

Success Rate of Probing for Congenital Nasolacrimal Duct Obstruction at Various Ages

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Purpose: To determine the success rate of probing for congenital nasolacrimal duct obstruction (CNLDO) in various age groups.

Methods: One hundred children (118 eyes) aged 4 to 48 months diagnosed with CNLDO were included and divided into 6 groups; group 1: infants 4-6 months of age, group 2: infants from 7 to 12 months, group 3: toddlers 13-18 months of age, group 4: older toddlers 19-24 months old, group 5: children from 25 to 36 months, and group 6: children 37-48 months of age. Probing was performed under general anesthesia in all subjects. All patients were followed at regular intervals up to 6 months postoperatively. Successful probing was documented as complete remission of symptoms 2 weeks following the procedure.

Results: The success rate of probing was 100% (2 eyes) in group 1, 94% (47 eyes) in group 2, 84.4% (27 eyes) in group 3, 83.3% (15 eyes) in group 4, 61.5% (8 eyes) in group 5 and 33.3% (1 eye) in group 6; the overall success rate was 84.7% (100 eyes). The majority of eyes, 87.3% (103 eyes), had membranous obstruction while 12.7% (15 eyes) had firm obstruction. The success rate was 92.2% (95 eyes) in eyes with membranous obstruction and 33.3% (5 eyes) in those with firm obstruction.

Conclusion: Probing of the nasolacrimal duct under general anesthesia is a safe and viable option as a primary treatment modality for CNLDO. The success rate decreases with increasing age; membranous obstruction resolves in the majority of cases whereas firm obstruction has a poorer outcome.

Keywords: Probing; Congenital Nasolacrimal Duct Obstruction; Epiphora

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INTRODUCTION

Epiphora is defined as abnormal overflow of tears due to excessive secretion of tears or obstruction of the lacrimal drainage passages. Congenital nasolacrimal duct obstruction (CNLDO) is the most common disorder leading to epiphora and is usually due to failure of canalization of the nasolacrimal duct (NLD) at its distal end. Canalization of the NLD usually takes place at the end of six months of

intrauterine life. However, it may be delayed for several weeks or months after birth.¹ Complete osseous obstruction can also occur, especially in association with anomalous passages. Abnormalities within the nasal passage may also contribute to obstruction of the duct.² It has been noted that approximately 30% of full term infants have obstruction at birth, however only 2 to 4% become symptomatic.³ The diagnosis of CNLDO is based on a history of a watering/discharging eye within the first few weeks after birth. The

eye generally remains white, although attacks of conjunctivitis may complicate the condition.⁴ The diagnosis can be confirmed by gently pressing over the nasolacrimal sac and observing mucopurulent material refluxing from either punctum.

Controversy exists regarding the natural course and management of CNLDO. In general, it is advisable to wait for spontaneous resolution. Crigler⁵ described a technique of applying pressure over the nasolacrimal sac area.⁵ Topical antibiotics may be used in the presence of active infection. The standard surgical procedure for children with persistent obstruction is probing of the lacrimal system under general anesthesia (GA). However, timing of probing has long been a controversial topic. The purpose of our study was to evaluate the success rate of probing in CNLDO in various age groups.

METHODS

This prospective study was conducted at the Department of Ophthalmology, Government Medical College, Srinagar, Jammu and Kashmir, India from 2005 to 2007. One hundred patients (118 eyes) with CNLDO in the age range of 4 to 48 months were included. The diagnosis was based on the history of watering or discharging eye and confirmed by evidence of epiphora with or without mucopurulent discharge and regurgitation on ocular examination. Any previous history of treatment (massage, antibiotic drops, probing) was noted. All patients received conservative medical treatment including nasolacrimal sac massage. In addition, parents were instructed to instill topical antibiotic drops whenever a mucopurulent discharge was present. This conservative medical regimen was continued for a minimum of 6 weeks in all patients and discontinued only if there was spontaneous resolution of epiphora or when probing was performed. Informed consent was obtained from the parents of the patients.

The children were divided into 6 age strata including group 1: 4-6 months, group 2: 7-12 months, group 3: 13-18 months, group 4: 19-24 months, group 5: 25-36 months, and group 6: 37-48 months.

Inclusion Criteria

1. Children aged 4 to 48 months with history suggestive of CNLDO (unilateral/bilateral).
2. Patients with previous diagnosis of CNLDO and failed conservative treatment.
3. Infants with congenital dacryoceles that did not resolve within a few weeks.
4. Infants with acute dacryocystitis (these subjects were administered systemic antibiotics before probing).
5. Infants with severe lid irritation due to persistent discharge.
6. Children with copious mucopurulent discharge causing blurred vision.
7. Children with persistent discharge leading to disruption of social activities such as exclusion from day care.

Exclusion Criteria

1. Any secondary cause of watering eye.
2. Eye conditions such as punctal agenesis, ectopic puncta, multiple puncta, congenital ectropion, blepharitis, congenital glaucoma and conjunctivitis.
3. Any nasal pathology.
4. Cases of canalicular obstruction.

Technique of Syringing and Probing

The procedure was performed under GA. Both upper and lower puncta were dilated with a punctum dilator. A lacrimal cannula was attached to a syringe containing sterile normal saline solution used for syringing. Syringing was done through the lower punctum to confirm obstruction of the nasolacrimal duct. Regurgitation of fluid through the opposite punctum confirmed NLD obstruction.

Probing was done using a Bowman probe which is available in various sizes ranging from size 000 (0.7 mm) to size 1 (1.1 mm). Keeping in view the direction of the first 2 mm of the canaliculus, the appropriately sized probe was first directed vertically. Then the probe was gently directed medially until a distinct bony feeling was encountered. At this point the probe was turned vertically and passed

through the NLD, gently advancing past the obstruction. Patency of the NLD was checked by syringing when fluid passed freely without any regurgitation.

Following the procedure, topical antibiotic drops were continued for 2 weeks. The patients were visited at 2 weeks, and 3 and 6 months postoperatively. Successful probing was documented as complete remission of watering and discharge together with no reflux from with lacrimal sac pressure two weeks after the procedure. Chi-square test was used for statistical analysis.

RESULTS

A total of 100 children, including 43 male and 57 female subjects were studied; these included 44 infants, 42 toddlers 1-2 years of age and 14 children 2-4 years of age. Onset of the symptoms was before 2 weeks of age in 87 patients and after 2 weeks of age in 13 other subjects. Unilateral obstruction was present in 82 eyes, while bilateral obstruction was present in 18 other children, summing to a total of 118 eyes. The most common sign was epiphora with discharge in 61% (72 eyes). The next common sign was

epiphora on ocular examination in 33.1% (39 eyes), mucocele in 5.1% (6 eyes) and lacrimal sac abscess formation in one eye (Figure 1). There was regurgitation of mucoid/ mucopurulent material with pressure over the lacrimal sac in the majority of subjects.

The overall success rate of probing was 84.7% (Table 1). CNLDO was membranous in 87.3% (103 eyes) and firm in 12.7% (15 eyes); 92.2% (95 eyes) of eyes with membranous obstruction were successfully cured and 33.3% (5 eyes) of cases with firm obstruction had a successful outcome (p<0.05, Chi square test, Table 2).

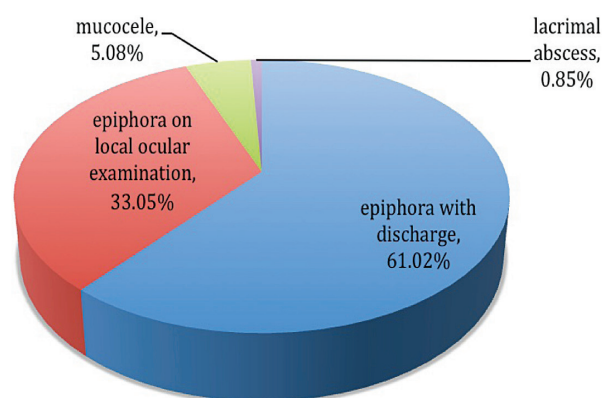


Figure 1. Signs of nasolacrimal duct obstruction.

Table 1. Success rate of syringing and probing in 118 eyes of 100 children

Age (Months)	Successful		Unsuccessful	
	(Number of Eyes)	%	(Number of Eyes)	%
4-6	2	100	0	0
7-12	47	94.0	3	6.0
13-18	27	84.4	5	15.6
19-24	15	83.3	3	16.7
25-36	8	61.5	5	38.5
37-48	1	33.3	2	66.7
Total	100	84.7	18	15.3

p = 0.009 for comparison of success rate among the age groups (Chi square test)

Table 2. Type of obstruction on probing

Age (months)	Membranous obstruction		Firm obstruction	
	(No. of Eyes)	%	(No. of Eyes)	%
4-6	2	100.0	0	0.0
7-12	47	94.0	3	6.0
13-18	25	78.1	7	21.9
19-24	16	88.9	2	11.1
25-36	11	84.6	2	15.4
37-48	2	66.7	1	33.3
Total	103	87.3	15	12.7

DISCUSSION

NLD probing is considered as a standard therapy for the management of CNLDO. However the timing of probing has always been a topic of debate. Early probing has been advocated at presentation or shortly after a period of conservative treatment irrespective of the age of the child. Ffookes⁶ recommended early probing of the nasolacrimal system, only after one to two weeks of topical therapy with antibiotic drops. Ffookes⁷ cited lacrimal abscess formation as a possible complication of delayed surgical treatment. Advocates of early probing suggest that early correction avoids complications such as acute dacryocystitis, recurrent dacryocystitis or canaliculitis⁸ and prevents months of morbidity due to epiphora and chronic dacryocystitis. Therefore, probing provides rapid improvement in symptoms thereby freeing the child and parents of the inconvenience of persistent epiphora, discharge and recurrent infections.⁹ In addition, it is reported that delayed probing beyond 13 months is associated with lower cure rates because of fibrosis due to prolonged inflammation in the lacrimal drainage system with increasing age.¹⁰⁻¹²

In our study, the overall success rate was around 85% which is comparable to previous studies.^{8,13-17} Our study showed a significant trend of decreasing success rates with increasing age: 100%, 94%, 84.4%, 83.3%, 61.5% and 33.3% at 6, 12, 18, 24, 36 and 48 months of age, respectively which is consistent with other studies.^{17,18} Kashkouli et al¹² concluded that older children are more likely to have complicated, non-membranous obstructions that might reduce the cure rate. Robb¹⁹ noticed that altered anatomy is important in determination of failure.

In our study, 87% of cases had onset of symptoms within 2 weeks of birth and 13% had symptoms after 2 weeks of age. Ballard²⁰ noticed that these infants experience tearing and discharge at 2 weeks of age. Ffookes⁶ reported that 188 out of 443 cases developed symptoms during one week after birth. The presence of epiphora within a week of birth is likely to be due to reflex tear production from inflammation of the lacrimal sac.

We noted two types of obstructions on probing: membranous and firm, with a higher success rate in cases with membranous obstruction. Therefore the outcome of probing has an anatomic basis. The majority of obstructions (both membranous and firm) were felt at the lower end of the NLD. However we cannot comment on the exact site of obstruction since a nasal endoscope was not used. Nasal endoscopy provides better visualization of the nature of distal blockage (i.e., stenosis, atresia, inferior turbinate position) and direct observation of the probe and fluorescein outflow.²¹⁻²³ Further study is warranted in reference to the site of obstruction.

In the present study, a Bowman probe of appropriate size ranging from size 000 to size 1 was used. Many authors recommend using a specific size of Bowman probe but none of them discuss the fact that there is no standardization among instrument manufacturers with respect to the size of the Bowman probe.

In our study, all probing procedures were performed under GA because it reduced the potential risk of trauma to delicate structures of the lacrimal drainage system and soothed the apprehension of the child and parents. Many authors recommend probing under GA as a safe option as a primary surgical modality for treatment of CNLDO in children with better control over the procedure and paying attention to the site and nature of the obstruction.⁴ However, some authors prefer topical anaesthesia for probing in children.^{14,24}

We observed that the outcome of probing at 2 weeks was highly correlated with the final results at 6 months. The cure rate was the same at the 3 and 6 month follow-up visits. Hence it seems that the early result could represent the final result of probing for CNLDO.

We may conclude that NLD probing under GA is a safe and viable option as a primary treatment modality for CNLDO. We document high success rates between 6 and 18 months of age. The success rate of probing decreases with increasing age and age over 24 months is a predictor of poor outcome. Our results may encourage one to proceed with early probing rather than wait for spontaneous resolution.

Decision about the optimal time to proceed with probing also depends on the severity of symptoms such as cases of mucoceles, recurrent dacryocystitis, copious discharge with blurred vision, disruption of social activities and informed parental request. In addition, the outcome of probing has an anatomic basis: membranous obstructions resolve in the majority of cases, whereas firm obstructions have a less favourable outcome.

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Conflicts of Interest

None.

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