

Original research article

## To determine the bacteriological profile of acute conjunctivitis in cases in NMCH

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### Abstract

**Background:** Conjunctivitis is an inflammation of the outermost layer of the white part of the eye and the inner surface of the eyelid. Conjunctivitis is a global economic burden due to its common occurrence, contagiousness and potentially debilitating morbidities. Some reports indicate that 50-75% of acute conjunctivitis is caused due to the bacteria. In adults *Staphylococcus*, *S. pneumoniae* and *H. influenza* are the common pathogens causing bacterial conjunctivitis.

**Aim:** The aim of the present study to determine the bacteriological profile of acute conjunctivitis.

**Materials and Methods:** This prospective observational study was done the Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India, for 10 months. This is prospective observational study with evaluation of demographic factors, associated comorbid conditions and finding causative organism i.e. bacteria gram staining culture methods and biochemical reaction.

**Results:** Out of 100 cases high number of cases of acute conjunctivitis was seen in the age group of 25–35. A male preponderance is noted with 65 males and 35 females. According to our study acute conjunctivitis was observed 70 patients were from low socioeconomic status and 30 cases were from middle socioeconomic status. All 100 patients underwent Gram stain and bacterial culture out of 100, 71 patients was culture positive and other was negative. The most common organism isolated Coagulase positive staphylococci 43% followed *Klebsiella pneumoniae* with 13%, *Pseudomonas* 6%, *Diphtheroids* 3% and least *Alkaligenes fecalis* was 2%. Out of 100 patients 45 patients had a involvement of both eyes which is 45% and 55 patients had involvement of only one eye which is 55%.

**Conclusion:** we conclude, bacteriological evaluation of conjunctivitis provides to the ophthalmologist a working knowledge of the causal microbes, their common presentations, clinical course and antibiotic sensitivity patterns along with confirming the clinical diagnosis. It also helps to avert the use of inappropriate medications and reduce the risk of drug resistant strains. To achieve this end, public awareness particularly of conjunctivitis, its cause, routes of spread and medical management should be sought.

**Keywords:** Conjunctivitis, clinical presentation, risk factors, bacteria, microbiological profile, Gram stain

## Introduction

Pathogenic microorganisms cause diseases to the eyes due to their virulence and host's reduced resistance from many factors such as personal hygiene, living conditions, socio-economic status, nutrition, genetics, physiology, fever and age.<sup>1</sup> The areas in the eye that are frequently infected are the conjunctiva, lid and cornea.<sup>2</sup> In infections of the lids, the anterior lid margins show hyperemia, telangiectasis, and scaling. The scales are hard and brittle and tend to be centered on the bases of the lashes. When removed they may leave behind a tiny bleeding ulcer. In severe cases the lashes may become matted down by yellow crust. Spread of the infection to the glands of Zeis and Moll may give rise to an acute external hordeolum (stye) and spread to the meibomian glands may give rise to an internal hordeolum. Conjunctivitis presents with an acute onset of redness, grittiness, burning and discharge. Photophobia may be present if there is associated severe punctate epitheliopathy or peripheral corneal infiltrates. On waking in the morning, the eyelids are frequently stuck together and difficult to open as a result of the accumulation of exudates during the night. Both eyes are usually involved; although one may become affected before the other.<sup>3</sup> Visual acuity is usually normal in the absence of severe punctate epitheliopathy. In 78-80% of infectious conjunctivitis cases, infection is initiated by bacteria.<sup>4</sup> Bacterial agents play a central role in the development of infectious conjunctivitis, especially in children.<sup>5</sup> The major bacterial causes of conjunctivitis are *Staphylococcus*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*.<sup>6</sup> Bacterial conjunctivitis epidemics often occur in winter and early spring.<sup>3</sup> If conjunctivitis is caused by viral or bacterial agents, the infection can become contagious. Accurate diagnosis of the type of infection and its etiologic factors and prescription of suitable antibiotics may shorten the duration of the disease as well as transmission time.<sup>6</sup> Prevalence and etiology of acute bacterial conjunctivitis varies from place to place, even within the same country owing to geographical, cultural and socioeconomic variation.<sup>7,8</sup> Till now no data is available regarding pattern of bacteriological flora of acute bacterial conjunctivitis in north-east Indian population. Studies evaluating association of different organisms and complications of acute bacterial conjunctivitis is not reported till date. The north-east Indian region needs a separate investigation as this area is very humid, rains heavily, its typical geographic location, wide temperature variation, predominance of low and middle socioeconomic class of people, ethnic and socio-cultural variation as compared to mainstream India. Again antibiotic sensitivity pattern of the organisms (conjunctival swab culture) in this region is also unknown. Acute conjunctivitis has a symptoms of less than 3 to 4 weeks of duration. Some reports indicate that 50-75% of acute conjunctivitis are caused due to the bacteria.<sup>9</sup> The disease lasts for 7 to 10 days. Clinical features seen in bacterial conjunctivitis include red eye, chemosis and discharge which can be mucopurulent or purulent. Hence the aim of the present study to determine the bacteriological profile of acute conjunctivitis.

## Material and methods

This prospective observational study was done in the Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India, for 10 months. After taking the approval of the protocol review committee and institutional ethics committee. After taking informed consent detailed history was taken from the patient or relatives. Total 100 patients with clinically diagnosed conjunctivitis were selected for the study. Clinical data and Conjunctival swabs collected by standard method. Duration of less than 15 days was considered acute conjunctivitis. Patients with history of previous medication for similar complaints in the immediate past and trachoma and allergic conjunctivitis cases were excluded from the present study. A standard questionnaire is completed for each patient to evaluate the following-demographic factors, medical history, occupational and allergic histories, past and family histories, characteristics of the patient's ocular complaints, any previous diagnostic studies

undertaken, the clinical diagnosis and treatment. A complete external examination of each eye including lids, conjunctiva, cornea, preauricular and submandibular lymph nodes, slit lamp biomicroscopy of the anterior segment, application of Fluorescein to the ocular surface and Schirmer's test where needed. Condition of the lids is noted for any evidence of oedema, blepharitis, mucous crusts, madarosis, tylosis, trichiasis, ectropion, etc. The samples are first directly inoculated onto selective media like Blood agar, Chocolate agar and McConkey's medium. Bacteria are then identified on the basis of cultural characteristics and bio-chemical tests.

### Results

Out of 100 cases high number of cases of acute conjunctivitis was seen in the age group of 25–35. Second age group observed for the cases of acute conjunctivitis is 35-45 years and above. Age group of below 25 years shows less no of cases. Male preponderance is observed in all age groups.

**Table 1: Demographic Profile of Patients**

	Male	Female	Total
<b>Age</b>			
Below 25 years	6	2	8
25-35	32	20	52
35-45	17	8	25
Above 45	10	5	15
Total	65	35	100
<b>Socioeconomic status</b>			
low socioeconomic	44	26	70
middle socioeconomic	21	9	30
	65	35	100

A male preponderance is noted with 65 males and 35 females. According to our study acute conjunctivitis was observed in low socioeconomic patients as compare to middle socioeconomic status. Total 70 patients were from low socioeconomic status and 30 cases were from middle socioeconomic status.

**Table 2: Bacterial isolates in acute conjunctivitis**

Bacterial species	No. =100	Percentage
<i>Coagulase positive staphylococci</i>	43	43
<i>Klebsiella pneumoniae</i>	13	13
<i>Pseudomonas aeruginosa</i>	6	6
<i>Haemophilus species</i>	4	4
<i>Diphtheroids</i>	3	3
<i>Alkaligenes fecalis</i>	2	2
Total	71	71

All 100 patients underwent Gram stain and bacterial culture out of 100, 71 patients was culture positive and other was negative.

In the present study, the most common organism isolated Coagulase positive staphylococci 43% followed Klebsiella pneumoniae with 13%, Pseudomonas 6% , Diphtheroids 3% and least Alkaligenes fecalis was 2% .

**Table 3: Involvement of the eyes**

Involved eye	Number of patients =100	Percentage
LE	35	35
RE	20	20
BE	45	45

Out of 100 patients 45 patients had a involvement of both eyes which is 45% and 55 patients had involvement of only one eye which is 55%.

**Table 4: complications in acute conjunctivitis**

Signs/complications	Number of patients 100	Percentage
Lid Edema	86	86
Matting eyelashes	40	40
Conjunctival congestion	100	100
Conjunctival chemosis	22	22
Petechial Hemorrhage	84	84
Conjunctival follicles	80	80
Conjunctival papillae	34	34
Pseudomembrane	3	3
Corneal sensation	86	86
Preauricular lymphadenopathy	44	44
<b>Complications</b>		
Punctate keratitis	8	8
Corneal ulcer	6	6

Complications like Petechial haemorrhages were seen in 84(84 %) of the cases while Punctate keratitis was seen in 8(8%). All the cases presented with red eyes, conjunctival congestion is seen in all the cases, lid oedema in 86(86%) cases, matting of eyelashes in 40(40%) cases and preauricular lymphadenopathy in 44(44%) cases , Conjunctival follicles 80(80%) cases and Corneal sensation was present in 86(86%) cases .

### Discussion

Conjunctivitis is one of the various infectious diseases that are easily contacted by newborns and elderly individual under poor hygienic conditions. Acute bacterial conjunctivitis typically presents abruptly with red eye and purulent drainage without significant eye pain, discomfort, or photophobia. Visual acuity does not typically decrease unless large amounts of discharge intermittently obscure vision. In our study out of 100 cases of acute conjunctivitis 52 cases were seen in the age group of 25-35. This age group is more susceptible as this age group is the mainly earning group and active also, they are more exposed to the pathogens. The age group of 35-45 had second highest number of positive culture. The age group of below 25 shows lowest no of cases. Close findings were recorded by Li et al. in a study conducted in a Beijing, China, shows that people of 18-40 years old are at high risk to be infected with acute conjunctivitis, health education on how to avoid catching this disease should be encouraged among them.<sup>10</sup> Total 65 male patients were seen in our study which is 65 % and 35 female patients were seen which is 35%. Similar findings were noted by K. aoki et al, that out of One hundred two patients he studied 62 were men which is 60.7% and 40 were women which is 39.35%.<sup>11</sup> The number of male patients is more as they are involved in outdoor activities and physical activities.

In our study out of 100 patients 45 patients had a involvement of both eyes which is 45% and 55 patients had involvement of only one eye which is 55%. The involvement of only one eye is seen which can be due to that the patient visit the OPD before the involvement of the other eye. A study conducted by Mini P. Singh, Jagat Ram,<sup>12</sup> Archit Kumar, Tripathi Rungta, Amit Gupta,<sup>13</sup> Jasmine K. et al showed that conjunctivitis was unilateral in 12 patients (52.2%) and

bilateral in 11 patients (47.8%).<sup>13</sup> In our study out of 100 patients 44 patients had preauricular lymphadenopathy which is 44% and 56 patients had no preauricular lymphadenopathy which is 56 %. A similar finding was noted in a study done by Balasopoulou et al. which shows that out of 231 cases of conjunctivitis preauricular lymphadenopathy was evident in 125 cases which is 54.2%.<sup>14</sup> According to our study acute conjunctivitis was observed in low socioeconomic patients as compare to middle socioeconomic status. Total 70 patients were from low socioeconomic status which is 70 % and 30 cases were from middle socioeconomic status which is 30%. A study done by Pruthu Thekkur, Mahendra M Reddy, Bijaya Nanda Naik, Subitha L, Sitanshu Sekhar Kar in South India also shows that out of 3193 patients 2666 patients were from low socioeconomic status which is 83.5%.<sup>15</sup>

In the present study, the most common organism isolated Coagulase positive staphylococci 43% followed Klebsiella pneumoniae with 13%, Pseudomonas 6%, Diptheroids 3% and least Alkaligenes fecalis was 2%. Okesola A O et al at Nigeria revealed Bacterial pathogens in 93.7% conjunctival samples. About one third were *Staphylococcus aureus*, approx 10% Coagulase- negative staphylococci, 22(6.4%) *Pseudomonas aeruginosa*, 11(3.2%) *Escherichia coli*, 7(2.1%) Klebsiella species, 5(1.5%) *Streptococcus pneumoniae*, 4(1.2%) *Haemophilus influenzae*, 1(0.3%) *Proteus mirabilis*, and 1(0.3%) *Neisseria gonorrhoeae*. The maximum of conjunctivitis were found among infants and children (0-10years).<sup>16</sup> The rate of isolation of Coagulase positive staphylococcus is 43% in the present study. The rate in other studies varies from 8.0% to 72.5%.<sup>17-20</sup> Acute infective conjunctivitis is a common presentation in primary healthcare. It is usually a mild condition and serious complications are rare. Clinical signs are a poor discriminator of bacterial and viral causes. Studies of treatment show that there is a high rate of clinical cure without any treatment. Treatment with topical antibiotics improves the rate of clinical recovery and this is more marked in the first 2-5 days after presentation, but less by 6-10 days. Studies comparing treatment with different antibiotics do not demonstrate that any one antibiotic is superior; the choice of antibiotic should be based on consideration of cost and bacterial resistance.<sup>21</sup>

Patients suffering from bacterial conjunctivitis should be advised not to touch their eyes with hands. In order to prevent the transmission of the disease it is very important to educate patients about their infectious nature and the importance of finishing their antibiotic regimen. Patients should also change their towel and wash cloth daily and should not share them with others. Patients must follow their ophthalmologist's instructions on proper contact lens care.

### Conclusion

We conclude, bacteriological evaluation of conjunctivitis provides to the ophthalmologist a working knowledge of the causal microbes, their common presentations, clinical course and antibiotic sensitivity patterns along with confirming the clinical diagnosis. It also helps to avert the use of inappropriate medications and reduce the risk of drug resistant strains. To achieve this end, public awareness particularly of conjunctivitis, its cause, routes of spread and medical management should be sought.

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