Bacteriology of Adult Chronic Dacryocystitis Cases in Rajshahi Medical College Hospital

Tamanna Afroze[a], Md. Shah Alam[b], Molla Abdullah Sakib[c], MST. Tania Nusrat Eva[d], Raihana Akhtar Jahan[e]

[a]Assistant Professor, Department of Microbiology, Barind Medical College, Rajshahi, Bangladesh

[b]Professor and Head, Department of Microbiology, Barind Medical College, Rajshahi, Bangladesh

[c]Junior Consultant (ophthalmology), Adhunik Zila Hospital, Joypurhat, Bangladesh.

[d]Consultant, Department of Pathology, Islami Bank Medical College, Rajshahi, Bangladesh.

[e]Medical Officer, Mohanpur Upazila Health Complex, Rajshahi, Bangladesh.

Correspondence to :T Afroze
drtamanna86@gmail.com

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Abstract

Background: A large number of people in Bangladesh suffer from chronic dacryocystitis. This is the 2nd highest eye problem among hospitalized patients after cataract. Although the final treatment option is surgery, it is essential to give antibiotics as conservative treatment before going into operative procedure. Otherwise, the chances of soft tissue infections are up to five times higher. **Objective:** The aim of this study was to know the bacteriological spectrum as well as their antibiotic susceptibility pattern to obtain the appropriate therapeutic response. **Methods:** A cross sectional type of descriptive study was carried out in the eye ward of RMCH between January to December 2017. One hundred diagnosed cases of chronic dacryocystitis undergoing DCR operation were selected and lacrimal sac swabs were collected from each patient. Isolation and identification of bacteria and their antibiotic sensitivity test were done by standard procedure in the laboratory of Microbiology Department, RMC. **Results:** Out of 100 swabs, 73(73%) were found culture positive among which Gram+ve organisms were 53 (72.58%) and Gram-ve were 20(27.42%). *S.epidermidis* was the predominant Gram+ve (39.73%) organism followed by *S.aureus* (30.12%) and *S.pyogenes* (2.74%). *P.aeruginosa* was the predominant Gram-ve isolate. The least isolated (2.74%) organism was *St.pyogenes.* In the Gram+ve isolates, vancomycin was the most sensitive drug (100%) followed by oxacillin (98.11%), chloramphenicol (94.33%), tetracycline (92.5%). and cefipime (92.5%) where as non of the antibiotics were satisfactorily sensitive against Gram-ve isolates. **Conclusion:** Culture and sensitivity test before prescribing antibiotics in case of chronic dacryocystitis should be an early treatment option or before doing surgery. It is beneficial both for the patient and ophthalmologist and will also prevent the emergence of drug resistant bacterial strains.

Key words: chronic dacryocystitis, bacterial agents, antibiotic sensitivity.

Introduction

Dacryocystitis is the inflammation of lacrimal sac.[1] It results from the obstruction of the naso-lacrimal duct (NLD).[2]

The healthy lacrimal passage is free from infective micro-organisms partly due to the resistance of the mucosa and partly due to the bacteriostatic influence of tears.[3]

If there is obstruction in the NLD for any reason, it results in stasis with accumulation of tears, desquamated cells and mucoid secretions in lacrimal sac. This creates a suitable environment for secondary bacterial infection and results in dacryocystitis.[4] Between its acute and chronic form, chronic dacryocystitis is more common.[5] It causes social embarrassment by constant watering and discharge. It also causes various ocular and extra ocular complications like chronic conjunctivitis, corneal ulcers, endophthalmitis, panophthalmitis with loss of eye ball, orbital cellulitis, facial cellulitis and even cavernous sinus thrombosis, putting the patient`s life at serious risk.[6,7] With early treatment, these complications can be prevented by reducing both the progression of chronicity and period of chronicity.[8] Different studies have shown that the bacterial agents of chronic dacryocystitis and their antibiotic sensitivity pattern are different in different regions. So, it is important to have proper knowledge about the bacterial agents in a particular area and their antibiotic sensitivities to choose the most appropriate antibiotic for the causative organism.

Materials and methods

It was a cross sectional type of descriptive study. A total 100 samples of lacrimal sac swabs were collected consecutively from the patients admitted with chronic dacryocystitis in eye departmentl of RMCH from January to December, 2017 during operative procedure with the help of surgeon. The swabs were then taken in the Microbiology laboratoryto culture in appropriate media (nutrient agar, Macconkey agar, blood agar, chocolate agar) under aerobic condition. Isolated bacteria were identified by colony morphology, standard biochemical tests and their antibiotic sensitivities were done by modified Kirby-Bauer disc diffusion method.

Results

A total of 100 samples, 73(73%) were culture positive and the rest 27(27%) were culture negative. Among the 73 culture positive solates, 53(72.6%) were Gram+ve and 20(27.4%) were Gram-ve. Among culture positive isolates, *S.epidermidis* was the predominant Gram+ve organism followed by *S.aureus* and *S.pyogenes. P. aeruginosa* was the predominant Gram-ve organism followed by *E. coli* (Table I). Gram+ve organisms were highest sensitive to vacomycin (100%) followed by oxacillin (98.11%), chloramphenicol (94.33%), tetracycline and cefepime (92.5%). Highest resistance was against azithromycin (22.64%) followed by ciprofloxacin (18.9%) (Table II). Table V showing Gram-ve organisms were highest (60.0%) sensitive to tetracycline, gentamycin and amikacin followed by piperacillin-tazobactam (55.0%). Highest resistance was against ciprofloxacin (60.0%) followed by amoxiclav (55.0%) and azithromycin (55.0%) (Table III).

Table I: Distribution of bacteria isolated from urine by culture (n=83).

Gram stain	Organism	Number N(%)
Gram+ve	*S. epidermidis*	29 (39.8)
	S. aureus	22 (30.1)
	St. pyogenes	2 (2.7)
Gram-ve	*P. aeruginosa*	10 (13.7)
	E. coli	7 (9.6)
	Klebsiella sp.	3 (4.1)
Total		73 (100.0)

Table II: Antibiotic sensitivity pattern of Gram+ve organisms (n=53)

Name of antibiotics	Sensitive	Intermediate	Resistant
	Number N (%)	Number N (%)	Number N (%)
Amoxiclav	40(75.5)	5(9.4)	8(15.1)
Oxacillin	52(98.0)	1(2.0)	0(0.0)
Vancomycin	53(100.0)	0(0.0)	0(0.0)
Cefuroxim	41(77.4)	3(5.7)	9(17.0)
Cefepime	49(92.5)	2(3.8)	2(3.8)
Gentamycin	47(88.7)	4(7.5)	2(3.8)
Tobramycin	46(87.0)	1(1.9)	8(11.3)
Amikacin	47(88.7)	4(7.5)	2(3.8)
Tetracycline	49(92.5)	1(1.9)	3(5.6)
Azithromycin	41(77.4)	0(0.0)	12(22.7)
Chloramphenicol	50(94.3)	1(1.9)	2(3.8)
Ciprofloxacin	40(75.5)	3(5.7)	10(18.9)
Moxifloxacin	48(91.0)	0 (0.0)	5(9.0)

Table III: Antibiotic sensitivity pattern of Gram-ve organisms (n=20)

Name of antibiotics	Sensitive	Intermediate	Resistant
	Number N (%)	Number N (%)	Number N (%)
Amoxiclav	4(20.0)	5(25.0)	11(55.0)
Cefuroxim	5(25.0)	5(25.0)	10(10.0)
Cefepime	6(30.0)	4(20.0)	10(50.0)
Gentamycin	12(60.0	2(10.0)	6(30.0)
Tobramycin	10(50.0)	6(30.0)	4(20.0)
Amikacin	12(60.0)	5(25.0)	3(15.0)
Tetracyclin	12(60.0)	0(0.0)	8(40.0)
Azithromycin	7(35.0)	2(10.0)	11(55.0)
Chloramphenicol	10(50.0)	3(15.0)	7(35.0)
Ciprofloxacin	5(25.0)	3(15.0)	12(60.0)
Moxifloxacin	6(30.0)	4(20.0)	10(50.0)
Piperacillin-tazobactum	11(55.0)	2(10.0)	7(35.0)

Discussions

In this study, out of 100 lacrimal sac swabs, 73(73%) showed positive bacterial growth. This observation was in accordance with other studies carried out in Ethiopia[9], Nepal[10] and India[11]. This higher culture positivity may be due to the fact that, most of our population have low living standard with poor personal hygiene and sanitation system. Most have recurrent association with conjunctivitis and chronic sinusitis which predispose them to suffer from chronic dacryocystitis. The finding was different from other studies in Egypt[12] and Iran[13]. Their low culture positivity may be due to their higher socioeconomic condition which gives them a better access to health care center and proper use of antibiotics.

The reason for culture negative finding in our study may be that patient received antibiotics before sample collection or had an anaerobic bacterial or fungal infection.

In this study, Gram+ve bacterial isolation was higher, which was comparable with findings in India[6] and Egypt[12]. The reason may the opportunity of nasal and conjunctival normal flora to enter into lacrimal apparatus and produce infection when there is NLD obstruction. However, the finding was incomparable with the observation of Briscoe *et al. (2005)*[14], which showed predominance of Gram-ve bacteria and the reason may be more prolong chronicity of infection where Gram-ve bacteria from external source got access into lacrimal sac and over powered Gram+ve normal flora.

The frequency of Gram+ve isolates in this study greatly coincided with Nepal[10] and India[11] but not with Ethiopia[9]. Similarly, frequency of Gram-ve isolates were more or less similar with Ethiopia[15], India[16] but dissimilar with Israel[14], Egypt[12] and other studies in India[16,17,18]. These variations may be related with different number of cases in different studies and also their socio-demographic and geographic differences.

Regarding antibiotic sensitivity pattern, vancomycin was the most effective drug against Gram+ve organisms followed by Chloramphenicol and tetracycline, cefepime. This pattern was almost similar with the findings of India[18,19,11,17] and Nepal[10]. Dissimilarity was also observed in different studies in India[20]. Gram-ve organisms in this study exhibited much higher drug resistance.

Their most sensitive antibiotics were tetracycline, gentamycin, amikacin followed by piperacillin-tazobactam (TableVI). Similarity was observed in a study in India[20] but Nepal[10] and some other studies in India[6,17] exhibited different pattern. In general, Gram-ve bacteria are naturally more resistant to antibiotics because of having an unique outer membrane and high transformation rate. Besides, geographical variation, empirical treatment and irrational use of antibiotics may contribute to the dissimilarities.

Chronic dacryocystitis is a common ophthalmological entity. Gram+ve infection is more common and vancomycin and oxacillin are most sensitive drugs. The high culture positive finding in this study signifies the importance of culture and sensitivity test before prescribing antibiotics as an early treatment option or before doing surgery. It is beneficial both for the patient and ophthalmologist and will also prevent the emergence of drug resistant bacterial strains.

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