

Clinico– Microbiological Study of Chronic Dacryocystitis

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Abstract

Background: Chronic dacryocystitis is the most commonly encountered adnexal disease met within the routine practice and is important cause of ocular morbidity in India. **Methodology:** 117 consecutive patients diagnosed with chronic dacryocystitis were included in this cross sectional study. After obtaining a written informed consent all the subjects underwent baseline evaluation. Sample fluid was collected by applying pressure over the lacrimal sac and allowing the regurgitant material to reflux through the lacrimal puncta or by irrigating the lacrimal drainage system with sterile saline and collecting the sample from the refluxing material. The samples were sent to microbiology department for Grams staining and culture. Antibiotic sensitivity testing was done for the cultured bacterial growth by the Kirby Baur disc diffusion test. **Results:** Chronic dacryocystitis shows highest incidence in the 5th decade of life. Chronic dacryocystitis is more common in females than in males. Left eye was involved more than right eye. Majority of patients had mucopurulent type of discharge. Among cases with mucopurulent and purulent discharge the percentage of samples yielded positive growth on culture were higher as compared to cases with serous discharge. Majority of cases with serous discharge showed no growth on culture. Majority of patients presented with epiphora associated with mucopurulent or purulent discharge. Deviated nasal septum was the predominant nasal association. 58.7% of the samples cultured were positive for microorganisms. The commonest aerobic Gram positive bacteria cultured were Staphylococcus species. Among Gram negative bacteria Pseudomonas and Klebsiella were common. Anaerobic organisms could have been responsible in many cases that yielded no growth in our study. The Gram positive isolates were more sensitive to Vancomycin followed by Erythromycin and Clindamycin. The Gram negative isolates were most sensitive to Ciprofloxacin and Amikacin. **Conclusion:** Knowledge about bacteriology of chronic dacryocystitis contributes significantly to choice of prophylactic antimicrobial agents that act specifically on the causative organism and also prevents antibiotic resistance caused due to injudicious use of antibiotics.

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

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Introduction

Lacrimal apparatus is one of the most important structure of ocular appendage. Its malfunctioning poses numerous unavoidable difficulties in proper functioning of ocular tissues. Lacrimal passage obstruction is a common condition encountered in clinical practice. Dacryocystitis is the obstruction of nasolacrimal duct or nasolacrimal sac leading to its acute inflammation if it is short duration and chronic one if it is of long duration. Sometimes there may be an acute exacerbation of a chronic dacryocystitis leading to lacrimal abscess which eventually may rupture and heal or form a chronic discharging lacrimal fistula. Dacryocystitis has a worldwide distribution with a higher incidence seen among people living in tropical countries with poor hygienic conditions. It is important cause of ocular morbidity in both children and adults with more female preponderance (80%) probably due to the narrow lumen of bony canal [1]. The obstruction may be an idiopathic inflammatory stenosis (Primary acquired nasolacrimal duct obstruction)[2] or may be secondary due to trauma, inflammation, neoplasm or mechanical obstruction

(secondary acquired lacrimal drainage obstruction)[3]. Obstruction of the nasolacrimal duct from any source results in stasis of tears, desquamated cells and mucoid secretions superior to the obstruction in a pathologically closed lacrimal drainage system. This creates a fertile environment for secondary bacterial infection and can result in dacryocystitis which is a constant treat to cornea and orbital soft tissue. It is the most common cause of epiphora and may present with or without mucopurulent discharge. Several studies have shown that bacterial pathogens differ in acute and chronic dacryocystitis. Bacterial species isolated from chronic dacryocystitis show higher resistance to broad spectrum antibiotics than acute dacryocystitis which may be the potential pathogens in postoperative infections both intraocular and lacrimal drainage surgeries.

There are distinct patterns of geographical variations in terms of etiology. Hence apart from the standard ocular examination, syringing of lacrimal sac and microbiological study of the conjunctival cul-de-sac, lacrimal sac and the flora of the nasal cavity should be done in terms of regional etiological agents as it is important in the management of disease.

Most often antibiotics are given empirically as prophylaxis as well as post operatively but the rising incidence of resistant infections and a significant increase in failure to open lacrimal sac surgery due to infection demand that more keen attention should be paid to the selection of antibiotics.

Hence an understanding of the regional etiological agents is important in the management of the disease. The knowledge of bacteriology of chronic dacryocystitis would contribute to the choice

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of effective antimicrobial agents and help in combating the menace of antibiotic resistant infections. This study is to know the current bacterial flora involved in chronic dacryocystitis so that proper antimicrobial prophylaxis can be planned.

Aim & Objectives

- To clinically study chronic dacryocystitis with respect to age, gender, laterality, etiology, symptoms and signs.
- To study the various modes of presentation of Chronic dacryocystitis.
- To define the current spectrum and relative incidence of the pathogens causing Chronic dacryocystitis and to determine antibiotic sensitivity for the same.

Materials and Methods

The clinicomicrobiological profile of 80 patients of all age groups attending Ophthalmology OPD of Mamata medical college and hospital, Khammam from January 2018 to January 2021 were selected for this study who fulfilled the Inclusion criteria of:

- Patients presenting with epiphora.
- Patients with purulent or mucopurulent regurgitation.
- Patients with mucocele.
- Patients in whom sac syringing revealed obstruction in the lower lacrimal passage with regurgitation from the other punctum.
- Patients with external lacrimal fistula.

Exclusion criteria:

- Acute dacryocystitis
- Patients with other adnexal swellings

The clinical was based on clinical history including distribution factors like age, sex, occupation, socioeconomic status of the patient, nature and duration of symptoms and also patients detected during routine local investigation procedures for intraocular surgeries and corneal ulcer patients.

Microbiological study of the regurgitant material was done to identify the organisms and their sensitivity to different antibiotics. Routine ENT examination was also conducted to diagnose nasal pathology.

Collection of sample

The sample fluid was collected by: Applying pressure over the lacrimal sac and allowing the fluid or purulent material to reflux through the lacrimal punctum.

Or Irrigating the lacrimal drainage system with sterile saline and collecting the sample from the reflux material.

Care was taken not to touch the lids, skin or conjunctiva while taking swabs from the lacrimal sac.

No antibiotics, systemic or topical were used before sample has been collected. Swabs were sent for direct smear studies and culture to the department of microbiology for bacterial and fungal isolation.

Microbiological Examination.

1. Grams staining – A Gram stained smear yields information about the morphology of the bacteria and their Gram’s reaction of the smear taken from the regurgitant material which may show gram positive, negative cocci/bacilli.
2. Empirical antibiotic treatment was started after obtaining samples based on bacteria identified on grams stain.
3. Zeil Nelson’s staining – The cell wall of the mycobacterium contains mycolic acid which makes penetration of dye substance difficult. Smear may show mycobacterium tuberculi and mycobacteriumleprae.
4. swab samples were cultured on the day of collection on to blood agar, chocolate agar and Mac conkey agar and incubated aerobically.

Antibiotic sensitivity testing was done for the cultured bacterial growth using Kirby Bauer disc diffusion test. After overnight incubation of these plates with the test bacterium containing broth, zones of inhibition of growth around the discs are measured and the degree of sensitivity to the tested antibiotic is determined.

Growth around the discs containing antibiotics to which the bacterium is susceptible is inhibited while growth remains unhindered around discs with antibiotic to which the bacterium is resistant. 4.10% potassium hydroxide smear – to detect fungi like Streptothrix and Leptothrix. 5. Sabourads medium – to culture various fungi.

Statistical Analysis

The analysed results were expressed as percentage and proportions for the distribution of chronic dacryocystitis cases according to age, sex, nature of the discharge, presenting complaints, socioeconomic status, findings of lacrimal syringing, bacteria isolated and their sensitivity to various antibiotics.

Observations and Results

Table 1: Age and Sex Distribution

Age Group (years)	Male		Female	
	No. Of cases	Percentage %	No. Of cases	Percentage %
10 – 19	2	5.2	3	3.6
20 – 29	3	7.8	16	19.5
30 – 39	6	15.7	10	12.1
40 – 49	5	13.1	20	24.3
50 – 59	5	13.1	14	17
60 – 69	7	18.4	9	10.9
70 & above	8	21	9	10.9
Total	36	30.7	81	69.2

In our study of 117 patients 81 were females and 36 were males contributing to 69.2% and 30.7% respectively. The highest incidence in females was in the age group of 40 – 49 and in males it was above

70 years and above age group. The mean age at presentation in females was 45.2 years and 51.1 years in males.

Table 2: Laterality

Laterality	No. Of cases	Percentage %
Right side	43	36.7
Left side	65	55.5
Bilateral	9	7.7
Total	117	100

In our study majority of patients presented with left sided dacryocystitis accounting for 55.5% and 36.7% of the patients

presented with right sided dacryocystitis. Bilateral disease was present in 9 of them constituting about 7.7%.

Table 3: Occupation

Occupation	No. Of cases	Percentage%
Agriculture	25	21.3
Home maker	48	41
Labourers	24	20.5
Professionals(Teachers)	2	1.7
Students	8	6.8
Others	10	8.5

In this study majority of the patients are females and most of them are homemaker (41%) who are commonly affected. Farmers 21.3%

and labourers 20.5% are next commonly affected followed by students(6.8%). The least affected are professionals(1.7%).

Table 4: Presenting Complaints

Clinical features	No. Of cases	Percentage %
Epiphora only	26	22.2
Epiphora with discharge	50	42.7
Epiphora associated with swelling of lacrimal sac	13	11.11
Edema of lid	5	4.2
Epiphora with fistula	8	6.8
Diminution of vision	13	11.1
Epiphora and discharge post trauma	2	1.7

In our study 42.7% of the cases presented with epiphora and discharge, while 22.2% presented with epiphora only. 11.1% of the patients presented with an associated swelling of lacrimal sac. 11.1% of them came with the complaint of diminished vision and were incidentally found to have chronic dacryocystitis while investigating

for cataract surgery. 8 patients presented with the complication of fistulous tract accounting for 6.8% and 5 of them had edema of lid associated with pain at the time of presentation. A small number of patients n=2(1.7%) presented with epiphora and discharge following a road traffic accident due to facial and nasal bone disfigurement.

Table 5: Clinical Types of Chronic Dacryocystitis

Clinical type	No. Of eyes	Percentage %
Chronic suppurativedacryocystitis	75	59.5
Chronic catarrhal dacryocystitis	30	24.6
Mucocele	16	12.6
Acute on chronic dacryocystitis	5	3.9

Chronic suppurative dacryocystitis was the most common clinical entity found in the present study. Among the 126 eyes studied 59.5% had chronic suppurative dacryocystitis. 24.6% had chronic catarrhal

dacryocystitis and 12.6% eyes had an associated mucocele. Acute exacerbation on chronic dacryocystitis was found in 3.9% cases.

Table 6: Associated Nasal Pathology

Nature of lesion	No. Of cases	Percentage %
Deviated nasal septum	7	5.9
Hypertrophied turbinate	3	2.5
Nasal polyp	1	0.8
Atrophic rhinitis	2	1.6
Normal	104	88.8

Out of 117 cases 13 of them had an associated nasal pathology. Out of the 13 cases 7 of them had deviated nasal septum, 3 of them had

hypertrophied turbinate while 2 had atrophic rhinitis and 1 patient had a nasal polyp.

Table 7: Associated Systemic Conditions

Systemic conditions	No. Of cases	Percentage
Diabetes mellitus	17	14.5
Hypertension	14	11.9
Others(Pulmonary disease, Coronary artery disease, Thyroid disorders, Kidney disorders.)	10	8.5

Of the 117 patients studied 17 patients had an associated systemic disease. Most of the had diabetes mellitus(14.5%), hypertension was seen in 11.9% and other systemic disorders were found in 10 patients.(8.5%).

Table 8: Nature of Regurgitant Fluid

Regurgitant fluid	No. Of eyes	Percentage %
Mucopurulent	55	43.6
Purulent	29	23
Serous fluid	42	33.33

Out of the 126 eyes majority had mucopurulent regurgitation accounting for 43.6%. While clear fluid regurgitation and purulent regurgitation was seen in 33.3% and 23.9 % respectively.

Table 9: Growth Positivity

Total no samples	126	100%
No. Of samples positive for growth of microorganisms	74	58.7%
No. Of samples sterile on incubation	52	41.2%

In our study of 126 samples cultured from 126 eyes, 74(58.7%) samples yielded growth on culture and 52(41.2%) samples showed no growth.

Table 10: Culture Positivity According to Nature of Discharge

Regurgitation	No. Of eyes	No growth	Percentage%	Growth	Percentage%
Mucopurulent	55	12	21.8	43	78.1
Purulent	29	9	31	20	68.9
Serous fluid	42	31	73.8	11	26.1

Our study showed that 78% of eyes with mucopurulent discharge had a positive growth on culture while 73.8% cases with serous discharge showed no growth on culture. 68.9% cases with purulent discharge also showed growth on culture.

Table 11: Causative Organism

Organisms	No. Of samples	Percentage %
Gram positive organisms	55	72.3
Pneumococcus	18	23.6
Staphylococcus aureus	22	28.9
Coagulase negative Staphylococci	13	17.1
Enterococcus	1	1.3
Gram negative organisms	21	27.6
Klebsiella	7	9.2
E.Coli	1	1.3
Pseudomonas	9	11.8
Diphtheroids	2	2.6
Citrobacter	3	3.9
Total	76	100

Among the positive cultures most of the samples yielded Gram positive bacteria (n= 55, 72.3%). Of these the staphylococcus species were the most commonly isolated. Staphylococcus aureus were grown in 22 samples(28.9%) while coagulase negative Staphylococcus were seen in 13 samples(17.1%).

The next commonly isolated organism was pneumococcus(18 samples, 23.6%). Only one sample was grown with E.Coli. Out of the 20(27.9%) samples with Gram negative bacteria, Pseudomonas was seen in 9(11.8%) and Klebsiella in 7 samples (9.2%). Citrobacter was obtained in 3 samples, Diphtheroids in 2 samples and E.Coli also was found in 1 sample.

Table 12: Pure and Mixed Culture Isolates

Bacterial isolates	No. Of samples	Percentage %
Pure Gram positive isolates	51	68.9
Pure Gram negative isolates	21	28.3
Mixed isolates	2	2.7
Total	74	100

Out of the 74 culture positive samples 51 samples yielded pure growth for single species of Gram positive organisms each and 21 samples yielded single species of pure negative organisms each. Only

2 samples showed mixed growth with Pneumococcus and enterococcus in one sample and Staphylococcus aureus and Klebsiella pneumonia in another sample.

Table 13: Antibiotic Sensitivity of Gram Positive Organisms

Antibiotic	Pneumococcus		Coagulase negative staphylococcus		Staphylococcus aureus		Enterococcus	
	No. Of sensitive cases (total cases)	Sensitivity rate (%)	No. Of sensitive cases (Total cases)	Sensitivity rate (%)	No. Of sensitive cases (Total cases)	Sensitivity rate (%)	No. Of sensitive cases (Total cases)	Sensitivity rate (%)
Aminoglycosides								
Amikacin	5(18)	27.7	5(13)	38.4	12(22)	54.5		
Penicillin	13 (18)	72.2	8(13)	61.5	12(22)	54.5		
Ampicillin	13 (18)	72.2	9(13)	69.2	13(22)	59	1(1)	100
Macrolides								
Erythromycin	11 (18)	61.1	8(13)	61.5	18(22)	81.8		
Clindamycin	9(18)	50	11(13)	84.6	16(22)	72.7		

Cephalosporins									
Cefperozone	10 (18)	55.5	9(13)	69.2	10(22)	45.4			
Cefoxitin	10 (18)	55.5	9(13)	69.2	11(22)	50			
Ceftriaxone	15 (18)	83.3	7(13)	53.8	10(22)	45.4			
Quinolones									
Ciprofloxacin	8(18)	44.4	8(13)	61.5	14(22)	63.6	1(1)	100	
Doxycycline	9(18)	50	7(13)	53.8	18(22)	81.8	1(1)	100	
Others									
Cotrimoxazole	8(18)	44.4	8(13)	61.5	10(22)	45.4			
Amoxiclav	12 (18)	66.6	9(18)	50	13(22)	59			
Vancomycin	18 (18)	100	13(13)	100	22(22)	100	1(1)	100	
Chloramphenicol	16 (18)	88.8	6(13)	46.1	9(22)	40.9			

Among samples showing growth for Staphylococcus aureus 81% were sensitive to Erythromycin and Doxycycline. 63.6% were sensitive to Ciprofloxacin and all were sensitive to Vancomycin. 59% were sensitive to Amoxiclav and Ampicillin. Chloramphenicol had the least sensitivity(40.9%). Cephalosporins showed only 50% sensitivity.

Among the Coagulase Negative Staphylococcus highest sensitivity was towards Vancomycin(100%) and Clindamycin(84.6%) whereas

Doxycycline showed only 53.8% sensitivity. Amikacin had the least sensitivity(38.4%).In contrast among Pneumococci Chloramphenicol showed the highest sensitivity(88.8%) followed by Ceftriaxone (83.3%) and least to Amikacin(27.7%)..

Only one sample with Enterococcus was obtained which showed sensitivity to Gentamycin, Amikacin, Ciprofloxacin, Doxycycline and Vancomycin.

Table 14:Antibiotic Sensitivity of Gram Negative Isolates

Antibiotic	Pseudomonas		Klebsiella		Citrobacter		Diphtheroids		E.Coli	
	No. Of sensitive cases (total cases)	Sensitivity rate (%)	No. Of sensitive cases (total cases)	Sensitivity rate (%)	No. Of sensitive cases (total cases)	Sensitivity rate (%)	No. Of sensitive cases (total cases)	Sensitivity rate (%)	No. Of sensitive cases (total cases)	Sensitivity rate (%)
Aminoglycosides										
Amikacin	4(9)	44.4	5(6)	83.3	3(3)	100	2(2)	100	1(1)	100
Gentamycin	4(9)	44.4	6(6)	100	0					
Penicillins										
Ampicillin	3(9)	33.3	2(6)	33.3	2(3)	66.6	1(2)	50		
Cephalosporins										
Cefepime	7(9)	77.7	4(6)	66.6	0					
Cefotaxime	6(9)	66.6	4(6)	66.6	0		1(2)	50		
Quinolones										
Ciprofloxacin	8(9)	88.8	6(6)	100	0		1(2)	50	1(1)	100
Others										
Vancomycin	3(9)	33.3	3(6)	50	0		1(2)	50		

Among the Pseudomonas cultured Ciprofloxacin and Cefepime had the highest sensitivity accounting to 88.8% and 77.7% respectively. Least sensitivity was shown by Ampicillin and Vancomycin. Klebsiella species had 100% sensitivity to Gentamycin and Ciprofloxacin followed by Amikacin(83.3%). Cephalosporins had 66.6% sensitivity. Least was shown by Ampicillin. Citrobacter showed 100% sensitivity to Amikacin and 66.6% to Ampicillin.All the species of Diphtheroids were also sensitive to Amikacin while on 50% were sensitive to Ampicillin, Cephalosporins, Ciprofloxacin and Vancomycin.Only one sample showed growth of E.Coli which showed sensitivity to Amikacin and Ciprofloxacin.

Discussion

Chronic dacryocystitis or chronic inflammation of the lacrimal sac has been known to be common disease worldwide.This study attempts to evaluate the changing trend in bacteriology and antibiotic sensitivity so that the disease can be treated much efficiently combating the antibiotic resistance.117 cases of various modes of presentation of chronic dacryocystitis attending to Mamata General Hospital between September 2015 and October 2017 were studied of which 36 were male patients and 81 were female patients contributing to 30.7% and 69.2% respectively.

Age incidence and sex incidence

The female to male ratio was 2.25:1. This is in agreement with several other studies that have documented higher incidence of the disease in females. MJ Bharathi et al[4] has reported female to male ratio of 3.9:1.Kanograt pornpnich et al[5] and Ahuja et al[6] noted that women are more frequently affected than men with 3:1 female preponderance. Ahuja et al[6] in their study which was conducted at a tertiary hospital found that 41.9% were males and 58.1% were females. In several other studies the incidence of dacryocystitis in females has been recorded as 83% .In controversy to the above mentioned studies and our study NN Sood⁷ in 1967 reported a comparatively less number of females of ratio 1.7:1.Duke Elder states that while the disease in the newborn affects both the sexes equally, its occurrence among adults is in the ratio of 75-80% females to 25- 30% males[1].Measurement of the bony nasolacrimal duct system has revealed that women have significantly smaller nasolacrimal fossa and middle nasolacrimal ducts which might explain the higher prevalence of the disease in women.H.Basil Jacobs in 1959 claimed that females have a higher vascular congestive factor and a narrow bony canal and hence are affected by chronic dacryocystitisIn the present study among the females the mean age at presentation was 45.2 years. The mean age of presentation in males was 51.1 years.

The peak incidence in females was in age group of 40 – 49 which were noted by several other studies also. Patel K[8] stated that the majority of the patients were in the age group 50 – 60 years (43%) followed by 40 – 50 years (39%). Chandra TJ et al[9] found maximum incidence among age group 40 – 50 years which was comparable to our study.

Laterality

In our series of 117 patients there was a slight predominance of left sided dacryocystitis accounting for 55.5% (65 cases). 36.7% (43 cases) had right sided disease and 7.7% (9 cases) presented with a bilateral disease. This correlates well with P. Shiva Reddy and Veris (1955). Ghose et al[10] and Patel K[8] also found a higher incidence of the disease on the left side with 40% and 56% respectively compared to the right side.

Occupation and Social Status

In our study more number of females were affected. Majority of them were homemakers (41%). Some of them belong to the agricultural community and daily wage labourers who constituted the next commonly involved group accounting to 21.3% and 20.5% each respectively. Very few patients affected by the disease were teachers, students and others like watchmen and bus drivers. Hence chronic dacryocystitis is less common among high socioeconomic patients who take maximum hygienic measures to maintain their eyes clean. Similar findings were observed in several other studies [11,12].

Presenting Complaints

The most frequent presenting complaints were watering and discharge from eyes (50 cases, 42.7%) and watering (epiphora) alone in 26 cases (22.2%). Our study documented more cases with complaints of watering as well as discharge than with epiphora alone, when compared to other studies [7] 13 cases (11.1%) presented with an associated swelling over the lacrimal sac area. Patel K et al [8] reported 70% of the patients had complaints of mucopurulent discharge and 30% presented with swelling over the lacrimal sac along with epiphora (38%) which was comparable to our study.

In the present study we noted 8 (6.8%) patients presenting with the complication of fistulous tract over the lacrimal sac area and a small percentage of patients (4.2%) had edema of lids.

Clinical Types of Chronic Dacryocystitis

Chronic suppurative dacryocystitis without mucocele or pyocele was the most common presentation in our study accounting for 60%. This correlates well with NN Sood statistics. The next most common clinical type identified was chronic catarrhal dacryocystitis (24.6%). Mucocele was found in 12.6%. Acute exacerbation on chronic dacryocystitis accounted for 3.9% in our study. This value can be correlated to NN Sood who noted 12.3% patients presenting with acute on chronic dacryocystitis in their study [7].

Associated Nasal Pathology

In the present study 11.1% cases had an associated nasal pathology. Of them majority had a deviated nasal septum (5.9%). 2.5% had hypertrophied inferior turbinate, 2 cases (1.6%) were found to have atrophic rhinitis and only 1 case (0.8%) had a nasal polyp. Similar results were found in a study conducted by Mandal and co-workers [13]. Nasal pathology was noted in 19.6% of patients. A study by Rajeev N Bhale reported 29% of cases with nasal pathology [14].

Associated Systemic Conditions

In our study of 117 patients, 48 (41.5%) patients had Diabetes Mellitus, 11.9% were Hypertensives and 10 patients (8.5%) were having other systemic illness like pulmonary disease, coronary artery disease, thyroid disorders and kidney disorders.

Nature of Regurgitant Fluid

In the present study majority of patients had mucopurulent fluid regurgitating from the lacrimal sac (42.7%). Serous and purulent discharge was found in 33.3% and 23.9% respectively. Similar results were found in many other study done by Patel K et al [8]

Culture Positivity According to Nature of Discharge

We have noted that 78% cases with mucopurulent discharge and 67.8% with purulent discharge was positive for growth of microorganisms when compared to 25.6% cases with serous discharge. 74.3% cases with serous discharge did not show any growth of microorganisms on culture.

Microbiological Study

The spectrum and proportion of bacterial pathogens as well as antibiotic susceptibility may differ from region to region [4].

In this study out of 126 samples collected from 117 patients 74 (58.7%) were culture positive while 52 (41.2%) samples showed no growth after incubation for 24 hours. Various studies on chronic dacryocystitis reflect culture positive rates from 52.5% to 97.3%.

Ahuja S et al reported high number of sterile cultures (61%) which are similar to our study while many studies reported more number of culture positive cases in their studies. Few studies reported very high number culture positive samples, who reported that inoculation of tissue samples on culture media instead of pus swabs might have been the cause for more number of culture positive rates [9]. The levels of overall culture positivity might be influenced by different techniques of sample collection. Hartikainen et al [15] collected material refluxed through the lacrimal puncta, or by wiping a broth moistened swab across the lower conjunctival cul-de-sac and reported positive cultures in 84% samples. DeAngelis et al [16] analyzed the posterior lacrimal flap and found only 41.7% of the samples were culture positive. In our study growth was observed in 74 samples (58.71%). 72 (97.2%) eyes showed single isolations while 2 (2.7%) showed mixed bacterial isolations. A study done by Kebede et al [17] in Ethiopia reported (79.8%) positive results. These results were lower than Das et al [18] that reported that (90.9%) of the cases were positive for bacteria. Also, he reported (74.5%) had single isolations while (16.3%) had mixed bacterial isolations. Chaudhary et al [19] reported that (97.3%) were positive for bacteria, (33.9%) of the cultures showed a single microorganism while more than 2 microorganisms were reported in (66.1%) of the cultures. In our study gram positive isolates outnumbered the gram negative organisms which was similar to many other studies. 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. In this study Gram positive bacteria were found in 72.3% of the isolates. This is in close agreement with observation of 65% of gram positive organisms by Coden et al [20]. Amongst all culture positive samples in the current study Staphylococcus species (46%) was most frequently grown of which Staphylococcus aureus accounted for 28.9% and Coagulase negative Staphylococcus was 17.1%. This percentage compares fairly well with the results of Huber-Spitz et al and Coden et al (their percentages being 51% and 49% respectively). Mandal et al. in their study on 56 patients in Kolkata showed similar results, Gram positive Staphylococcus aureus being the most common implicated organism in their study. While Shah and Santani in July 2011 reported from Jodhpur that the cultures showed equal number of Gram positive and Gram negative organisms [21]. Our study showed 100% Ciprofloxacin sensitivity to Klebsiella and E. Coli, 88.8% sensitivity to Pseudomonas and only 50% sensitivity to Diphtheroids. Amikacin sensitivity was shown by 100% of Citrobacter, Diphtheroids, and E. Coli while Klebsiella showed 83.3% sensitivity. Gentamycin had 100% sensitivity to Klebsiella and only 44.4% sensitivity to Pseudomonas. Penicillins, Cephalosporins and Vancomycin showed lesser sensitivity.

Conclusion

The treatment of lacrimal duct obstruction in adults is surgery. Some studies have reported an increase in risk of soft tissue infection after open lacrimal surgery without systemic antibiotic prophylaxis. Knowledge about bacteriology of chronic dacryocystitis contributes significantly to choice of prophylactic antimicrobial agents that act specifically on the causative organism and also prevents antibiotic resistance caused due to injudicious use of antibiotics.

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