Medical and Research Publications
International Open Access

Research Article **Journal of MAR Ophthalmology (Volume 5 Issue 5)**

Success rate of Probing surgery for Congenital Nasolacrimal Duct Obstruction – Our Experience: A Retrospective Study of 5 Years

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Received Date: March 09, 2023

Published Date: April 01, 2023

Abstract

Purpose: *To evaluate the results & ideal time for probing in children with congenital nasolacrimal duct obstruction (CNLDO).*

Methods: *Congenital nasolacrimal duct obstruction (CNLDO) is a common condition affecting as many as 20% children aged < 1 year worldwide causing excessive tearing or mucoid discharge from the eyes, due to the blockage of the nasolacrimal duct. Available conservative treatment options include lacrimal sac massage and antibiotics and this seems to be the best option in infants aged < 1 year. In children, aged > 1year, nasolacrimal probing successfully resolves most obstructions.*

We present a retrospective study, of 60 children who underwent Probing for CNLDO at Rustaq Hospital from 2018 till 2022.

The children were divided into two groups, Group 1(12 - 21 months) and Group 2 (>24 months). Success was defined as complete resolution of signs and symptoms. The chi-square test was used to analyse the result.

Results: *It shows clearly that Group 1 had a higher success rate of (95%) in comparison to Group 2 which had (86.4%) success rate. Overall success of this cohort study was (90.7%). Results in both groups showed encouraging outcome although the success rate in Group 1 was higher.*

Conclusion: *Probing has revealed promising results in the management of CNLDO, however an open debate about the optimal timing of the intervention still persists. Success rate was significantly high in early probing than in late.*

Key Words: *Nasolacrimal duct obstruction, probing, children.*

Introduction

Congenital nasolacrimal duct obstruction (CNLDO) is a common disorder in the pediatric population, with an incidence of 6 % to 20 % in newborns and it is bilateral in approximately 1/3rd of cases.

The obstruction usually occurs distally at the Hasner valve, where the nasolacrimal duct open into the inferior meatus of the nasal cavity **[**2**]**. As demonstrated in the study of Weiss et al, the obstruction may be due to persistent membrane at the distal end of the duct, a bony obstruction, or a narrowing of the inferior meatus.

It clinically presents as excessive tearing, which is also known as epiphora, mucoid discharge from the eyes or erythema of the periorbital skin, upper and lower eyelids. Few cases may present with acute dacryocystitis **[**3**]**.

About 80-100% of patients shows spontaneous resolution through the first year of life especially during the first 6 months. Conservative management, including hydrostatic massage of the lacrimal sac and antibiotics, is thought to be the best option for patients less than 1 year of age. Probing is considered as a first-line interventional therapy in cases of persistent CNLDO **[**1**]**.

The optimal timing for probing remains controversial. Probing seems to be more successful at an early age. On the other hand, late probing has shown a considerable success rate of 75–80% in some. According to some authors, prolonged chronic inflammation of the NLD may induce fibrosis. However according to recent studies, there is no presence of inflammatory-induced fibrosis in children with CNLDO **[**1**]**.

This study was undertaken to evaluate the results of probing in chidren aged 13 months and above. The date presented here were taken from patients who were seen in eye clinic from 2018 till 2022.

Materials & Methods

A retrospective study was done of 60 consecutive children undergoing probing for congenital nasolacrimal duct obstruction.

The children were divided into two groups. Group 1 (12 – 21 months) and Group 2 (24 – 63 months). The mean age of children in Group 1 was 16.71±2.831 and in Group 2 was 37.26±13.36. There were 22 male and 10 female children. The study period was from January 2016 to December 2021. The group wise distribution of patients is shown in Table 1.

Group	# of cases	Age range (Months)	Male	Female	OD/OS	Mean Age Months	Success	Failure
1	41	12-21	22	19	24/17	16.71±2.831	39 (95%)	2 (5%)
2	19	24-63	10	9	7/12	37.26±13.36	13 (86.4%)	6 (31.6%)

Table 01

The initial examination included looking for the lacrimal puncta, assessing anomalies of the lids or face, ruling out conjunctivitis, allergic inflammation and other causes of epiphora in these children. The diagnosis of congenital lacrimal duct obstruction was based on history of tearing and/or discharge and on clinical examination as evidenced by epiphora beginning during the first few weeks of life, recurrent mucopurulent discharge and reflux of the contents of lacrimal sac on pressure – (Positive Regurge Test)

Pre anaesthetic checkup was done in all patients and the procedure was performed under General anaesthesia in all children by the same team of doctors. Probing in all cases was done through the upper puncta. The puncta were first dilated using a lacrimal punctum dilator. Bowman's probe size were used in all cases starting from small size (000) followed by progressively larger probes. The probe was introduced through the puncta into the canaliculus until medial wall of the lacrimal fossa was felt (Hard Stop), at this point it was turned and directed downwards, backwards & laterally into the nasolacrimal duct and gently advanced till resistance was felt. The breaking of the membrane was felt as the probe advanced into the obstruction. The free movement of the Bowmans probe (without any resistance) within the lacrimal system ensured the patency of the nasolacrimal system.

After the procedure, each patient received topical antibiotic eyedrops 4 times daily for 2 weeks. Parents were advised to continue lacrimal massage for 3 weeks in these children and to instill nasal saline drops in the nostril of the affected side 4 times daily for 1 week. A course of systemic antibiotics (Amoxyclav suspension) 5 ml 3 times daily for 5 days was also given.

Patients were seen in the clinic at 1 week, 1 month and then at 3 months after probing.

Success of probing was the main outcome measure and was defined as complete remission of watering, discharge and reflux of contents of the lacrimal sac on pressure at one week of the procedure and no recurrence at all.

Results

Results of the probing done in our hospital are shown in table 1. The patients were divided into 2 groups according to the age & the same procedure was conducted in all. Group one includes patients less than 24 months (12 – 21 months), while Group 2 includes those with age more than 24 months (24 – 63 months). It shows clearly that Group 1 had a higher success rate of (95%) in comparison to Group 2 which had (86.4%) success rate. Overall success of this cohort study was (90.7%). Results in both groups showed encouraging outcome although the success rate in Group 1 was higher. No anasthesia or surgical complications were reported.

Chi-square analysis showed a significant difference in the cure rate with increasing age. (Chi square value 8.010, the number of degrees of freedom 1 and significant at the 5 % level). The P value 0.005 was significant.

Discussion

Nasolacrimal duct which is the anatomical passage of physiological eye secretions begins forming at around 6 weeks of gestational age. The process of its canalization is mostly complete at or just after birth. However 20-30% of newborns have obstruction of Nasolacrimal duct. Spontaneous resolution occurs in 80-90% between age of 2 months to 1 year but some infants (approximately 2-4%) has obstruction persists even after 2 years of age. **[**4**]**

Anomalies can occur anywhere along the nasolacrimal system. The most common cause of epiphora in children is atresia of nasolacrimal duct or dacryostenosis. And the most common site of obstruction is at the mucosal entrance into the nose (valve of Hasner).**[**5**]**

The conservative approach consists of simple observation and hydrostatic massage of the lacrimal sac, and the application of topical antibiotics when a bacterial superinfection occurs. Several studies have focused their attention on the use of antibiotic drops in combination with conservative therapy for CNLDO **[**17, 18**]**. However, there is no evidence of a significant clinical effect of antibiotic eye drops in the resolution of the disorder. In conclusion, most of the studies agree that antibiotic therapy is indicated only with the clinical evidence of infection, but not in the conservative management of CNLDO.

Several studies have reported a high rate of spontaneous resolution of CNLDO within the first year of age ranging from 32% to 95% by the age of 13 months 10. Paul showed a prevalence of spontaneous resolution in 15% of patients at 3 months, 45% at 6 months, 71% at 9 months and 93% at 12 months

in a non-randomized prospective study [11]. Nelson et al. described a CNLDO resolution rate of 93% with conservative management in children aged 8 months or less [12]. Nonetheless, resolution of the disorder may occur even beyond the first year of life; in this regard Young et al. found that in a multicenter, randomized clinical trial (RCT); the obstruction resolved spontaneously between the first and second year of life in 44% of the children with CNLDO.

The massage of the lacrimal sac is a widely adopted conservative treatment modality, with the aim of improving the chances of resolution provided by only observation. This maneuver was first introduced in 1923 by Crigler [13]. Lacrimal sac massage entails gently compressing the lacrimal sac until the fingertip reaches the inferior medial orbital rim, performed 3 to 5 times, twice daily after cleaning the lashes with cooled boiled water. The administration of antibiotic drops before massage is necessary in cases of purulent discharge. Massaging in a downward fashion increases the hydrostatic pressure inside the nasolacrimal canal and ruptures the membranous Hasner valve and also helps to drain discharge inside that. A recent study published by Stolovitch et al. demonstrated the clinical efficacy of the Crigler maneuver in a group of 742 children with CNLDO [14].

Probing is considered as time proven invasive treatment for congenital nasolacrimal obstruction. But there is debate regarding the timing of probing and its result in older children. [6,7]

Early (6-9 months) Vs late (6 months of observation, after 1 year of age) probing was studied prospectively by the Pediatric Eye Disease Investigator Group (PEDIG) 15. Similar success rates were reported; however, 66% of cases in the late group resolved without intervention. In the PEDIG study, the success rate in a second intervention was 56% for repeat probing, 77% for balloon catheter dilatation and 84% for intubation.

Supporters of early probing propose that early correction avoids complications due to epiphora and chronic dacryocystitis. Moreover they believe that later the procedure, the more chance of decreased success because of chronic inflammation and secondary fibrosis. [6, 7]

The probable complication of early probing is formation of false passage or injury to the lacrimal epithelium which might later cause stenosis and essentially prevent later spontaneous resolution of the obstruction. [9]

Supporters of the late probing suggest that there is no need of early probing as high number of children shows spontaneous resolution. [8]

Katowitz et al. (16) reported a success rate of 97% for probing in patients younger than 13 months of age, 54.5% for patients older than 13 months, and 33% for patients older than 24 month, and they

recommnede conservative therapy till 1 year of age. Repeat probing can be performed in patients who still have epiphora despite successful initial probing and patent nasolacrimal lavage.

Several studies have reported optimal results in children beyond the first year of age, with a resolution rate ranging from 76.8% to 89% in children aged 13 to 18 months, 54% to 88.6% in children aged 18 to 24 months and 33% to 71.7% in children aged 24 to 36 months **[**16,19**]**.

Our study too shows better success rate of 95% when probing is done between 12 to 21 months than when it is done between 24 to 63 months (86.4%).

Urgent surgical treatment is unnecessary in the first year, education of parents on conservative treatment is the mainstay of therapy. In case of persistence of symptoms and obstruction, probing is performed at around 1 year of age. If the obstruction remains unresolved, a second probing may be attempted. If epiphora still persists after interventions, intubation of the nasolacrimal system or balloon dacryoplasty can be performed. Dacryocystorhinostomy is indicated only in intractable conditions such as anatomical and/or traumatic abnormalities.

Conclusion

In conclusion, probing has revealed promising results in the management of CNLDO, however an open debate about the optimal timing of the intervention still persists. The risk benefit ratio of early probing should be thoroughly weighed. Conservative treatment has shown to be safe and in the majority of the patients and probing offers good results in children older than 12 months, acting as a convincing second line strategy.

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