

MANAGEMENT OF PAEDIATRIC EPIPHORA AND ITS SUCCESS RATE IN A TERTIARY EYE CARE CENTER

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ABSTRACT

Objectives: The objectives of the study are to assess the children under 5 years of age presenting with epiphora and to institute proper treatment with regular follow-up to get an overview of treatment success.

Methods: A prospective and non-randomized study was conducted on 518 eyes of 353 patients 165 (B/L) and 188 (U/L) that presented to us between April 2014 and April 2015. Informed consent was taken from parents. Institutional Ethical Committee approval was taken. The patients were followed up quarterly for 1st year to look for the resolution of signs and symptoms and if required quarterly till the resolution of the disease. Statistical analysis was done using Chi-square and Fisher's exact test to test the difference in proportions. $p < 0.05$ was denoted as statistically significant.

Result: Congenital nasolacrimal duct obstruction (NLDO) was the most common cause of childhood epiphora - 76% (394/518) followed by trauma (iatrogenic and non-iatrogenic) seen in 18% (93/518), acquired NLDO in 4% (21/518) and punctual causes 2% (10/518). The overall treatment success rate was 82%, individual success rate: Sac Massage: 85.9%, probing: 73.95%, dacryocystorhinostomy (DCR): 72%, punctum surgery: 100%. Although with increasing age, success rate of massage and probing reduced.

Conclusion: Sac massage is the best treatment in children till 1 year of age and probing is very effective till 3 years of age. Thus, early treatment prevents further chances of surgical intervention.

Keywords: Epiphora, Congenital nasolacrimal duct, Lacrimal sac massage, Probing, Intubation dacryocystorhinostomy.

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INTRODUCTION

Epiphora is defined as an overflow of tears in the presence of normal tear production, produced due to either obstruction in the drainage apparatus, i.e., lacrimal puncta, canaliculi, lacrimal sac, or nasolacrimal duct or improper tear drainage system. In children, the most common cause of epiphora is congenital nasolacrimal duct obstruction (NLDO) occurring in 20–30% of newborns [1-3]. However, 1–6% of these children are symptomatic [1]. The most common cause is membranous obstruction at the valve of Hasner in the distal nasolacrimal duct. The other causes are trauma, inflammation, surgery, etc. leading to NLDO, canalicular obstruction, or punctal stenosis and malposition.

50% of congenital NLDO resolve by 6 months of age, and 90% resolve by 1 year of age. Symptoms can recur after a few weeks of apparent resolution [4]. Resolution can be incomplete with residual intermittent symptoms, especially with URI.

Treatment modalities consist of both non-surgical treatment and surgical treatment. Non-surgical treatment consists of topical antibiotic ointments, such as erythromycin or polymyxin B/bacitracin, and tobramycin ointment, which were used along with lacrimal massage. Systemic antibiotics can be used when non-response to topical treatment and/or associated with cellulitis. The most commonly used method is the Crigler method of NLD massage. Massage of the NLD increases the hydrostatic pressure within the sac thereby breaking upon the distal membrane. The most important aspect of massage is educating the parents/caregivers by demonstrating the procedure, providing reassurance and information about the etiology. Parents should be encouraged to clean the lids and lashes with cooled boiled

water or normal saline and to lightly express the contents of the lacrimal sac. Massage includes the index finger applying pressure over the NL sac with a downward rocking motion.

Surgical intervention is done when CNLDO becomes persistent and/or the child is older than 1 year of age. Probing the nasolacrimal duct to open the membranous obstruction at the distal nasolacrimal duct is the preferred initial management. Studies showed that in older children, success of probing is less. If the preliminary probing and syringing fail, one may perform a second probing or additional procedure, namely balloon dacryoplasty and silicone tube intubation. In cases where all the above measures fail or in complex CNLDO, some surgeons perform additional procedures such as dacryocystorhinostomy (DCR). Conventional external DCR is carried out through skin incision, the lacrimal sac is exposed, an osteotomy is made through the nasal bone, flaps are created between nasal mucosa, and then, a tube is placed as a stent. Laser DCR is a substitute where an endoscope is mostly used during the laser.

The aim of our study was to assess the treatment modalities and success rate in children under 5 years of age presenting with epiphora in a tertiary eye care center.

METHODS

A prospective and non-randomized study was conducted on 518 eyes of 353 patients. 165 (B/L) and 188 (U/L) patients presented to our outpatient clinic of the Department of Ophthalmology of Nil Ratan Sircar Medical College and Hospital between April 2014 and April 2015. Informed consent was taken from the parents/caregivers. Institutional

Table 1: Results of sac massage in epiphora

Age group	Number of patients	Number of success	Percentage of success	Number of failures	Percentage of failures
<6 months	70				
<3 months	60	58	96.7	2	3.3
3–6 months	10	7	70	3	30
6 months–1 year	56				
6–9 months	50	47	94	3	6
9 months–1 year	6	4	66.7	2	33.3
1–2 years	48				
1–1 _{1/2} years	39	35	89.7	4	10.3
1 _{1/2} –2 years	9	5	55.6	4	44.4
>2 years	33				
Early management done	28	20	71.4	8	28.6
Early management not done	5	2	40	3	60
Total	207	178		29	

Table 2: Results of probing for epiphora: Total patients - 215 (186+29)

Timing	No. of patients	Success	Failure
1 st probing	186	123	63
2 nd probing	92 (63+29)	36	56

Ethical Committee approval was taken. Demographic details and clinical history were taken from parents/caregivers, including age, sex, laterality, socioeconomic status, etiology, and previous treatment history.

Inclusion criteria

- History of watering for >4 weeks
- Presence of discharge
- Raised tear meniscus height
- Positive regurgitation test (ROPLAS test).

Exclusion criteria

- Irregular follow-up
- Pseudoepiphora
- Epiphora due to craniofacial abnormalities.

The patients were followed up quarterly for 1 year to look for resolution of signs and symptoms and if required quarterly till the resolution of the disease. Massage was demonstrated to the parents/caregivers who carried it out by fixing the baby's face, placing the index finger between the inner corner of the eye and the side of the nose with a clean hand and trimmed nails, pressing in and down over the lacrimal sac for a few seconds. The massage was done at least 3 times a day and each massage was 3–5 strokes each. It was done before feeding. Antibiotic eye drops (Tobramycin) were given after the massage if there was purulent discharge.

If this procedure failed to remove the block, probing was done, where a narrow probe was guided through the puncta into the tear drainage system, then through the nasal opening and removed. The tear drainage system was flushed with a normal saline solution to clear out any residual blockage.

When the above-mentioned procedures failed, patients were put for a second probing and then intubation DCR. DCR was undertaken mainly at the age of 4–6 years. A bicanalicular silicone tube was introduced into the DCR site through the upper and lower punctum and drawn out from the nasal cavity with a straight hemostat under direct visualization. The ends of the tube were tied together with 6–0 black silk at a point where the knot could sit deeply in the nasal cavity and be left free in the nasal cavity [5]. Punctal malposition and stenosis cases underwent punctal surgery.

RESULTS

A total of 353 patients were studied. The mean age of onset of symptoms was 2–8 months and the mean age of presentation was 1–2 years. Male: female ratio was 2:1. Congenital NLDO was the most common cause of childhood epiphora - 76% (394/518) followed by trauma (iatrogenic and non-iatrogenic) seen in 18% (93/518), acquired NLDO in 4% (21/518), and punctal causes in 2% (10/518). Regarding socioeconomic status, 84% of patients belonged to the lower and upper-lower class, as per the modified Kuppaswamy scale. 80% of cases (414/518) first presented to an ophthalmologist, 12% (62/518) to the pediatrician, and 8% (42) to the general practitioner, which was followed by referral to an ophthalmologist.

The most common symptom seen was discharge 61% (316 cases) followed by watering 33.97% (176), and 5.01% (26) had occasional watering and swelling of the inner canthus. The treatments applied are shown in Fig. 1.

- Sac massage - 207 pts
- Probing - 215 pts
- Intubation DCR - 100 pts
- Punctum Surgery - 16 pts.

207 cases were treated by sac massage of which 170 cases responded but 37 cases still complained of watering as shown in Table 1 and discharge. Upon eliciting history, it was found that 22 cases were still following the wrong technique. The procedure was demonstrated to them again. 15 cases did not carry out the procedure at all. It was noted the caregiver was an aunt or a relative mostly. As shown in Table 1, thus of the 37 cases, 8 cases were successful and 29 failed, which were considered for probing. Probing was carried out in two phases, one around the age of 9 months to 1 year and the second around one and a half to 2 years. Of the 215 cases that underwent probing 123 cases were successful in the first attempt as shown in Table 2. Of the 92 failures, 36 cases were successful and the remaining 56 cases were posted for intubation DCR under general anesthesia. Intubation DCR was undertaken at the age of 4–6 years of age. Of the 100 cases (44+56) of intubation DCR, 54 cases were successful shown in Table 4. Re-DCR with intubation was done in 46 cases and 28 cases failed even after this procedure. Punctal surgery which included cases of punctal stenosis mainly and punctal malposition had a 100% success rate.

The overall treatment success rate was 82%. The success rate of individual treatment modality was as follows (Fig. 2):

- Sac Massage: 85.9%
- Probing: 73.95%
- DCR: 72%
- Punctum Surgery: 100%.

The failure rate of individual treatment is as follows:

- Sac Massage: 29 cases - 14%
- Probing: 56 cases - 26%
- Intubation DCR: 28 cases - 28%

Table 3: Early versus late probing for epiphora

Number of samples	Timing	Number of successes	Rate of success compared to total number of samples (%)	Number of failures	Rate of failure compared to total number of samples (%)
186	Early	123	57.2	92	42.8
92	Late	36	16.7	56	26

Table 4: Results of intubation DCR in epiphora

No. of patients	Timing	Success	Failure
100	4 and 1/2 years of age	54	46
46	5 and 1/2 years of age	18	28

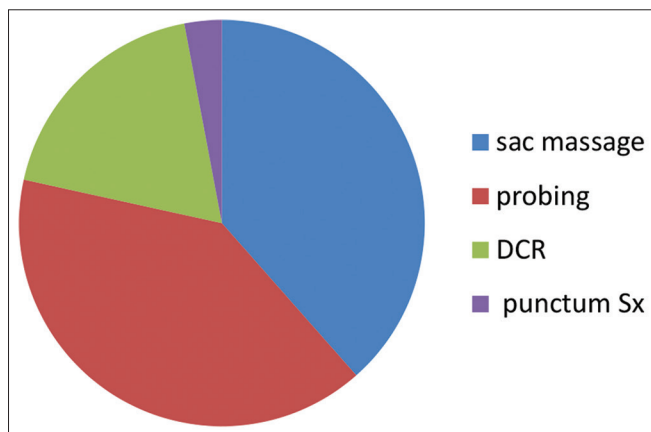


Fig. 1: Treatment Applied

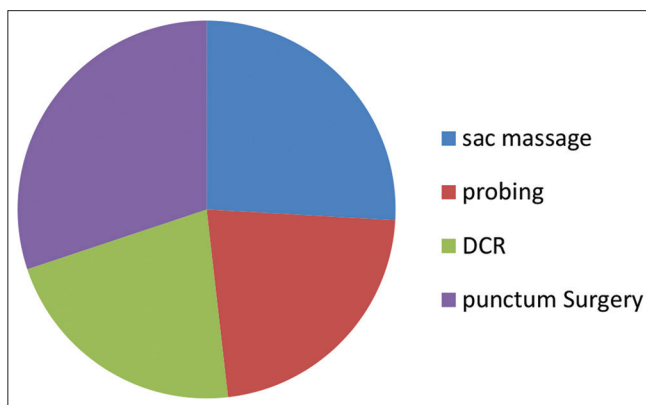


Fig. 2: Treatment success rate

These cases are considered as treatment failure.

DISCUSSION

In our study, congenital NLDO was the most common cause of epiphora. We conducted a prospective evaluation of pediatric patients with true epiphora and found that 76% of cases were due to congenital NLDO. On comparing the severity of the symptoms, discharge (61%) is predominant followed by watering (34%), occasional watering, and swelling of medial canthus (5%).

The association of treatment, outcome, and demographic factors were also studied. These included age, sex, socio-economic status, etiology, symptoms severity, laterality, presence of past infections, and previous treatment history. Treatment was done in a stepwise manner: Sac massage, then probing, and then intubation DCR. A stepwise approach to the treatment is a clinically and financially effective model for

treatment [5]. The success rate for sac massage was 86%. Several other studies have shown the result of a similar entity in relieving congenital dacryocystitis at an early age [6]. A study by Kumar *et al.* showed that efficacy of sac massage in their study was 81%. [7]. Among 37 failed massage treatments, repeat massage was restarted after a repeat proper demonstration of the procedure, as the primary cause of failure was found to be noncompliance or inappropriate massage. Among them, 8 patients improved. The rest 29 cases were scheduled for probing. Among 215 probing cases, 123 patients responded in the 1st time probing, 36 patients were successful in the 2nd time, and 56 cases were treatment failure as cited in Table 2. Increasing age was a significant risk factor for failure of sac massage and probing. The success rate of sac massage declined after 12 months of age ($p=0.0004$) and probing after 3 years of age ($p=0.0005$). As shown in Table 3, in our study, success rate of probing alone was lower (73%), the success rate of probing in eyes that underwent the first trial was 57.2%, whereas the success rate may be due to various causes: First, the inclusion of the cases of a complex form of obstruction like previously failed treatment was a cause for lower success rate. Secondary referral bias could not be excluded, this being a tertiary center. Honovar *et al.* reported the factors predictive of failure of probing, such as age >36 months, bilateral affection, failed earlier probing, failed conservative therapy, dilated lacrimal sac, and firm obstruction [8]. Failed probing cases underwent DCR, here all patients posted for DCR underwent intubation DCR. In our studies, success rate of intubation DCR was 72%. A study by Kumar *et al.* found that overall DCR success rate was 50% in their study, though they preferred endonasal DCR [7]. Various studies showed a lower success rate of intubation DCR in traumatic cases as compared to primary cases [9]. Several studies have explored the effectiveness of intubation as the main treatment in older subgroups of patients because of a decrease in the success rate of late probing [5].

Limitations

Traumatic cases should be properly investigated and treated, which in our study is deficient. A comparative analysis between early and late-onset age groups should be conducted for proper further research purposes and also for treatment purposes. The differentiation between types of obstruction was not noted during the probing in our study. All possible investigative options such as fluorescein dye disappearance test and CT-DCG were not done and management options of pediatric epiphora such as balloon dacryoplasty and inferior turbinate fracture repair if needed were not done in our center.

CONCLUSION

In younger children, congenital NLDO is the most common cause of pediatric epiphora. In congenital NLDO, sac massage is an important treatment modality in children up to 1 year of age and should be demonstrated to the mother or the caregiver for effective results. Probing is very effective in children up to 3 years of age. Increasing age decreases the success rate of sac massage and probing. Most cases of probing were advised of daycare surgery but most parents insisted on a one-day stay in the hospital. The intubation and DCR cases stayed for 2-3 days. Thus, a simple procedure like lacrimal sac massage if carried out sincerely not only ensures a high success rate but also may help in avoiding a surgical procedure in a child thereby avoiding a hospital stay with the risk of contracting iatrogenic infections and also minimizes the financial expenses involved in extra hospital visits, medicines, and hospital stay. Apart from increasing age, other predictive factors of treatment failure, namely laterality, symptoms severity, and presence of secondary infection to be more thoroughly investigated for better management status.

CONFLICTS OF INTEREST

None.

AUTHOR'S CONTRIBUTION

All authors are involved in data collection and technical writing.

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