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Original Research Article

A Clinicobacteriological Profile of Chronic Dacryocystitis in Rural India

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ABSTRACT

Introduction: Chronic dacryocystitis, chronic infection of the lacrimal sac and nasolacrimal duct, is an important cause of ocular morbidity in adults and children mostly presented with epiphora and mucoid discharge.
Objective: To determine the current bacteriology and antibiotic sensitivity pattern of chronic dacryocystitis in a rural tertiary care hospital.
Materials and Methods: An institute based prospective observational study was carried out. Total 90 samples were obtained from cases of chronic dacryocystitis. Standard microbiological tests were carried out to identify the causative organisms. Antibiotic sensitivity pattern of the bacteria was determined using Kirby- Bauer disc diffusion technique.
Results: The disease was mostly unilateral affecting middle aged females (67.78%) mostly from rural area (63.33%) with lower socio-economic status. Most patients had history of using 'Kajal/ Surma', bathing in pond and epiphora. Seventy five samples (83.33%) were positive for bacteria, 66 (73.33%) had single isolations and 9 (10%) samples had mixed isolations. No organism was isolated from 14 (15.56%) specimens. 66 bacteria were gram-positive (78.57%) with a predominance of staphylococcus species. Gram-negative bacteria were isolated in 18 (21.43%) with predominance of Pseudomonas aeruginosa. The Gram-positive bacteria were most sensitive to vancomycin and gatifloxacin while Gram-negative organisms were most sensitive to amikacin.
Conclusion: Gram positive bacteria especially Staphylococcus aureus is the most common cause of chronic dacryocystitis. Gatifloxacin is the single most effective agent both pre and post operatively.

Key words: Chronic dacryocystitis, lacrimal sac, epiphora, Staphylococcus aureus, gatifloxacin.

INTRODUCTION

Chronic dacryocystitis is chronic inflammation of lacrimal sac and nasolacrimal duct, frequently caused by bacteria. Distal obstruction of nasolacrimal duct converts the lacrimal sac into a stagnant pool, which easily becomes infected leading to chronic dacryocystitis. [1] It may be primary affecting middle aged and elderly women or may be secondary to trauma, neoplasm or mechanical obstruction. [2,3] Whatever may be the cause, stasis provides a fertile media for the bacterial growth which may rise to vision threatening

complications like corneal ulcer, endophthalmitis following intra ocular surgery. [4,5]

A large number of studies on microbiological profile of chronic dacryocystitis have been reported. The sac fluid yielded pure growth in 66.4%, mixed growth in 15.1%, no growth in 18.5%. Pseudomonas aeruginosa was the commonest organism (21.9%) followed by Staphylococci (14.3%). [6] Kebede A et el documented five most common isolates viz. Streptococcus pneumoniae (23%), Streptococcus pyogenes (14.3%), Staphylococcus aureus (12.1%), Streptococcus viridans (9.9%) and Haemophilus influenzae (9.9%). [7] Eeffective antibiotic agents were chloramphenicol (82.4%), gentamicin (79.1%), erythromycin (68.1%) and tetracycline (61.5%). Similarly in other study Coagulase negative staphylococci was documented as the most frequently isolated bacteria and Chloramphenicol was the most effective drug. [8]

Though many studies on dacryocystitis are available, still there is a considerable scope to research on the changing pattern of causative pathogens in a geographical area as well as their antibiotic sensitivity pattern. So, this study was conducted to reveal the current bacteriology and in vitro antibiotic sensitivity pattern in a rural tertiary hospital with a huge catchment area in South Bengal and parts of neighbouring states of Bihar and Jharkhand.

MATERIALS AND METHODS

This research was conducted under the Institutional Ethical Committee approval and conformed to the tenets of the Declaration of Helsinki. A hospital based prospective observational study was carried out from March 2011 to February 2012 on 90 clinically diagnosed cases of chronic dacryocystitis. Patients of acute dacryocystitis, having history of previous lacrimal surgery were excluded from the study.

In congenital cases, the surrounding area was aseptically cleaned and samples were collected in two sterile cotton swabs either by applying pressure over the sac or by irrigating the lacrimal drainage system with sterile saline ensuring that the lid margins or the conjunctiva were not touched. In adults, samples were collected as in infants and also during Dacryocystorhinostomy or Dacryocys-tectomy. Sample from more symptomatic side was taken first in bilateral cases.

The samples were immediately sent to the Microbiology laboratory for testing according to Clinical and Laboratory Standards Institute (CLSI) guidelines. The study was limited to studying the aerobic and facultative anaerobic bacteria. Specimens were processed in the following ways-

1. Gram staining: Particular attention was paid to the numbers and variety of different morphological forms of Gram positive and Gram negative bacteria.
2. Examination of wet film: to identify motile bacteria.
3. Culture Procedure:

On the day 1, the specimen was streaked on Nutrient agar plate and Mac Conkey's agar plate, maintaining aseptic condition and was incubated overnight at 37°C. On the second day, colony and cultural characteristics were studied from the incubated plates. The Gram's staining was performed. Various biochemical tests (Viz. for Gram positive bacteria: Catalase, Coagulase, VP etc. and for Gram negative bacteria: Catalase, Oxidase, SIM, TSI, Urease, OF etc.) were carried out, various media (selective and differential) were inoculated and incubated overnight at 37°C depending upon the Gram reaction and

lactose fermenting nature of the organisms. On the third day, culture characteristics and results of different biochemical tests were observed. The organisms were identified on the basis of morphological, colony characteristics and biochemical reaction.

4. Antibiogram Study:

In this in vitro study, antimicrobial sensitivity was determined by Kirby-Bauer disc diffusion method. After inoculating antibiotic discs, the plates were incubated for 18-24 hours at 37^{o}C. The zone of inhibition around the disc was measured and compared to the standard interpretative chart.

Data analysis:

Statistical analysis was done using Epi info Software Version 3.5.3. Fisher exact 2-tailed test was applied. $p \leq 0.05$ was considered statistically significant.

RESULTS

Results of various parameters were as follows -

Table No.1: Distribution of Cases according to Age (n=90)

Age in years	Total no. of cases (%)
0 – 15	3 (3.33)
16 – 30	10 (11.11)
31 – 45	27 (30.00)
46 – 60	41 (45.56)
>61	9 (10.00)
Total	90 (100.00)

The mean age for congenital and acquired dacryocystitis was 7 months and 49.82 years respectively.

Table No.2: Distribution of cases according to demographic characteristics (n=90)

Gender No (%)		Complaints No (%)		Type No (%)		Residence No (%)		Laterality No (%)		Ocular Complications No (%)	
Male	Female	Epiphora	Mucocele	Congenital	Acquired	Rural	Urban	Unilateral	Bilateral	Yes	No
29 32.22	61 67.78	83 92.12	6 7.78	3 3.33	87 96.67	57 63.33	33 36.67	72 80	18 20	14 15.55	76 84.45

The male and female ratio (M: F) in congenital and acquired dacryocystitis was 1:2 and 1: 2.1 respectively. The difference between sex and type of dacryocystitis was not statistically significant (p = 1.000).

Table No. 3: Distribution of cases according to socio-economic status (n= 90)

Socio-Economic Status	Per capita monthly income (Rs) B.G.PRASAD's Social Classification Scale for the Month of December 2004		No (%)
	Original Prasad's Scale	Modified proposed scale	
Upper High	≥100	≥10000	0 (0)
High	50-99	5000-9999	2 (2.22)
Upper Middle	30-49	3000-4999	10 (11.11)
Lower middle	15-29	1500-2999	28 (31.11)
Poor	<15	500-1499	43 (47.78)
Very poor(BPL)	—	<500	7 (7.78)

The disease was more prevalent in lower socio-economic status (86.67%).

Table No. 4: Distribution of cases according to spectrum of Gram positive bacterial isolates and antibiogram pattern

Organisms	Strains No (%)	Cx*No (%)	Co*No (%)	Cf*No (%)	V*No (%)	A*No (%)	Gati*No (%)
Staphylococcus aureus	48 (100)	3 (6.25)	33 (68.75)	32 (66.67)	48 (100)	26 (54.17)	46 (95.83)
Staphylococcus epidermidis	1 (100)	0	1 (100)	1 (100)	1 (100)	0	1 (100)
Streptococcus pneumoniae	12 (100)	0	11 (91.67)	10 (83.33)	11 (91.67)	6 (50)	12 (100)
Beta hemolytic Streptococci	4 (100)	0	4 (100)	4 (100)	4 (100)	0	3 (75)
Enterococci	1 (100)	0	1 (100)	1 (100)	1 (100)	0	1 (100)

*Cx . – Co-trimoxazole; *Co. – Co-amoxyclav; *Cf. – Ceftriaxone; * V. -- Vancomycin ; *A. – Amikacin; *Gati.-- Gatifloxacin

Table No. 5: Distribution of cases according to spectrum of Gram negative bacterial isolates and antibiogram pattern

Organisms	Strains No (%)	Cx*.No (%)	Co*.No (%)	Cf*.No (%)	V*No (%)	A*No (%)	Gati*No (%)
Pseudomonas aeruginosa	11(100)	1(9.09)	0	9(81.81)	0	11(100)	9(81.81)
Klebsiella pneumoniae	6(100)	2(33.33)	0	5(83.33)	0	6(100)	5(83.33)
Escherichia coli	1(100.00)	0	0	1(100)	0	1(100)	1(100)

*Cx . – Co-trimoxazole; *Co. – Co-amoxyclav; *Cf. – Ceftriaxone; * V. – Vancomycin; * A. – Amikacin; *Gati.-- Gatifloxacin

Most frequent Gram-positive documented organism in adults was Staphylococcus aureus (57.14%) mostly sensitive to vancomycin and gatifloxacin. Pseudomonas aeruginosa was the most frequent Gram negative organism sensitive to amikacin and gatifloxacin.

DISCUSSION

Dacryocystitis is an important cause of ocular morbidity both in children and adults. [9] The mucosa of lacrimal excretory system is continuous with conjunctival and nasal mucosa. Obstruction of nasolacrimal duct results in stasis of tears and accumulation desquamated cells, mucus which creates a fertile environment for bacterial growth.

The disease is more prevalent in older patients which may be due to atony of the sac. [10-13] Rural females are affected more commonly (M: F= 1: 2.1). Narrow naso lacrimal canal, hormonal factors, lack of hygiene, using "Kajal/ Surma," pond bathing and working in the dusty environment may be responsible for female predilection of the disease. [14-17] Males are more predominant in congenital dacryocystitis. [9,18,19] Although no sexual predilection was noticed by Noda S et al in congenital dacryocystitis. [11]

The disease was predominantly unilateral mostly affecting right side. [9,11] Various ocular complications (recurrent conjunctivitis, corneal ulcer and hordeolum externum) were found in 15.55 % of patients. [20,21] Single organism was isolated in 73.33 % and mixed organisms in 10 % of cases. [18, 20,21] No growth was documented in 14(15.56 %) cases which may be due to presence of anaerobic organisms. [13,21] Gram-positive organisms were documented in 78.58 % and Gram-negative organisms in 21.42 %. [13,21,22] The most commonly documented Gram-positive isolate congenital and acquired cases were Streptococcus pneumoniae and Staphylococcus aureus respectively. [8,20,21] But, Staphylococcus epidermidis was more predominant in adult as per other studies. [22,23] The second most common Gram positive organism in adults was Streptococcus pneumoniae (14.29 %) which is supported by Gutierrez et al (8%). [24] In our study, the most common Gram-negative isolate was Pseudomonas aeruginosa (13.09%). [24-26]

The most effective antibiotic against all organisms was Fluoroquinolones (Gatifloxacin). Kuchar A et al documented ofloxacin and tetracycline as the most effective single agent followed by chloramphenicol, bacitracin and ciprofloxacin. [14] Ghose S et al documented tobramycin (100 %), followed by gentamicin (97 %) and vancomycin (97 %) as effective antibiotic against all organisms. [9] Usha K et al demonstrated that Gram-positive organisms exhibited a higher sensitivity to chloramphenicol, vancomycin, and ofloxacin. [18] Mandal R et al showed that most of the organisms were resistant to penicillin. Chloramphenicol was effective against most of the Gram-positive organisms while Fluoroquinolones were effective against Gram negative organisms like Pseudomonas aeruginosa and Klebsiella pneumoniae. [21] Bacterial isolates have geographical and time variations. Therefore bacterial isolate and sensitivity pattern in our study varies with other investigators.

The limitations of this study were study period and sample size. A larger study group with a longer study period may yield better outcome. Secondly, a comparative bacteriological study among acute and chronic dacryocystitis would be very fruitful. Lastly, anaerobic culture may be included to isolate the anaerobic organisms for analysis.

CONCLUSIONS

Chronic dacryocystitis, a constant threat to the eye, may lead to vision threatening complications like corneal ulcer, endophthalmitis etc. Knowledge of bacteriology and anti microbial sensitivity in a particular geographic area is necessary for formulation of a management protocol to reduce the cost burden and emergence of drug resistant strains. In our study, the most common organism in adults was Staphylococcus aureus and in children was Streptococcus pneumoniae. Among the gram negative organisms, Pseudomonas aeruginosa was most common. The single most effective antimicrobial agent against all bacteria was found to be topical fluoroquinolone gatifloxacin.

REFERENCES

1. Traquair HM. Chronic dacryocystitis, its causation and treatment. Arch Ophthalmol 1941; 26:165-80.
2. Linberg JV, Mc Cormic SA. Primary acquired Nasolacrimal Duct Obstruction: A clinico-pathological report and biopsy technique. Ophthalmology 1986;93(8):1055-62.
3. Bartley GB. Acquired lacrimal drainage obstruction: an etiologic classification system, case reports, and a review of the literature. Part 1. Ophthal Plast Reconstr Surg 1992;8(4):237-49.
4. Lacrimal drainage system. In: Kanski JJ, editor. Clinical Ophthalmology, 6th ed. New York: Butterworth-Heinemann; 2007. p. 163-4.
5. Diseases of the lacrimal apparatus. In: Shihota R, Tandon R, editors. Parson's diseases of the eye. 20th ed. Noida: Elsevier; 2007. p. 446-7.
6. Sood NN, Ratnaraj A, Balaraman G, Madhavan HN. Chronic dacryocystitis - a clinico-bacteriological study. J All India Ophthalmol Soc. 1967;15(3):107-10.
7. Kebede A, Adamu Y, Bejiga A. Bacteriological study of dacryocystitis among patients attending in Menelik II Hospital, Addis Ababa, Ethiopia. Ethiop Med J. 2010 Jan;48(1):29-33.
8. Chaudhary M, Bhattarai A, Adhikari SK, Bhatta DR. Bacteriology and antimicrobial susceptibility of adult chronic dacryocystitis. Nepal J Ophthalmol 2010;2(2):105-13.
9. Ghose S, Jha RK, Nayak N, Satpathy G. Current Microbial Correlates of the Eye and Nose in Dacryocystitis – Their Clinical Significance. AIOC Proceedings. 2005. p. 437-9.
10. Alfred GJ, Mansour K, Manoliu RA. Abscess of the Lacrimal Sac due to Chronic or Subacute Dacryocystitis: Treatment with Temporary Stent Placement in the Nasolacrimal duct. Radiology 2000;215(1):300-4.
11. Noda S, Hayasaka S, Setogawa T. Congenital nasolacrimal duct obstruction in Japanese infants: its incidence and treatment with massage. J Pediatr Ophthalmol Strabismus 1991;28 (1):20-2.
12. Chaudhry IA, Shamsi FA, Al-Rashed W. Bacteriology of chronic dacryocystitis in a tertiary eye care centre. Ophthal Plast Reconstr Surg 2005;21(3):207-10.
13. Hartikainen J, Lehtonen OP, Saari KM. Bacteriology of lacrimal duct obstruction in adults. Br J Ophthalmol 1997;81(1):37-40.
14. Kuchar A, Lukas J, Steinkogler FJ. Bacteriology and antibiotic therapy in congenital nasolacrimal duct obstruction. Acta Ophthalmol Scand 2000;78:694-8.
15. Badhu B, Dulal S, Kumar S, Thakur SK, Sood A, Das H. Epidemiology of chronic dacryocystitis and success rate of external dacryocystorhinostomy in Nepal. Orbit 2005;24(20:79-82.
16. Machin SJ, Castillo Laguarta JM, De Gregorio Ariza MA, Medrano J, Cristobal Bescos JA. Lacrimal duct obstruction treated with lacrimonasal stent. Arch Soc Esp Oftalmol 2003;78(6):315-8.

17. Janssen AG, Mansour K, Bos JJ, Castelijns JA. Diameter of the bony lacrimal canal: normal values and values related to nasolacrimal duct obstruction: assessment with CT. Am J Neuroradiol 2001;22(5):845-50.
18. Usha K, Smitha S, Shah N, Lalitha P, Kelkar R. Spectrum and the Susceptibilities of Microbial Isolates in Cases of Congenital Nasolacrimal Duct Obstruction. J Pediatr Ophthalmol Strabismus 2006;10(5):469-72.
19. Brook I, Frazier EH. Aerobic & Anaerobic Microbiology of Dacryocystitis. Am J Ophthalmol 1998;125 (4):552–4.
20. Sun X, Liang Q, Luo S, Wang Z, Li R, Jin X. Microbiological analysis of chronic dacryocystitis. Ophthalmic Physiol Opt. 2005;25(3):261-3.
21. Mandal R, Banerjee AR, Biswas MC, Mondal A, Kundu PK, Sasmal NK. Clinicobacteriological study of chronic dacryocystitis in adults. J Indian Med Assoc 2008;106(5):296-8.
22. Das JK, Deka AC, Kuri GC, Bhattacharjee K, Das D, Gogoi K. Bacteriology of chronic dacryocystitis in adult population of northeast India. Orbit 2008;27(4):243-7.
23. Coden DJ, Hornblass A, Haas BD. Clinical bacteriology of dacryocystitis in adults. Ophthal Plast Reconstr Surg 1993;9(2):125-31.
24. Gutierrez EH. Bacteriological infections of the eye. In: Khorazo DL, Seegal BC, editors. Microbiology of eye. St.Louis: CV Mosby; 1972. p. 63.
25. Sainju R, Franzco AA, Shrestha MK, Ruit S. Microbiology of dacryocystitis among adults population in southern Australia. Nepal Med Coll J 2005;7 (1):18-20.
26. Briscoe D, Rubowitz A, Assia EI. Changing bacterial isolates and antibiotic sensitivities of purulent dacryocystitis. Orbit 2005;24(2):95-8.

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