheroids with an average CFU/mL of 24, 9 grew Aerobic Spore Bearers, 6 grew Micrococci with an average CFU/mL of 72, 3 were contamination. Rest of the 71 swabs grew no growth on culture, with the smears showing plenty to no pus cells and No organism.

Conclusion: The study has revealed in majority of no secondary bacterial infection. Few cases are associated with secondary infection with various organisms. Out of which the Proteus is seen in majority of cases, which itself is not a normal resident flora in the conjunctiva. Due to the local decrease in Immunity may be the reason for access to the various organism to cause for secondary infection in Epidemic kerato conjunctivitis

Keywords: Acute Viral Conjunctivitis, Secondary Infection, Conjunctival Swabs, Proteus, micrococci.

INTRODUCTION

Epidemic Kerato Conjunctivitis is caused by Adenovirus. Adenoviral ocular disease was recognized as early as 1889 in Austria by Fuchs during an epidemic and was described as "keratitis punctate superficialis"¹. In 1901, a report of a presumed Epidemic keratoconjunctivitis epidemic in Bombay, was published. They are double stranded DNA viruses that do not have a viral envelope and are icosahedral particles. Fifty three immunologically distinct serotypes have been identified based on their capsomere antigen¹. Most serotypes are associated with ocular infections and some are most commonly associated with epidemics specifically serotypes 2, 3, 4, 5, 7, 10, 11, 22, 29 and 34.

The epidemics may be seasonal and different serotypes may predominate in different populations. Serotypes 3, 8, 19, 37 are the common causes of Epidemic Keratoconjunctivitis. There are seven subgenera, A to G, based on the molecular genome characteristic, Fifty percent are subgenus D, which is the most common subgenus associated with adenoviral conjunctivitis². Human adenovirus is a leading cause of conjunctivitis, representing 15 – 70% of all cases of conjunctivitis in the world. It can present as a mild, self limiting infection or a severely disabling, visually compromising disease³.

In the western world, viral conjunctivitis appears to be mainly iatrogenic, affecting primarily adults⁴. In developing nations, it is endemic and a disease of children. Adenovirus infections are spread via droplets or direct contact such as hand to eye from eye care professionals, contaminated non porous vectors such as door knobs, plastics, swimming pools, eye drops, ophthalmic equipments (tonometer tips and lenses for lasers).

Upto 46% of patients with epidemic keratoconjunctivitis had viable virus on their hands. Adenoviruses are very contagious and can results in epidemics that can greatly impact productivity in the workplace. The viruses can live on surfaces

for 4 – 5 weeks and remain stable to both adverse chemical and physical conditions. Alcohol or Chlorhexidine glutamate are not effective disinfectants for adenoviruses. Sporadic outbreaks have been postulated to occur as a result of increased global mobility, i.e, air travel. Chronic and asymptomatic infections may serve as reservoir for the infection, and respiratory, gastrointestinal and genitourinary may also be the sites of infection.

Overcrowded conditions, sharing of towels and poor community hygiene may play a role in transmission. The mean viral incubation time is 9 days and viral shedding occur for 14 – 16 days from the onset of the initial symptoms⁵. Epidemics occur most commonly in autumn, winter and spring⁶. There is low protectivity and minimal to no immunity following infection^{7,8,9}. Nutritional status, sex, race and social classes are not appears to predominate in the third and fourth decade of life in adults, Symptoms can occur rapidly with tearing, foreign body sensation, clear and mucoid discharge, and generalised conjunctivitis. Epidemic kerato conjunctivitis is more often unilateral. The clinical manifestations can vary from subclinical to excessive lacrimation, follicular conjunctivitis or mixed papillary follicular conjunctivitis that predominates in inferior fornix, preauricular node, pseudoproptosis, inflammatory pseudomembrane decreased vision and photophobia¹⁰.

Unusual corneal staining and ulceration may occur that mimic Herpes simplex keratitis. It often results from corneal injury during blinking and eye movements from inflammatory pseudo membranes or true membranes on the palpebral conjunctiva. There are also varying degrees of hyperemia, ranging from petechiae to frank subconjunctival haemorrhage. Epidemic kerato conjunctivitis is characterised by an acute phase may last from 4 – 6 weeks and progress rapidly in severity following the infection. Foreign body sensation often marks the onset of the infection. Involvement of the second eye often occurs in 3 – 7 days. The symptoms in the first eye tend to be more severe.

The acute phase is characterised by a severe conjunctivitis that can last upto 2-4 weeks¹¹. Within 24 hours, a generalised follicular conjunctivitis develops with a mucoid non purulent discharge and profuse lacrimation⁷. Preauricular adenopathy often follows the initial symptoms within approximately 24 – 48 hours. Within 48 hours of the onset of the disease, corneal involvement may occur, characterised by the development of small epithelial vesicles (Stage 0) Punctate epithelial defects may appear 3 – 4 days following the infection (Stage I). In stage II, the corneal lesions coalesce, involve the deep stroma and may last for 2 – 5 days, possibly more than 3 weeks. These corneal lesions may resemble pits that stain with fluorescein and result in worsening foreign body sensation, tearing and photophobia. The acute phase can vary significantly in terms of severity, incidence and prevalence depending on the many potentially infectious serotypes. There

are 53 different serotypes of the epidemic kerato conjunctivitis. Despite long lasting immunity to other serotypes, infections from other serotypes are clinically indistinguishable from one another and can only be identified by viral culture. Therefore, repeat infections with adenovirus are presumed to be from different strains despite similar clinical presentation. The viral infection may be superimposed by secondary Bacterial infection due to a local decrease in the Immunity and may involve either exogenous bacteria or normal commensals of the conjunctiva⁸.

METHODS & MATERIALS

This prospective study was conducted on 100 patients who presented with Acute conjunctivitis during the period of an Epidemic in the months of September and October 2007 at Regional eye Hospital, Warangal. Clinical features included redness, serous and purulent discharge, foreign body sensation and mild to moderate pain, swollen lids and preauricular lymphadenopathy. Relevant history of patient's sex, age, occupation, geographical location of the patients and the history of any other family member effected was taken. A detailed clinical examination of both eyes included the lids, conjunctiva cornea by slit lamp examination. On clinical examination the eye showed the edematous lids conjunctival congestion more localised in fornices.

The exclusion criteria were Diabetes Mellitus, lacrimal Pathology and Corneal Pathology, patients with allergic conjunctivitis

After informed Consent, the patients were subjected to Conjunctival swabbing with 2 swabs each, one for smear & staining and the other for culture. The first swab was used for preparing smear and was examined for Organism under the Microscope. For isolation and identification of the organisms a second swab was inoculated in Glucose Broth and immediately subcultured in Nutrient Agar, Blood Agar and MacConkey's Media. On suspecting C diptheriae on smear, they were inoculated in Potassium Tellurite medium. For Non-Lactose fermenters, identification was done with Triple Sugar Iron. In positive cultures, the CFU / ml, was counted to prove the etiological nature of the organism.

The procedures followed were in accordance with the Ethical standards of the institutional Committee on Human Experimentation and with the Helsinki Declaration of 1975, revised at Tokyo 2004.

RESULTS

This series comprises of 100 patients with acute conjunctivitis. Out of 100 patients maximum incidence that is 33% of the affected patients were between 20-30 years. Males

were 54% and females 46%. 28% of the patients were Housewives, Students were 18%, farmers 17%. 77% of the infection was acquired from an affected family member and 23% were acquired from public or work place. No geographic predisposition was found and 41% belonged to Warangal. 59% of the patients had involvement of both the eyes, 32% left eye and 9% Right eye. 12% had mild keratoconjunctivitis, 78% had Moderate severity, 10% had severe keratoconjunctivitis. 21% of the cases had 100% of the family members being affected. The most common complaints were Redness (100%), Watering of the eyes (100%), pain (29%) and foreign body sensation.

The smears revealed either No organism / Gram -ve Diplococci / Gram +ve Bacilli / Gram +ve Cocci/Gram +ve diplococci / Gram -ve Bacilli / Diphtheroids. In the cultures, 7 of them grew Proteus with an average CFU / mL of 17 and 4 grew Diphtheroids with an average CFU/mL of 24, 9 grew Aerobic Spore Bearers, 6 grew Micrococci with an average CFU/mL of 72, 3 were contamination. Rest of the 71 swabs grew no growth on culture, with the smears showing plenty to no pus cells and no organism.

DISCUSSION

The study aim is to find out the various etiological cause of secondary infection in Acute Viral Conjunctivitis cases. The epidemic of acute conjunctivitis probably could have been Viral in Origin as most of the swabs did not show growth on culture, and also in concordance with the symptoms of the patients both local and systemic.

7% of the Conjunctival swabs of the cases examined grew Proteus which is not normally found in the Conjunctival Flora, but it is found in Immunocompromised Individuals. Due to Local decrease in Immunity, the Normal commensal Bacteria can turn virulent and cause secondary infection, like Micrococci or the organism not present in conjunctiva can also cause secondary infection, as seen in our study.

The study has revealed Proteus in majority which itself is not a Normal resident flora in the conjunctiva, and also due to the Local decrease in Immunity due to a preceding Infection. As such the treatment for Epidemic Viral Conjunctivitis is Non-specific with mild decongestive and Lubricant drops to relieve discomfort and Antibiotic Drops to prevent secondary bacterial infection.

This study helps us to understand the extent of secondary infection in Epidemic Viral Conjunctivitis, and also the Pharmacological administration of Drugs in these cases need to be further evaluated.

Table 1 : Occupation of the Patients

Occupation	No.of Affected
1. House Wife	28% (28)
2. Student	18% (18)
3. Farmer	17% (17)
4. Mechanic	3% (3)
5. Businessman	16% (16)
6. Daily Wager	3% (3)
7. Auto Driver	6% (6)
8. Police Officer	1% (1)
9. Accountant	1% (1)
10. Potter	2% (2)
11. Tailor	1% (1)
12. Retired Person	4% (4)

Table 2 : Geographical Location of the Patients

Sl.No.	Location	No.of Patients
1.	Warangal	41% (41)
2.	Hanamkonda	34% (34)
3.	Mulugu	12% (12)
4.	Papaiahpet Chaman	2% (2)
5.	Peddammagadda	1% (1)
6.	Paginipalli	2% (2)
7.	Pallegadda	2% (2)
8.	Nandagiri	2% (2)
9.	Ghanpur	1% (1)
10.	Narsampet	2% (2)
11.	Station Ghanpur	1% (1)

Table 3 : Severity of Conjunctivitis :

Sl.No.	Severity	No.of Patients
1.	Mild	12% (12)
2.	Moderate	78% (78)
3.	Severe	10% (10)

Table 4 : Symptoms & Signs of the Patients

Sl.No.	Symptoms & Signs	No.of Patients
1.	Redness	100% (100)
2.	Watering (Serous)	100% (100)
3.	Discharge (Muco-purulent / Purulent)	30% (30)
4.	Pain	29% (29)
5.	Swelling of Eyelid	12% (12)
6.	Preauricular Lymphadenopathy	37% (37)

Table 5 : Percentage of Family Members Affected

Sl.No.	% of the Family Members affected	No.of Patients
1.	100%	21% (21)
2.	75%	12% (12)
3.	66%	16% (16)
4.	60%	3% (3)
5.	50%	19% (19)
6.	40%	2% (2)
7.	33%	12% (12)
8.	25%	11% (11)
9.	Misc. (1/8, 5/6, 4/7, 5/7)	4% (4)

Table 6 : Mode of Infection

Sl.No.	Mode of Infection	No.of Patients
1.	Travel	0% (0)
2.	Family Members	77% (77)
3.	Public or Work Place	23% (23)

REFERENCES

- Payne W J, Cole J R, Snoddy E L., et al. The eye gnat *Hippelates pusio* as a vector of bacterial conjunctivitis using rabbit as an animal model. *J Med Entomol.* 1977; 13:599-603.
- De Jong J, Wermenbol A, Verweij-Uijterwal. Adenovirus from human immunodeficiency virus infected individuals. *J Clin Microbiol.* 1999;37:3940-5
- Cheung et al. Epidemic kerato conjunctivitis. Do outbreaks have to be epidemic?. *Eye.* 2003;17:356-63.
- Fields Virology. David Mahan Knipe, Peter M. Haly, Lippincott Wilkins (2001)
- Sambursky R, Tauber S, Scherra F, et al. The RPS adenodetector for diagnosing adeno viral conjunctivitis. *Ophthalmology* 2006;(113);1758-64.
- Prepose JS. Ocular infection and immunity. St.Louis; Mosby; 1996
- Ford E, et al. Epidemiology of epidemic kerato conjunctivitis, *Epidemiol Rev.* 1987;9: 244-61.
- Mannis M J. Tasman W, Jaeger E A, . Duane's : Clinical Ophthalmology volume IV : Philadelphia: JB Lippincot : 1990: 5.3.7
- Friedlander MH. Immunology of Ocular Infections In : Friedlander MH,ed, Allergy and Immunology of the eye . Philadelphia: Harpes & Row, 1979; 12:10-20.
- Schmitz HR, Wigand R, Heimrich W. Worldwide epidemiology of human adenovirus infection. *Am. J Epidemiol* 1983; 117 : 455-66.
- Chatterjee S, Quarcopome CO, Apenteng A . An epidemic of acute conjunctivitis in Ghana, *Ghana Med J.* 1970: 9.9-11.

How to cite this article : Vijay K , Bharath G R, Anthony V. Etiological cause of Secondary Infection in Acute Conjunctivitis Epidemic at Regional Eye Hospital, Warangal. *Perspectives in Medical Research* 2017;5(3):43-46.

Sources of Support: Nil, Conflict of interest: None declared