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Outcomes and comparison of nasolacrimal probing for patients older than 12 months

Kürsad Ramazan Zor, Erkut Küçük and Zeynep Yılmaz Öztorun

Abstract

Objective: In this study, we report the results of probing done in our clinic. We also want investigate role of late probing on outcome, especially in children older than 24 and 48 months.

Methods: We retrospectively evaluated records of patients who underwent probing under general anaesthesia due to congenital nasolacrimal duct obstruction between 2013 and 2017 in Nigde Ömer Halisdemir University Faculty of Medicine in Nigde, Turkey. Success rates of probing for different age groups were compared.

Results: 143 eyes of 123 patients were included in the study. Overall success rate was 93.7% (134 eyes out of 143). We found the success rate as 95.5 in 12–18 months age group, 93.3% in 18–24 months age group, 93.8% in the 24–48 months age group, 86.6% in the 48 months and older age group. Overall success rate in 24 months and older age group was 91.5%. The second operation was performed on seven of the nine patients where the initial surgery failed, and successful results were achieved in six patients. Success rate was 100% after the second surgery in patients older than 48 months.

Conclusion: The success rate of probing is high in patients with congenital nasolacrimal duct obstruction from 12 to 84 months. In patients with congenital nasolacrimal duct obstruction who are older than 48 months probing is effective and should be first-choice in this age group in management of congenital nasolacrimal duct obstruction. Probing may be used even in older patients who had previous unsuccessful probing.

Keywords: congenital epiphora, nasolacrimal duct, probing

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Introduction

Congenital nasolacrimal duct obstruction (CNLDO), which is the most common congenital or developmental lacrimal disorder, affecting up to 20% of the newborns.[1] The nasolacrimal duct is the last portion of the lacrimal system to canalize.[2] Canalization of the nasolacrimal duct is complete at the end of the 6th month of intrauterine life. However, it can be delayed up to a few weeks or months after birth.[3]

CNLDO can occur at any part of the lacrimal duct system, which ranges from the lower and upper puncta at the margins of eyelids to the inferior nasal meatus. However, it has been frequently observed at the bottom of the nasolacrimal duct or atresia at the valve of Hasner due to the presence of a persistent membrane. Clinical findings of the newborns with CNLDO can vary between mild epiphora to severely persistent mucopurulent discharge. In rare untreated cases, preseptal cellulitis or dacryocystitis can also occur.[3]

Using the tip of the finger, successively applying pressure several times to the lacrimal sac towards the back of the inner canthal ligament can help to empty the accrued secretion. Massage can help

Correspondence to:
Zeynep Yılmaz Öztorun
Assistant Professor, Department of Pediatrics, Ömer Halisdemir University Training and Research Hospital, Aşağı Kayabaşı Mahallesi, 51100 Niğde, Turkey
drzeynoyilmaz@gmail.com

Kürsad Ramazan Zor
Erkut Küçük
Assistant Professor, Department of Ophthalmology, Ömer Halisdemir University Training and Research Hospital, Niğde, Turkey

opening of the canal by increasing the hydrostatic pressure. In addition, the increased pressure within the sac helps to prevent colonization by microorganisms. After several applications, the child gets used to this massage and does not cry. If yellow-green crusting (a sign of bacterial infection) is observed, topical antibiotic eye drops and pomades can be used.

In cases that cannot be cured by massaging, the main treatment is probing-irrigation. In some cases, probing-irrigation cannot adequately cure the infection. Therefore, alternative treatments have been used including balloon dacryoplasty, silicone intubation and as a last option, dacryocystorhinostomy (DCR). The most important determinant for the probing-irrigation technique is the timing. The timing of the probing is a debate between ophthalmologists and pediatrists. Also, this issue is a major problem in the communication between the physician and the parents of the patient. The parents are anxious due to continuous tearing and accompanying mucopurulent secretion and seek urgent solution. But early intervention may be unnecessary in this situation because of the high possibility of spontaneous opening of nasolacrimal duct obstruction and expose the children to the risks of general anaesthesia and iatrogenic damages. However some authors claim that waiting can decrease the chance of success of probing procedure. They propose the use of more complicated techniques like DCR as the first-line therapy especially in patients older than 48 months, since probing has a low rate of success in these patients.

In this study, we report the results of probing-irrigation administered to CNLDO patients that were admitted to our outpatient clinic. In addition, we investigated how late probing (>12 months) impacts the success rate particularly in children older than 24 months group and older than 48 months group.

Materials and methods

This retrospective study included 143 eyes from a total of 123 patients that underwent probing-irrigation due to CNLDO within the ophthalmology outpatient clinic of Nigde Ömer Halisdemir University Faculty of Medicine in Nidge, Turkey. The study started April 2013 and finished 2018 July.

The diagnosis of CNLDO was made based on patient history (presence of complaints such as continuous watering and crusting that started at the time of birth or within the several weeks from birth) and clinical findings (e.g. dacryocystitis). Patients with a previous history of probing-irrigation were excluded from the study.

Probing was performed by the same consultant (K.R.Z.) under general anaesthesia using an inhalational anaesthetic. K.R.Z. has been performing probing for more than 10 years. After the site was sterilized with betadine, an upper punctum dilatation was performed. Following dilatation, a 22 G probe (0.70 mm × 45 mm) was advanced vertically until ampulla, and then 90° horizontally, reaching the nasal wall of the lacrimal duct and bone structure. At this stage, the probe was retracted and directed downwards and backwards, and advanced until rupture was reached. After probing, the diluted betadine was instilled from the punctum, and betadine aspiration due to the paediatric oxygen catheter placement at the inferior meatus was observed. For the patients with bilateral obstruction, the contralateral eye was also operated. Following the operation, tobramycin (1 drop q4–q6 hours) and loteprednol (1 drop q4–q6 hours) were prescribed for 1 week.

If the families reported an improvement in watering eye and other accompanying complaints, surgery was considered successful. In all patients, the status of the lacrimal system was confirmed using the fluorescence disappearance test.

In seven of the nine patients with watering after operation, a second operation was performed 3 months after the first operation using the same method.

Statistical analysis was performed using SPSS, version 20.0 (IBM Corporation, Armonk, NY). The success rate was expressed as percentages. Chi-square test was used to compare groups for success rate.

Results

143 eyes from a total of 123 patients were examined in the study. The mean age of the patients was 23.78 ± 14.52 (range: 12–84) months. The right eye was affected in 49 patients, while the left eye was affected in 54 patients. Both eyes were affected in 20 patients. Of the patients, 57 were females and 65 were males. All patients were followed for at least 6 (range: 6–36) months.

The total success rate was 93.7% for all eyes examined (134 eyes). We recorded a success rate of 95.5% (63 eyes) in the 12–18 months age group, 93.3% (28 eyes) in the 18–24 months age group, 93.8% (30 eyes) in the 24–48 months age group, 86.6% (13 eyes) in the 48 months and older age group, respectively. In the late probing patients older than 24 months, the success rate was 91.5%, while bilateral cases had a success rate of 90%. One of the 7-year-old patients achieved successful outcomes for both eyes. The success rate in the male group was 92.1% (70 out of 76 eyes) and it was 95.5% in the female group (64 eyes out of 67). The success rate was not significantly different between male and female patients ($p = 0.487$, chi-square test).

The second operation was performed on seven of the nine patients, where the initial surgery failed, and successful results were achieved in six patients. The success rate was 100% after the second surgery in patients older than 48 months. In cases that failed after the first probing surgery, the same surgeon performed the reoperation without changing the surgical technique.

The difference between the groups was not significant. ($p = 0.858$, chi-square test with Monte Carlo method).

Two of the nine cases that failed after the first probing surgeries had hard stop, not membranous. We did not find a secondary cause that may affect the surgical outcome in the rest of the patients that failed after the first probing surgery. Also, the only case that failed after the second operation was one of these patients with hard stop, and an otolaryngological examination of this patient was normal. However, in physical examination, polydactyly was detected in this patient.

In addition, the nine patients with failed surgery reported complaints within the first week. None of the cases that were successful in the first week developed obstruction later. None of the patients had anaesthesia- or surgery-related complications.

Discussion

The main cause of epiphora in paediatric age group is the CNLDO. Probing operation is used in the treatment CNLDO with a high success rate; however, the timing of the operation is still controversial.[4,5]

Most authors recommend conservative treatment due to the high spontaneous resolution within the first year. MacEwen and Young[1] followed a total of 964 infants with nasolacrimal obstruction within the first year of their life and reported spontaneous healing in 96% of them. In the aforementioned study, they reported an inability to obtain any findings to support the application of probing in infants less than 1 year of age. The spontaneous resolution rate for infants ⩽1 year of age were 94.6% as reported by Price,[6] 94.7% as reported by Nelson and colleagues,[7] and 82.9% as reported by Kakizaki and colleagues.[8] Özdemir and colleagues[9] also reported a success rate of 88.57% in infants younger than 8 months with conservative treatment. MacEwen and Kakizaki and colleagues[8] reported that the spontaneous resolution rate was particularly higher during the first 6 months with a tendency to drop between 6 and 12 months. Lyon and colleagues[10] reported that 44% of the unsuccessful probing cases had iatrogenic canalicular obstruction, suggesting that the 'wait-and-see' approach was optimal for these patients.

Zwaan[11] also found that the success of probing operation was independent of age, and reported a success rate of 93% for infants greater than 24 months old. Similarly, Robb[12] achieved a success rate of 90% for late probing cases, and the success rate particularly for infants in 24- to 36-month-old patients was as high as 96.4%. Erdem and colleagues[13] achieved a success rate of 90.35% in infants less than 24 months old and 90.8% in infants greater than 24 months old. They reported an inability to find any statistically significant difference between the two age groups. In another study, Zilelioglu and Hosal[14] achieved a success rate of 88% in 50 eyes of 38 infants from 12 to 101 months of age and did not find any correlation between the age and the success of the probing operation. Une and colleagues[15] also reported 85% success in 2–5 years age group and 73% success in 6–8 years age group. In our study, we achieved a success rate as high as 93.8% in patients of 24–48 months of age, 91.5% in patients greater than 24 months old and 86.6% in patients greater than 48 months old suggesting that there was no correlation between the age and success of the probing. Different from our study in patients older than 48 months of age, Mannor and colleagues[16] had 42%, Honavar and colleagues[17] had 42.9%, and Kashkouli and colleagues[18] reported a 50% success rate. Rajabi and colleagues[19] also

Table 1. The number and success rate of the patients that were operated.

Age	12–18 months	18–24 months	24–48 months	> 48 months
Number of patients	54	27	32	14
Number of eyes	66	30	32	15
Success rate	95.5%	93.3%	93.8%	86.6%

reported a success rate of 63% for the age group of 2–3 years, 50% for 3–4 years, and 50% for 4–5 years, respectively. Kashkouli and colleagues[18] reported a success rate of 89% for patients in the age group 13–18 months old, and 71.7% for patients older than 24 months old.

Sharma and colleagues[5] also reported that instead of delaying the probing operation until the patient with CNLDO was 12 months of age, the operation should be performed after the patient was older than 6 months of age. The rationale for this was that late probing might cause complications such as chronic dacryocystitis. The authors also suggested that the success rate of probing operation might decrease, if the patient was greater than 12 months of age and the operation could be performed using topical anaesthesia for younger infants. Katowitz and Welsh[20] also reported the success rate of the probing operation as 94.7% for infants younger than 13 months old, and 54.7% for infants greater than 13 months old. This suggested that probing operation may be performed within the first year of life depending on the severity of the symptoms and parent compliance, since the success rate may drop after 13 months of age. In another study, Ffooks[21] reported that early probing prevented complications such as acute dacryocystitis, recurrent dacryocystitis, and canaliculitis. Therefore, early probing would be appropriate in cases which could not be cured after antibiotic treatment for several weeks. In addition, Perveen and colleagues[4] reported that the success rate of the probing operation remarkably decreased with increased age. The authors classified the patients who underwent the probing operation into age groups of 6-, 12-, 18-, 24-, 36-, and 48-month old, and the success rates for these groups were found to be 100%, 94%, 84.4%, 83.3%, 61.5%, and 33.3%, respectively. This suggested early probing rather than spontaneous resolution. In our study, the success rates were 95.5% for 12–18 months of age, 93.3% for 18–24 months of age and 91.5% for >24 months of age (Table 1).

On the contrary, our study results support that bilateral involvement was not an influential factor for the prognosis. Also, Kashkouli and colleagues[20] and Erdem and colleagues[13] reported that bilateralism does not affect prognosis. However, Honavar reported that bilateral involvement was also a factor that adversely affected the success of the probing operation.[22]

In the postoperational follow-up, we found no significant differences between the results of the first week and the later weeks. Kashkouli and colleagues and Perveen and colleagues also reported no significant differences between the results of the first week and third month.[20]

Like Rajabi and colleagues[19] and Beato and colleagues,[23] we found that the gender is not related to the success of probing surgery.

We aimed to report our results in older (>24 and >48 months) patients who had previous unsuccessful probing which is rarely emphasized in previous studies. The second operation was performed on seven of the nine patients where the initial surgery failed, and successful results were achieved in six patients. The success rate was 100% after the second surgery in patients older than 48 months. In contrary to our results, Une and colleagues[15] reported the results of second probing with a 27% success rate in 2- to 8-year-old patients. The results of Beato and colleagues[23] after first probing were lower than our results. They reported the success rate as 77.3% after the first probing procedure. They performed second probing in 14 of 20 eyes with unsuccessful probing and they achieved success in 12 of these eyes with a success rate of 85.7% which is quite high. They reached 90.9% success rate after two probings. We also think that the success of second probing is high and should be used as first-line therapy after prior unsuccessful probing.

Beato and colleagues[23] reported that adenoid hypertrophy requiring surgery was detected in

otorhinolaryngological examination in 7 of 20 patients (30%) who failed after the first probing procedure. This study showed the importance of otorhinolaryngological examination after unsuccesful probing procedure. We did not detect adenoid hypertrophy in failed probing cases. However, two cases had hard stop. Also the only case that failed after the second operation was one of these patients with hard stop. Polydactyly was detected in this patient in physical examination.

A limitation of our study is that we did not give the results of patients who were managed conservatively in the first year of their life.

Conclusion

We found a higher success rate of probing in patients with CNLDO between 12 and 84 months of age. This operation, which requires general anaesthesia and due to the high spontaneous resolution rates of CNLDO within the first 12 months of age, cannot be performed unless complications such as dacryocystitis and canaliculitis develop within the first year. In infants with CNLDO older than 12 months, probing should be considered as the first-choice and effective approach. Probing operation may be used as first-line therapy even in patients older than 12 months who had previous unsuccessful probing because high success rates can also be obtained in these patients. Otorhinolaryngological pathologies and congenital anomalies should be considered in failed probing cases.

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Conflict of interest statement

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Ethics statement

The research was approved with the IRB number PRO18050009 by Ömer Halisdemir University institutional board on 30 May 2018. Written informed consent was obtained from the parents of all patients.

ORCID iDs

Kürsad Ramazan Zor https://orcid.org/0000-0002-3233-7906

Erkut Küçük https://orcid.org/0000-0002-1474-9237

Zeynep Yılmaz Öztorun https://orcid.org/0000-0001-8017-3048

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