

**Original article**

**Isolation of dacryocystitis causing bacteria among the patients of East Godavari district, Andhra Pradesh.**

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**Abstract:**

**Introduction:** Inflammation of the lacrimal sac, Dacryocystitis is one of the important causes of ocular morbidity in Indian subcontinent. **Objective:** To isolate and identify the aerobic bacterial pathogens associated with dacryocystitis and to determine their antibacterial sensitivity pattern. **Materials and methods:** A total of 304 individuals were included in the study. Blocked tissue / pus was collected and microbial analysis was done. **Results:** Infection rate was more in the female than male, statistically highly significant ( $p < 0.0001$ ). The culture positivity was 91% (277/304), infection rate was maximum at the age of 40 - 50 years {200/204, 98% ( $p < 0.0001$ )}. In culture positive cases gram positive cocci is commonly isolated. Most of gram positive bacteria are sensitive to Chloramphenicol. Gram negative bacteria were sensitive to Gentamycin, Chloramphenicol and Ciprofloxacin. **Conclusion:** Knowledge of the bacteriology of dacryocystitis and the susceptibility of the bacteria towards antibiotics helped the need for proper treatment, so that time as well as money can be saved.

**Key Words:** Dacryocystitis, Gram positive cocci, Gram negative bacilli

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**Introduction:**

The lacrimal apparatus, which include lacrimal gland and the lacrimal passage. It protects eye by the flow of tears. It plays an important role in keeping the eye in its optimal functional capacity. The lacrimal secretion which is alkaline in nature is reported to have bacteriostatic properties, owing to the presence of an enzyme, lysozyme.

Inflammation of lacrimal gland is known as dacryocystitis. It is a constant threat to cornea and orbital soft tissue. Dacryocystitis also causes social embarrassment due to chronic watering from the eye. Obstruction of nasolacrimal duct is one of the commonest causes of dacryocystitis.

Several studies have been conducted to evaluate the microbial profile of the dacryocystitis.<sup>1, 2, 3, 4</sup> Some of the isolates in dacryocystitis are floral members of human body. Hence bacteriological analysis of this chronic dacryocystitis is very essential to prevent the vision threatening complications like endophthalmitis, corneal ulcer etc.

Studies have been concluded that gram positive

bacteria like Coagulase Negative Staphylococci (CONS) and Staph.aureus are the common causative agents. Among gram negative organisms, *Pseudomonas aeruginosa* is the most common followed by *Klebsiella pneumoniae* and *Haemophilus influenzae*.<sup>[1, 2]</sup>

As per the available literatures, pus or swabs were collected from the volunteers for the isolation of microbial pathogens, where gram positive cocci (GPC) were isolated very commonly. But, some of GPC are the floral members of human body also. The mucus membrane lined the tract is contagious and normally colonized with bacteria.<sup>[4]</sup> Hence it is very difficult to prove the pathogenicity of isolated GPC. Adding to this, attempts also minimal to prove the pathogenicity of the isolated GPC. So in the current study, the blocked pus or tissue was collected for bacterial culture and sensitivity. With this, less contaminated samples are collected, which is the additional feature of our study.

**Material and methods:**

The present study was conducted over a period

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### Isolation of dacryocystitis causing bacteria among the patients

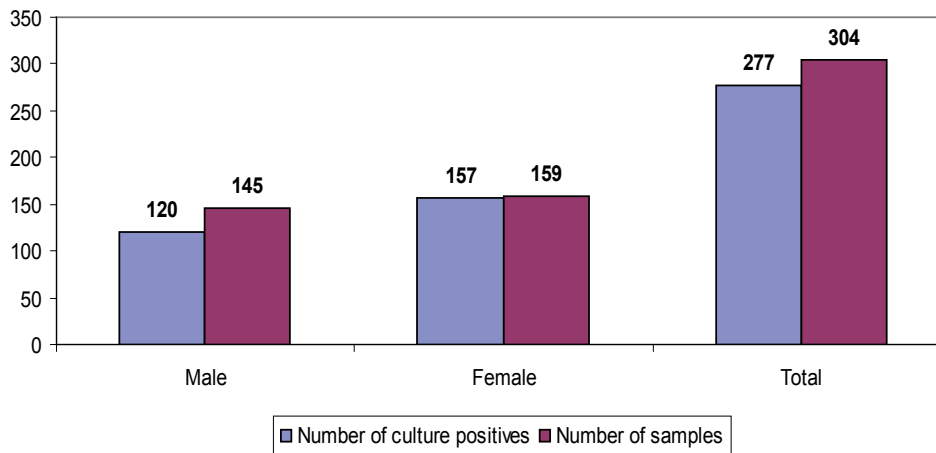


Figure 1: Gender wise sample size and culture positivity

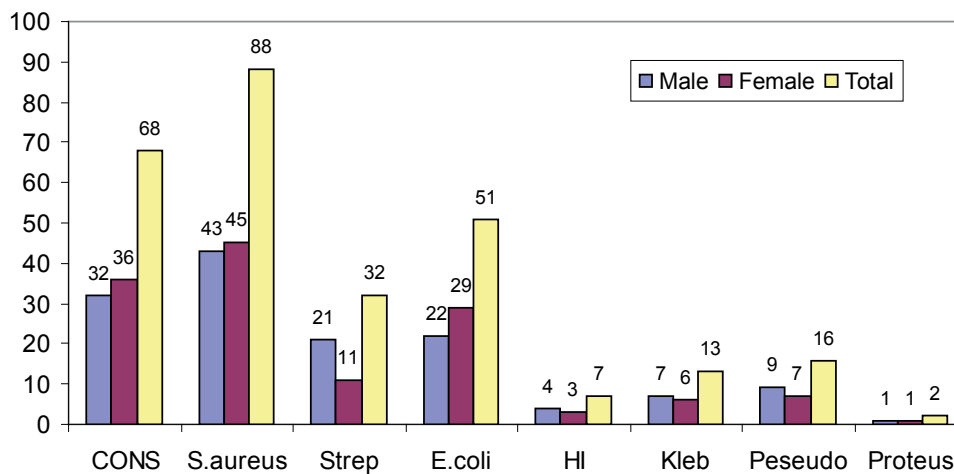


Figure 2: Gender wise bacterial isolates

of two and half years i.e. from January 2010 to October 2014. This study had approved by the institutional ethics committee. An informed written consent in the presence of witness was taken from all the participants. Both male and female aged  $\geq 15$  years with symptoms of lacrimal secretions or known dacryocystitis, the patients fit for DCR were excluded in the study.

Initially 5 ml of sterile normal saline was injected through the punctum of lacrimal sac to look for any regurgitation of mucopurulent pus or clear fluid. Then patient was kept under medical observation for two days. During the observation period the volunteers were not allowed to use any kind of eye drops. If so, they were removed from the study. On next day the individuals were taken to operation theatre and local anaesthesia, 2% xylocaine with adrenalin was given to non hypertensive patients. Adrenalin was avoided to hypertensive patients. Patient was cleaned with betadine and draped with

eye towel. Skin insertion was given, median palpable ligament was identified. Cut, sac was dissected from skin side and bony side. Sac was transported to the Microbiology laboratory immediately in a sterile sample container. Wound was closed in two layers. Oral antibiotics, Amoxycillin 400 mg three times, diclophenac three times per day were prescribed for 5 days. Ciprofloxacin drops (0.3%) four times per day for a week was prescribed. Suture removal was done after one week.

The tissue samples were grinded in a sterile mortar with pessel and incubated in nutrient broth for overnight. On the next day, subcultures were made on solid media like blood agar, Mac Conkey agar and processed routinely i.e. incubation at  $37^{\circ}\text{C}$  and identification of isolate followed by antibiotic sensitivity test. <sup>5, 6, 7</sup>

Initially the isolates were identified by colony morphology. All the isolates were classified based on Gram's staining, catalase and oxidase

S.No	Antibiotic	Isolates		
		CONS (%)	Staph.aureus (%)	Viri.Strept (%)
1	Gentamycin	66 (96.4)	22 (24.5)	21(67)
2	Ciprofloxacin	68 (100)	80 (91)	31 (96)
3	Ofloxacin	66 (97.3)	82 (93)	30 (94)
4	Chloramphenicol	68 (100)	82 (93)	32 (100)
5	Cephazolin	67 (98.2)	72 (82)	30 (94)
6	Cephalexin	65 (96.3)	74 (84)	30 (94)
7	Vancomycin	43 (63.6)	69 (55)	25 (77)
8	Tobramycin	70 (73.6)	67 (53.2)	31 (98)

Table 1: Antibiotic sensitivity pattern among GPC

S.No	Antibiotic	Isolates				
		Esch.coli	Pseu	Kleb	HI	Proteus
1	Genta	51 (100)	15 (93)	13 (100)	06 (83)	01 (50)
2	Chloram	46 (90)	13 (80)	12 (90)	06 (83)	01 (50)
3	Cipro	48 (94)	14 (87)	12 (90)	4.5 (64)	02 (100)
4	OF	50 (98)	12 (73)	12 (90)	3.5 (50)	00
5	Cepha	40 (78)	13 (80)	10 (80)	04 (66)	02 (100)
6	Cephalexin	44 (86)	11 (66)	12 (90)	06 (83)	00
7	NA	47 (92)	09 (53)	09 (70)	06 (83)	Not tested
8	Piper	28(54)	16 (100)	08 (60)	3.5 (50)	02 (100)

Table 2: Antibiotic sensitivity pattern among GNB

enzymes were detected to all the isolates. By using tube coagulase test gram positive cocci i.e *Staphylococcus* is differentiated from CONS. To confirm gram negative bacilli (GNB) biochemical tests like: Indole, Methyl Red, Voges Proskauer, Citrate, Urease tests and growth on Triple Sugar Iron agar were done.

After identification tests, antibiotic sensitivity of isolates was done on Muller-Hinton agar (MHA) by disk diffusion method.<sup>[8]</sup> Briefly, five colonies of each of the isolates were emulsified in Bijou bottle containing 3 ml sterile normal saline compared with McFarland standard 0.5. A sterile cotton swab was dipped into the suspension and the swab was squeezed against the sides of the bottle to remove excess fluid. The inoculated swab was streaked across the surface of the MHA to get uniform lawn culture. The inoculated plates were allowed to dry for 4-5 minutes before each of the following antibiotic discs (Himedia) were placed on the plates: Ceftriaxone (30 µg), Ofloxacin (5 µg), Chloramphenicol (30 µg), Erythromycin (15 µg), Gentamycin (10 µg), Nitrofurantoin (300 µg), Tetracycline (30 µg), Cotrimoxazole (5 µg), Amoxicillin (10 µg), Pefloxacin (5 µg), Ciprofloxacin (5 µg), Methicillin (5 µg), Augmentin

(12.5 µg) and Streptomycin (1 µg). The plates were incubated aerobically at 37°C for 18-24 hours. After incubation the diameters of the zones of inhibition were measured with a scale and compared with a zone-interpretation chart. *Escherichia coli* ATCC 25922 was used as the control. Chi square test was applied to the culture results.

#### **Observations:**

During the study period a total of 304 individuals were included in the study, with female and male ratio 159:145 (1.1:1) [Figure 1]. Mucopurulent discharge was observed in 71% (216 / 304) individuals and clear fluid was seen in the remaining 88 (29%) volunteers. The culture positivity was 91% (277/304). Among culture positive samples, GPC is commonly isolated than GNB [Figure 2]. Infection rate was more in female than male, statistically this is highly significant ( $p < 0.0001$ ).

#### **Discussion:**

Dacryocystitis is the most common infection of lacrimal apparatus. This is an important cause of ocular morbidity in India. The function of lacrimal system is to drain the tears from the eye to the nasal cavity. The mucus membrane of this is colonized with various bacteria. Hence if there is any obstruction to this passage, lead to accumulation

of tears and become a fertile source for infection.

As per the study by Bharathi et al chronic dacryocystitis is reported more in females than males.<sup>9</sup> In the current study the female, male ratio was 1.1:1. Most of our study subjects were villagers. Female patients use dried cow dung for hot water. This generates more smoke. This could be the reason for more culture positivity.

The infection rate was maximum at the age of 40 - 50 years. Out of 304 patients 204 patients were in 40 - 50 age group and 200 samples (67.8%) showed growth ( $p < 0.0001$ ).

In our study 91% cultures showed growth, i.e. 277 samples were positive out of 304. In a study by Chaudhary et al, 77% of cultures showed growth. Where as in Jyothi et al study, 87% cultures showed growth.<sup>1</sup> In both of these studies pus swabs were inoculated in culture media. Where as in our study tissue was inoculated. This could be the reason for getting more number of positive

cultures.

In our study *Staph. aureus* was predominantly isolated bacteria followed by CONS, 35.5%, 27.5% resp. Total 76% of GPC and 24% of GNB were isolated in our study. Chowday et al could isolate 89% of GPC.<sup>14</sup> In one study by Shah et al, GPC and GNB were isolated equally.<sup>3</sup>

Most (97%) of GPC in our study were sensitive to Chloramphenicol followed by Ciprofloxacin, Ofloxacin, Cephalexin, Cephazolin, Tobramycin, Vancomycin and Gentamycin [Table 1]. Even most of GNB were also sensitive to Chloramphenicol [Table 2].

#### **Conclusion:**

To conclude, in our study an attempt was made to isolate the bacterial pathogens in chronic Dacryocystitis patients. This helped them for proper treatment, so that time as well as money can be saved.

**Conflict of interest:** None

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