



MICROBIOLOGICAL PROFILE IN PATIENTS WITH CONGENITAL NASO LACRIMAL DUCT OBSTRUCTION

Dr. N. V. N Prasanna Bharathi*	M.S Ophthalmology, Ex Junior Resident Sarojini Devi Eye Hospital, Hyderabad. *Corresponding Author
Dr. P. Ramdas	Assistant professor of Ophthalmology, Sarojini Devi Eye hospital, Huymayun nagar, Hyderabad .500028 T.S.
Dr. M. Padma	Associate professor of Ophthalmology, Sarojini Devi Eye hospital, Huymayun nagar, Hyderabad. 500028 T.S.
Dr. Sowmya Andole	M.S Ophthalmology, Ex Senior Resident, Sarojini Devi Eye hospital, Hyderabad.

ABSTRACT

AIM: To study and evaluate the different organisms that are responsible for congenital nasolacrimal duct obstruction .To initiate appropriate antimicrobials based on the sensitivity patterns of the isolated organisms. **Methods:** It is a prospective study conducted in Sarojini Devi Eye hospital during September 2016 to February 2018. 112 samples from 100 cases were collected from clinically diagnosed congenital nasolacrimal duct obstruction with epiphora below 1 year without any ocular and systemic diseases .Swabs taken were analysed for causative microorganisms of congenital nasolacrimal duct obstruction. **Results:** In our study out of 112 samples[88 unilateral cases + 12 bilateral cases]82 cases [73.21%] were culture positive, of which 80 [71.42%] were bacterial, 2 cases [1.78%] were mixed [bacterial + fungal]. Gram positive bacteria were predominant, staphylococcus epidermidis 56[68.29%] followed by Staphylococcus aureus 13[15.85%]. Among gram negative bacteria Escherichia coli 1 [1.21%], klebsiella 1[1.21%]. 2 cases were mixed [bacteria + fungal]. Infection is more commonly seen in right eye. Rate of infection was higher in females 62[55.35]. Higher incidence of infection was seen in the age group of less than 7 months. Both gram positive and gram negative were most susceptible to tobramycin. **Conclusion:** Among all the congenital nasolacrimal duct obstructions 90% of the cases would resolve spontaneously with medical therapy and Crigler massage. 10 % of the cases require probing and silicon tube intubation. The knowledge of identification , awareness and bacteriology of congenital nasolacrimal duct obstruction by the paediatricians , physicians and the parents would contribute to the choice of effective antimicrobials and reduce keratitis medicamentosa , induced astigmatism due to excessive eye rubbing and apprehension among the parents.

KEYWORDS : Congenital nasolacrimal duct, Epiphora, Microorganisms, Probing.

INTRODUCTION:

Congenital nasolacrimal duct obstruction is a common condition that results in epiphora (excessive tearing) early in life. Congenital naso lacrimal duct obstruction occurs in 5% of the normal newborn infants . Most (approximately 90%) clear spontaneously during the first year of life. (1)(2)(3) The lacrimal excretory system is responsible for draining excess tears and is composed of the canaliculi, the lacrimal sac, and the nasolacrimal duct. The most common cause is the failure of a membrane at the end of the tear duct (valve of Hasner) to open normally at or near the time of birth. Other causes of blocked tear ducts in children include ,absent puncta (upper and/or lower eyelids) narrow tear duct system and infection.

Children with Down syndrome, Craniosynostosis, Goldenhar syndrome, clefting syndromes, hemifacial microsomia, or any midline facial anomaly are at an increased risk for congenital nasolacrimal duct obstruction . Congenital naso lacrimal duct obstruction may affect one or both eyes. Tearing does not always suggest nasolacrimal duct obstruction, as this symptom may occur in other conditions, such as exposure to irritants, eyelid malposition, abnormal eye lashes, or congenital glaucoma, which may be identified on careful examination. Infants present with excessive tearing or mucoid discharge from the eyes because the natural drainage system is blocked. Obstruction of the nasolacrimal duct results in stasis with the accumulation of tears, desquamated cells, and mucoid secretions. This creates a fertile environment for secondary bacterial infections. Morbidity is related primarily to the lacrimal sac abscess and spread of the infection. The primary morbidity is associated with chronic lacrimation, matting, and conjunctival inflammation and infection. As many as 30% of new born infants are believed to have closure of nasolacrimal duct at birth. If not treated promptly and

aggressively, newborn infants can experience orbital cellulitis (because the orbital septum is formed poorly in infants), brain abscess, meningitis, sepsis, and death.

The purpose of this study is to identify the bacterial aetiology in congenital nasolacrimal duct obstruction and to determine the in vitro antibacterial susceptibility and resistance of bacterial pathogens to commonly used antibacterial agents. 90% of the CNLD resolves spontaneously with medical therapy and Crigler massage within 1 st year. Only 10% of them requires probing and silicon tube intubation.

MATERIALS AND METHODS:

This is a prospective study done at a tertiary eye care government medical college hospital from 2016 to 2018. The study includes 100 infants with congenital nasolacrimal duct obstruction attended to Paediatric Ophthalmology outpatient department with the complaint of watering of eyes.

INCLUSION CRITERIA :

All the infants with congenital nasolacrimal duct obstruction without any eye disease are included.

EXCLUSION CRITERIA:

1. Infants with CNLDO with other ocular and systemic manifestations are excluded.
2. Infants with CNLDO without parents consent are excluded.

METHODS:

A complete history and examination of eyes and ocular adnexa was done. Specimen collected after cleaning with normal saline swab, pressure was applied on medial epicanthic fold, the regurgitant pus or serosanguinous fluid

was collected by sterile swab. Two sterile cotton swabs moistened with physiological saline were used for collection of discharge from the lacrimal punctum, ensuring that the lid margin or conjunctiva was not touched. **Specimen processing** One swab was spread on two labeled slides to prepare smears. The direct smears so made and stained by Gram stain and KOH method for fungal elements. The second swab was used for inoculation into culture media like Brain Heart Infusion broth (BHI), Blood agar (BA), Mac Conkey (MA), Chocolate agar (CA) Sabouraud dextrose agar (SDA). The inoculated media were incubated at 37°C for 24 to 48hrs. A positive culture was defined as a growth of the same organisms on more than two solid phase media or confluent growth on one solid medium and smear results consistent with cultures.

A standardized protocol was followed for each ocular specimen for the evaluation of significant microbiological features. In vitro susceptibility testing was performed by Kirby-Bauer disc diffusion method and interpreted using Clinical and Laboratory Standards Institute's serum standards. (4) The antibacterial agents (Himedia Laboratories Pvt. Ltd., Mumbai, India) used were amikacin (30 µg/disk), tobramycin (10 µg/disk), gentamicin (10 µg/disk), ceftazidime (30 µg/disk), ciprofloxacin (5 µg/disk), norfloxacin (10 µg/disk), ofloxacin (5 µg/disk), gatifloxacin (5 µg/disk), moxifloxacin (5 µg/disk), chloramphenicol (30 µg/disk) were consistently tested for their efficacy . All the isolates were subjected to cefoxitin disc diffusion test using a cefoxitin (30 µg/disk). A 0.5Mc Farland standard suspension of the isolate was made and lawn culture was done on Mueller Hinton agar plate. Plates were incubated at 35°C for 18hr and zone diameters were measured. An inhibition zone diameter of ≤ 21mm was reported as resistant and ≥ 22mm was considered as sensitive.

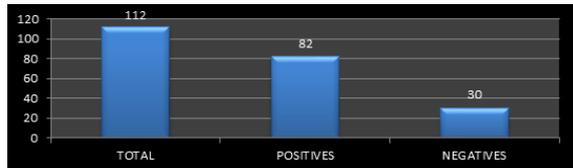
Identification of fungal ocular pathogens:

The fungal elements were observed in 10% KOH mount and Gram stain. The fungi were identified based upon the colony characters, such as texture, color, growth rate on obverse side of Sabouraud's dextrose agar slants and presence of pigment on the reverse side of colony and whether the pigment was localized or diffuse. A lactophenol cotton blue mount was done for the microscopic features like mycelium, conidium relationship between hyphae and fruiting bodies.

RESULTS: Our prospective study of 100 patients with 112 samples of clinically diagnosed congenital nasolacrimal duct obstruction

Table 1: Distribution of culture positive cases

Total cases	No of patients	Percentage
No.cases studied	112	100%
No.of positive	82	73.21%
No.of negative	30	37.33%



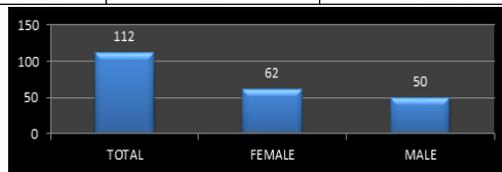
GRAPH 1:DISTRIBUTION OF CULTURE POSITIVE CASES

In our study no of samples collected were 112 from 100 patients of CNLD. Out of 112 samples 73.21% were culture positive.27.33% were culture negative .

GENDER DISTRIBUTION: In our study out of 112, 73.21% samples were culture positive. Out of 112 cases 55.35% were seen in females and 44.64% were seen in males.

TABLE 2. GENDER DISTRIBUTION

Gender	No.of samples	Percentage
Female	62	55.35%
Male	50	44.64%



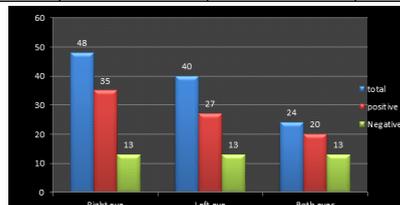
GRAPH 2:GRAPH DEPICTING GENDER DISTRIBUTION

Laterality:

In our study the involvement of eye was mainly unilateral(75.60%)either the right eye or left eye and there were also some bilateral cases(24.39%) .Among unilateral right eye (42.68%) was predominant.

Table: 3 LATERALITY

Infected eye	Total samples	Growth	Percentage
Right eye	48	35	42.68
Left eye	40	27	32.92
Both eyes	24	20	24.39
Total	112	82	73.21

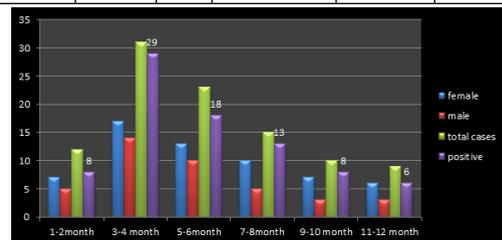


GRAPH 3:Laterality distribution of positive cases

Age distribution: The age of the patients in the study ranged from 1 month to 12 months, majority of cases were seen in 3-4, 5-6 months of age in female gender constituting 35%,22%.

Table 4:Age wise distribution

Age group in months	Female	Male	No of cases studied	No of positive cases	Percentage
1-2	7	5	12	8	10
3-4	17	14	31	29	35
5-6	13	10	23	18	22
7-8	10	5	15	13	16
9-10	7	3	10	8	10
11-12	6	3	9	6	7



GRAPH 4:

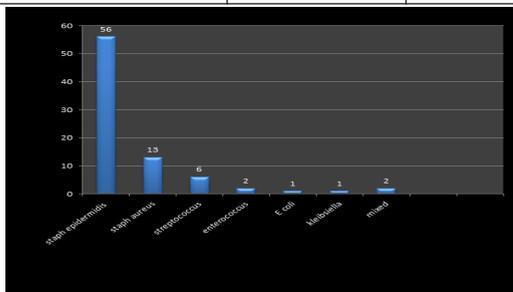
GRAPH DEPICTING AGE AND GENDER DISTRIBUTION IN THE PRESENT STUDY MICROBIOLOGICAL PROFILE:

In this study among 82 culture positive,80 [71.42%] cases were purely bacterial isolates and 2[1.78%] cases were mixed [bacterial +fungal] isolates. Among 80 [71.42%] bacterial isolates, 78 [97.50%] were gram positive, 02[2.50%] were gram negative.

Among 78 gram positive cases, staphylococcus epidermidis 56(68%), staphylococcus aureus 13(16%), streptococcus pneumoniae 6(10%), enterococcus faecalis 3(3.5%) and 2 were gram negative E-coli 1(1.21%), klebsiella 1(1.21%).

TABLE 5: MICROBIOLOGICAL PROFILE IN OUR STUDY

ORGANISM ISOLATED	NO OF POSITIVE SAMPLES	PERCENTAGE
Staphylococcus epidermidis	56	68%
Staphylococcus aureus	13	16%
Streptococcus pneumoniae	6	10%
Enterococcus faecalis	3	4%
E coli	1	1%
Klebsiella	1	1%
Streptococcus+ fusarium fungus	2	



GRAPH 5: DISTRIBUTION OF DIFFERENT ISOLATES

Drug susceptibility of different isolates: In this study most of the isolates are susceptible to tobramycin, moxifloxacin and chloramphenicol.

Table 6: Drug susceptibility of different isolates

ANTIBIOTIC	Staphylococcus epidermidis	Staphylococcus aureus	Streptococcus	Enterococcus	Escherichia coli	Klebsiella
ciprofloxacin	42.8	54.5	98	25	-	-
Ofloxacin	57.1	45.4	99	25	-	-
Gatifloxacin	85.7	81.8	100	50	-	-
Moxifloxacin	100	81.8	100	50	-	-
Chloramphenicol	85.7	90.9	100	75	100	100
Ceftazidime	14.2	27.2	100	50	100	-
Gentamicin	71.4	81.8	100	80	100	-
Tobramycin	100	90.9	100	100	100	-

DISCUSSION :

The most common infection of the lacrimal apparatus is dacryocystitis. The lacrimal excretory system is prone to infection and inflammation in infants with CNLDO. This mucous membrane-lined tract is contiguous with two surfaces (conjunctival and nasal mucosal) that are normally colonized with bacteria. The functional purpose of the lacrimal excretory system is to drain tears from the eye into the nasal cavity. Obstruction of the nasolacrimal duct from whatever source results in stasis with the accumulation of tears, desquamated cells, and mucoid secretions above the level of obstruction. This creates a fertile environment for secondary bacterial infection (5). The present study includes 100 patients with 112 samples of clinically diagnosed congenital nasolacrimal duct obstruction which were studied for microbial involvement of which 82(73%) were culture positive cases and 30(27%) were no bacterial growth.(table 1).This is in accordance with the study of Kuchar et al. In their study 72.64% cases were positive out of 50 samples where as Usha et al (17) study analysed 83 % positive cultures from 238 samples .This is due to large sample study.

In our study female predominance was seen. This is in accordance with Chaudhary et al., (2005), where study was predominated to female subjects 65.4% .This is also in accordance with the study of Prakash et al.,2012.(23)

reported that CNLD is more predominant in females due to narrow bony canal in females. In our study ,the involvement of the eye was mainly unilateral [88%],bilateral cases were [12%].This is in accordance with the study of Prakash et al.,2012(23) reported that incidence of CNLD is high unilaterally either right eye or left eye.

In the present study there was a relatively high incidence of the disease on the right side[54%],as compared with the left side [45.45%].

Age wise distribution of culture positive cases in the present study were predominantly seen in 3-4,5-6 months of age constituting 35%,22%(chart 5).

This is in accordance with the study of Ffooks et al.,1962(21) and Mahwish Jawaid et al .,2017.(25) Among 82 culture positive,80[71.42%] cases were purely bacterial isolates and 2[1.78%] cases were mixed[bacterial+fungal] isolates. In this study among 80[71.42%] bacterial isolates 78[97.50%] were gram positive and 2[2.50%] were gram negative.

Usha et al in their study in 2006(17) also obtained 57% gram positive bacteria and 43% gram negative bacteria ,1(0.5%) fungal isolate from 83%culture positive cases.This is also in accordance with the study of Prakash et al.,2012.(23) .Bareja U et al 1990 study also reveals that streptococcus pneumoniae were 28.9% and staphylococcus epidermidis 11.4% out of 57.9% cases.According to Usha et al.,2006 study (57%) isolates were gram positive bacteria, the most frequent isolate being Streptococcus pneumoniae .Gram negative bacteria accounted for (43%) of the isolates, the most frequent isolate being Haemophilus influenza. There was one fungal isolate (0.5%) of Candida tropicalis. In the present study , most of the gram positive cocci were susceptible to Tobramycin, chloramphenicol and were equally susceptible to Gentamycin, moxifloxacin and gatifloxacin.This is in accordance with BHAVANA RAINA et al studied 37 eyes of 30 congenital dacryocystitis patients (7 bilateral), out of which 60% of patients were male and 40% female. Gram positive cocci constituted the major bacterial isolate (56.7%) with Streptococcus pneumoniae (27.9%) predominating. Most effective antibiotics against the commonest organism Streptococcus pneumoniae were Tobramycin and Gentamycin showing 100%effectivity. Staphylococcus albus 17.4% was the most common normal conjunctival commensal isolated. .In the present study gram negative organisms were sensitive to chloramphenicol and tobramycin.This is in correlation with the studies of Kebede et al., (2010), who reported the antibiotics to which the majority of the isolates sensitive to were chloramphenicol (82.4%), gentamycin (79.1%). (24) Among Gram negative organisms most of them are susceptible to chloramphenicol, gatifloxacin and tobramycin. Bharathi et al., (2010), reported all Gram positive cocci were most frequent isolated from ocular infections and were most sensitive to moxifloxacin and Gram negative were most sensitive to amikacin and gatifloxacin. Majority of the isolated organisms were least sensitive to ciprofloxacin and ofloxacin.

CONCLUSION:

1. In the present study the commonest organism isolated was staphylococcus epidermidis[68.29%].
2. It was well established as a normal commensal of the conjunctiva along with diptheroids.(16)
3. A number of reports have proved its pathogenicity in postoperative ocular infections, blepharoconjunctivitis and corneal ulcer.(16)We should not ignore it as a mere commensal.(16)
4. Our study shows that all congenital nasolacrimal duct obstruction cases should be routinely investigated for staphylococcus epidermidis and its sensitivity patterns.

The knowledge of identification, awareness and bacteriology of CNLD by the paediatricians, physicians and the parents would contribute to the choice of effective antimicrobials. It would reduce the keratitis medicamentosa, anisometropia and apprehension among the parents. In this study we did not follow up all the cases whether they needed probing in future.

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