

# Microbiological Study of Dacryocystitis in Paediatric Age Group

Prathiba<sup>1</sup>, Aruna Sunder<sup>2</sup>, Taruni<sup>3</sup>, V. Sudha Rani<sup>4</sup>

## ABSTRACT

**Introduction:** Paediatric acute dacryocystitis (PAD) is a special subset with features that are unique and distinct from those of adults. There are few studies on paediatric dacryocystitis, hence the present study was undertaken to see the incidence of various microbial pathogens causing paediatric dacryocystitis, to identify and study their antibiogram.

**Material and Methods:** Retrospective study of 168 patients of pediatric age group, attending outpatient department of a tertiary care eye hospital, clinically diagnosed as dacryocystitis was done. Discharge from lacrimal punctum was collected by 2 sterile swabs, one was used for staining and another was inoculated onto Blood agar, Chocolate agar, Mac Conkey agar and Sabouraud's dextrose agar (SDA). The isolated organisms were identified using standard procedures. Sensitivity was tested by Kirby – Bauer's disc diffusion method.

**Results:** Out of the 168 samples collected, majority cases were between 1 month to 3 years, dacryocystitis was common in right eye, 72.6% were culture positive and 27.3% were negative. *Staphylococcus epidermidis* was the predominant organism. Fungal isolates were three, *Aspergillus* spp 2 and *Fusarium* spp 1. Majority of *S. epidermidis* were sensitive to Gatifloxacin, least sensitivity was to Ca, *Staph. aureus* were sensitive to Mo and Tb, *Enterococci*, *Streptococci* and *Micrococci* were sensitive to all antibiotics except Ca. In case of *Pseudomonas* Ofloxacin and Gatifloxacin showed 100% sensitivity.

**Conclusions:** Paediatric dacryocystitis is a distinct entity with unique features of its own. In the era of antibiotic resistance, microbiological work up of paediatric acute dacryocystitis is very useful for subsequent treatment.

**Keywords:** Dacryocystitis, paediatric, antibiotic sensitivity.

## INTRODUCTION

Dacryocystitis is caused by obstruction of nasolacrimal duct. It is due to malformation of tear duct, infection of eye, trauma or injury. Clinically patient presents with swelling over the inner aspect of the lower eyelid, redness and pain.<sup>1</sup> There are 2 forms of Dacryocystitis, acute and chronic.<sup>2</sup> The acute form could be associated with severe morbidity and primarily related to the lacrimal sac abscess and spread of infection.<sup>2,3</sup> There is a varied spectrum of its clinical presentations ranging from tenderness and erythema of the overlying tissues to a frank lacrimal abscess.<sup>4</sup> Untreated lacrimal abscess can progress to orbital cellulitis, superior orbital vein thrombosis, and cavernous sinus thrombosis.<sup>5-7</sup> Acute dacryocystitis can present as a medical emergency with sudden pain, erythema and swelling, below the medial canthal tendon. Infection of lacrimal sac and perisac tissues can lead to epiphora.<sup>8</sup> Clinically Paediatric acute dacryocystitis (PAD) presents as dacryocoele in neonates. It can lead to complications like orbital cellulitis, orbital abscess, meningitis and loss of vision.<sup>9-12</sup> There are few studies on paediatric dacryocystitis, hence the present study was undertaken to see the

incidence of various microbial pathogens causing paediatric dacryocystitis, to identify various bacterial isolates and study their antibiogram.

## MATERIAL AND METHODS

A retrospective study of 168 patients of paediatric age group of either sex, attending outpatient department of a tertiary care eye hospital, clinically diagnosed as dacryocystitis by ophthalmologists was done after ethical board clearance.

**Specimen Collection:** After cleaning with normal saline swab, pressure was applied at medial epicanthic fold, the regurgitated pus or serosanguinous fluid was collected by sterile swab, two sterile cotton swabs moistened with physiological saline were used for collection of discharge from lacrimal punctum.

**Specimen processing:** One swab was spread on glass slide to prepare smear and stained by Grams stain. The second swab was used for inoculation on culture media like Blood agar, Chocolate agar, Mac Conkey agar and Sabouraud's dextrose agar (SDA). The inoculated media were incubated at 37°C for 24 hrs to 48 hrs for aerobic cultures and SDA at room temperature for 3 weeks. The stained smears were screened for presence or absence of pus cells and bacteria, KOH mount for fungal elements. The isolated organisms were identified using standard procedures. Antibiotic sensitivity of organisms was tested by Kirby Bauer's disc diffusion method on Muller hinton agar using the following antibiotics, 30 Mcg-Chloramphenicol (C), 30 Mcg Cefazidime (CA), 5 Mcg Ciprofloxacin (CF), 5 Mcg Ofloxacin (OF), 5 Mcg Gatifloxacin (GF), 10 Mcg Gentamycin (G), 5 Mcg Moxifloxacin (MO), 10 Mcg Tobramycin (TB).

## RESULTS

Out of the 168 samples collected over a period of one year, 85 were in the age group of 1 month -1 year, 36 were between 1-2 years, 23 were between 2-3 years and 25 were between 3-5 years. Out of 168 patients boys were 92, girls were 76, da-

<sup>1</sup>Assistant professor, <sup>2</sup>Professor, Department of Microbiology, Sarojinidevi Eye Hospital, <sup>3</sup>Assistant professor, Department of Microbiology, Sir Ronald Ross Institute of Tropical and Communicable Diseases, Osmania Medical College, Hyderabad, <sup>4</sup>Associate Professor, Department of Microbiology, Kakatiya Medical College, Warangal, Telangana State, India

**Corresponding author:** Dr. V. Sudha Rani, M.B.B.S., M.D. (Microbiology), Associate Professor of Microbiology, Kakatiya Medical College, Warangal, Telangana State. H. No.11-13-716, Road No.4, Green Hills Colony, Hyderabad, 500035, Telangana State, India

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ryocystitis was common in right eye (93 patients) and in 75 patients left eye was affected. Majority cases were between 1 month to 3 years (Table - 1). Out of total 168 samples 122 (72.6%) were culture positive and 46 (27.3%) were culture negative. Bacterial organisms isolated were *Staphylococcus epidermidis* 86 (70.4%), *Staphylococcus aureus* 17 (13.9%), *Enterococcus* species 09 (7.3%), *Streptococcus* species 04 (3.2%), *Pseudomonas aeruginosa* 04 (3.2%), *Micrococci* 02 (1.6%). *Staphylococcus epidermidis* was the predominant organism. In Gram negative organisms it was only *Pseudomonas*. (Fig-1) Fungal isolates were three, *Aspergillus* spp 2 and *Fusarium* spp 1.

**Sensitivity patterns:** In case of *S.epidermidis* 78 isolates were sensitive to Gatifloxacin, least sensitivity was to Ca, next CF, in case of *Staph.aureus* out of 17, Mo and Tb shown high sensitivity, CF least sensitive, for *Enterococci* sensitivity almost same for all antibiotics, *Streptococci* were almost sensitive to all antibiotics except Ca. In case of *Pseudomonas* Ofloxacin and Gatifloxacin showed good sensitivity of 100%. *Micrococci* were resistant only to Ca and sensitive to all. (Table 2)

## DISCUSSION

In the present study out of 168 samples collected, male children were 92 and female children were 76, in 93 right eye was affected and in 75 left eye showed infection, right eye infection was common. In a study done by Mohammed Javed Ali et al, the female to male ratio was approximately 1.7:1, there was no preponderance of laterality.<sup>13</sup> In a study done by O. O. Ffook *et al* StRoyal Infirmary,<sup>14</sup> of the total se-

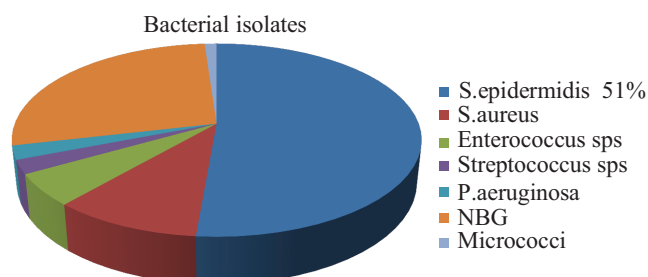


Figure-1: Showing different bacterial isolates.

Age	Number
1month-1year	85
1-2 years	36
2-3 years	23
3-4years	08
4-5 years	07
>5 years	09

Table-1: Showing age wise distribution of cases.

Isolate	C	CA	CF	OF	GF	G	MO	TB
<i>S.epidermidis</i>	74S,12R	31S,55R	48S,38R	57S,29R	78S,8R	69S,17R	71S,15R	72S,14R
<i>S.aureus</i>	12S,5R	8S,9R	3S,14R	6S,11R	8S,9R	9S,8R	13S,4R	13S,4R
<i>Enterococcus</i>	8S,1R	6S,3R	7S,5R	8S,1R	8S,1R	7S,2R	8S,1R	7S,1R
<i>Streptococcus</i> spp	4S,0R	1S,3R	4S,0R	4S,0R	4S,0R	4S,0R	4S,0R	4S,0R
<i>P.aeruginosa</i>	2S,2R	2S,2R	2S,2R	4S,0R	4S,0R	3S,1R	3S,1R	3S,1R
<i>Micrococci</i>	2S,0R	0S,2R	2S,0R	2S,0R	2S,0R	2S,0R	2S,0R	2S,0R

Table-2: Showing antibiotic sensitivity pattern of bacterial isolates.

ries, 224 were girls and 213 were boys. This proportion is not very different from the normal ratio and is not considered significant. The right eye was affected in 53 (47.3%) patients and the left eye in 59 (52.7%) patients. In a study done by Mohammed Javed Ali et al<sup>13</sup>, they have separately analyzed the 13 pediatric patients, there was no sex predilection with 7 males and 6 females. The mean age at presentation was 30.6 months (range 22 days to 108 months). In our study majority of cases were in the age group of between 1 month to 36 months. In a study done by Yared Assefa, Feleke Moges, Mengistu Endris, Banchamlak Zereayet al from the total of 51 dacryocystitis cases, bacterial origins were isolated among 31 (60.8%) cases.<sup>15</sup> In an interesting study of 47 children, Kuchar et al., observed that Gram positive bacteria were more frequently isolated in the samples obtained, *S. pneumonia* being the predominant microorganism in 36.4% of cases, followed by *H. influenzae* (19.6%).<sup>16</sup> Mohammed Javed Ali, Swapna R Motukupally, Surbhi D Joshi and Milind N Naik observed in their study that the microbiological profile was not found to be different in the pediatric subset of their study group with *S. aureus* being the most common organism followed by *S. pneumonia*.<sup>13</sup> In our study *Staphylococcus epidermidis* was the predominant organism 86 (70.4%), followed by *Staphylococcus aureus* 17 (14.2%), and the only Gram negative organism isolated was *Pseudomonas aeruginosa*. We have isolated 3 fungi (3.4%). As for fungi, they have been reported to be present in 4% to 7% of cases, the most commonly isolated genus being *Candida*, although *Aspergillus* and *Mucor* may also be found.<sup>17</sup> In a study done by Supriya Ghose, VM Mahajan<sup>18</sup> fungal isolates were 12 (13.95%). - 5 were *C. albicans* and 5 were *A. niger* -. Our study showed 3 fungi, 2 *Aspergillus* and 1 *Fusarium*. Antibiotic sensitivity results showed that in case of *S.epidermidis* 78 isolates were sensitive to Gatifloxacin, least sensitivity was to Ca, next CF, in case of *Staph.aureus* out of 17, Mo and Tb shown high sensitivity, CF least sensitive, for *Enterococci* sensitivity almost same for all antibiotics, *Streptococci* were almost sensitive to all antibiotics except Ca. In case of *Pseudomonas* Ofloxacin and Gatifloxacin showed good sensitivity of 100%. *Micrococci* were resistant only to Ca and sensitive to all. In a study done by Yared Assefa, Feleke Moges, Mengistu Endris, Banchamlak Zereayet al the antimicrobial susceptibility tests revealed that ceftriaxone (95.3%), erythromycin (84.2%), nalidixic acid (87.1%), gentamycin (83.3%) were more effective than other antibiotics tested to all bacterial isolates.

## CONCLUSIONS

Paediatric dacryocystitis is a distinct entity with unique features of its own. It is a serious infection that needs careful

evaluation and immediate management. In the era of antibiotic resistance, microbiological work up of paediatric acute dacryocystitis is very useful for subsequent treatment.

## REFERENCES

1. Huber E, Steinkogler FJ, Huber-Spitz V. A new antibiotic in the treatment of dacryocystitis. *Orbit*. 1991;10:33–5.
2. Atallah S, Sloan B. Acute dacryocystitis presenting as an orbital abscess. *Clin Exp Ophthalmol*. 2002;30:44–6.
3. Janssen AG, Mansour K, Bos JJ, Manoliu RA, Castelijns JA. Abscess of the lacrimal sac due to chronic or subacute dacryocystitis: treatment with temporary stent placement in the nasolacrimal duct. *Radiology*. 2000;215:300–4.
4. Warrak E, Houry P. Orbital abscess secondary to acute dacryocystitis. *Can J Ophthalmol*. 1996;31:201–202.
5. Mauriello JA, Wasserman BA. Acute dacryocystitis: an unusual case of life threatening orbital intraconal abscess with frozen globe. *Ophthal Plast Reconstr Surg*. 1996;12:294–295.
6. Maheshwari R, Maheshwari S, Shah T. Acute dacryocystitis causing orbital cellulitis and abscess. *Orbit*. 2009;28:196–199.
7. Schmitt NJ, Beatty RL, Kennerdell JS. Superior ophthalmic vein thrombosis in a patient with dacryocystitis induced orbital cellulitis. *Ophthal Plast Reconstr Surg*. 2005;21:387–88.
8. Ali MJ, Joshi SD, Naik MN, Honavar SG. Clinical profile and management outcomes of acute dacryocystitis: two decades of experience in a tertiary eye care center. *Semin Ophthalmol*. 2015;30:118–123.
9. Campollataro BN, Leuder GT, Tychsen L. Spectrum of pediatric dacryocystitis: medical and surgical management of 54 cases. *J Pediatr Ophthalmol Strabismus*. 1997;34:143–153.
10. Baskin DE, Reddy AK, Chu YI, et al. The timing of antibiotic administration in the management of infant dacryocystitis. *J AAPOS*. 2008;12:456–9.
11. Pollard ZF. Treatment of acute dacryocystitis in neonates. *J Pediatr Ophthalmol Strabismus*. 1991;28:341–3.
12. Ffooks OO. Lacrimal abscess in the newborn: a report of seven cases. *Br J Ophthalmol*. 1961;45:562–5.
13. Ali et al. The microbiological profile of lacrimal abscess: two decades of experience from a tertiary eye-care center. *Journal of Ophthalmic Inflammation and Infection*. 2013;3:57 <http://www.joi-journal.com/content/3/1/57>.
14. Ffooks OO. Royal Infirmary, Sheffield DACRYOCYSTITIS IN INFANCY. *Brit. J. Ophthalmol*. 1962;46:422.
15. Yared Assef, Feleke Moges, Mengistu Endris, Ban-chamlak Zereay. Bacteriological profile and drug susceptibility patterns in dacryocystitis patients attending Gondar University Teaching Hospital, Northwest Ethiopia. *BMC Ophthalmology*. 2015;15:34.
16. Kuchar A, Lukas J, Steinkogler FJ. Bacteriology and antibiotic therapy in congenital nasolacrimal duct obstruction. *Acta Ophthalmol Scand*. 2000;78:694–8.
17. Pinar-Sueiro S, Fernández-Hermida RV, Gibelalde A, et al.: Study on the effectiveness of antibiotic prophylaxis in external dacryocystorhinostomy: a review of 697 cases. *Ophthal Plast Reconstr Surg*. 2010;26:467–72.
18. Supriya Ghosh and VM Mahajan. Fungal flora in congenital dacryocystitis. *Indian journal of ophthalmology*.

1990;38:4:189-190.

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