

A CLINICO-BACTERIOLOGICAL PROFILE OF CHRONIC DACRYOCYSTITIS IN ADULT PATIENTS - A STUDY IN KHAJA BANDA NAWAZ TEACHING AND GENERAL HOSPITAL, KALABURAGI NORTH KARNATAKA

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Abstract

Background: To study chronic dacryocystitis in adults with respect to age, gender, laterality, symptoms and signs. To isolate the current spectrum of aerobic bacterial pathogens causing chronic dacryocystitis and their antibiotic sensitivity patterns. **Materials and Methods:** A prospective study of 50 cases of chronic dacryocystitis were studied in Khaja Banda Nawaz Teaching And General Hospital, Kalaburagi for which Gram's staining and aerobic culture and sensitivity done on lacrimal regurgitate. Samples which was collected either by Regurgitation On Pressure over the Lacrimal Sac (ROPLAS) test. Or By irrigating the lacrimal drainage system with sterile saline and collecting the sample from the refluxing material. **Result:** Incidence of chronic dacryocystitis is more in middle ages 41-50 yrs (28%) & in males with sex ratio F: M = 2.84: 1. The disease is unilateral in 41 cases. Most common chief complaint being watering and discharge in 26 cases (52%). Positive culture is seen in 42 (84%) cases, while 8 (16%) cases showed no growth. Gram positive organisms were isolated in 27 (54%) cases and gram negative organism in 13(26%) cases. Gram positive organisms, Staph Aureus and CONS accounted for 22% each which were sensitive to Amoxicillin/ Clavulanic acid. Among Gram negative organisms Klebsiella in 10% cases sensitive to Aminoglycosides, Fluoroquinolones. **Conclusion:** This study helps Ophthalmologists to specifically investigate, clinically and bacteriologically and aid efficient diagnosis and management of chronic dacryocystitis cases including proper antibiotic prophylaxis before any intraocular or lacrimal surgery, hence preventing antibiotic resistance caused due to injudicious use of antibiotics.

INTRODUCTION

Chronic dacryocystitis is an important cause of ocular morbidity in India. The disease presents as epiphora with or without mucopurulent discharge. Chronic dacryocystitis is also found often in cases of corneal ulcer or may be diagnosed on routine syringing carried out prior to cataract surgery. This is a common oculoplastic problem. No cataract surgery can be planned without ruling out chronic dacryocystitis.^[1]

It is an annoying condition and sometimes a sight threatening ophthalmic problem which affects the patients of every age. The obstruction may be an idiopathic inflammatory stenosis, the primary acquired nasolacrimal duct obstruction, which mostly affects middle-aged and elderly women. The obstruction may be secondary to trauma, infection,

inflammation, neoplasm or mechanical obstruction, the secondary acquired lacrimal drainage obstruction. Distal obstruction converts the lacrimal sac into the stagnant pool, which easily becomes infected leading to chronic dacryocystitis with epiphora and purulent discharge.^[2]

Obstruction of the nasolacrimal duct from whatever source results in stasis with the accumulation of tears, desquamated cells, and mucoid secretions superior to the obstruction in a pathologically closed lacrimal drainage system. This creates a fertile environment for secondary bacterial infection and can result in dacryocystitis which is a constant threat to the cornea and orbital soft tissue. It is the most common cause of epiphora and may present with or without mucopurulent discharge.^[3]

Dacryocystitis of non-specific origin can be acute or chronic.^[4] Acute dacryocystitis presents with

severe inflammation and invariably leads to chronic dacryocystitis. Chronic dacryocystitis is more common and presents with epiphora and discharge. In the chronic form, the disease tends to be indolent. Epiphora causes social embarrassment by constant watering and discharge and is a menace to the integrity of eye. The peculiar location of lacrimal sac at the junction of orbit and nose makes it frequently involved by diseases of both these sites causing chronic conjunctivitis, orbital cellulitis and infection may spread to cavernous sinus.

The studies have shown that bacterial pathogens differ in chronic and acute dacryocystitis. Acute dacryocystitis is caused by gram negative rods. In chronic dacryocystitis mixed flora is isolated. The percentage of culture positive was found to be higher in chronic dacryocystitis with single or mixed growth. This infection should be treated prior to intraocular or lacrimal surgery. Post operative infections after lacrimal surgery can be minimised⁵. There are distinct patterns of geographical variation in terms of aetiology according to the local climate in infective keratitis and also in microbial conjunctivitis.^[5-7] Hence an understanding of the region wise etiological agents is important in the management of these diseases. Hence this study is conducted in isolating the bacterial agent causing chronic dacryocystitis in this region of North Karnataka.

On the whole this study was undertaken to evaluate chronic dacryocystitis from clinical and bacteriological point of view.

MATERIALS AND METHODS

A prospective study carried out at Department of Ophthalmology, Khaja Banda Nawaz Teaching And General Hospital, Kalaburagi for a period of one year. The study included 50 patients who attended ophthalmology out-patients and in-patients departments. The patients were randomly selected and studied from the clinical and bacteriological point of view. Patients were examined with special reference to the lacrimal apparatus.

First of all, the patient's demographic data was noted that included the age, gender, occupation, rural or urban and socioeconomic status according to modified version of the Kuppuswamy's socio-economic status⁸.

Then detailed history was taken. The presenting complaints and duration of the complaints were noted, to study the different modes of presentation of the disease, its progression and complications.

Inclusion Criteria

- Age >15years
- Patients with epiphora
- Patients with purulent or mucopurulent regurgitation
- Samples processed under aerobic conditions

Exclusion Criteria

- Age < 15 years
- Patients with acute dacryocystitis
- Patients with other ocular infection
- Patients on antibiotics since past one week

All patients included in the study underwent basic evaluation as mentioned in the standard proforma after obtaining written informed consent. Routine ophthalmic examination was conducted by the investigator, including slit lamp examination, paying special attention to the presence of discharge and epiphora. The presence of any anomaly of eye lids and other ocular adnexa were noted. Any coexistent ocular infection or inflammation was specifically looked for and cases excluded if did not meet the inclusion criteria. Routine ENT examination was also conducted, specifically to diagnose nasal pathology.

Importance was stressed for detailed Nasal Examination in ENT department to detect any nasal or paranasal sinus pathology. Anterior rhinoscopy examination was done.

Statistical Analysis

The analyzed results were expressed as percentage and proportions for the distribution of chronic dacryocystitis cases according to age, sex, nature of discharge, presenting complaints, correlation of ROPLAS test with findings of lacrimal syringing, bacteria isolated and their sensitivity to various antibiotics.

RESULTS

This study shows highest incidence in the age group 41-50 yrs (28%), followed by 61-70yrs (18%) and 51-60yrs (16%). Incidence is lower in extremes of age. Thus it is evident that chronic dacryocystitis is a disease of middle age.

Table 1: Nature of regurgitate on ROPLAS test and lacrimal sac syringing

Sl.no	RGT	No of cases	Percentage
1	Clear fluid	11	22%
2	Muco Purulent Discharge	30	60%
3	Mucoid Discharge	9	18%

On regurgitation and lacrimal sac syringing, 60% cases showed mucopurulent discharge (MPD), 22% showed clear fluid (CF) regurgitation and 18% showed mucoid discharge (MD).

Table 2: Bacteriological Pattern of chronic dacryocystitis

Sl.no	Organisms isolated	No of cases	Percentage
1	Gram +ve organisms	27	54%
	Staphylococcus aureus	11	22%

	Streptococcus	5	10%
	CONS	11	22%
2	Gram -ve organisms	13	26%
	Pseudomonas	3	6%
	Klebsiella	5	10%
	E.coli	1	2%
	Citrobacter	3	6%
	NF Gram -ve bacilli	1	2%
3	Mixed Growth	2	4%
4	No Growth	8	16%

Table 3: Antibiotics sensitivity to Gram positive Bacteria.

Sl. No	Organisms	Amp/clox/methicillin	amox/clav	CF	CXN	CLN	PIP/TN	TOBA	G	A	C	CoT	E	CPZ
1	STAPH A	6	4	2	1	2	1		3	1	1	1	5	2
2	STREPT	2	3	1	1	1				1			1	1
3	CONS	4	4	1	1	2	1	3	1		10	3	4	1

This study showed increased sensitivity of gram positive bacteria to Cloxacillin, Amoxicillin/ Clavulanic acid, Erythromycin and Clindamycin and Cefazidime. Also CONS showed sensitivity to Ciprofloxacin.

Table 4: Antibiotics sensitivity to Gram negative Bacteria.

Sl. No	Organisms	Amp/clox	amox/clav	CF	CXN	CLN	PIP/TZ	TOBA	G	A	C	COT	E	CPZ
1	PSEUDO			1			1			3	1			3
2	KLEB	2	1	2				5	5	2	1			
3	E.COLI	1						1	1	1	1			
4	CB	1		1				1	2		2			

Among Gram negative organisms isolated, increased sensitivity to Gentamicin, Amikacin and Fluoroquinolones like Ciprofloxacin. Also Pseudomonas showed sensitivity to Chloramphenicol.

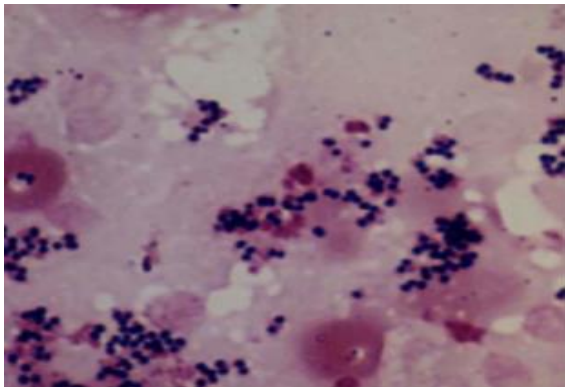


Figure 1: Gram stain with Gram-positive cocci in clusters



Figure 3: β -Haemolytic colonies of Staphylococcus aureus on Blood agar

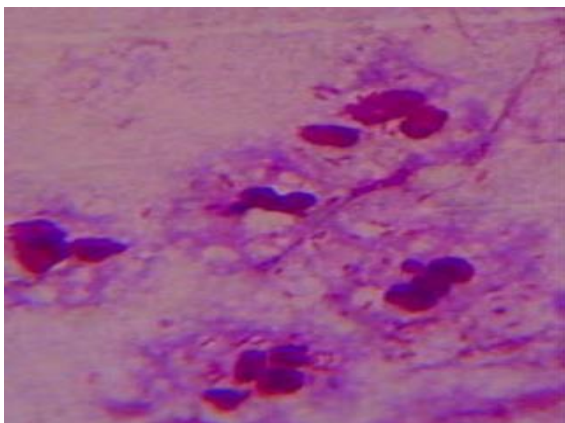


Figure 2: Gram stain with Gram-negative bacilli



Figure 4: Klebsiella colonies

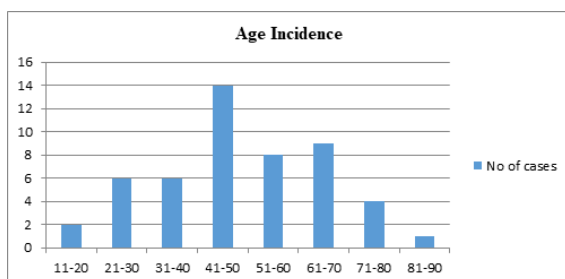


Figure 5: E coli colonies



Figure 6: Kirby Bauer disc diffusion test

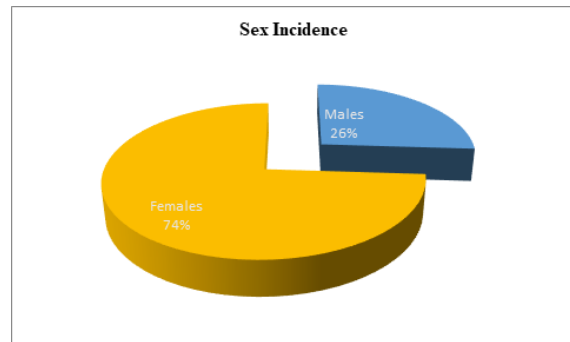
In the present study bacterial growth was seen in 42 (84%) cases. Gram positive organisms were isolated in 27 (54%) cases and Gram negative organism in 13 (26%) cases. 2 (4%) cases showed mixed growth pattern. Staph Aureus and CONS accounted for 22% each and Streptococcus 10% cases. Among Gram negative organisms Klebsiella was isolated in 10% cases. Citrobacter and Pseudomonas were isolated in 6%.



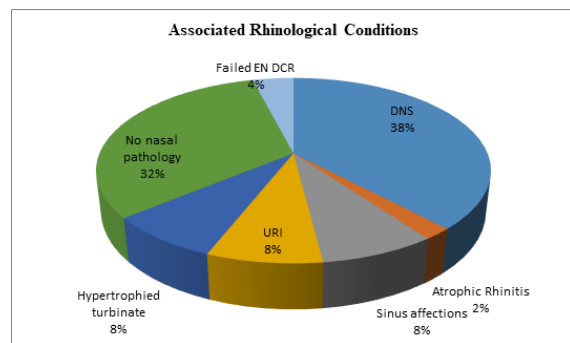
Graph 1: Showing the age incidence

This study shows that incidence of chronic dacryocystitis in males as 26%, and females as 74%.

The sex ratio F: M = 2.84: 1. Thus it is evident that chronic dacryocystitis shows female preponderance.



Graph 2: Showing sex incidence



Graph 4: Showing associated rhino logical conditions

Above Graph shows associated nasal and paranasal pathologies in 68% cases. Deviated nasal septum (DNS) was found in 38%, URI and sinus infections in 8% each, turbinate hypertrophy in 8%. Failed endonasal DCR (EN-DCR) was noticed in 2 cases (4%). Atrophic rhinitis was found in 2% cases. No nasal pathology was seen in 32% of patients.

DISCUSSION

Age: In this study patients above the age of 15yrs were selected. The highest incidence of chronic dacryocystitis was found in the age 41-50 years (28%), followed by 61-70 yrs (18%) and 51-60 years. Similar age incidence was seen in the study carried out by Shah C P9 et al, with highest incidence occurring between 41-50 years (27%), followed by 21- 40 and 51-60 years.

Thus it is evident that the disease is common among middle aged and elderly people.

Gender: In the present study, the incidence was higher in females (74%) than males (26%). The sex ratio F: M is 2.84: 1. Similar results were observed in RIO Guwahati by Dr Jyoti Bhuyan (2009),10 (76.66%) were females and (23.33%) were males with sex ratio of 3.28:1; Similar results were observed by Etezad Razavi11 et al (2010) (female 74% and males 26%) and Prakash R12 i.e. 70% females & 30% males. Chaudhry I.A13 et al(2005) - 65.4% , Shah C.P9 et al(2011) 64%.

A female pre-ponderance has been noted in all the series. This higher incidence of chronic

dacryocystitis in females would be due to significantly smaller dimensions in the lower nasolacrimal fossa and middle nasolacrimal duct. These changes in the antero posterior dimensions of nasolacrimal canal coincide with osteoporotic changes occurring in middle aged and elderly females. Moreover menstrual and hormonal fluctuations and a heightened immune systems are factors that may contribute to the disease process. Hormonal changes that bring about a generalised deepithelization in the body may cause the same within the lacrimal sac and duct. An already narrow lacrimal fossa in women predisposes them to obstruction by the sloughing off the debris.

Laterality: In the present study, left side is affected in 52% and right in 30%. The disease is unilateral in 82% and bilateral in 18% cases. Left side is affected more than right eye. This results correlates with most of the study result Mandal R14 et al (2008) found it common on the left side. Possibly, the nasolacrimal duct and lacrimal fossa formed a greater angle on the right side than on the left side. A significant difference in the involvement of the right and left lacrimal sacs is seen in the present study. Amanat L A et al¹⁵ found that significant number of opposite asymptomatic eyes in patients with unilateral epiphora, were found to have an abnormalities in NLP, on both sides in lacrimal Scintigraphy.

Occupation and socioeconomic status: In the series by Mandal R14 et al (2000), the disease was more common in lower socioeconomic strata with habit of pond bathing. In the present study most of the female patients were housewives (74%) and placed in rural areas.

Dr Jyoti Bhuyan et al,¹⁰ reports (63.33%) were housewives, 16.66% are farmers, 6.67% are service holders and 6.67% are students. Most of the females come from the lower income group who used wood and dried cow dung for cooking which gave away a lot of smoke particles which could have settled down in the conjunctival sac, entered the nasolacrimal duct through tears and in turn had blocked the nasolacrimal duct. Poor personal hygiene could also have contributed. Kajal which was artificially prepared in the house could have been contaminated. In the present study 42% cases are from urban, 58% cases are from rural areas indicating that though rural incidence is common; well placed and civilized people are not immune to the disease.

Clinical presentation of chronic dacryocystitis: Present study found only watering/epiphora as the presenting symptom in 44%, and the remaining presented with watering & discharge (52%), swelling at medial canthus either as firm nodule or in 4% which is lower than Tariq farooq¹⁶ et al who reported mucocele in 12.31%.

Our study documented more cases with complains of watering as well as discharge than with epiphora alone when compared with other studies. Our study showed most common duration of presenting

symptoms between 6months-1 year 36% followed by 3-6 months in 34%. Epiphora for 2-3 yrs and longer duration could be present without clinical infection, representing simple stenosis of lacrimal duct.

A majority of patients (60%) had mucopurulent discharge. Mucoïd discharge (18%) and clear fluid (12%) was noted.

Of the 50 patients in the study, 40 patients (80%) had regurgitation on pressure over lacrimal sac. The ROPLAS test was negative in 10 patients (20%). As per an Indian study by Devdatta J. Gohell the sensitivity and specificity of ROPLAS in detecting chronic dacryocystitis are 87% and 98% respectively. Thus the sensitivity of this test as per our study is nearer (83.33%) to that study.

Bacteriology of chronic dacryocystitis: The present study shows positive culture positive in 84% cases, 80% cases showed pure growth, 4% mixed growth pattern and no growth was seen in 16% cases. Anaerobic growth too has been documented in many studies with Hartikainen et al documenting a highest incidence of 20%. The presence of anaerobic organisms as sole etiological agents could explain the negative aerobic cultures in several studies.¹²

Among culture positive 54% were Gram positive and 26% were Gram negative. Coden et al,¹⁷ found Staph aureus in 22.1% and S. epidermidis in 27.3% and 27% were Gram negative organisms. He found 52.5% culture positive of which 71% were in pure culture and 29% were mixed growth. Similar results were seen in series of studies.

Bharti M J et al,⁵ 2007 reported CoNS to be present in 44.2%, Staph aureus in 10.8% Streptococcus 10% in chronic dacryocystitis. Sainju et al,¹⁸ reported Staph aureus in 34.2% cases among Southern Australia. Staphylococcus has been shown to be the predominant species in the bacterial isolates of several studies all around the world.¹⁹ Contrary to many older studies our study did not find Staphylococcus pneumonia in any of the growths.⁶

In our study 26% of the cultures positive for growth yielded Gram negative organisms. Of these, growth of Pseudomonas aeruginosa (3 Cases) and Klebsiella pneumonia (5 Cases) was seen. Single samples showing growth of each of E coli, and 3 samples of Citrobacter were also obtained. Varied results have been obtained by different studies regarding the incidence of Gram negative bacterial isolates, with incidence ranging from 20% to nearly 60%.^{2,5} Most of them have described incidence of Gram negative organisms in 20 to 25 % of the total isolates.^{2,8} While most studies have found Haemophilus influenza as the most common gram negative bacterial isolate,¹³ recent studies have documented other bacteria which are normally present neither in the conjunctiva or in the nose. Among these are Pseudomonas, E coli, Enterococci, Proteus and Citrobacter.²⁰ Several studies have quoted Pseudomonas as most frequent Gram negative bacteria isolated with incidence varying from as low as 8% to as high as 22%.^{18,20}

The documented incidence of mixed bacterial isolates varies from 18% to as high as 66% in different studies.^[2,13,17] Mixed Growth included Staphylococci and NF Gram negative bacilli in 1 case and E.coli and NF gram negative bacilli in 1 case. Among NF Gram negative bacilli, most common in this region are Acinetobacter.

In the present study, Gram positive organisms showed sensitivity to Amoxicillin, Cloxacillin, Clavulinic acid, Erythromycin, Clindamycin. Bareja U21 series exhibited 93.3% sensitivity to Cloxacillin and is comparable to the present study and found an excellent response to 1% to 2.5% drops depending on child's age. It could act as topical drug of choice in case of Staphylococcal aureus and epidermidis infections. According to Bareja U,^[21] nasal flora has no role in causation of congenital dacryocystitis. In the present study increased sensitivity of Gram positive organisms to Clindamycin was seen, did not correlate with the study by Chaudhary M et al,^[22] and Das D et al,^[23] (2008) which says Chloramphenicol is the most effective drug for chronic dacryocystitis. Prakash R,^[12] found Gram positive organisms were sensitive to Vancomycin (100%) followed by Tobramycin and Linezolid (99.3%) and Gram negative to Gentamicin (100%), Cefepime (98.79%) and Chloramphenicol (97.14%). This is comparable to present study in which Gram-negative organisms are sensitive to Gentamicin, Amikacin, Tobramycin and Fluoroquinolones like Ciprofloxacin. Also Pseudomonas showed sensitivity to Chloramphenicol. The antimicrobial sensitivity pattern changes from community to community and also in the same area. This necessitates careful individual culture and sensitivity of each affected eye more than once during the course of treatment.

CONCLUSION

To conclude, multiple organisms harbour in lacrimal sacs of chronic dacryocystitis. Bacterial examination is necessary to identify aetiological agent and its antibiotic sensitivity to treat with appropriate antibiotics in catarrhal stage of the disease and aid efficient diagnosis and management of these cases including proper antibiotic prophylaxis for lacrimal sac surgeries, hence preventing antibiotic resistance caused due to injudicious use of antibiotics.

REFERENCES

1. Devdatta J, Gohel, Manoj kumari, Ashok Kumar Sokhal., Nishant Solanki, et al. A study of comparison of hydrostatic regurgitation test with sac syringing preoperative cataract patients, *Int J Med Public Health* 2016;5(2):119-122.
2. Hartikainen J, Olli-Pekka Lehtonen, Matti Saari K et al. Bacteriology of lacrimal duct obstruction in adults. *Br J Ophthalmol* 1997;81:37-40.
3. Shakya DK, Gandhi S, Adlakha N, Kujur R, Singh Chauhan HR, Rajan KP. A clinico-bacteriological study of lacrimal regurgitation in cases of chronic dacryocystitis in referral hospital in Madhya Pradesh, *Int J Med Public Health* 2015;5:270-3.
4. Inflammations, Diseases of lacrimal passages In *The Ocular Adnexa System of Ophthalmology* Sir Stewart Duke Elder Vol XIII, Part II, Page 704. Publisher Henry Kimpton London.
5. Bharti MJ, Ramakrishnan R, Maneksha V, Shivkumar C, Nithya V and Mittal S. Comparative bacteriology of Acute and chronic dacryocystitis. *Eye* (2008) 22,953-960.
6. Bharti MJ, Ramakrishnan R, Vasu S, Shivkumar C, Palaniappan R. Epidemiology of bacterial keratitis in a referral centre in south India. *Indian J Med Microbiol* 2003;21:239-245.
7. Scott D. Barnes and C Stephen foster. Bacterial Conjunctivitis: In Smolin G, Thoft RA (Eds). *The Cornea Scientific Foundations and Clinical Practices*, 4th ed. Lippincott Williams & Wilkins 2005, pp 289-295.
8. Park K. *Parks text book of Preventive and Social medicine*, 23rd ed M/s Banarasidas Bhanot publishers Jabalpur 2015 Jan; 689-90.
9. Shah C P, Santani D. Bacteriology of Dacryocystitis. *Nepal Journal ophthalmol* 2011; 3(6): 134-139
10. Dr. Jyoti Bhuyan A clinico bacteriological study on dacryocystitis Lacrimal session AIOC 2007 proceeding 337-338.
11. Etezad Razvi M Ansari-Astaneh M-R, Farzadnia M, Rahmaniyan H, Moghiman T. Bacteriological Evaluation of Adult Dacryocystitis in Iran. *Orbit* 2010, Vol.29, No.5, pages 286-290.
12. Prakash H.Girish Babu.R.J Nagaraj E.R, Prashanth H.V Jayashree.S.shah. A Bacteriological study of Dacryocystitis. *Journal of Clinical and Diagnostic Research*.2012May(suppl 2),vol-6(4):652-655.
13. Chaudhry IA, Shamsi FA, Al-Rashed W Bacteriology of chronic dacryocystitis in a tertiary eye care center. *Ophthalmology Plast Reconstruction surgical* 2005 May ; 21(3): 207-210
14. Mandal R, Banerjee AR, Biswas MC, Mondal A, Kunelu PK. Clinicobacteriological study of chronic dacryocystitis in adults. *J Indian Med Association* 2008;(5): 296-298.
15. Amanat LA, Hilditch T E, Kwok C S. Lacrimal scintigraphy. II .Its role in the diagnosis of epiphora. *Br J Ophthalmol* 1983 November; 67(11): 720-728.
16. Nicholas T Illiff. Infections of the Lacrimal drainage system. In *Ocular Infections and immunity*. Jay S Pepose Gary N Holland. Page 1349, 1996 publisher Mosby Year Book Inc
17. Coden, Daniel J, Hornblase, Albert. Haas, Brian D. Clinical Bacteriology of Dacryocystitis In Adults. *Ophthalmic Plastic and Reconstructive surgery* 9(2):125, June 1993.
18. Sainju R, Franzco AA, Shrestha MK, Ruit S. Microbiology of dacryocystitis among adults population in southern Australia. *Nepal Med Coll J* 2005; 7(1): 18-20.
19. Dr P. Chitra Rajlakshmi, MD & Dr Lalitha Prajna MD. Ocular Microbiology Bacteriology chapter 4. Publisher- Arvind Eye hospital and post graduate Institute of ophthalmology Madurai India pages 5-6 and 13-25.
20. Briscoe, Daniel; Rubowitz A, Assia E. Changing Bacterial isolates and Antibiotic sensitivities of purulent Dacryocystitis. *Orbit* vol 24, Number 2, June 2005, pp 95-98(4).
21. Bareja U, Ghose S, clinic bacteriological correlates of cong dacryocystitis. *Indian Journal ophthalmol* 1990; 38:66-69.
22. Choudhary M, Bhattarai A, Adhikari S K, Bhatta DR, Bacteriology of chronic dacryocystitis. *Nep J Oph* 2010;2(4) :105-113.
23. Das JK, Deka AC, Kuri GC, Bhattacharjee K, Das D, Gogoi K. Bacteriology of chronic dacryocystitis in adult population of northeast India. *Orbit*. 2008; 27(4): 243-7.