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Comparative Microbiologic Spectrum of Acute & Chronic Dacryocystitis

Madhuri Kulkarni[1], Soumya S[2*], Nagabhushan Chougule[3]

[1] *M.Sc. student of Microbiology, Jawaharlal Nehru Medical College (JNMC), KAHER, Belgaum, India*

[2] *Assistant Professor, Depart of Microbiology, Jawaharlal Nehru Medical College (JNMC), KAHER, Belgaum, India*

[3] *Assistant Professor, Depart of Ophthalmology, Jawaharlal Nehru Medical College (JNMC), KAHER, Belgaum, India*

***Corresponding authors:** Dr. Soumya S, **Address:** Department of Microbiology, Jawaharlal Nehru Medical College (JNMC), KAHER, Belgaum, India, **Email**: soumya86.s@gmail.com, **Tel**: +919481557399

Abstract

***Background & Aims*:** Dacryocystitis is an inflammation of the lacrimal sac, which occurs due to obstruction of the nasolacrimal duct. This study was conducted to know the changing trends in organism causing acute and chronic dacryocystitis.

Materials & Methods: It is a prospective study done on consecutive 30 patients attending to Ophthalmology Department. Samples were collected and bacteria were detected by conventional microbiological tests and antibacterial susceptibility of the isolates were detected according to CLSI guidelines.

Results: From a total of 30 samples processed, acute dacryocystitis was found to be more prevalent in 20 to 29 years of age group followed by involvement of 30 to 39 years' age group. Females were seen to be predominantly affected than males in both acute and chronic dacryocystitis. Of the total 30 samples processed, 36.7% were from chronic dacryocystitis cases and 63.36% were from acute dacryocystitis. In both acute and chronic dacryocystitis, gram-positive organisms were the predominant accounting for 16.67% and 23.27% respectively. Methicillin-sensitive Staphylococcus aureus (MSSA) (10%) was the predominant Gram-positive organism in acute dacryocystitis and methicillin-resistant Staphylococcus aureus (MRSA) (10%) in chronic dacryocystitis. P.aeruginosa (3.33%) was the gram-negative organism isolated from acute cases of dacryocystitis and E.coli (6.67%) was the predominant gram-negative organism isolated from chronic cases of dacryocystitis.

Conclusion: It's necessary for the treating clinicians to note that the type of organism involved in acute and chronic dacryocystitis could be different, and they must include suitable antibiotics for empirical treatment to avoid further complications.

***Keywords*:** Acute Dacryocystitis, Chronic Dacryocystitis, Causative Agents

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Introduction

Dacryocystitis is an inflammation of the lacrimal sac, which occurs due to obstruction of the nasolacrimal duct at the distal end (1). The causes of obstruction are divided into two types a) idiopathic inflammatory stenosisand b) secondary to mechanical obstruction, infection, inflammation, neoplasm or trauma (2, 3). This obstruction of nasal lacrimal duct creates a closed

lachrymal drainage system which causes stagnation of tears resulting in dacryocystitis. The other reason why nasal lacrimal system is more prone to infection and inflammation is due to the continuation of mucous membrane lining with nasal mucosa and conjunctiva, which are highly colonized with bacteria (4).

Two forms of dacryocystitis are known: a) Acute and b) Chronic. Acute dacryocystitis presents with acute inflammation of the lacrimal sac with erythema and tenderness (5, 6). Chronic dacryocystitis presents with epiphora, chronic conjunctivitis, conjunctival redness and mucoid discharge (5). Chronic dacryocystitis is more common compared to acute dacryocystitis, and microbial pathogenesis of dacryocystitis varies based on variation in geography area and social-economic status. If untreated at early stages, dacryocystitis can be life-threatening by progressing to the orbital cellulitis/abscess, meningitis or cavernous sinus thrombosis. Most of the studies of nasal lacrimal system infections showed the predominance of gram-positive organisms as the causative agents, although there are few recent studies which have shown that gram-negative organisms are also increasing in frequency (5, 7-10).

This study was conducted to know the changing trends in organisms causing acute and chronic dacryocystitis.

Materials & Methods

This prospective study done on consecutive 30 patients attending to Ophthalmology Department of KLE, Dr. Prabhakar Kore's Hospital, Belgaum, India, which is a tertiary care center. Institutional ethical clearance was taken for this study.

Inclusion criteria: All patients with signs and symptoms of primary acute/chronic dacryocystitis were included in the study.

Exclusion criteria: Patients on systemic/topical antibiotics or steroids and those with secondary dacryocystitis were excluded from the study.

Sample collection: Specimens were collected taking all aseptic precautions after cleaning the area surrounding the lacrimal sac and punctum. Care was taken to not touch the eyelid. Slight pressure was applied over the lacrimal sac and then the purulent material that oozed out of the punctum was collected using sterile swab. Once the swabs were collected, they were transported to the microbiology laboratory, JNMC, immediately.

In the laboratory, gram staining was done first, followed by inoculation on blood agar and MacConkey agar. These plates were incubated at 37°C for overnight. Next day, colony morphology was noted and biochemical reactions along with antibiotic sensitivity was put up following CLSI guidelines.

MRSA and MSSA were detected based on their susceptibility to Cefoxitin disk (30 micrograms). Zone of inhibition >25 mm is considered as MSSA and <25 mm as MRSA. Quality control strain Staphylococcus aureus ATCC 25923 is used as control.

Results

A total of 30 clinically diagnosed patients were examined and samples collected from them and processed.

Table 1: Age wise distribution of Bacterial etiology

Age group	Acute dacryocystitis (%)	Chronic dacryocystitis (%)
20 to 29 years	6 (20%)	2 (6.67%)
32 to 39 years	5 (16.6%)	4 (13.3%)
40 to 49 years	4 (13.3%)	3 (10%)
>50 years	4 (13%)	2 (6.67%)
	19 (63.3%)	11 (36.7%)

Acute dacryocystitis was found to be more prevalent in 20 to 29 years of age group with a total of 20% involvement and chronic dacryocystitis in 30 to 39 years' age group with 13.3% being involved (Table 1).

Table 2: Sex wise distribution of acute and chronic cases

Sex	Acute dacryocystitis	Chronic dacryocystitis
Male	9 (30%)	4 (13.3%)
Female	10 (33%)	7 (23.3%)
Sum	19 (63.3%)	11 (36.6%)

Both acute and chronic dacryocystitis are seen to be more common in females than males (Table 2).

Table 3: Distribution of gram positive and gram negative bacteria in acute and chronic cases. MRSA = methicillin-resistant Staphylococcus aureus, MSSA = methicillin-sensitive Staphylococcus aureus.

		Organism	No. of isolates	%
Acute 19.97%	Gram-positive organism 16.67%	MRSA	2	6.67%
		MSSA	3	10%
	Gram-negative organism 3.3%	P. aeruginosa	1	3.33%
Chronic 36.54%	Gram-positive organism 23.27%	MRSA	3	10
		MSSA	2	6.67
		S. pneumoniae	1	3.33
		CONS	1	3.33
	Gram-negative organism 13.27%	E.coli	2	6.67
		K. pneumoniae	1	3.33
		P. aeruginosa	1	3.33

Of the total samples processed, 36.54% were from chronic Dacryocystitis cases and 19.97% were from acute Dacryocystitis (Table 3).

In both acute and chronic dacryocystitis, gram-positive organisms were the predominant types, accounting for 16.67% and 23.27%, respectively. Gram-negative organisms were accounting for 3.3% in acute dacryocystitis and 13.27% in chronic dacryocystitis. MSSA (10%) was the predominant gram-positive organism in acute Dacryocystitis and MRSA (10%) in chronic dacryocystitis.

P.aeruginosa (3.33%) was the gram-negative organism isolated from acute cases of dacryocystitis and E. coli (6.67%) was the predominant gram-negative organism isolated from chronic cases of dacryocystitis.

Discussion

The spectrum of bacterial pathogens responsible for acute and chronic dacryocystitis varies, hence this study was taken up to know and compare the bacterial agents predominantly responsible for acute and chronic dacryocystitis.

In this study, younger age group of 20 to 29 years were more affected compared to chronic in which 30 to 39 years group was predominantly affected. This is similar to results seen in the studies conducted by Bahramet al. and Bharathi et al. (10, 11).

Both acute and chronic dacryocystitis were seen to be more common in females than males which is almost similar to the results by previous studies done by Ali et al., Mills et al (12, 13).

The bacterial pathogen spectrum causing dacryocystitis varies from one geographical area to another and also among acute and chronic conditions.

It was showed in previous studies done by Mills et al. (13), Bharathi et al. (14), Choudhary et al. (15), and Huber-spitzy et al. (16) that gram-positive organisms were predominant in both acute and chronic dacryocystitis and Staphylococcus species being the most common among them (13-16). In our study also gram-positive organisms were found to be the predominant organism in causing both acute and chronic dacryocystitis, accounting to 16.67% in acute and 23.27% in chronic cases.

In gram-negative organisms Pseudomonas aeruginosa was the organism type isolated in acute and E. coli, Klebsiella pneumoniae, and Pseudomonas were isolated from chronic dacryocystitis cases. Among the various gram-negative organisms isolated in chronic dacryocystitis, E. coli was the predominant. This finding of our study is in contrast to the study findings done by Bahram et al., who found Klebsiella pneumoniae to be the predominant organism and also to the study done by Syed Ali et al. that reported Pseudomonas aeruginosa to be the most predominant in chronic dacryocystitis (11,17). This variation in the organism type is maybe due to the differences in the geography area where the studies were conducted.

There were some limitations in the study, including that anaerobic organisms and fungal pathogens responsible for dacryocystitis were not evaluated.

Conclusion

Gram-positive organisms are found to be the most predominant followed by gram-negative ones in causing both acute and chronic dacryocystitis. Amongst all Staphylococcus species are among the most common causative organisms in this disease. Thus, it's necessary for the treating clinicians to note the type of organism involved in acute and chronic dacryocystitis could be different, and they must include suitable antibiotics for empirical treatment to avoid further complications. Further studies with larger sample sizes that included anaerobic organisms and fungal pathogens in their study is recommended.

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Conflict of interest

The Authors declare no conflict of interest in this study.

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