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CLINICAL AND BACTERIOLOGICAL PROFILE OF CHRONIC DACRYOCYSTITIS CASES AT TERTIARY CARE CENTRE MUZAFFARPUR

Ophthalmology

Dr.Rajnath singh* Senior resident,Department of Ophthalmology SKMCH Muzaffarpur *Corresponding Author

Dr.Archana Junior resident,Department of Microbiology RIMS Ranchi.

Dr R.K Singh Head,Department of Ophthalmology SKMCH Muzaffarpur

ABSTRACT

Aims and objectives: The aim of this study was to identify the organisms responsible and to determine the antibiogram of the bacterial isolates from conjunctiva, nasal mucosa and lacrimal sac in cases of chronic dacryocystitis. Design: Prospective longitudinal study. Methods: A prospective analysis of 50 lacrimal sac contents of patients with chronic dacryocystitis conducted during the period from June 2019 to May 2020. Material was obtained directly from the lacrimal sac while making sac flap during external dacryocystorhinostomy for chronic dacryocystitis. Samples were also collected from ipsilateral conjunctiva and inferior meatus of nose. The specimens were cultured and results analyzed. Statistical **Analysis:** The results were analyzed by using Chisquare ($\chi 2$) test. Results: All the patients were in age group of 30 and above. Gram positive bacteria i.e., Coagulase negative staphylococci and Staphylococcus aureus were the most common isolates (60% and 25% respectively). Vancomycin, Linezolid, 3rd generation cephalosporins and amoxyclav were most sensitive antibiotics (82%, 85%, 81%, and 80% respectively). Comparison between lacrimal and nasal/conjunctival isolates showed high degree of resemblance between the isolates of two sites ($p< 0.05$). **Conclusion:** Majority of the chronic dacryocystitis cases are caused by Staphylococcus aureus and Coagulase negative Staphylococci. Amoxyclav and 3rd generation cephalosporins can be used to treat chronic dacryocystitis. Commensal flora of nose and conjunctiva shown a direct role in pathogenesis of chronic dacryocystitis.

KEYWORDS

Cephalosporins, Chronic dacryocystitis, Coagulase negative Staphylococcus, Nasolacrimal duct.

INTRODUCTION

Chronic dacryocystitis is an inflammatory condition of the lacrimal sac commonly associated with partial and total obstruction of the nasolacrimal duct, which affects patients of middle age. Several bacteria have been implicated as causative agents of chronic dacryocystitis [3]. Also, there is a change in the agents responsible for chronic dacryocystitis over the time [5,1]. Knowledge of the microbial organisms responsible for chronic dacryocystitis in a particular geographical area is essential in choosing the appropriate antibiotics [7]. Hence we aimed at finding out the bacteria responsible for lacrimal sac infections in the patients visiting this tertiary care hospital and study their antibiogram. We also compared the isolates from ipsilateral nasal mucosa and conjunctival specimens in order to verify the role played by the commensal bacterial flora in the causation of chronic dacryocystitis.

MATERIAL AND METHODS

A total of 50 samples from 50 cases of chronic dacryocystitis, who attended the ophthalmology outpatient department of a tertiary care centre muzaffarpur during the period June 2019 to May 2020,were included in the study. Inclusion criteria: Clinically diagnosed cases of chronic dacryocystitis undergoing external dacryocystorhinostomy (Ext-DCR) were included in the study. Exclusion criteria: The patients who had received either topical or systemic antibiotics in the past one week during their visit to the hospital were excluded. An informed consent was obtained from all the patients. Clinically diagnosed cases of chronic dacryocystitis were operated for ExtDCR after relevant investigations. Samples were collected directly from lacrimal sac during Ext-DCR. Preoperative nasal swab and conjunctival swab from the same side were also collected. The materials were collected with sterile cotton swabs and sent for culture to the microbiology laboratory. The specimens received at the laboratory were inoculated immediately on MacConkey agar, blood agar and nutrient broth. Organisms grown were identified using standard biochemical reactions and antibiotic sensitivity test was done by the Kirby-Bauer disc diffusion method.[2,9]. Chi-square ($\chi 2$) distribution was used to test the qualitative distribution. A p (predictive) value of <0.05 was considered indicative of significant association between the variables which were tested.

RESULTS

Total of 50 adult patients were included in the study; (22 males and 28 females).

The bacterial pathogens grown from lacrimal sac, nasal and conjunctiva have been shown in [Table-1].

In ten nasal and four conjunctival specimens organism identical to the lacrimal sac specimen was recovered.

A total of 24 isolates were recovered from 50 lacrimal sac specimens. The Gram positive bacteria (19/24; 79.16%) outnumbered the Gram negative bacteria. Coagulase Negative Staphylococci (CONS) were the predominant isolates (13/24; 54.16%) followed by Staphylococcus aureus (6/24; 25%) and one isolate each of Escherichia coli, and Citrobacter freundii. As staphylococci constituted majority of isolates the antibiogram of these isolates is presented in [Table-2].

To ascertain the possibility of acquisition of pathogens causing chronic dacryocystitis from anatomically connected nasal or conjunctival colonizers, we compared the isolates from ipsilateral swab from these two sites. Comparing the isolates from these two sites with the pathogens by Chi–square test, p value indicative of significant association (<0.05) was obtained. In three cases identical isolates were grown in lacrimal sac and conjunctiva, p value 0.001044 (Very significant). In ten cases identical isolates were found in lacrimal sac and nasal mucosa, p value 0.000041 (Very significant).

[Table-1]: Results of culture of nasal, conjunctival and lacrimal specimens

	Total	Growth	No Growth	% No Growth
Lacrimal	50	24	26	52
Conjunctival	50	17	33	66
Nasal	50	36	14	28

[Table-2]: Antibiogram of CONS and Staphylococcus aureus R-Resistant, S- Sensitive.

Antibiotic	CONS		S.aureus	
	S	R	S	R
Amoxycillin-Clavulanic acid	80	20	80	20
Chloramphenicol	89	11	72	28
Cefotaxime	81	19	81	19
Ciprofloxacin	43	57	19	81
Erythromycin	63	37	17	83
Clindamycin	58	42	59	41
Vancomycin	91	09	73	27

Linezolid	89	11	81	19
Piperacillin-Tazobactam	71	29	43	57

DISCUSSION

Chronic dacryocystitis is a result of chronic obstruction due to systemic disease, repeated infection, dacroliths, and chronic inflammatory debris of the nasolacrimal system. It is common in the age group above 30 years. Lacrimal apparatus contains lacrimal gland, punctum, canaliculi, lacrimal sac and nasolacrimal duct. Lacrimal apparatus is concerned with formation and draining of tears, which keep the cornea moist, protects against airborne pathogens and foreign bodies. Obstruction of the nasolacrimal duct results in stasis with accumulation of tears, desquamated cells and mucous secretions above the obstruction and creates a fertile environment for secondary bacterial infection.

In the present study, specimens were obtained directly from the lacrimal sac under the operating microscope while making the sac flap for Ext-DCR, which gives less chance for collection contamination compared to collection by applying pressure over the lacrimal sac or by allowing the purulent material to reflux through the lacrimal sac [3].

In pre-antibiotic era, Streptococci were very common causative agents of chronic dacryocystitis. However, after the discovery of effective antibiotics like penicillin and cephalosporins, Streptococci have been replaced by Staphylococci; notoriously known to acquire drug resistance [5,1]. Previous studies state that pathogens implicated in chronic dacryocystitis are more often Gram positive bacteria like CONS, Staphylococcus aureus and Streptococci [4]. Some studies have also reported Gram negative bacteria like Pseudomonas, Enterobacter, Citrobacter species [5]. Environmental factors in different geographical regions may have a role in determining the microbial pattern of chronic dacryocystitis [11].

In our study, we noted female preponderance (56%) which was also noticed in other studies 80.9% [4] and 61.04% [6]. All the patients were in the age group of 30 and above. Similar findings were reported in other articles [3, 4].

We isolated 13 CONS (54.16%) and six were Staphylococcus aureus (25%) species. Many Indian studies have reported growth of Gram positive bacteria more frequently than Gram negative bacteria [4, 6, 13-15]. CONS hitherto were considered as non-virulent or low grade pathogens. However, more evidence suggesting pathogenic potential of CONS is now coming forward [14]. We also found Methicillin Resistant Staphylococcus aureus in few isolates. All the patients were admitted to the hospital one day prior to surgery.

Out of 50 cases, same organism with same antibiotic pattern had been isolated in both lacrimal sac and nasal specimen in ten cases. In four cases lacrimal and conjunctival samples showed similar pattern. This is probably because lacrimal apparatus is contiguous with nasal and conjunctival mucosal surfaces. Normal flora from these two sites, often enter into the lacrimal apparatus. Usually any small number of bacteria gaining entry into the lacrimal sac will be washed away by the flow of tears. When there is obstruction to the flow of the tears, then these bacteria will not be flushed and will get very good environment for the growth. Common normal flora of the conjunctiva and nasal cavity are CONS and Staphylococcus aureus respectively [12]. Hence these are the most common pathogens implicated as etiological agents of chronic dacryocystitis. After statistical analysis of the growth from lacrimal, nasal and conjunctival specimens, we found that there was a significant resemblance between lacrimal and nasal/conjunctival isolates. The statistical analysis pointed that lacrimal pathogens might have came from nose/conjunctiva. Bale et al., reported 50% correlation between lacrimal and nasal pathogens [13].The resemblance of the isolates has been determined by matching the antibiogram. Though this is not a confirmatory method to type the bacterial species it is an easy and fairly reliable technique for preliminary comparison of the isolates [2]. Use of modern molecular methods like restriction fragment length polymorphism can provide precise matching of the isolates [12].

Vancomycin, Linezolid, 3r generation cephalosporins and amoxyclav were most effective antibiotics against the Gram positive isolates (82%, 85%, 81% and 80% sensitivity respectively).Vancomycin and Linezolid being parenteral drugs can be reserved for severe cases. Amoxyclav and 3rd generation cephalosporins can be used as first line of antibiotics in the management of chronic dacryocystitis. It must be noted that in our study, culture for aerobic organisms only was attempted. We did not do anaerobic culture of the specimens. Inclusion of anaerobic culture would be certainly a useful aid in similar studies. Inclusion of large sample size would have given us a better picture.

CONCLUSION

Organisms responsible for majority of the chronic dacryocystitis cases are CONS and Staphylococcus aureus. Amoxyclav and 3rd generation cephalosporins can be used to treat chronic dacryocystitis cases. Organisms from nose and conjunctiva have direct role in pathogenesis of chronic dacryocystitis. Use of PCR and other molecular methods will provide a better picture.

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