

Original Article

ACUTE INFECTIVE CONJUNCTIVITIS A RETROSPECTIVE STUDY OF THE RECENT OUTBREAK REPORTED IN TERTIARY CARE CENTRE

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ABSTRACT

Objective: Acute conjunctivitis refers to the inflammation of conjunctiva, mostly of viral etiology and is highly contagious and self-limiting. The present study aims to assess the clinical characteristics, presentation, outcomes of acute conjunctivitis and its treatment for complications among the study population.

Methods: It was a record-based retrospective study conducted in a tertiary care teaching hospital in Puducherry for the period of two months among 100 study participants.

Results: The study showed that 62% and 16% of patients had complications like membrane formation and Superficial Punctate Keratitis (SPK). Moxifloxacin was highly used antibiotics (57%), with the median duration of the treatment being six days (IQR: 5 – 7.75).

Conclusion: From our study, we found that even though the conjunctivitis outbreak is widespread among the general population due to its contagious nature and is self-limiting, it requires medical attention to prevent complications. Public awareness is required regarding this

Keywords: Acute conjunctivitis, Antibiotics, Infection, Pink eye, Outbreak

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INTRODUCTION

Acute conjunctivitis (pink eye), refers to the inflammation of conjunctiva characterized by a reddening of the eye with associated with symptoms such as pain, itching, and foreign body sensation accompanied by tearing or discharge due to infection or allergic-induced in less than 14 d in duration [1-3].

Viral conjunctivitis, causing 75% of cases, is highly contagious and self-limiting [4]. It is usually caused by adenovirus and its serotypes [5-7]. While bacterial conjunctivitis, typically presents with moderate to severe redness, mucopurulent discharge and occasional matting of eyelids [2, 8]. The diagnosis is predominantly at the primary level with clinical examination and does not require laboratory investigations unless that impacts the vision or symptoms did not subside [1, 2, 8]. More notably, conjunctivitis is easily treatable, usually benign and self-limiting [2, 4, 8].

Conjunctivitis outbreaks are not being rare due to its contagious nature and its rapid spread in short duration [7, 9, 1]. As it also affects the basic daily activities and cause a surge in eye care institutes [3, 9, 1]. Most outbreaks are viral, leading to epidemic conjunctivitis that leads to continuous surveillance [11]. Many clinically unreported cases occur during outbreaks due to self-limiting capabilities and over-the-counter drugs [12, 13]. In Tamil Nadu and Puducherry, this condition is famously called as "Madras-eye", [12] and only few outbreaks were reported [3, 10, 12, 15]. But, in all reported literature disease outcome and its treatment were not clearly studied. With this background, our aim of the study was to assess the disease outcome in acute conjunctivitis among the study population. The objectives of the study were to assess acute conjunctivitis clinical characteristics, presentation, outcomes, and treatment for complications using antibiotics, steroids and antiviral among the study population.

MATERIALS AND METHODS

Study design and setting

It was a Record-based retrospective study conducted in the Department of Ophthalmology in a tertiary care hospital, in Puducherry. The study was done between the period of April 2024

to May 2024 and after the ethical approval from the Institutional Ethics Committee obtained.

Study participants

Inclusion criteria

The inclusion criteria for the study were patient of any age group, both sexes, including infants, pregnancy, and lactating mother, who presented with symptoms and signs of acute conjunctivitis either as mucopurulent discharge or with stickiness and treated in our tertiary care centre.

Exclusion criteria

Patients diagnosed with other ophthalmologic conditions, including pre-existing symptoms for more than seven days, acute loss of vision, wearing of contact lenses, use of systemic or local antibiotics within the previous two weeks, ciliary redness, eye trauma, and a history of eye surgery, other cause of red eye like trauma, inflamed pterygium, pinguela, angle closure glaucoma, dry eye disease were excluded from the study.

Sample size and sampling

Considering the etiological trends (75% of cases were of viral origin) of conjunctivitis found in the study by Woodland RM *et al.*, [16] among the population of a Southeast Asian country, at 95% confidence interval with 8.5% as the absolute precision, the sample size was 100.

Consecutive sampling technique was used to include all patient who attended Ophthalmology OPD with signs and symptoms of acute conjunctivitis were identified and included in study based on the criteria until the desired sample size.

Data collection procedure

A retrospective study was carried out by using the record of the patient who were diagnosed with acute conjunctivitis and treated in the Department of Ophthalmology. At inclusion of each patients record, principal investigator analysed the patient details, including history clinical examination and treatment. The demographic details

including age, sex, occupation, co-morbidities were taken. The common symptoms and ocular examination included the degree of redness (peripheral, whole conjunctiva, or whole conjunctiva and pericorneal), the presence of periorbital oedema, corneal lesions, the kind of discharge (watery, mucous, or purulent), and bilateral involvement (yes or no) pre-auricular node. Presence of membrane and Superficial Punctate Keratitis (SPK) were taken and considered as complication of acute conjunctivitis. The follow-up details of the patient were also be included.

Treatment for acute conjunctivitis during this outbreak were based on the patient's prescription and categorized as antibiotics, steroids, and other agents. The duration of treatment was also taken into account.

Ethical issues

The study was cleared by the Research Committee and Institutional Ethics Committee (Ref no: IEC No: EC/117/2024).

Data analysis

Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS) (Version 24.0) software. Data were analyzed for normality before analysis. Descriptive statistics were calculated

for all categorical variables and measured in terms of frequencies and percentages. Continuous variables which followed normal distribution were calculated and presented as mean and standard deviation (SD) or median with interquartile range (IQR). Data were analyzed based on the type of variables and the normal distribution between two groups. Categorical variables which follow nonparametric distribution were analyzed using Pearson's Chi-square test or two-tailed Fisher's exact test to test the significance of difference. Bivariate analyses were done to find out the determinants for the membrane and SPK development. The level of significance was set at 5% (P<0.05). The multiple coefficient of determination (R2) was used as a goodness-of-fit statistic for the model.

RESULTS

The mean age of the study participants was 39.67±21.28 y; among them 58% belong to age to group of 20 to 59 y and 61% were male patient. Of these 28% were students and 33% were daily wage workers while the rest of the other patients were employees (12%), housewife (15%), and retired (12%). About 53% of the patients belonged to middle class and 43% were in lower class of socioeconomic status in table 1.

Table 1: Sociodemographic characteristics of the study participants (N = 100)

Variables	n (%) or mean±SD
Age (in Years)*	
0-9 (Child)	6 (6.0)
10-19 (Adolescent)	17 (17.0)
20-59 (Adults)	58 (58.0)
≥ 60 y (Senior adults)	19 (19.0)
Sex	
Male	61 (61.0)
Female	39 (39.0)
Occupation	
Student	28 (28.0)
Daily wage	33 (33.0)
Employee	12 (12.0)
Housewife	15 (15.0)
Retried	11 (11.0)
Others	1 (1.0)
Socio-economic status	
Upper	4 (4.0)
Middle	53 (53.0)
Lower	43 (43.0)

*Age is categorised based on the WHO category. SD – Standard deviation

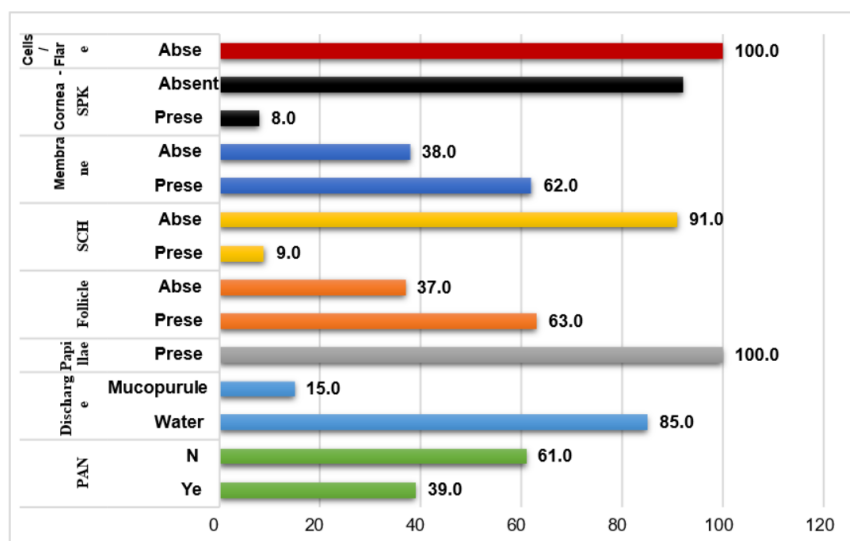


Fig. 1: Clinical characteristics of the conjunctivitis among the study participants (N = 100), *PAN – pre-auricular nodes; SCH-Subconjunctival hemorrhage; SPK-Superficial punctate keratitis

Among the study participants, 14% of patients had diabetes, and 17% patients had hypertension. As for the clinical characteristics of conjunctivitis, 8% of patients had SPK, 62% of them had membrane, SCH was present in 9%, 63% patients had follicle, and 39% had PAN. All (100%) patients had papillae. As for the discharge, 85% had watery type and the remaining 15% had mucopurulent type of discharge. Among 100 patients, 92% of patients had both eye (BE) diffuse type, while four patients (4%) presented with left eye (LE) diffuse type and one patient (1%) had LE temporal site. Of these patients, one patient (1%) had right eye (RE) diffuse type and two patients (2%) had RE nasal site. Among the study participants, 57% of patients were treated with moxifloxacin (0.5%) eye drops (E/D),

15% with E/D tobramycin (0.3%) and only 5% with E/D gatifloxacin (0.3%). While the rest of 8% patients had a combination moxifloxacin with nepafenac (0.1%) and 15% had moxifloxacin and loteprednol (0.5%) with eye ointment gancyclovir in case of SPK. The median duration of the treatment was six days (IQR: 5 – 7.75) and duration of each agent represented in (fig. 1). The treatment and its duration of conjunctivitis are presented in (fig. 2, table 2).

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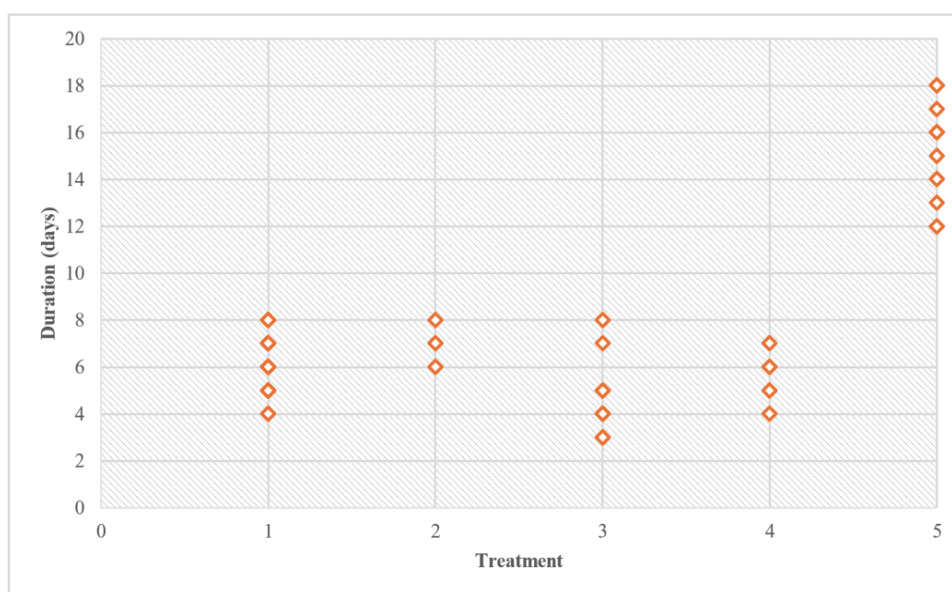


Fig. 2: Fig represents the treatment agents and its duration (N = 100), Treatment-1 - Moxifloxacin; 2 - Gatifloxacin; 3 - Tobramycin; 4 - Moxifloxacin+Nepafenac; 5 - Moxifloxacin+Loteprednol+Gancyclovir

Table 2: Association of duration of treatment with the other variables in the study population (N = 100)

Variables	Duration of treatment	p-value
Pregnancy and lactation		
Yes	5 (4 - 6)	0.047 ^a
No	6 (5 - 8)	
Children		
Yes	5 (3 - 7)	0.008 ^a
No	6 (5 - 8)	
Corneal involvement		
Yes	15.5 (12.25 - 16.75)	<0.001 ^a
No	6 (5 - 7)	
Treatment		
E/D Moxifloxacin 0.5%	6 (5 - 7)	<0.001 ^b
E/D Gatifloxacin 0.3%	7 (6 - 7.5)	
E/D Tobramycin 0.3%	4 (4 - 5)	
E/D Moxifloxacin+Nepafenac (0.1%) E/D Moxifloxacin+Loteprednol (0.5%)+E/Oint Gancyclovir	6 (5 - 6.75) 16 (13 - 17)	
Treatment types		
Antibiotics	6 (5 - 7)	<0.001 ^b
Antibiotics and steroids with antiviral agent	15.5 (12.75 - 16.25)	
Antibiotics with other agents	6 (5 - 7)	

^aMann-Whitney U test; ^bKruskal-Wallis test; p-value<0.05 was considered statistically significant and indicated in boldface. Antibiotics - Moxifloxacin, gatifloxacin, tobramycin; Antibiotics and steroids with antiviral agent - moxifloxacin+loteprednol+gancyclovir; Antibiotics with other agents - Moxifloxacin+nepafenac

It has been found that presence of membrane was not associated with any of the demographic features of the study population (p>0.05), while

presence of the pre-auricular node found to have statistically significance with the presence of membrane ($\chi^2 = 4.145$; p 0.042) (table 3).

Table 3: Association of the presence of membrane with co-morbidities and other ophthalmologic characteristics among the study participants (N = 100)

Variables	Present (n = 62) n (%)	Absent (n = 38) n (%)	χ^2 ; p value*
Diabetes			
Diabetic	8 (12.9)	6 (15.8)	0.163; 0.686
No-diabetic	54 (87.1)	32 (84.2)	
Hypertension			
Hypertensive	11 (17.7)	6 (15.8)	0.064; 0.801
Normotensive	51 (82.3)	32 (84.2)	
Pregnant and lactation			
Yes	4 (6.5)	4 (10.5)	0.531; 0.466
No	58 (93.5)	34 (89.5)	
Pre-auricular node			
Yes	29 (46.8)	10 (26.3)	4.145; 0.010
SCH	33 (53.2)	28 (73.7)	
Present	8 (12.9)	1 (2.6)	3.035; 0.042
Absent	54 (87.1)	37 (97.4)	

*Pearson's chi-square test; p-value<0.05 considered statistically significant and indicated in boldface.

In regression analysis, an association between presence of membrane (dependent variable) and independent variables were done and found that preauricular node (p 0.010) and SCH (p 0.042) were found statistically significant. Following this, we considered for

bivariate analysis and found that preauricular node was statistically significant for the development of membrane (p 0.009; 95% CI: 0.101 – 0.711) with the nagelkerke R² for the final model was 20.1 percentage in table 4.

Table 4: Bivariate and multivariate analysis of determinants of development of membrane among the patients with acute conjunctivitis (N = 100)

Variables	n(%)	Membrane (n = 62) n(%)	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Pre-auricular node				
Yes	39(39.0)	29 (46.8)	2.43 (1.02 – 6.08)	0.011 (1.34 – 9.81)
No	61(61.0)	33 (53.2)	1	1
Discharge				
Watery	85(85.0)	53 (85.5)	1.10 (0.33 – 3.43)	
Mucopurulent	15(15.0)	9 (14.5)	1	
Follicle				
Present	63(63.0)	41 (66.1)	1.41 (0.60 – 3.28)	
Absent	37(37.0)	21 (33.9)	1	
Subconjunctival hemorrhage (SCH)				
Present	9 (9.0)	8 (12.9)	5.41 (0.81 – 125.7)	
Absent	91(91.0)	54 (87.1)	1	
Corneal involvement – SPK				
Present	16(16.0)	11 (17.7)	1.41 (0.45 – 4.90)	
Absent	84(84.0)	51 (82.3)	1	

p-value <0.05 considered statistically significant and indicated in boldface; SPK-Superficial punctate keratitis.

DISCUSSION

In the present study, complication such as membrane and SPK were present in 62% and 8% of the study population. About 92% has bilateral diffuse type and 57% patients were treated with moxifloxacin and the overall median duration of the treatment was six days (IQR: 5 – 7.75).

The main clinical manifestation found in our study was the discharge and pre-auricular node, which corroborate findings done by Sundaramoorthy *et al.*, [15] in Puducherry. Similarly studies done by Chawla *et al.*, [3] Mohanasundaram *et al.*, [12] Madurapandian *et al.*, [14] and Prajna *et al.*, [10] also reported the similar symptoms among the patients with acute conjunctivitis during the outbreak. In our study papillae was present in all patients, and about 63% had follicle during the ocular examination. Similarly, Sundaramoorthy *et al.*, [15] also depicted the similar symptoms presented among the study participants. In 2017 Barbosa Junior *et al.*, proposed a diagnostic hypothesis that follicles that are forming in the inferior fornix are typically by the adenoviral conjunctivitis in adults combined with tearing and foreign body sensation [17]. In our study, Commonly follicles were found in the superior tarsal conjunctiva. Most of the outbreak were caused by viral origin, as the pooled result from Azari *et al.*, [8] showed that main etiological agent was virus.

The complication found in our study was the development of membrane (62%) and it was found that preauricular node was statistically significant for the development of membrane that suggestive of highly viral etiology. The mainstay of the treatment in such a condition is the removal of the membrane and antimicrobial treatment with or without steroid.

Since, conjunctivitis is self-limiting and within two to four weeks it heals naturally [2, 4, 7, 8, 19] moreover, in our study, pregnant and lactating mothers as well as the children had statistically significance (P value 0.047) and (P Value 0.008) respectively with the duration of treatment, implying that these patients had reduced duration of treatment. Moreover, in our study, it was found that diabetic patient did not have significant changes in duration or complication. Also in patients whose cornea were involved had longer duration of treatment and it was statistically significant (P Value<0.001) when compared to the those whose cornea not involved. Hence, patients were advised Antibiotics and steroid with antiviral agent or Antibiotics with NSAIDs in addition to routine treatment [8–11, 14, 15, 19]. Though, treatment with antibiotics might reduce the duration of conjunctivitis [9]. Overusing topical antibiotics might exacerbate allergies, drug toxicity, and/or microbial resistance. In our study, commonly used antibiotics was moxifloxacin (57%), and the mean duration of overall treatment was six days.

Another alternative therapy is topical steroids with antibiotic, while in our study only 15% of patients were treated with antibiotics with steroid combination who had membrane as a complication (93.8%). Thus, steroids are most commonly used to reduce the local inflammation and, alleviate the pain and reduce the complication such as membrane formation [8, 20].

CONCLUSION

The conjunctivitis outbreak is widespread among the general population due to its contagious nature, with treatment being mostly self-limiting and often not necessitating medical attention unless symptoms persisted. The primary manifestations observed during this outbreak included discharge, presence of papillae and follicles, and potential complications such as membrane development and SPK. However, addressing this requires public awareness to prevent future outbreaks and the establishment of a standardized protocol for early diagnosis to mitigate the risk of conjunctivitis.

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AUTHORS CONTRIBUTIONS

All authors have contributed equally

CONFLICT OF INTERESTS

Declared none

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