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Original Article

Spectrum of Bacterial Conjunctivitis and Their Drug Sensitivity (Efficacy) Pattern, in the Patients Attending in Tertiary Care Hospital at Muzaffarpur, Bihar

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Abstract
Objective: *Conjunctivitis is the most common disease of conjunctiva which occurs by exogenous or endogenous source. Bacterial conjunctivitis is the most common type of this infection for which empirical treatment is started without knowing the etiological agents because prior cultures are generally not taken. Present Study was undertaken to determine the prevalence of bacterial conjunctivitis in the patients attending in our hospital, in and around muzaffarpur, Bihar and their Drug Efficacy Pattern in conjunctivitis.*
Materials and Methods: *A total of 364 Conjunctival swab samples were taken aseptically from the surface of lower Conjunctival sac and inner canthus (angle) of the eye, in the Eye OPD and send for the culture and Drug Sensitivity Testing.*
Result: *Out of 364 swab samples, the prevalence of bacterial conjunctivitis was found to be 21.4% with a predominance of Staphylococcus aureus (85.89%) followed by Streptococcus pneumoniae (5.12%) and Gram Negative Bacilli (E.coli+Klebsiella spp. + Pseudomonas spp.) in 8.9% swabs. For S.aureus Moxifloxacin showed maximum sensitivity(100%), than Ciprofloxacin (85.07%), Ofloxacin(89.5%), While for S. Pneumoniae, Cefotaxime, Cefazolin, Ofloxacin, Moxifloxacin were found highly sensitive (100%) drugs. For Gram Negative Bacilli Moxifloxacin (85.71%), Cefotaxime(85.71%), Ceftazidime (100%) were found to be preferred options.*
Conclusion: *Thus it is concluded that bacterial conjunctivitis in our hospital is predominated by S. aureus. The bacterial isolates obtained from conjunctiva have not yet attained a high level of antibiotic resistance and hence bacterial conjunctivitis has an excellent prognosis, but high frequency of spontaneous remissions. Hence topical antibacterial agent like Moxifloxacin and Ofloxacin may be used as empirical therapy.*
Keywords: *Conjunctivitis, Bacteria, Antibiotic Sensitivity, Drug Efficacy.*

Introduction

Conjunctivitis is a very commonly encountered ocular infection by ophthalmologist It can have bacterial, viral or fungal etiology. Amongst these, it is the bacterial cause which tops the list. Age-related factors are the key determinants of the etiological agent.

In neonates, Neisserial and chlamydial infections are frequent and are acquired during passage through an infected vaginal canal. However, incidence of above two infections has dropped down dramatically due to regular practice of instilling antibiotic drops in the eyes of all newborns. Yet Chlamydia trachomatis is responsible for an important type of conjunctivitis i.e. trachoma which is one of the leading causes of blindness in the world, primarily in under developed countries.

In children most common causes of bacterial conjunctivitis are Haemophilus spp., Streptococcus pneumoniae and Staphylococcus aureus.S. Pneumoniae and haemophilus aegipticus have been responsible for epidemics of conjunctivitis. Moraxella lacunata can also cause conjunctivitis which is localized with little discharge from the eye. Other rare causes can be mycobacterium tuberculosis, Francisella tularensis, Treponema pallidum and Yersinia enterocolitica.

Fungi may be responsible for conjunctivitis but they generally occur in association with a foreign body in the eye or an underlying immunologic problem. However, these infections are infrequently encountered.

Viruses are an important causes of conjunctivitis. In a study conducted in US in children and adult population, 20% and 14% respectively of viral conjunctivitis resulted from adenovirus. Adenovirus type 4,3,7 A are the commonly encountered serotypes. Most of these infections are self limiting but are highly contagious, with potential to cause major outbreaks. Worldwide, enterovirs 70 and coxsackie virus A24 are responsible for outbreaks and epidemics of acute hemorrhagic conjunctivitis.

Materials and Methods

Present study was conducted in the Department of Pharmacology, Sri Krishna Medical College, muzaffarpur with the help of Department of Ophthalmology and Department of Microbiology, during the period of October 2017 to June 2018.

A total of 364conjunctival swab were collected aseptically from the surface of lower conjunctival sac and inner canthus (anlge) of the eye, sterile swab were pre moistened with sterile saline for culture. All the samples were sent to the Microbiology Department for culture and Drug Sensitivity Testing.

Sample Processing

Conjunctival swabs were inoculated on Blood agar Chocolate agarand Mac -Conkey^{s} agar (supplied by Himedia, Mumbai). A preliminary Gram's staining was performed on all the samples after inoculation on solid media. All plates were incubated aerobically at 37^{0} C for 8-24 hrs. Plates were evaluated for bacterial growth by colony morphology and identification was carried out by performing Gram's staining and biochemical reactions using standard techniques. Antibiotic Susceptibility Testing was performed by Kirby bauer technique on Mueller Hinton agar using following antibiotic discs (Supplied by Himedia, Mumbai): Amikacin, Gentamicin, Tobramycin, Chloramphenicol, Ciprofloxacin. Moxifloxacin, Ofloxacin, Cefotaxime, Ceftazidime, Cefazolin and result will be taken according to CLSI guidelines.

Result

A total of 364conjunctival samples were studied. Amongst them, 78(21.4%) samples were positive for bacterial conjunctivitis.

S. aureus was isolated from 67(85.89%) cases while S. Pneumoniae accounted for 4(5.12%) cases of conjunctivitis. Gram Negative bacteria were isolated from 7 cases (8.9%) out of which 4(57.1%) were E.coli, 2(28.7%) Klebsiella spp. and 1(14.2%) Pseudomonas spp.

Antibiotic susceptibility pattern Amongst S. aureus isolates, Aminoglycoside group of

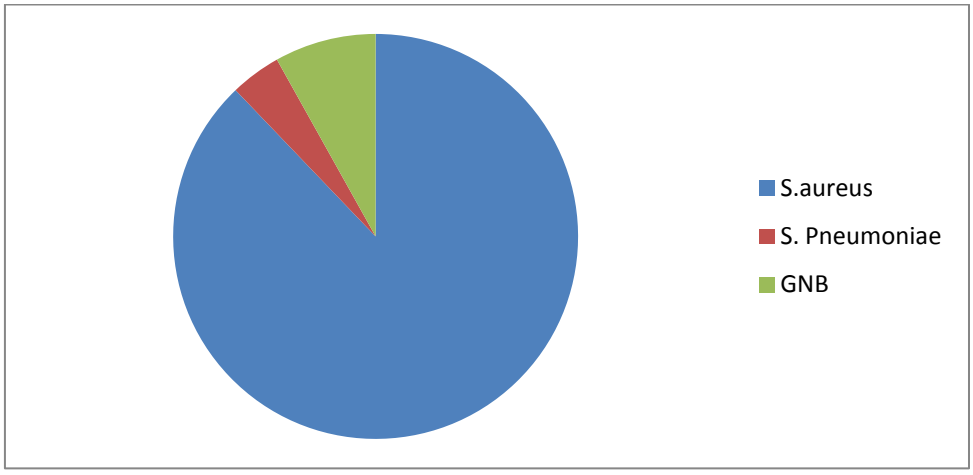
antibiotics i.e. Amikacin, Gentamicin and Tobramycin showed a good sensitivity of 74.6%, 61.2% and 77.6%. Against Beta lactam group of antibiotics like Cefazolin and Cefotaxime 70.1% and 64.1% respectively isolates were sensitive.

Amongst Quinolones group Moxifloxacin showed 100% sensitivity, Ofloxacin demonstrated a better sensitivity i.e. 89.5% when compared to Ciprofloxacin (85.07%). Chloramphenicol was found to be least effective drug with only 50.7% sensitivity.

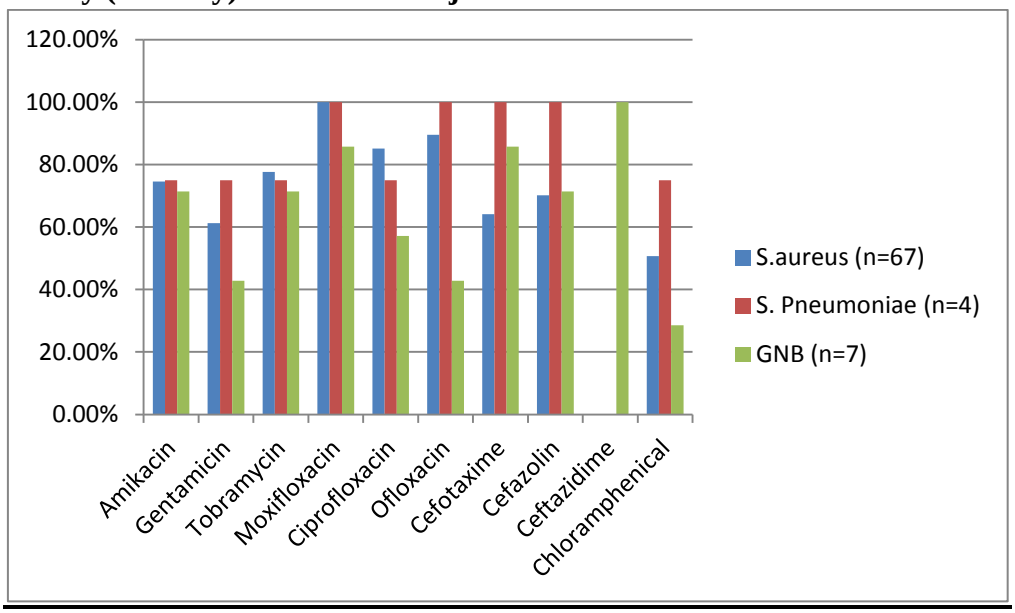
For. S. Pneumoniae, □ lactams i.e. Cefotaxime and Cefazolin gave a high sensitivity of 100% and 100% respectively, followed by Moxifloxacin 100%, ciprofloxacin 75% and Ofloxacin 100%. Chloramphenicol showed a sensitivity of 75% while aminoglycosides i.e. Amikacin, Gentamicin and Tobramycin were effective against 75%, 75% and 75% isolates respectively.

Amongst Gram Negative Bacilli (GNB) maximum isolates (100%) were sensitive to Ceftazidime which is a third generation cephalosporin with a good antipseudomonal activity followed by Cefotaxime(85.71%) and Moxifloxacin(85.71). Sensitivity to Ofloxacin was observed in 42.8% isolates compared to 57.1% sensitivity against Ciprofloxacin. Amikacin was effective in 71.4% isolates followed by Tobramycin (71.4%) and Gentamicin (42.8%).

Spectrum of conjunctival isolates



Antibiotic Sensitivity (Efficacy) Pattern of Conjunctival Isolates



Drug Sensitivity (Efficacy) Pattern of Conjunctival Isolates

ANTIBIOTIC	S.aureus(n=67)	S. Pneumoniae(n=4)	Gram Negative Bacilli(GNB) (n=7)
Amikacin	50(74.6%)	3(75%)	5(71.4%)
Gentamicin	41(61.2%)	3(75%)	3(42.8%)
Tobramycin	52(77.6%)	3(75%)	5(71.4%)
Moxifloxacin	67(100%)	4(100%)	6(85.71%)
Ciprofloxacin	57(85.07%)	3(75%)	4(57.1%)
Ofloxacin	60(89.5%)	4(100%)	3(42.8%)
Cefotaxime	43(64.1%)	4(100%)	6(85.71%)
Cefazolin	47(70.1%)	4(100%)	5(71.4%)
Ceftazidime	0(0%)	0(0%)	7(100%)
Chloramphenical	34(50.7%)	3(75%)	2(28.57%)

Discussion

Bacterial conjunctivitis is a self limiting process but topical antibiotic treatment is recommended to eradicate the pathogens and reduce symptom duration. The treatment given is usually empirical and prior cultures are not normally taken due to which the etiological agent remain unknown.

In the present study which was performed retrospectively over a period of nine month (October 2017- June2018), a total of 364 conjunctival swabs were obtained in the microbiology lab. The swabs were obtained from cases suspicious of having acute conjunctivitis and preoperative patients who had to undergo some intraocular surgery. Amongst these, a total of 21.4% (78 Swabs) were positive for bacterial infection. This was in accordance with result obtained in a German study which reported 18.4% isolation rate of bacterial isolates in preoperative patients. However, Spanish study has reported a much higher incidence (71.8%) than our results. This difference can be explained by the fact that our study group included suspected cases of conjunctivitis along with all pre-operative asymptomatic patients while the Spanish study screened only clinically confirmed cases of conjunctivitis and that also in only pediatrics population.

The spectrum of bacterial isolates was pre-dominated by S.aureus (85.89%) which was comparable to another study with a 92% isolation rate for staphylococcus spp. Isolation rate for Gram Negative rods was 8.9% which included .E. coli, klebsiella spp. and pseudomonas spp. A much lower incidence has been reported in a recent study conducted in children<14 yrs of age which reported S.aureus and Gram Negative Rods in only 7.5% and 4.2% cases respectively. These variations can be attributed to difference in etiological agents of conjunctivitis according to age group and geographical location.

Streptococcus pneumoniae was isolated in 5.12% cases in the current study. This was in variance with another survey conducted in USA which reported a 13% isolation rate for S. pneumoniae but in paediatric population.

The current study found Moxifloxacin, Tobramycin, Amikacin and Ofloxacin as good options for treatment of conjunctivitis by staphylococcus aureus with a sensitivity of 100%, 77.6%, 74.6% and 89.5% respectively. For S. Pneumoniae conjunctivitis, Moxifloxacin, Cefotaxime, Cefazolin and Ciprofloxacin showed remarkably high sensitively of 100%, 100%, 100%, 75% respectively. Amongst Gram Negative Bacilli, Ceftazidime (which was put up only for GNB) was found to be most effective (100%) followed by Cefotaxime (85.71%) and Moxifloxacin (85.71%).

Overall we found Moxifloxacin and Ofloxacin as a good empirical option to start till the sensitivity report is awaited for both Gram Positive and Gram Negative bacterial conjunctivitis.

Conclusion

Acute infectious conjunctivitis in the eye disease is a commonly encountered ailment by ophthalmologist and it presents 2-3% of their total consultation. We conclude that the incidence of bacterial causes of acute conjunctivitis can vary in

different age groups and in different geographical areas. The spectrum of bacteria and their Antibiotic sensitivity patterns also vary accordingly. Currently there is an ongoing era of Multi Drug Resistant (MDR) pathogens. However the bacteria isolated from conjunctival swabs of patients in our Hospital have not yet reached alarming level of multidrug resistance. Hence bacterial conjunctivitis has an excellent prognosis but unfortunately has a high frequency of spontaneous remissions. Hence topical antibacterial therapy like Moxifloxacin and Ofloxacin should always be given because this will shorten the course of disease and reduce the risk of epidemic outbreaks, particularly in the tertiary care hospitals.

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