

STUDY ON BACTERIOLOGICAL ANALYSIS OF DACRYOCYSTITIS

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ABSTRACT

Objective: The aim of the study was to isolate, identify and determine antibiotic susceptibility pattern of bacterial isolates found in cases of dacryocystitis. **Materials and Methods:** Prospective study of 60 patients with dacryocystitis attending OPD services of Rajah Muthiah Medical College & Hospital, Annamalai University from October 2018 to September 2019. **Results:** Samples were collected from 60 patients presenting with acute and chronic dacryocystitis. In 20 (1 bilateral) acute and 40 (8 bilateral) chronic cases, growth was seen in 36% and 45% respectively of which gram positive cocci were 34.61% and gram negative bacilli were 65%. The most common isolates were *Pseudomonas* (38%), *Staphylococcus* (35%), *E. coli* (19%) and *Acinetobacter* (7%). No anaerobic bacteria were isolated. Gram negative organisms were sensitive to *Amikacin* (54.5%), *Ceftriaxone* (36.3%), *Ciprofloxacin* (54.5%), *Gentamicin* (100%), *Cefuroxime* (36.3%). All *S. aureus* were sensitive to *Gentamicin* (100%), *Ciprofloxacin* (100%), *Erythromycin* (66.7%), *Amikacin* (88.9%), *Ceftriaxone* (17.1%). **Conclusion:** This study demonstrates a significant change in bacterial flora and antibiotic treatment requirements of prevalent dacryocystitis from previously published data. A higher incidence of gram negative organisms particularly pseudomonas with resistance to antibiotics used commonly. The Emergence of rare highly resistant gram negative organism indicate a trend in lacrimal sac infections. These findings suggest that the antibiotic treatment protocol before and after lacrimal surgery should be recommended in this subgroup of patients.

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INTRODUCTION

Dacryocystitis is an inflammation of lacrimal sac and duct. It may be congenital or acquired. Acquired dacryocystitis assumes two main forms acute and chronic.¹ The lacrimal excretory system is prone to infection and inflammation for various reason as mucous membrane lined tract is contiguous with two surfaces (conjunctival and nasal mucosa) that are normally colonized with bacteria (Sunita Agarwal, et al., 2002).

Previous studies on etiology of chronic dacryocystitis showed lesser evidence of gram positive isolates but recent studies have reported changing trends in bacterial etiology. It also showed changing susceptibility of organisms to various drugs (Codan and Hornblan, 1993).

Dacryocystitis can become a life threatening infection with potential to progress to orbital cellulitis and or orbital abscess, meningitis or cavernous sinus thrombosis (Mauriella and Wasserman, 1996). Thus an upto date knowledge of spectrum of causative bacteria and their sensitivities is important for treatment of this disease.

This study was undertaken to assess the bacterial profile and antimicrobial susceptibility pattern and then demographic associations in acute and chronic dacryocystitis.

MATERIALS AND METHODS

This study is a prospective study of 60 patients diagnosed with dacryocystitis from October 2018 to September 2019 attending the OPD services of Rajah Muthiah Medical College and Hospital, Annamalai Nagar, Chidambaram, Tamilnadu.

Inclusion Criteria

1. Patients between 20-90 years of age.
2. All patients with complaints of epiphora, discharge and sac abscess

Exclusion Criteria

1. Patients less than 20 years of age.
2. Patients who have been treated with topical or systemic antibiotics within 1 week of presentation.
3. All cases of epiphora caused by diagnosis other than nasolacrimal duct obstruction.

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METHODOLOGY

The surrounding area was aseptically cleaned, to avoid contamination from the surface microorganisms and the samples were collected in two sterile cotton swabs from sac, either by applying pressure over lacimal sac and allowing the purulent material to come through lacimal punctum or by lacimal syringing. The sample from refluxing material was collected by ensuring that the lid margin or conjunctiva were not touched. One swab was immediately inoculated on plates of MacConkey's agar, Blood agar and Chocolate agar and another swab was used for gram staining. The stained smear was screened for the presence or absence of pus cells and bacteria. The isolated organisms were identified by using standard procedures.⁶ The sensitivity of the organisms tested by the Kirby-Bauer disc diffusion method as per the Clinical and Laboratory Standards Institute (formerly NCCLS) guidelines.⁷

Microbial cultures are considered significant if growth of same organism was demonstrated on more than one solid- phase medium, and/or if there was confluent growth at the site of inoculation on one solid medium, and/or if growth of one medium consistent with direct microscopy findings (i.e. appropriate staining and morphology with Gram stain), and/or if the same organism grown from more than one specimen (Ali *et al.*, 2015).

RESULTS

Study Comparison

A total of 60 patients were analysed. 20 patients (1 bilateral) presented as acute cases (1 bilateral) and 40 patients as chronic cases (8 bilateral). 23 patients were male (38.3%) and 37 (61.6%) patients were female. Male to female ratio was found to be 1:1.6.

Table 1 Types of Dacryocystitis Versus Sex Distribution

Clinical Type	Male		Female		Total
	No.	%	No.	%	
Acute	5	34.7	15	41	20 (33%)
Chronic	18	78.2	22	59	40 (67%)
Total	23	100	37	100	60 (100%)

Table 2 Distribution of Eye Affected Versus Sex Distribution

Eye Affected	Male		Female		Total
	No.	%	No.	%	
Right Eye	12	52	12	32	24 (40%)
Left Eye	6	26	21	58	27 (45%)
Both Eye	5	22	4	10	9 (15%)
Total	23	100	37	100	60 (100%)

Maximum number of dacryocystitis cases was seen in the age group were seen in the age group of 60-90 years (53%) followed by 40-60 years (33%). Mean age was found to be 56 ± 14 years.

Maximum number of bacteria were seen in the age group of 30-50 years and above, with *S. aureus*, *E. coli*, *Pseudomonas*, *Acinetobacter*.

Table 3 Age-wise Bacterial Etiology

Age (in Years)	<i>S. aureus</i>	<i>P. aeruginosa</i>	<i>E. coli</i>	<i>Acinetobacter</i>
<30	-	-	-	-
30 – 50	2	1	1	2
50 – 70	-	-	2	-
>70	2	-	1	3

Around 65% dacryocystitis cases were observed to be caused by gram negative bacilli and 35% cases by gram positive cocci.

In gram positive bacteria, *Staphylococcus aureus* (50%) was observed to be responsible for acute cases of dacryocystitis.

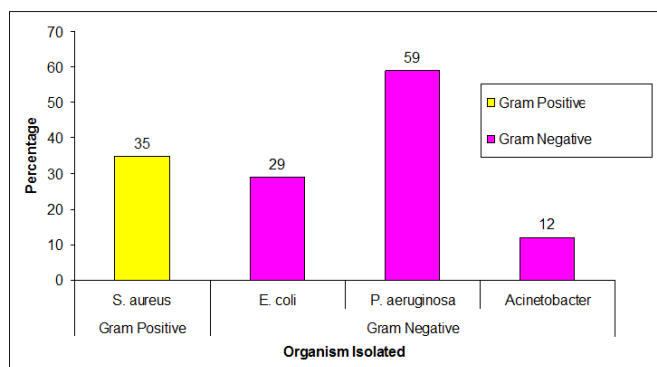


Figure 1 Distribution of Organisms among Culture Positive Dacryocystitis Cases

Acinetobacter (12%) species was observed to be the least common causes of dacryocystitis.

Table 4 Distribution of Gram Positive Organism in Acute and Chronic Dacryocystitis

Gram Positive	Acute	Chronic	Total
<i>S. aureus</i>	3 (63%)	6(26%)	9

Pseudomonas was the commonest organism among gram negative responsible for about (59%) of dacryocystitis followed by *E. coli* (29%) and *Acinetobacter* (12%).

Table 5 Distribution of Gram Negative Organism in Acute and Chronic Dacryocystitis

Gram Negative	Acute	Chronic	Total
<i>P. aeruginosa</i>	2(67%)	8(57%)	10(59%)
<i>E. coli</i>	1(33%)	4(29%)	5(29%)
<i>Acinetobacter</i>	-	2(14%)	2(12%)
Total	3	14	17

Growth was present in (36%) of acute case as compared to (45%) of chronic case.

Table 6 Presence and Absence of Growth in Acute and Chronic Dacryocystitis

Growth	Acute	Chronic	Total
Present	8(40%)	18(45%)	26(43%)
Absent	12(60%)	22(55%)	34(57%)
Total	20	40	60

Both acute 3(60%) and chronic case 6(29%) have gram positive bacteria while gram negative bacteria were seen predominantly in chronic cases 14(54%) than acute cases 3(11.5%).

Table 7 Distribution of Gram Positive and Gram Negative in Acute and Chronic Dacryocystitis

Growth	Acute	Chronic	Total
Gram Positive	3(50%)	6(30%)	9(35%)
Gram Negative	3(50%)	14(70%)	17(65%)
Total	6	20	26

S. aureus were observed to be (100%) sensitive for Gentamicin (100%), Linezolid (100%), Ciprofloxacin (67%), Amikacin (78%), Clindamycin (56%).

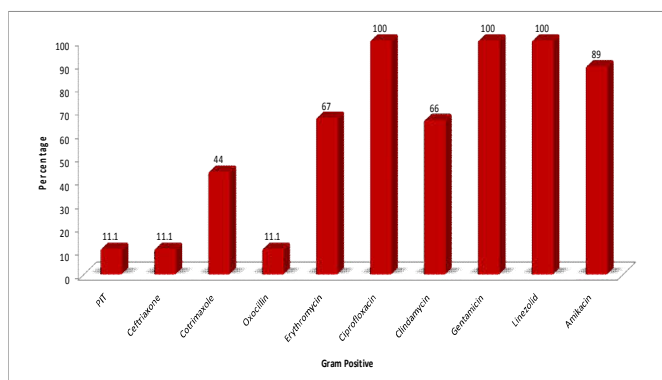


Figure 2 Antibiotic Sensitivity Pattern of Gram Positive Bacteria

Pseudomonas was sensitive to Tobramycin (70%), Ciprofloxacin (70%), Ceftriaxone (70%), Amikacin (60%). *E. coli* were found to be sensitive to Ciprofloxacin (100%) followed by Amikacin (80%), Cefuroxime (80%) and Gentamicin (80%). *Acinetobacter* were sensitive to Gentamicin (100%), Ciprofloxacin (100%), Tetracycline (100%), followed by Amikacin (50%).

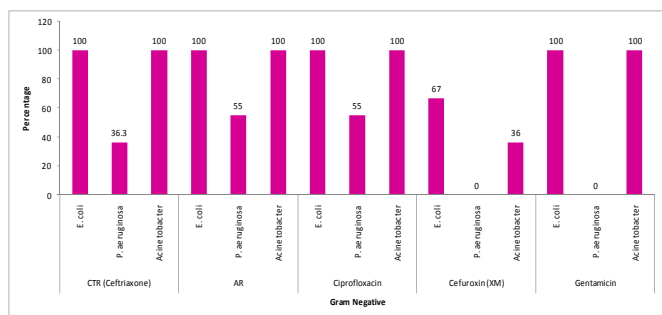


Figure 3 Antibiotic Sensitivity Pattern of Gram Negative Bacteria

DISCUSSION

Sun *et al.*, (2005) report in his study, that nearly 72% cases were over the age of 40 years which was comparable with study by Delia *et al.*, (2008) which is similar to our study nearly 87%.

Females were found to be commonly affected in congenital and acquired dacryocystitis, with a male to female ratio of 1:2.3, which correlated with the findings of Badhu *et al.* In our study males : female ratio is 1:1.6).



In our study, the involvement of the eye was mainly unilateral, 85% with higher incidence of left side 55% as compared to right side 45%. This correlated well with findings of Ghose *et al.*, Brook *et al.* in which left lacrimal sac was involved in 36 patients (58%).

A single organism was isolated in 25 cases (96.1%) and mixed organisms were isolated in 1 case (3.8%) which correlated well with findings of Kundu *et al.* (82.5% and 10.5%) and Sanju *et al.* (81.82% and 18.8%).

Hartikainen *et al.* (1997) observed an increasing trend toward gram negative isolates incase of dacryocystitis. Previous studies have varied with upto 27% of all isolates in lacrimal blockage being gram negative and upto 52% of cases of copious purulent discharge having gram negative isolates (Evans *et al.*, 1991; Huber – Spitzzy *et al.*, 1992; Blicher and Buffam, 1993; Coden *et al.*, 1993 and Hartikainen *et al.*, 1997).

Mills *et al.* (2007) showed greater growth positively in chronic cases when compared to acute which is similar to our study, 47% of chronic case, 36% in acute cases of culture positive patients.

In this study gram negative bacteria were found to be more prevalent in chronic dacryocystitis. In our study 65% isolates were gram negative 38% were pseudomonas species. Hartikainen *et al.*, (1997) showed that of the 52% gram negative isolates in patients with copious purulent discharge, 7% were *hemophilus* species. They found *pseudomonas* species in only 4% of total isolates. *Pseudomonas* isolates were cultured in upto only 9% cases in previous studies (Evans *et al.*, 1991; Huber-Spitzzy *et al.*, 1992; Blicher and Buffam, 1993; Coden *et al.*, 1993 and Hartikainen *et al.*, 1997). It is noteworthy, that unlike in previous studies, *hemophilus* species were not isolated in our study.

CONCLUSION

There is a significant emergence of resistant Gram negative organisms in purulent dacryocystitis. The spectrum of the Gram negative bacteria is also different from previous studies, with the appearance of *pseudomonas* species as the most common isolates in chronic dacryocystitis and the simultaneous disappearance of *Hemophilus*, which was previously so common. This probably reflects widespread use of broad spectrum antibiotics.

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