

Microbiological spectrum of acute and chronic dacryocystitis in Malwa region

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Abstract

Introduction– The aim of this study is to report the microbiological spectrum and antibiotic sensitivity of acute and chronic dacryocystitis. This was a prospective study done at Sri Aurobindo medical college and PG institute in 61 cases of dacryocystitis from October 2017 to April 2019. **Materials and Method**- After proper clinical examination patients were diagnosed with dacryocystitis. On presence of pus filled sac patients were categorised as acute dacryocystitis, chronic dacryocystitis patients were diagnosed after ROPLAS test and lacrimal syringing These cases were reviewed for microbiological and demographic profile. Culture results with the organisms isolated were then recorded. Under aseptic precautions, cleaning the surrounding area, specimens for microbiological analysis were obtained by sterile cotton swab from the lacrimal sac, by applying pressure over the lacrimal sac area and allowing purulent material to reflux through the lacrimal puncta. All the specimens were sent to institute's microbiology department for analysis. **Results**– 61 patients were evaluated out of which 24 were acute onset and 37 had chronic onset. Female male ratio was 1.68. Mean age of presentation was 52 yrs. Gram positive organisms were the most commonly isolated accounting for 74% and the commonest species isolated was *S. aureus* in 76 %. Percentage of gram-positive cultures was higher in chronic dacryocystitis than acute ones. Also, in culture positive acute dacryocystitis, gram negative species were found in only 17% of cases. **Conclusion**– Gram positive bacteria is commonest cause of dacryocystitis however gram negative bacterias were found to be more virulent. The result of this study had significant bearing on patients with dacryocystitis and also helpful when mass cataract surgeries were being performed.

Keywords- Dacryocystitis, Lacrimal sac, Culture

Introduction

Inflammation of the lacrimal sac is known as dacryocystitis which usually occurs due to obstruction in the nasolacrimal duct. It has bimodal distribution affecting children less than 1 year and adults over 40 years of age [1]. It is a significant cause of ocular morbidity in children and adults. This disease is more common in patients with poor personal hygiene [2].

Dacryocystitis is an unpleasant disease, as it causes constant watering and discharge. Dacryocystitis is also a threat to the integrity of the eye by becoming the source of infection to orbital cellulitis and panophthalmitis [3, 4]. Dacryocystitis can be classified as congenital and acquired dacryocystitis. Acquired dacryocystitis can occur as acute and chronic dacryocystitis. Chronic

dacryocystitis is more common [1]. Nasolacrimal duct obstruction (NLD) can occur from different aetiologies, such as primary idiopathic obstruction and secondary obstruction which finally results in stasis of tears, desquamated cells and mucoid secretions in the lacrimal sac, this creates favourable environment for inflammation and infection [5, 6].

There has been growing noise about changing trends in the microbiologic spectrum of dacryocystitis and where initial studies have shown Gram positive isolates predominantly in most studies, some recent studies suggested an increasing frequency in gram negative organisms [5]. Knowledge of the presence of nasolacrimal obstruction and the potential organisms inoculated is therefore of paramount importance before planning any intraocular procedure.

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Material and Methods

Duration and type of study- This is a Prospective study and we included patients with acute and chronic dacryocystitis who underwent microbiological evaluation presenting between October 2017- April 2019 at Shri Aurobindo medical college and post graduate institute Indore

Sample size- 61 patients of acute and chronic dacryocystitis

Ethical consideration and permission- We have obtained necessary permission from ethical committee before initiation of study written informed consents were obtained from all participants.

A thorough history of the patients were taken regarding the complaints and associated systemic diseases. Patients were examined by an ophthalmologist, and cases of dacryocystitis were identified and categorized as acute or chronic, based on their history, signs and symptoms. Acute dacryocystitis was diagnosed in patients with pain, redness, and swelling in the lacrimal sac area. Chronic dacryocystitis was diagnosed in patients with persistent epiphora and regurgitation of mucoid or mucopurulent material on pressure over the sac area or during irrigation of the lacrimal drainage system. Other causes of epiphora were also ruled out such as

1. Conjunctivochalasis
2. Lid laxity
3. Lid margin abnormalities.

Sampling- After aseptically cleaning the surrounding area, specimens for microbiological analysis were

Results

A total of 61 patients with dacryocystitis were enrolled in the study, which included 16 males (26%) and 45 females (74%). Females were more affected than males.

Age (years)	Males		Females	
	Count	Percentage	Count	Percentage
20-40	3	18.75%	2	4.4%
41- 60	12	75%	25	55.5%
>60	1	6.25%	18	40%
Total	16	100%	45	100%

The mean age of the participants was 52.07 (\pm 39.05) years, with minimum of 20 years and maximum of 90 years. In this population, 28 patients had right-side involvement and 23 of them had left-side dacryocystitis. In addition, there were 10 patients with bilateral dacryocystitis. In terms of type, 24 patients were encountered with acute dacryocystitis and 37 of them had chronic form.

The result of culture was positive in 56 cases (92 %) rest cases showed no growth.

obtained by sterile cotton swabs from the lacrimal sac, by applying pressure over the lacrimal sac and allowing the purulent material to reflux through the lacrimal punctum. Regurgitation test of affected eye was done, then discharge were sent to microbiology lab for culture and sensitivity

After culture and sensitivity report, patients were shifted on sensitive antibiotics. All cases of pseudoepiphora and epiphora caused by diagnoses other than nasolacrimal duct obstruction, patients with any history of previous infection, maxillofacial surgery, or maxillofacial trauma and the patients who had received any topical or systemic antibiotics for the past one week during their visit to the hospital were excluded.

Results of smear, culture, and antibiogram of patients were extracted from documents of the microbiology laboratory, and demographic and clinical data were taken.

Inclusion criteria

1. Patients aged 15-60 years.
2. Both males and females.
3. Cases with acute and chronic dacryocystitis.

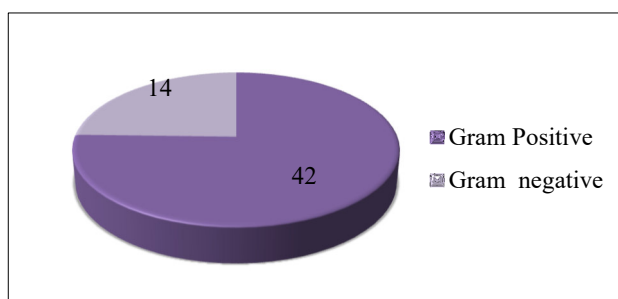
Exclusion criteria

1. Cases of pseudoepiphora and epiphora diagnosed by other than nasolacrimal duct obstruction,
2. patients with any history of previous infection,
3. Patients with maxillofacial surgery, or maxillofacial trauma
4. patients who had received any topical or systemic antibiotics for the past one week

Table-2: Distribution of bacteriological growth.

Bacterial Growth	No. of Cases (N=61)	Percentage
Growth	56	92
No Growth	5	08
Total	61	100%

The most common type of isolated microorganism was gram positive bacteria (75%) whereas gram negative culture isolates were seen in 25% of cases. Based on the morphology of cultivated microorganisms, Cocci were mainly prevalent in the acute dacryocystitis, while bacillus were mostly seen in the chronic type.

**Figure-1: Distribution of bacteriological gram finding**

In this study, the dominant strain in the culture media was considered as an effective microbial agent in the pathogenesis of dacryocystitis, and antibiogram was performed on this dominant strain. It was also assumed that if two strains with equal colony count were found in the medium, both of them must be introduced as causative agents of dacryocystitis, and antibiogram must be performed for each of them separately, but this situation did not occur in any of our patients. *S. aureus*, *S. epidermidis*, were the most prevalent microorganisms in patients with acute dacryocystitis, while *S. epidermidis*, *Pseudomonas spp.*, *S. aureus*, were common species in those with chronic type.

Table-3: Distribution of Bacteriological Isolates.

Bacterial isolates	No. of Cases (N=61)	Percentage
<i>Staphylococcus</i>	32	57
<i>Streptococcus</i>	10	18
<i>Pseudomonas</i>	8	14
<i>Morexella</i>	6	11
Total	56	100%

The most sensitive antibiotics used against prevalent bacteria were Ciprofloxacin, Ceftriaxone, Amoxicillin, Vancomycin, Chloramphenicol and Amikacin

Table-4: Correlation of prescribed drugs and of bacteria

Prescribed drugs	Bacteria				
	<i>Staphylococcus Aureus</i>	<i>Streptococcus</i>	<i>Pseudomonas</i>	<i>Morexella</i>	<i>MRSA</i>
Ciprofloxacin	25	6	1	1	1
Amoxicillin	1	0	7	2	0
Ceforoxime	0	0	0	0	1
Cefotaxime	0	1	1	0	0
Amoxicillin+clavulanic acid	1	1	0	0	0
Amikacin	2	0	0	0	0
Ceftriaxone	0	2	0	0	0
Moxifloxacin	1	0	0	2	0
Total	30	10	9	5	2

Discussion

Dacryocystitis is an infection of lacrimal sac secondary to obstruction of nasolacrimal duct. In the present study majority of patients were in the age group of 50-60 (43.2%) followed by 40-50 (38.2%), and > 60 (16.6%). Madhusudhan et al 2005-2010 had an average age of 46.5 years in their study.

The present study is comparable to theirs having 38.2% of cases under the age group of 40-50 years. Slight variation of age group may be evident due to the geographical and living conditions of the patients and their occupation. The study was predominant in female subjects (74%) as compared to male subjects (26%). The female to male ratio was 2.8:1 which correlated with the findings of Assefa et al [13] in which the female preponderance was 62.7%.

In the present study chronic dacryocystitis was most frequently encountered (76.2%) followed by acute dacryocystitis (23.8%). This comparable to the study carried out by Prakash et al in which 63.7% cases were of chronic dacryocystitis followed by 25% of acute dacryocystitis [7]. The most common Gram-positive organisms isolated worldwide include *Staphylococcus aureus* (worldwide), *Streptococcus pneumoniae* (Africa), and *S. epidermidis* (USA).

Among the Gram-negative isolates, there is a variable predominance like that of *Haemophilus influenzae* (Middle East), *Pseudomonas aeruginosa* (North India and USA), *Escherichia coli* (Europe), and *Corynebacterium diphtheriae* (China) [7, 12]. Sun et al [8] from China and Brook and Frazier 9 from USA, although reported *Staphylococcus* isolation as the most common, however, we did not found fungus in culture isolates.

Microbiological spectrum of acute dacryocystitis has been studied in 23 patients by the American Society of Ophthalmic Plastic and Reconstructive Surgery ASOPRS [10], and it was found that 78.3% of the isolates were Gram-positive and 21.7% were Gram-negative. Among the Gram-positive isolates, *Staphylococcus aureus* was the most common organism noted, accounting for 50% of all the Gram-positive isolates.

In the present study 61 clinical samples were evaluated, among them 56 (92%) were culture positive and rest were reported as no growth 5 (8%). Among the Gram-positive organisms *Staphylococcus aureus* encountered

as the commonest isolate (57%) followed by *Streptococcus pneumoniae* (18%) and in the Gram-negative organisms, *Pseudomonas aeruginosa* was found to be predominant. As it has been also common in many of similar studies, Gram-positive bacteria accounted for higher isolation rate (75%) in study of Kebede et al [11]. Interestingly, the current findings and previous reports by Kebede et al. were also in line with most similar studies [11, 12].

However, unlike the ASOPRS group, our Gram-negative profile was very different *Pseudomonas aeruginosa*, accounting for 15% of all the Gram-negative isolates, respectively. The antibiotic susceptibility pattern varies from region to region community. In general, the causes of this bacterial diversity in various studies can be due to the different number of patients in different studies, the geographical differences in regional pathogens, the difference in the social level of patients, the availability of ophthalmology care, and the awareness of individuals to public health. This is because of emergence of resistant strains as a result of indiscriminate use of antibiotics.

In the present study most of the isolates of *Staphylococcus aureus* were sensitive to ciprofloxacin followed by amoxicillin and cefuroxime.

Conclusion

Available studies show that microorganisms isolated from patients with dacryocystitis are various based on their regional distribution, prevalence, and antibiotic susceptibility patterns in different geographic areas. The present study is useful for determining the appropriate antibiotic for systemic treatment of dacryocystitis in our region. According to our findings, ciprofloxacin and vancomycin are the most sensitive antibiotics against the most common isolated microorganisms in both age groups.

What the study adds to the existing knowledge?

In order to use appropriate antibiotics, each region should have sufficient periodic information about the various pathogens involved in dacryocystitis and their antibiotic susceptibility to achieve effective empirical treatment. So, by managing the order of antibiotics, we can control antibiotic resistance. The use of a broader spectrum of antibiotics and anaerobic culture media can be considered in future studies.

Author's contribution

Dr. Abha Verma: Concept, Study design, Manuscript preparation

Dr. Mayank Gupta: Concept, Study design, Manuscript preparation.

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