

Study of Micro-Organism's Isolation from Acute Bacterial Conjunctivitis: Study of Bacteriological Profile

Pragya Rai¹, Sujata Kumari², Kumar Nishant³, Nageshwar Sharma⁴

¹Senior Resident, Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India

²Senior Resident, Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India

³Senior Resident, Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India

⁴Associate Professor and Head, Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India

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Corresponding author: Dr. Sujata Kumari

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Abstract

Aim: The aim of the present study to determine the bacteriological profile of acute conjunctivitis. **Methods:** This prospective observational study was done the Department of Ophthalmology, Patna 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:** All 90 patients underwent Gram stain and bacterial culture out of 90, 65 patients were culture positive and other was negative. In the present study, the most common organism isolated Coagulase positive staphylococci 44.44% followed Klebsiella pneumoniae with 12.22%, Pseudomonas 5.56%, Diptheroids 3.33% and least Alkaligenes fecalis was 2.22%. Out of 90 patients 40 patients had a involvement of both eyes which is 44.44% and 50 patients had involvement of only one eye which is 55.56%. Complications like Petechial haemorrhages were seen in 78(86.67 %) of the cases while Punctate keratitis was seen in 7(7.78%). All the cases presented with red eyes, conjunctival congestion is seen in all the cases, lid oedema in 80(88.89%) cases, matting of eyelashes in 34(37.78%) cases and preauricular lymphadenopathy in 39(43.33%) cases, Conjunctival follicles 75(83.33%) cases and Corneal sensation was present in 80(88.89%) cases. **Conclusion:** The 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

Keywords: Conjunctivitis, Clinical Presentation, Risk Factors, Bacteria, Microbiological Profile, Gram Stain.

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Introduction

The conjunctiva as described is a transparent membrane, which is attached to

the sclera at the margins of the cornea, with which it blends. It is loosely attached over

the anterior part of the sclera and thence reflected to the inner surface of the eyelids[1]. It is firmly attached to the tarsal plates and blends with the skin at the margin of the lids. The conjunctival sac in normal newborns is usually sterile at birth and becomes contaminated soon afterward by organisms either saprophytic or parasitic in nature. In such cases, it is referred to as conjunctivitis. Just about the time that the Apollo II space ship hit the moon surface in July, 1969, this eye disease conjunctivitis hit Accra, Ghana and in line with the tropical African sense of humour, the people of Accra named the eye disease Apollo as it was believed that the disease was brought to earth by Apollo II astronauts[2]. Conjunctivitis, commonly known as pink eye is characterized by infection and redness of the conjunctiva with clear to purulent discharge, swelling of the eyelid and itching, which usually indicate allergic conjunctivitis. In the bacteria form, a crust of sticky mucopurulent discharge is present. Upper respiratory infection and fever may be associated with conjunctivitis particularly when due adenovirus type 3 or 7. Allergic conjunctivitis may be associated with the seasonal rhinitis of hay fever[3].

Visual acuity is usually normal in the absence of severe punctuate epitheliopathy. In 78-80% of infectious conjunctivitis cases, infection is initiated by bacteria[4]. Bacterial agents play a central role in the development of infectious conjunctivitis, especially in children[5]. The major bacterial causes of conjunctivitis are *Staphylococcus*, *Streptococcus pneumoniae*, and *Haemophilus influenza*[6]. Bacterial conjunctivitis epidemics often occur in winter and early spring[3]. 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[6]. Prevalence and etiology of acute bacterial conjunctivitis

varies from place to place, even within the same country owing to geographical, cultural and socioeconomic variation[7]. 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 symptom of less than 3 to 4 weeks of duration. Some reports indicate that 50-75% of acute conjunctivitis is caused due to the bacteria. 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. The incubation period is 1-7 days. The communicability is 2-7 days. The aim of the present study to determine the bacteriological profile of acute conjunctivitis.

Material and methods

This prospective observational study was done the Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India, for 10 months after taking the approval of the protocol review committee and institutional ethics committee. Total 90 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 bio-microscopy 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 90 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
Age			
Below 25 years	6	2	8
25-35	29	17	46
35-45	16	7	23
Above 45	9	4	13
Total	60	30	90
Socioeconomic status			
low socioeconomic	40	20	60
middle socioeconomic	20	10	30
	60	30	90

A male preponderance is noted with 60 males and 30 females. According to our study acute conjunctivitis was observed in low socioeconomic patients as compared to

middle socioeconomic status. Total 60 patients were from low socioeconomic status and 30 cases were from middle socioeconomic status.

Table 2: Bacterial isolates in acute conjunctivitis

Bacterial species	No. =90	Percentage
<i>Coagulase positive staphylococci</i>	40	44.44
<i>Klebsiella pneumonia</i>	11	12.22
<i>Pseudomonas aeruginosa</i>	5	5.56
<i>Haemophilus species</i>	4	4.44
<i>Diphtheroids</i>	3	3.33
<i>Alkaligenes fecalis</i>	2	2.22
Total	65	72.22

All 90 patients underwent Gram stain and bacterial culture out of 90, 65 patients were culture positive and other was negative. In the present study, the most common organism isolated Coagulase positive

staphylococci 44.44% followed *Klebsiella pneumoniae* with 12.22%, *Pseudomonas* 5.56%, *Diphtheroids* 3.33% and least *Alkaligenes fecalis* was 2.22%.

Table 3: Involvement of the eyes

Involved eye	Number of patients =90	Percentage
LE	25	27.78
RE	25	27.78
BE	40	44.44

Out of 90 patients 40 patients had an involvement of both eyes which is 44.44%

and 50 patients had involvement of only one eye which is 55.56%.

Table 4: complications in acute conjunctivitis

Signs/complications	Number of patients 90	Percentage
Lid Edema	80	88.89
Matting eyelashes	34	37.78
Conjunctival congestion	90	100
Conjunctival chemosis	19	21.22
Petechial Hemorrhage	78	86.67
Conjunctival follicles	75	83.33
Conjunctival papillae	30	33.33
Pseudomembrane	2	2.22
Corneal sensation	80	88.89
Preauricular lymphadenopathy	39	43.33
Complications		
Punctate keratitis	7	7.78
Corneal ulcer	5	5.56

Complications like Petechial haemorrhages were seen in 78(86.67 %) of the cases while Punctate keratitis was seen in 7(7.78%). All the cases presented with red eyes, conjunctival congestion is seen in all the cases, lid oedema in 80(88.89%) cases, matting of eyelashes in 34(37.78%) cases and preauricular lymphadenopathy in 39(43.33%) cases, Conjunctival follicles 75(83.33%) cases and Corneal sensation was present in 80(88.89%) cases.

Discussion

Conjunctivitis is one of the various infectious diseases that are easily contacted by newborns and elderly individual under poor hygienic conditions[8]. This is why the diseases are sometimes seen as an indication of possible outbreak of an infectious disease and an increase should therefore be of serious concern[9]. In our study out of 90 cases of acute conjunctivitis 46 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 cultures. 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[10]. Total 60 male patients were seen in our study which is 66.67 % and 30 female patients were seen which is 33.33%. 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[11]. The number of male patients is more as they are involved in outdoor activities and physical activities.

In our study Out of 90 patients 40 patients had an involvement of both eyes which is

44.44% and 50 patients had involvement of only one eye which is 55.56%. 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[12], Archit Kumar, Tripti Rungta, Amit Gupta[13], Jasmine K. et al showed that conjunctivitis was unilateral in 12 patients (52.2%) and bilateral in 11 patients (47.8%)[13]. In our study out of 90 patients 39 patients had preauricular lymphadenopathy which is 43.33% and 51 patients had no preauricular lymphadenopathy which is 56.67 %. 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%[14]. According to our study acute conjunctivitis was observed in low socioeconomic patients as compare to middle socioeconomic status. Total 60 patients were from low socioeconomic status which is 66.67 % and 30 cases were from middle socioeconomic status which is 33.33%. 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%[15].

In the present study, the most common organism isolated Coagulase positive staphylococci 44.44% followed Klebsiella pneumoniae with 12.22%, Pseudomonas 5.56%, Diptheroids 3.33% and least Alkaligenes fecalis was 2.22%. Okesola A O et al. in 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)[16]. 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%[17-20]. 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[21]. 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

The study concluded that 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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