

Non Chlamydial Acute Bacterial Conjunctivitis in Sudanese Children

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Abstract

In children there is a paucity of data in recent literature on the prevalence of infective conjunctivitis and almost it is absent from an area like Sudan. This research was aimed to study the point prevalence of a cute bacterial conjunctivitis in Sudanese children and put light on causative bacterial pathogens. Acute bacterial conjunctivitis is a common infection in children and it may be extremely contagious and easily spread in day care centres and school class rooms leading to absences or lost time from work for parents, outbreaks may occur. Common presenting symptoms are red eye and eye discharge. Commonly involved bacteria are *Staphylococcus aureus* and *Haemophilus influenzae*. Generally it is a mild disease but more serious complications may occur.

Methods: Hundred children with clinical presentation of acute conjunctivitis were included in this study. For each patient a sample for bacterial culture and sensitivity to commonly used antibiotics was obtained by a thin cotton micro swab, isolation and identification of pathogens was done by conventional methods. Antimicrobial susceptibility testing was performed according to method standardized by CLSI. Data was analyzed by SPSS computer program.

Results: The most common presenting symptom is the red eye. Bacterial pathogens were detected in 65% of the studied sample. Predominant bacterial pathogens were *Staphylococcus aureus* and *Haemophilus influenzae*, *Klebsiella pneumoniae* is a cause in small number of patients. All isolates are sensitive to Gentamycin.

Conclusion: acute bacterial conjunctivitis is a common infection in children, muco purulent discharge points to bacterial cause in acute infective conjunctivitis. *Staphylococcus aureus* is a common pathogen and it is sensitive to Gentamycin.

Keywords: Conjunctivitis; Acute; Children; Bacterial

Introduction

The conjunctiva is a vascularized mucous membrane that covers the anterior surface of the globe, fornical conjunctiva and the posterior surface of the upper and lower eye lids [1]. Conjunctivitis refers to any inflammatory condition of this membrane [2]. The common cause of conjunctivitis is infection by bacteria or viruses; also it can be caused by chemical irritants, traditional eye remedies or allergy [2-4]. Usually it is a self-limiting condition [5-8], but it may be extremely contagious. It may easily spread in day care centres and school class rooms leading to absences or lost time from work for parents. The general recommendation is that a patient with eye infection should not attend work neither school until the infection clears [9]. Sometimes infection of the conjunctiva may invade the cornea and can cause perforation e.g. *gonococcal* infection [3]. Acute infectious conjunctivitis is a common disorder with annual incidence of 1.5-2% in primary care centres [10,11]. In children incidence of acute infectious conjunctivitis is higher than in adults and the spectrum of causative micro-organisms may differ from that in adults [12]. The most common aetiology of infective conjunctivitis in children is bacteria and this is responsible for 54-74% of all cases of infective conjunctivitis [13-16]. The common clinical presentation is red eye [17]. Purulence, swollen eyelids and a papillary response are generally associated with bacterial aetiology, while watery discharge, a follicular response and preauricular node are more indicative of viral picture [18]. Other

clinical indicators of bacterial aetiology were reported by Patel report [4] those include history of gluey or sticky eyelids or eyelashes in the morning, examination findings of mucoid or purulent eye discharge and findings of eyelids or eye lashes crusting or gluing, also lacking of sensation of burning eyes and the absence of watery discharge. Another important diagnostic clue is the concomitant infection with acute otitis media [19] and the most common bacterium causing this syndrome is *Haemophilus influenzae* [20]. The same result was obtained by Block [10] who recommended that when practitioners encounter children with conjunctivitis-otitis media syndrome they should more than ever select an antimicrobials that possess good in vitro coverage for *Haemophilus influenzae*. Rietveld study stated that glued eye, itch and history of conjunctivitis provided optimal discrimination between patients with bacterial and viral aetiology, a history of both infectious conjunctivitis and itch make the probability of bacterial aetiology less likely, while glued eye is strong hint for bacterial aetiology [18]. On the other hand a very valuable report coming after searching the literature by Gigliotti, stated that he was unable to find evidence of the diagnostic usefulness of clinical signs, symptoms or both in distinguishing bacterial conjunctivitis from viral conjunctivitis and he recommended further researches to provide general practitioners with easy to use diagnostic tools to differentiate bacterial from viral conjunctivitis to tailor antibiotic prescriptions [21].

The common causative agents of bacterial conjunctivitis in children include *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Staphylococcus aureus* [22]. Other rare bacterial pathogens of

conjunctivitis include *Moraxella catarrhalis*, *Streptococcus mitis* and *Streptococcus pyogenes* [19,20] In the neonatal period *Haemophilus influenzae* and *Streptococcus pneumoniae* are still considering as important pathogens but other pathogenic bacteria should be considered at this age namely *Neisseria gonorrhoea* and *chlamydia*[4,23].

The clinical course is usually benign and it is frequently a self-limiting condition as clinical remission, cure or significant improvement, occurred within days in 64%. Treatment with antibiotics is however associated with significantly better rates of clinical remission [6] but the benefit is marginal and still there are concerns about whether antibiotic therapy confers significant clinical benefit in the treatment of acute bacterial conjunctivitis [24]. In acute infectious conjunctivitis the general practitioner has to distinguish a bacterial cause from viral one to select the patients who are likely to benefit from antibiotic treatment. Studies showed that in the paediatric population approximately (54%) of cases of acute infectious conjunctivitis are caused by bacterial pathogens [3], however physicians prescribe antibiotics nearly 80-95% of time. Ocular antibiotics are considered to be frequently over prescribed and concerns for increased cost of health are often raised [12,25].

In children there is a paucity of data in recent literature on the prevalence of infective conjunctivitis and almost it is absent from an area like Sudan. This research was aimed to study the point prevalence of a cute bacterial conjunctivitis in Sudanese children and put light on causative bacterial pathogens.

Patients and Method

The study was registered in Sudan medical specialization board and it is adhered with the tenets of the Declaration of Helsinki.

Hundred Sudanese children were enrolled in this study. All patients attending the emergency unit in an eye hospital (Al Waledaine eye hospital, Omdorman, Khartoum) complaining of symptoms of conjunctivitis of duration less than one week were included. All are children between one and eighteen years old. Exclusion criteria were eye trauma, recent eye surgery, patients who wearing contact lenses and using systemic or local antibiotic during the last week. All patients were subjected to ocular examination. For each patient a sample for bacterial culture and sensitivity to commonly used antibiotics was obtained by rolling a thin cotton micro swab over the lower fornix of the conjunctival sac. In cases of bilateral eye involvement, the eye with more significant signs or symptoms was selected for specimen collection, if both eyes are equally affected the first chronologically affected eye was assigned for the study. All swabs were inoculated on blood, chocolate and MacConkey agars, the colonies were then identified using Gram staining technique, and conventional tests [26]. Susceptibility of the isolates was tested against gentamicin (10 µg), ciprofloxacin (5 µg) tetracycline (30 µg), ofloxacin (5 µg) and erythromycin (15 µg). Antimicrobial susceptibility testing was performed by disk diffusion method that has been standardized by CLSI. Suspensions of pure culture was adjusted to turbidity of 0.5 McFarland standard. A swab was dipped in suspension and streaked evenly onto Mueller-Hinton gar (MHA) or *Haemophilus* test medium (HTM) and left for few minutes to dry. Then the disks were applied aseptically. The plates were incubated at 37°C for 24 hours before reading the results. According to zones of growth inhibition compared to zone diameters of interpretive standards, isolates were reported as sensitive, intermediate or resistant [27].

Data were analyzed using computer software statistical package for social sciences (SPSS). Chi square test was used to compare the associated variants values less than 0.05 was considered significant.

Results

Hundred Sudanese children with clinical presentation suggestive of acute conjunctivitis were recruited in this study. All of the patients has bilateral eye involvement, they were 62% male and 38% female, distribution of the presenting symptoms indicates that redness is universal in all patients follows by eye discharge which is present in 96% of the patients then sticky eye lid 81%, pain 28%, foreign body sensation 14% of the patients, itching 47% and photophobia 25%. Recent history of ear discharge was a rare finding among all age groups only one patient, his age one year, was found to have an ear involvement with conjunctivitis and the micro-organism isolated in this case was found to be *Haemophilus influenzae*.

Clinical examination revealed universal conjunctival injection followed by the presence of discharge in 94% of the patients, sticky eye lid 59% but follicles are present only in 10 patients.

Out of the hundred samples sixty five showed a positive bacterial growth in culture and 35% showed no bacterial growth.

The predominant isolate among the positive samples is *Staphylococcus aureus* 61. 5% followed by *Haemophilus influenzae* 30.8% and *Klebsiella pneumoniae* 7.7%.

Association between the presenting symptoms and positivity of the sample for bacterial growth was only positive for the mucopurulent discharge p value 0.03 (Figure 1).

Distribution of the isolates among the age groups showed that *Haemophilus influenzae* is common between 1 and 5 years but *Staphylococcus aureus* is predominating in all age groups (Table 1).

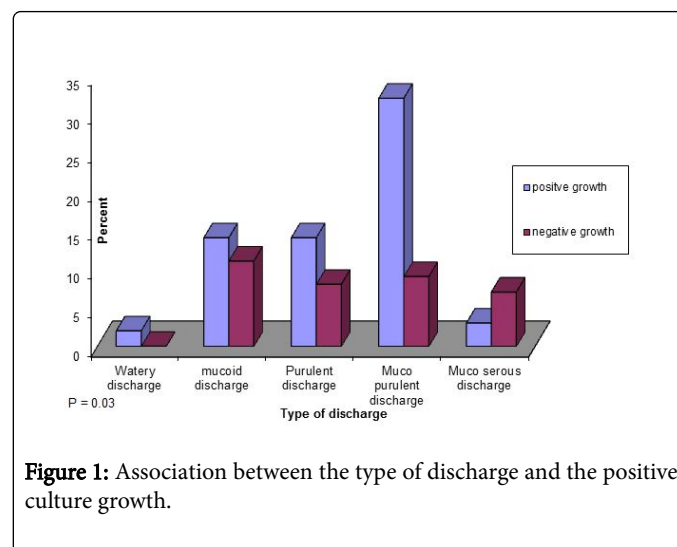


Figure 1: Association between the type of discharge and the positive culture growth.

All isolates are 100% sensitive to Gentamycine, for other antibiotics they showed different degrees of sensitivity (Figure 2).

Discussion

Hundred children were included in this study and hundred eyes were investigated.

Presenting symptoms were dominated by the redness of the eye which was present in almost the entire studied sample this is in agreement with Ruppert [17], it was the most important symptom that influenced the parents and the patients to seek medical advises. Sticky eyelids and discharge were more common among the age group between 1-5 years. Itching was commoner in older age groups and this can be explained by the fact that younger children are unable to describe this presentation correctly which is also true for the foreign body sensation.

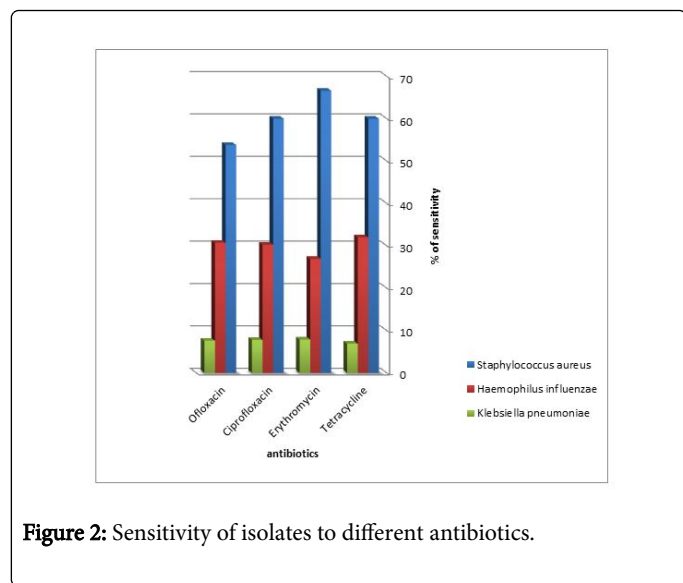


Figure 2: Sensitivity of isolates to different antibiotics.

Our data shows that out of 100 eyes investigated 65% gave a positive culture for bacterial growth in agreement with [6,13,15,16], who reported that bacteria is responsible for 54-74% of all cases studied. The bacterial pathogens in our study include *Staphylococcus aureus*, *Haemophilus influenzae* and *Klebsiella pneumoniae* (Table 1). *Staphylococcus aureus* and *Haemophilus influenzae* were the dominating pathogens and this is in agreement with different reports [14,22,25]. *Klebsiella pneumoniae* is reported as a cause of conjunctivitis in children in Marijan's report [28,29].

Most of the positive cultures for bacterial pathogens are obtained in age group 1 to 5 years (Table 1) in consisting with the literature [13,30].

Isolates Age(years) Groups	<i>Staphylococcus aureus</i>		<i>Haemophilus Influenzae</i>		<i>Klebsiella pneumoniae</i>		Total	
	No.	%	No.	%	No.	%	No.	%
1-5	24	36.9	10	15.3	1	1.5	35	53.8
5-10	10	15.3	5	7.6	2	3.1	17	26.1
≥ 10	6	9.2	5	7.6	2	3.1	13	20
Total	40	61.5	20	30.7	5	7.6	65	100

Table 1: Distribution of the isolates among the age groups.

Our results showed significant value of the type of the discharge as a predictor of bacterial pathogen since strong association was found between the muco-purulent discharge and the positive growth culture with is in agreement with Tissa et al. and Rietveld et al. [4,21]. Apart from the above association our data showed that clinical presentation

has no significant association with the outcome of the culture this is as the same as the conclusion of Rietved et al. [18]. Searching for any relationships between the type of isolates and the age of the patients we found that *Haemophilus influenzae* is predominating in the age group between 1-5 years and *Klebsiella pneumoniae* in the older age groups (Table 1).

In spite of the fact that our data was not compatible with Binqen's [29] because the prevalence of the conjunctivitis otitis media syndrome was low in our study, only one patient, still it match it in the type of isolate in this syndrome which is *Haemophilus influenzae*. Association between conjunctivitis otitis media syndrome and *Haemophilus influenzae* as a cause has been approved in different reports [10,16,20,31-33].

In the literature there are concerns regarding whether antibiotics-therapy confers significant benefit in the treatment of acute bacterial conjunctivitis. Regarding our isolates sensitivity tests, isolates showed a universal sensitivity to gentamycin and different sensitivities to tetracycline, erythromycin, ciprofloxacin and ofloxacin (Figure 2). Ciprofloxacin was found to be effective and safe in management of acute bacterial conjunctivitis [34].

But still the use of antibiotics for treatment of acute bacterial conjunctivitis is a cloudy area with some voices deny any usefulness of this and claim that acute bacterial conjunctivitis is a mild and self-limiting condition [12,25,35] while other opinions show some benefits, sometimes marginal, in prescribing antibiotics for the treatment of acute bacterial conjunctivitis [19,36-40] and they reported that this is associated with improved rate of clinical and microbiological remission. Studies comparing treatment with different antibiotics do not demonstrate that any one antibiotic is superior and the choice of antibiotic should be based on consideration of cost and bacterial resistance [36].

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