

CONJUNCTIVITIS AS SEEN IN ILE-IFE

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SUMMARY

Objective: To survey the clinical pattern of conjunctivitis with the aim of identifying the etiologic agents of bacterial conjunctivitis and their antimicrobial sensitivity pattern.

Method: Patients with clinical features of conjunctivitis form the cohort of this study. A retrospective study of 3,872 patients seen at the eye clinic of the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, between January 1997 and December 2000 was undertaken. Of these, 689 patients (17.8%) had conjunctivitis. Those diagnosed as having infective conjunctivitis had conjunctival swabs taken for microscopy, culture and sensitivity tests, and were investigated by standard microbiological methods.

Results: Out of a total of 3,872 new patients seen over a 3-year period, 689 (17.8%) presented with conjunctivitis. Of these, allergic conjunctivitis was the most common type, seen in 580 patients (84.2%), followed by acute bacterial conjunctivitis in 98 patients (14.2%), while conjunctivitis secondary to physical trauma and toxic etiologies were seen in 8 (1.2%) and 3 (0.4%) patients respectively. Thirty-three patients (33.6%) with infective (acute bacterial) conjunctivitis had laboratory confirmed positive culture results. Thirteen patients (13.3%) developed complications such as corneal ulceration 9 (9.2%) and perforation 4 (4.1%) before they presented at the hospital. Most of the bacterial isolates were sensitive to third generation cephalosporin, especially ciprofloxacin (89.8%-97.8% sensitivity).

Conclusion: Conjunctivitis due to allergy and infective causes is a major cause of ocular morbidity. The high sensitivity of the isolates to ciprofloxacin (89.8-97.8%), chloramphenicol (68.9%), and gentamicin (84.9%), supports the appropriateness of using these drugs as first line drugs in the management of bacterial conjunctivitis. Corneal ulceration (9.2%) and perforation (4.1%) are major causes of ocular morbidity and

blindness (6.1%), among patients with conjunctivitis as seen in Ile-Ife. There is a need for public eye health education and early referral of all cases of eye infections to an eye specialist to prevent blinding complications.

Key Words: conjunctivitis, acute, aetiology and treatment

INTRODUCTION

Conjunctivitis is an inflammation of the conjunctiva, characterized by redness and often accompanied by a discharge. An Egyptian papyrus in 155 B.C. gave an accurate description of the cardinal signs of conjunctivitis (redness, secretion and oedema) and provided topical remedies for its various forms.¹ The anonymous pre-Alexandrian Greek physician at the Hippocratic School described several forms of conjunctivitis including taraxis or mild mucopurulent conjunctivitis, psorophthalmia or ulcerative blepharoconjunctivitis.^{1,2} It varies in severity from a mild hyperemia with tearing as in hay fever conjunctivitis to a severe necrotic process as seen in membranous conjunctivitis.

The conjunctiva is exposed to many microorganisms and other noxious substances either by accident or design because of its location. The source of the offending agent or substances may be exogenous or endogenous; however it has both a specific and non-specific immunologic system to protect it and thus limit infection.^{3,5} Physical protection to the conjunctiva is provided by the blinking reflex, complemented by bacteriostatic factors in the tears. Among such factors are lactoferrin, lysozyme and a non-lysozyme antibacterial agent. The bactericidal and antiviral activities of tear secretion are enhanced in the acute inflammatory state by the exudation of such plasma proteins as C-reactive protein, properdin, interferon and

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transferring.³ Furthermore tears contain appreciable amounts of IgA and IgG and complements.^{4,6} Most of the IgA has an attached secretory piece and recent studies indicate that this component is formed by the lacrimal gland epithelium.⁷

There are many causes of conjunctivitis. Viruses are the most common cause. Other causes include bacteria, Chlamydia, fungus, and rarely, parasitic agents. Bacteria are an uncommon cause of conjunctivitis. Conjunctivitis is also caused by allergies (allergic conjunctivitis), chemical exposure, and certain systemic diseases. Bacteria in the birth canal can infect newborns. This condition is called ophthalmia neonatorum, and it must be treated immediately to preserve sight. Use of contact lenses, particularly extended-wear lenses, can cause conjunctivitis.

Though, the global incidence of conjunctivitis is not known, reports from various studies in Nigeria have revealed significant differences in the pattern of conjunctivitis.⁸⁻¹¹ Magulike and Ezepeue in their study on childhood blindness reported that ophthalmia neonatorum was responsible for about 6.7% of all cases of blindness due to corneal diseases,¹² while Abiose reported that 27.4% of the children in her study had bacterial conjunctivitis.¹³ There had been several reports on various aetiologic types of conjunctivitis in different communities,^{9, 14-17} only a few of these discussed the antimicrobial sensitivity pattern in conjunctivitis.^{18, 19}

A definitive review of the antimicrobial sensitivity pattern of all cases of bacterial conjunctivitis, with the aim of assessing the relevance and suitability of our current treatment regime is needed.

MATERIALS AND METHODS

The medical records of 3,872 patients seen consecutively at the Eye Clinic of Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, between January 1997 and December 2000 were reviewed. The following information from the medical records were considered relevant; demographic and occupational status, prior medication, past medical and surgical history, clinical features and diagnosis, laboratory investigation, treatment and clinical outcome.

In this study, conjunctivitis was diagnosed based on the patient's symptoms: eye discharge, redness, irritation or itching in either one or both eyes. Information on previous use of antibiotics, traditional eye medication, foreign body insertion, contact with irritants, and recent history of acute ocular infection or possibility of administration of human urine was also documented.

In addition, conjunctivitis was categorized as allergic, infective, toxic or traumatic. Presenting symptoms and the nature of the ocular discharge were used in classification. The frequency of conjunctivitis in the various age groups was determined.

Those with a diagnosis of ocular infection had their conjunctival swabs collected for microscopy, culture and sensitivity test and were investigated by standard microbiological methods. The data collected were analysed by simple proportion and distribution using the software package SPSS version 10.

RESULTS

During the 3-year study period, a total 689 (17.8%) out of 3,872 eye patients were diagnosed with acute conjunctivitis. There were 291 (42.2%) males and 398 females (57.8%) with a male to female ratio 1 : 1.4. The age range was 5 days to 89 years; the mean age was 12.5 ± 5.6 years (SD). Table 1 shows the age and sex distribution of patients with acute conjunctivitis. The majority of the conjunctivitis patients 336 (48.8%) were between the second and third decades of life. About one-fifth, 138 (19.8%) were below 10 years, while 145 (20.9%) were 40 years and above.

Table 1. Age and sex distributions of 689 patients with acute conjunctivitis

Age (Yrs)	No of Males		No. of Females		Total	
	No	%	No	%	No	%
0-9	71	(10.3)	67	(9.5)	138	(19.8)
10-19	83	(12.1)	107	(15.5)	190	(27.6)
20-29	60	(8.7)	86	(12.5)	146	(21.2)
30-39	20	(2.9)	50	(7.3)	70	(10.2)
40-49	25	(3.6)	37	(5.4)	62	(9.0)
50-59	11	(1.6)	24	(3.5)	35	(5.1)
60-69	15	(2.2)	18	(2.6)	33	(4.8)
70-79	5	(0.7)	6	(0.9)	11	(1.5)
80-89	1	(0.1)	3	(0.4)	4	(0.5)
Total	291	(42.2)	398	(57.8)	689	(100.0)

The most frequent type of conjunctivitis was allergic conjunctivitis 580 (82.4%) followed by conjunctivitis due to infection 98 (14.2%) while traumatic and toxic causes account for 8 (1.2%) and 3 (0.4%). There was a statistically significant preponderance of females (59.1%) among those with allergic conjunctivitis (P value = 0.002). The aetiology of acute conjunctivitis is as shown in table 2.

Table 2. Aetiological diagnosis of acute conjunctivitis in 689 patients

Aetiology	Frequency			Total	
	Male	Female	%	No.	%
Allergic	237	343	(49.8)	580	(84.2)
Infective	47	51	(7.4)	98	(14.2)
Traumatic	6	2	(0.3)	8	(1.2)
Toxic	1	2	(0.3)	3	(0.4)
Total	291	398	(57.8)	689	(100.0)

Figure 1 shows the periodicity of presentation in those with allergic conjunctivitis. Majority of cases presented between April and September of each year except in 2000 where presentation in the last quarter of the year was also high. The presenting clinical features of allergic conjunctivitis recorded include itching of the eye 537 patients (92.6%), conjunctiva hyperemia and edema 517 (89.2%) and lacrimation 501 (86.4%).

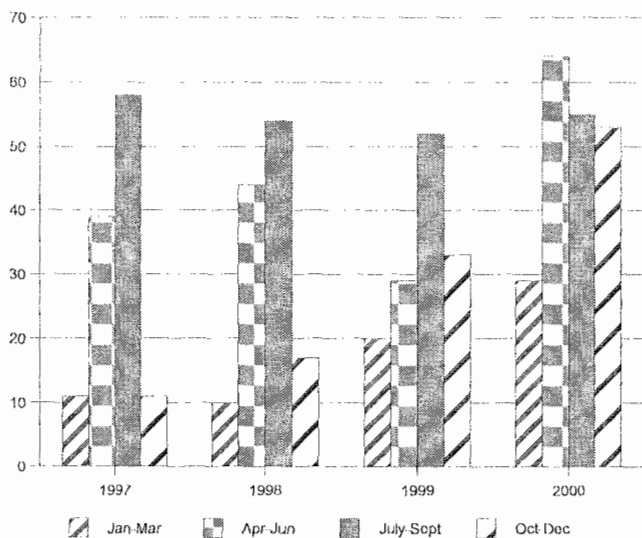


Figure 1. Seasonal distribution of allergic conjunctivitis

In our study, 98 patients (14.2%) who presented with conjunctivitis had infections. Bacteriological studies were done on 38 (38.9%) of these patients who presented with purulent conjunctivitis before beginning of any form of therapy. The results of the bacteriological test were positive in 33 (33.6%) patients, while 5 (5.6%) had no organisms. Ocular infection is common between the first and fourth decades of life, with a mean age of 23 years \pm 3.7 years (SD). Most of those who had positive culture results, 8 (24.3%) were between the age range of 0-9 years while 9 (27.2%) were 40 years and above. Sixty patients did not have bacteriologic studies.

Causative organisms in bacterial conjunctivitis are shown in table 3. Gram-positive cocci (*Staphylococcus aureus* and *Streptococcus pneumoniae*) were commonly isolated as pathogens; these accounted for 51.5% of the isolates followed by gram-negative rods. *Neisseria gonorrhoea* (30.3%) and gram negative cocci (15.2%). Hemolytic *Streptococci* and *Streptococcus pneumoniae* accounted for about 9.8% and 12.8% of all cases seen.

When the duration of presentation was considered, 83 (84.7%) patients with conjunctivitis presented after one week of onset of ocular infections, only 15 (15.3%) presented within a week. Most of them 95 (96.9%) had

used all sorts of medication including chloramphenicol ointment or drops and traditional medicine before presenting to the hospital.

Table 3. Causative organisms in bacterial conjunctivitis

Organisms	Frequency	(%)
<i>Neisseria gonorrhoea</i>	5	(15.2)
<i>E. Coli</i>	8	(24.2)
<i>Haemolytic streptococcus</i>	3	(9.1)
<i>Streptococcus aureus</i>	10	(30.3)
<i>Streptococcus pneumoniae</i>	4	(12.1)
<i>Haemophilus influenzae</i>	3	(9.1)
<i>Anaerobes</i>	-	-
Total	33	(100)

Thirteen patients (13.3%) developed complications such as corneal ulceration 9 (9.2%) and perforation 4 (4.1%) before they presented at the hospital. All the patients who developed complications presented late and had all used various medications before presenting at the hospital. Six of these (6.1%) eventually went blind in the affected eye. Two patients (2.0%) were bilaterally blind following conjunctivitis due to delayed hospital presentation and prior use of toxic traditional medicine containing human urine 1 (1.2%) and cassava juice 1 (1.2%).

The species and antibiotic sensitivity pattern of isolates is as shown in table 4. Most of the bacterial isolates were sensitive to the third generation cephalosporin especially ciprofloxacin (89.8%-97.8% sensitivity). *E. coli* was also sensitive to gentamycin (84.9% sensitivity). *Staphylococcus aureus*, the most common pathogen, was only sensitive to ciprofloxacin (92.9% sensitivity) and chloramphenicol (68.9% sensitivity). The results were based on standard sensitivity identification methods.²¹

DISCUSSION

This study reveals that allergic conjunctivitis is the most common aetiological type of ocular inflammation seen in Ile-Ife. Reports from northern Nigeria, however, revealed that Chlamydia infection is of major epidemiological significance. It is the major cause of ocular morbidity and blindness in the north.¹⁴ None of the patients in the Ile-Ife study tested positive for Chlamydia. It was noted, however, that routine examination of the specimen from conjunctival scrapings or swabs is not carried out in the hospital except on special request. It is likely that Chlamydia organisms could have been isolated if routine screening were done and specimens from more patients were examined. Most of the other organisms are not difficult to diagnose in the laboratory, especially if the necessary

reagents are available. The examination of conjunctival scrapings, however, rather than conjunctival swabs, yields more reliable results.

Previous studies have documented that allergic conjunctivitis is the most frequent presentation of ocular inflammation.^{10,22} Seasonal variation in acute conjunctivitis has been observed with the incidence peaking in the late summer to fall among neonates in Atlanta, Georgia and in the spring and autumn among children and adults in northern Egypt.^{23,24} In our study the incidence of acute allergic conjunctivitis increases from March through August each year; this corresponds to the pollination season. This is in consonance with other studies in Nigeria,^{25, 26} but at variance with a report by Endrel,²⁷ though this may not be unconnected with the difference in environment and populations studied. Common presenting clinical features of allergic conjunctivitis are largely due to histamine release in the course of the allergic reaction. There is a statistically significant female preponderance among patients with allergic conjunctivitis. Frequent use of hair styling chemicals, various types of body cream and eyelid pencils by females could explain the significant difference noted. Contributions from other factors, however, should be explored.

Table 4. Percentage antibiotic sensitivity pattern of bacterial isolates

Antibiotic	<i>E. coli</i> (% R)	<i>N. gonorrhoea</i> (% R)	Haemolytic Strept (%R)	<i>S. pneumoniae</i> (%R)	<i>S. aureus</i> (% R)
Chloramphenicol	30.2	0.6	11.3	6.4	68.9
Gentamicin	84.9	13.7	12.9	15.6	30.4
Ampicillin	-	-	-	12.3	14.6
Streptomycin	36.2	-	-	-	-
Ciprofloxacin	97.8	89.8	89.3	94.8	92.9
Penicillin G	-	56.4	-	-	26.4
Methicillin	14.6	-	-	-	23.8
Cotrimoxazole	-	-	-	0.3	0.7
Nitrofurantoin	-	-	-	-	-
Erythromycin	-	-	-	-	32.3
Carbenicillin	-	-	-	-	-
Kanamycin	-	-	-	-	-
Nalidixic acid	32.6	-	-	12.6	-
Cefuroxime	42.7	33.9	56.4	54.3	50.4
Ceftazidime	-	-	-	-	-
Ceftriazone	-	-	-	-	26.4

Although bacterial conjunctivitis is acknowledged to be an extremely common disorder,²⁸⁻³⁰ the precise incidence in the general population is not yet known. In

our study, a culture positive rate of about 33% was observed. The incidence is higher among children and young adults than among elderly individuals, this is in agreement with the findings by Nakhala and others in Egypt.²³ Among neonates, the over all incidence of culture proven conjunctivitis caused by bacteria of all types was reported to be 4-6% in the United Kingdom²⁹ where prophylactic treatment is not routinely practiced, compared to 0.6% in the United State where neonatal antimicrobial prophylaxis is mandatory.³⁰ Among male military recruits in the US a weekly case incidence of non-epidemic conjunctivitis was found to be 0.01% of which 25% were culture positive for bacteria. The relative incidence of viral and bacterial conjunctivitis also shows pattern variation with viral cases occurring mostly in epidemics,²⁸ while most cases of bacterial conjunctivitis are sporadic. The epidemic spread occurs most commonly in congested settings, at day-care centers,³¹ boarding schools,³² or intensive care units.³³ It appears that patients who are predisposed to nosocomial conjunctivitis and patients with epidemic viral conjunctivitis are all predisposed to bacterial super infection.³⁴

The conjunctival sac is highly susceptible to gonococcus and inclusion conjunctivitis agents, both of which are infectious for the genitourinary tract. In this study, however, the majority of acute bacterial conjunctivitis is due to infection with *Staphylococcus aureus* and pathogenic *Escherichia coli*. Five patients (15.2%) had acute bacterial conjunctivitis from *Neisseria gonorrhoea*. Two of these were neonates who contracted the infection during delivery from infected mothers while three young adults were infected through contaminated urine used in treatment of allergic conjunctivitis. *Haemophilus influenzae* infection was more prevalent in the extremes of life, 33% of infection with *H. influenza* was found in patients less than 5 yrs.³⁵ *Haemophilus influenzae* was observed in three patients among whom two were less than five years. Variation in the age and immune status of the bacterial conjunctivitis patient affect the relative frequency of most commonly cultured pathogens.

Among all age groups, infants under the age of one year have been found to have the highest frequency of enterococcal and coliform bacterial conjunctivitis.³⁵ Alcoholics and immuno-compromised adults have increased susceptibility to bacterial conjunctivitis especially that caused by *Moraxella* species or gram-negative bacteria.³⁷

In the differential diagnosis of conjunctivitis as the cause of a red painful or irritated eye, it is important to rule out keratitis, iritis, acute glaucoma and systemic causes of conjunctival inflammation.³⁸ The causal

organisms of bacterial conjunctivitis can then be identified by the microscopic examination of stained conjunctival material before treatment is commenced, culture studies should be made and antibiotic sensitivity performed. Usually, the causative organism can be identified through microscopic examination of conjunctival scrapings stained with gram's stain or giemsa's stain. Direct examination and culture study are necessary for all cases and they are mandatory if the discharge is purulent, membranous or pseudo-membranous. Antibiotic sensitivity studies are also highly desirable, so that the appropriate drug can be started at once.

Prior use of a topical antibiotic (commonly chloramphenicol eye drops) before presentation at the eye clinic may have contributed to the low demand for culture and sensitivity test in patients with clinical diagnoses of acute bacteria conjunctivitis. However, a significant proportion 33 (86.8%) of those tested had a positive culture report. Specific treatment of bacterial conjunctivitis depends on the identification of the etiologic agent while awaiting the laboratory results, the physician can start topical therapy like sulphonamide or chloramphenicol drops. In any purulent conjunctivitis an antibiotic suitable for treatment of *N. gonorrhoea* and *N. meningitidis* infections should be given both systemically and topically immediately after specimen for laboratory study has been collected. The high sensitivity of the isolates in this study to both chloramphenicol and gentamicin greatly support the appropriateness of using these two drugs as the first line of treatment of bacterial conjunctivitis. Though third generation cephalosporin like ciprofloxacin demonstrated a wider spectrum of antimicrobial sensitivity. Also, the use of cephalosporin in our centre in cases of gonococcal conjunctivitis is supported by the result of the susceptibility pattern of the antibiotics tested. Other antimicrobial agents such as topical 1% fusidic acid, tobramycin and netilmicin have been tried in the treatment of acute bacterial conjunctivitis in various studies and these drugs have been found very useful.³⁹⁻⁴¹

Delay in seeking care and self-medication were noted to be major causes of morbidity and blindness in those patients who developed complications: six eventually went blind in the affected eye(s). Two patients ended up with bilateral phthisis bulbi due to delayed hospital presentation and prior use of toxic traditional medicine containing human urine and cassava juice. The harmful material was used to treat viral conjunctivitis during an epidemic (commonly called 'Apollo' in the study area). The importance of eye health education as important tool in the prevention of

blindness in patients with acute conjunctivitis should be emphasized.

CONCLUSION

Conjunctivitis due to allergy and infective causes is a major cause of ocular morbidity. The high sensitivity of isolates to ciprofloxacin (89.8-97.8%), chloramphenicol (68.9%) and gentamicin (84.9%) support the appropriateness of using these drugs as the first line of treatment in bacterial conjunctivitis. Complications such as corneal ulceration (9.2%) and perforation (4.1%) are major causes of blindness (6.1%) among patients with conjunctivitis seen at Ile-Ife. There is need for public eye health education and early referral of all cases of eye infections to an eye specialist to prevent complications from loss of vision. Local instillation of harmful traditional medication in patients with ocular inflammation should be discouraged.

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