ISSN 2515-8260 Volume 9, Issue 7, Summer 2022

ORIGINAL RESEARCH

Chronic Dacryocystitis Clinico-Microbiological Study

[1]Poulami Nandi, [2]Suman Adhikari, [3]Parikshit Nandi

[1]Associate Professor, Department of Microbiology, Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal, India
[2]Associate Professor, Department of Ophthalmology, ICARE Institute of Medical Sciences and Research & Dr.Bidhan Chandra Roy Hospital, Haldia, West Bengal, India
[3]Associate Professor, Department of Ophthalmology, Gouri Devi Institute of Medical Sciences and Hospital, Rajbandh, Durgapur, West Bengal, India

Correspondence:
Parikshit Nandi
Associate Professor, Department of Ophthalmology, Gouri Devi Institute of Medical Sciences and Hospital, Rajbandh, Durgapur, West Bengal, India

ABSTRACT

Background: Chronic dacryocystitis is the most prevalent adnexal illness encountered in routine treatment and is a major cause of ocular morbidity in India.

Methodology: This cross-sectional study comprised 200 consecutive individuals with persistent dacryocystitis. All subjects had baseline examination after providing signed informed consent. By applying pressure to the lacrimal sac and allowing the regurgitant material to reflux via the lacrimal puncta, or by irrigating the lacrimal drainage system with sterile saline and collecting the sample from the refluxing material, sample fluid was collected. Gram staining and culture were performed on the samples, which were delivered to the microbiology department. The Kirby Baur disc diffusion test was used to assess antibiotic sensitivity in cultured bacterial growth.

Results: Chronic dacryocystitis is most common in the fifth decade of life. Females are more likely than males to develop chronic dacryocystitis. The left eye was more affected than the right. The majority of patients developed mucopurulent discharge. When compared to cases with serous discharge, the percentage of samples yielding positive growth on culture was higher in cases with mucopurulent and purulent discharge. On culture, the majority of patients with serous discharge exhibited no growth. The majority of individuals had epiphora with mucopurulent or purulent discharge. The most common nasal association was a deviated nasal septum. Microorganisms were found in 58.7% of the samples cultivated.

Conclusion: Knowledge of the bacteriology of chronic dacryocystitis aids in the selection of prophylactic antimicrobial drugs that act precisely on the pathogenic organism and also helps to prevent antibiotic resistance induced by injudicious antibiotic usage.

Keywords: Dacryosystitis, antibiotic resistance, Gram positive, Amikacin, Sensitive

INTRODUCTION

Dacryocystitis is an inflammation of the lacrimal sac caused by a blockage of the nasolacrimal duct. The lacrimal drainage equipment is an efficient tear drainage mechanism. When the drainage device becomes obstructed, the sac contents become stagnant, becoming a reservoir for the development of infection. Because of the tight contact of conjunctival and nasal mucosa with the sac, it is more susceptible to infection. The nose, paranasal sinuses,

ISSN 2515-8260 Volume 9, Issue 7, Summer 2022

and pericystic tissues are the most prevalent sites of infection [1]. Dacryocystitis is divided into two types: acute and chronic. Acute dacryocystitis is characterised by discomfort, redness, and soreness over the sac area.

Chronic dacryocystitis is characterised by prolonged epiphora and regurgitation of mucoid or mucopurulent material when pressure is applied to the sac region. The chronic type of dacryocystitis is characterised by chronic tearing, thickening of the lacrimal drainage system, and germ buildup; the majority of patients usually host numerous bacteria. It is an ongoing danger to the cornea and orbital tissue. Dacryocystitis complications include fistula, corneal ulcer, and orbital cellulitis; also, it causes social shame owing to long-lasting epiphora. Epiphora is a common condition that both socially and functionally embarrasses the patient.

Understanding the regional etiological agents is critical in illness management. Knowledge of the bacteriology of chronic dacryocystitis would aid in the selection of appropriate antimicrobial drugs and aid in the fight against antibiotic-resistant diseases. The purpose of this research is to identify the present bacterial flora implicated in chronic dacryocystitis so that appropriate antibiotic prophylaxis can be determined.

This study will look at chronic dacryocystitis in terms of age, gender, laterality, aetiology, symptoms, and signs, as well as the various forms of presentation. In addition, the current spectrum and relative incidence of microorganisms causing chronic dacryocystitis, as well as antibiotic sensitivity for the same, must be defined.

METHODS

This observational research was conducted on dacryocystitis at the Department of Ophthalmology, Gouri Devi Institute of Medical Sciences and Hospital, Durgapur. A total of 200 clinically confirmed patients of dacryocystitis who presented to the emergency department or were hospitalised for care were chosen for the study, and informed consent was obtained.

INCLUSION CRITERIA

Patients with epiphora, purulent or mucopurulent regurgitation, or mucocele were included in the study. Patients with external lacrimal fistula and sac syringing demonstrated occlusion in the lower lacrimal tube with regurgitation from the other punctum were also included.

EXCLUSION CRITERIA

Patients with acute dacryocystitis and other adnexal swellings were ruled out.

The clinical was based on clinical history, which included distribution factors such as age, gender, occupation, the patient's socioeconomic status, the nature and duration of symptoms, and patients detected during routine local investigation procedures for intraocular surgeries and corneal ulcer patients. A microbiological examination of the regurgitant material was performed in order to identify the organisms and their susceptibility to various antibiotics. A routine ENT exam was also performed to diagnose nasal pathology.

MICROBIOLOGICAL EXAMINATION

Gram staining - A Gram stained smear provides information on the shape of the bacteria as well as their Gram reaction of the smear produced from regurgitant material, which may exhibit gramme positive, gramme negative cocciorbacilli.

Following the collection of samples based on bacteria identified using the Grams stain, empirical antibiotic treatment was initiated.

Zeil Nelson's staining- The mycobacterium's cell wall contains mycolic acid, which makes dye penetration difficult. Mycobacterium tuberculi and Mycobacterium leprae may be found on a smear.

ISSN 2515-8260 Volume 9, Issue 7, Summer 2022

On the day of collection, swab samples were grown on blood agar, chocolate agar, and Mac conkey agar and aerobically incubated.

STATISTICAL ANALYSIS

The data were expressed as percentages and proportions for the distribution of chronic dacyocystitis cases based on age, gender, nature of the discharge, presenting complaints, socioeconomic status, findings of lacrimal syringing, bacteria isolated, and sensitivity to various antibiotics.

RESULTS

In our study of 200 patients, 100 were girls and 100 were males, with each contributing 50%. Females had the highest prevalence between the ages of 40 and 49, whereas males had the highest incidence between the ages of 60 and 69. Females presented at an average age of 45.2 years, whereas males presented at an average age of 51.1 years (Table 1).

Table 1: Age and sex incidence

Age Group (years)	Male	Female
	No. Of cases	No. Of cases
10 – 19	12	13
20 – 29	13	16
30 – 39	16	10
40 – 49	15	20
50 – 59	15	14
60 – 69	17	19
70 & above	12	8

In our study, 42.7% of the cases had epiphora and discharge, while 22.2% had only epiphora. A lacrimal sac edoema was found in 11.1% of the patients (Table 2). 11.1% of them presented with complaints of blurred vision and were discovered to have chronic dacryocystitis when being evaluated for cataract surgery. 8 patients (6.8%) reported with a fistulous tract problem, and 5 of them had lid edoema coupled with pain at the time of presentation. Following a car accident that resulted in facial and nasal bone deformity, a limited number of patients n=2 (1.7%) reported with epiphora and discharge.

Table 2: Presenting complaints

Clinical features	No. Of cases
Epiphora with discharge	80
Epiphora associated with swelling of lacrimal sac	23
Epiphora only	36
Epiphora with fistula	18
Epiphora and discharge post trauma	5
Edema of lid	15
Diminution of vision	23

Among the positive cultures, Gram positive bacteria were found in the majority of the samples (n= 55, 72.3%). (Table 3). The staphylococcus species were the most frequently isolated. Staphylococcus aureus was found in 22 (28.9%) of the samples, while coagulase negative Staphylococcus was found in 13 (17.1%). Pneumococcus was the second most usually isolated organism (18 samples, 23.6%). E.Coli was used to grow only one sample. Pseudomonas was found in 9 (11.8%) of the 20 Gram negative bacteria samples, and

Klebsiella was found in 7 (9.2%). Citrobacter was discovered in three samples, Diphtheroids in two, and E. Coli was found in one.

Table 3: Causative organism

Organisms	No. Of samples
Gram positive organisms	55
Pneumococcus	18
Staphylococcus aureus	22
Coagulase negative Staphylococci	13
Enterococcus	11
Gram negative organisms	21
Klebsiella	17
E.Coli	11
Pseudomonas	19
Diphtheroids	12
Citrobacter	13

DISCUSSION

Chronic dacryocystitis, also known as chronic inflammation of the lacrimal sac, is a common condition all around the world. This study tried to examine the changing trend in bacteriology and antibiotic sensitivity in order to treat the condition more efficiently while preventing antibiotic resistance.

Male to female ratio was 2.25:1. This is consistent with several other studies that have found a higher prevalence of the condition in women. According to Bharathi et al. [4], the female to male ratio is 3.9:1. Women are more frequently affected than men, according to Kanogratpornpanich et al [5] and Ahuja et al [6], with a 3:1 female preponderance. In their study in a tertiary hospital, Ahuja et al [6] discovered that 41.9% were males and 58.1% were females. The incidence of dacryocystitis in females has been reported to be 83% in various different investigations. In contrast to the preceding research and ours, NN Sood [7] reported a 1.7:1 female-to-male ratio in 1967.According to Duke Elder, while the condition affects both sexes equally in newborns, it affects 75-80% of girls and 25% of males in adults[1]. The measurement of the bony nasolacrimal duct system revealed that women have much smaller nasolacrimal fossa and middle nasolacrimal ducts, which may explain why women have a higher prevalence of the condition. According to H.Basil Jacobs in 1959, females have a larger vascular congestive factor and a narrow bone canal, and so are plagued by chronic dacryocystits. The mean age at presentation for females in the current study was 45.2 years. Males presented at an average age of 51.1 years.

There was a little prevalence of left sided dacryocystitis in our series of 117 individuals, accounting for 55.5%. (65 cases). 36.7% (43 patients) had right-sided disease, while 7.7% (9 instances) had bilateral disease. This is consistent with P.Shiva Reddy and Veris (1955). Ghose et al [10] and Patel K [8] discovered a 40% and 56% increase in illness incidence on the left side compared to the right side.

Watering and discharge from eyes were the most common presenting complaints (50 cases, 42.7%), followed by watering (epiphora) alone in 26 cases (22.2%). When compared to earlier studies, our investigation identified more instances with complaints of watering as well as discharge [7]. An accompanying swelling over the lacrimal sac area was found in 13 patients (11.1%). Patel K et colleagues [8] found that 70% of patients had mucopurulent discharge and 30% had edoema above the lacrimal sac associated with epiphora (38%), which was similar to our findings. In the current investigation, we found 8 (6.8%) individuals with a fistulous tract above the lacrimal sac area, and a minor fraction of patients (4.2%) had lid edoema.

ISSN 2515-8260 Volume 9, Issue 7, Summer 2022

MICROBIOLOGICAL STUDY

The diversity and proportion of bacterial pathogens, as well as antibiotic susceptibility, may vary by area [4]. In this study, 74 (58.7%) of 126 samples obtained from 117 patients were culture positive, while 52 (41.2%) samples exhibited no growth after 24 hours of incubation. According to various research on chronic dacryocystitis, culture positive rates range from 52.5% to 97.3%. Ahuja S et al reported a high percentage of sterile cultures (61%) in their study, which is similar to ours, however several studies reported a higher number of culture positive cases.Few studies reported a high number of culture positive samples, with one suggesting that inoculation of tissue samples on culture media rather than pus swabs was the cause of the higher number of culture positive rates [9]. Different sample collection strategies may alter the degree of overall culture positive. Hartikainen et al[15] collected material from the lacrimal puncta or by wiping a broth-soaked swab across the lower conjunctival cul-de-sac and found positive cultures in 84% of the samples. DeAngelis et al [16] examined the posterior lacrimal flap and discovered that only 41.7% of the samples tested positive for culture.

Growth was detected in 74 samples (58.71%) in our investigation. 72 (97.2%) of the eyes had single bacterial isolations, while 2 (2.7%) had mixed bacterial isolations. Kebede et al [17] conducted a study in Ethiopia and found (79.8%) good results. These findings were lower than those of Das et al [18], who reported that 90.9 percent of the cases tested positive for bacteria. In addition, he reported that 74.5 percent of the isolates were singles, whereas 16.3 percent were mixed bacterial isolates. According to Chaudhary et al [19], 97.3 percent of the cultures were positive for bacteria, 33.9 percent of the cultures showed a single bacterium, and 66.1 percent of the cultures showed more than two microorganisms. Gram positive isolates outnumbered gramme negative organisms in our investigation, as in many other studies.Streptococci were a prevalent cause of persistent dacryocystitis in the pre-antibiotic period. Streptococci have been replaced by Staphylococci with the discovery of effective antibiotics such as penicillin and cephalosporins.

Gram positive bacteria were detected in 72.3% of the isolates in this investigation. This is consistent with Coden et al's [20] observation of 65% of gram-positive organisms. Staphylococcus species (46%) were the most often cultivated among all culture positive samples in the current investigation, with Staphylococcus aureus accounting for 28.9% and Coagulase negative Staphylococcus accounting for 17.1%. This percentage contrasts favourably with the findings of Huber-Spitzy et al and Coden et al (51% and 49%, respectively). Mandal et al. found similar results in their investigation of 56 patients in Kolkata, with Gram positive Staphylococci aureus being the most commonly implicated bacterium.While Shah and Santani reported from Jodhpur in July 2011 that the cultures contained an equal amount of Gram positive and Gram negative organisms [21]. Ciprofloxacin sensitivity was 100% against Klebsiella and E. Coli, 88.8% against Pseudomonas, and only 50% against Diphtheroids in our investigation. Citrobacter, Diphtheroids, and E. Coli all demonstrated amikacin sensitivity, whereas Klebsiella showed 83.3% susceptibility. Gentamycin was 100% effective against Klebsiella but only 44.4% effective against Pseudomonas. Penicillins, Cephalosporins, and Vancomycin were found to be less sensitive.

CONCLUSION

Surgery is used to treat adult lacrimal duct blockage. Some studies have found that open lacrimal surgery without systemic antibiotic prophylaxis increases the risk of soft tissue infection. Knowledge of the bacteriology of chronic dacryocystitis aids in the selection of prophylactic antimicrobial drugs that act precisely on the pathogenic organism and also helps to prevent antibiotic resistance induced by injudicious antibiotic usage.

REFERENCES

1. Duke Elder S, Cook C. Diseases of the lacrimal passages. In: Duke-Elder S, editor. System of Ophthalmology, Vol. 13, PartII. St. Louis, CV: Mosby Elsevier; 1974:675-724.
2. Paulsen F. The human nasolacrimal ducts. Advances in Anatomy, Embryology and cell biology 2003; 170:1-106.
3. Thicker JA, Buffam FV. Lacrimal sac, conjunctival, and nasal culture results in dacryocystorhinostomy patients. OphthalPlastReconstr Surg 1993; 9:43–46.
4. Bharathi MJ,RamakrishnanR,ManekshaV,Shivakumar C, Nithya V,Mittal S. Comparative bacteriology of acute and chronic dacryocystitis. Journal of Aravind eye care System 2008; 8:20-28.
5. Pornpanich K, Luemsamran P, LeelapornA,JirapornSantisukJ, Tesavibul N, Lertsuwanroj B, Vangveeravong S. Microbiology of primary acquired nasolacrimal duct obstruction: simple epiphora, acute dacryocystitis, and chronic dacryocystitis. Clin Ophthalmol. 2016; 10:337–342.
6. Ahuja S, Chhabra AK, Agarwal J. Study of Bacterial Spectrum in Patients of Chronic Dacryocystitis, At a Tertiary Care Centre in Northern India. J Community Med Health Educ. 7:536.
7. Sood NN, Ratnaraj A, Balaraman G, Madhavan HN. Chronic dacryocystitis-clinicobacteriological study. J All India Ophtha- lmol Soc. 1967;15:107-10.
8. Patel K, Magdum. A clinic bacteriological study of chronic acryocystitis.Sudanese Journal of Ophthalmology.2013; 6(1): 1-5.
9. Chandra TJ, Satish K, Selva Raj R, Sharma YV. Isolation of dacrocystitis causing bacteria among the patients of East Godavari district, district, Andhra Pradesh. Bangladesh Journal of Medical Science. 2016; 15:399-402
10. Ghose S, Mahajan V M. Fungal flora in congenital dacryocystitis. Indian J Ophthalmol.1990;38(4):189–190.
11. Bhuyan J, Das S. A clinicobacteriological study on chronic acryocystitis. AIOC Proc. 2010:392-3.
12. Sihota R, Tandon R. Parsons' Diseases of the Eye; 20 th ed. New Delhi: Elsevier; 2007, 447p
13. Mandal R, Banerjee AR, Biswas MC, Mondal A, Kundu PK, Sasmal NK. Clinicobacteriological study of chronic dacryoc- ystitis in adults. J Indian Med Assoc.2008;106(5):296-98.
14. Bale RN. Dacryocystitis: Bacteriological study and its relation with nasal pathology. Indian J Ophthalmol. 1987;35:178-82.
15. Hartikainen J, Lehtonen OP, Saari KM. Bacteriology of lacrimal duct obstruction in adults. Br J Ophthalmol. 1997; 81:37–40.
16. Huber-SpitzyV,SteinkoglerFJ,HuberE,Arocker-MettingerE,Schiffbänker M. Acquired dacryocystitis: microbiology and conservative therapy. Acta Ophthalmol. 1992;70(6):745–749.
17. Kebede A, Adamu Y, Bejiga A. Bacteriological study of dacryocystitis among patients attending in Menelik II hospital, Addis Ababa, Ethiopia. Ethiop Med J. 2010; 48:29–33.
18. 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.
19. Chaudhary M, Bhattarai A, Adhikari SK, Bhatta DR. Bacteriology and antimicrobial susceptibility of adult chronic dacryocystitis. Nepal J Opthalmol. 2010; 2:105-113.
20. Coden DJ, Hornblass A, Haas BD. Clinical bacteriology of dacryocystitis in adults. OphthalPlastReconstr Surg.1993; 9: 125–131.
21. Shah CP, Santani D. Bacteriology of dacryocystitis. Nepal J Ophthalmol. 2011;3(6):134-139.