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ORIGINAL ARTICLE

SUCCESS RATE OF PROBING IN CHILDREN WITH CONGENITAL NASOLACRIMAL DUCT OBSTRUCTION IN MENELLIK II REFERRAL HOSPITAL

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ABSTRACT

Introduction: *The timing of probing for congenital nasolacrimal duct obstruction (CNLDO) has been a matter of controversy. This study was conducted to assess the success rate of probing in children with congenital nasolacrimal duct obstruction and to evaluate the association between success rate and age at the time of intervention.*
Methods: *A prospective study was conducted between April 2014 and March 2015 on 71 children diagnosed to have congenital nasolacrimal duct obstruction. Patients were divided into three age categories. Group A was (1-4 years), group B (4- 7 years), and Group C (7-9 years). Probing was performed by two ophthalmic plastic and lacrimal surgeons under light sedation. Statistical analysis was conducted using Statistical Package for Social Sciences version 17.0. Chi-square test and Fisher's exact test with P value less than 0.05 were used to examine the relationship between success rates of probing and age.*
Results: *A total of 101 eyes of 71 children, were included in the analysis. The overall probing success rate was found to be 88.1%. The success rate of probing was 96.0 % in group A, 82.4% in Group B and 33.3% in group C. Statistical analyses showed that there were significant differences in the success rate among these age groups (P< 0.0001).*
Conclusion: *This study confirmed that success rate of probing is greatest in children between 1-4 years and declines with increasing age. Hence, earlier diagnosis and probing are recommended and can be taken as a first line treatment for children with reasonable outcome.*

Keywords: *Probing; Success rate; congenital nasolacrimal duct obstruction.*

INTRODUCTION

Congenital nasolacrimal duct obstruction (CNLDO) is the most common congenital lacrimal abnormality usually due to an imperforated valve of Hasner (1, 2). It occurs when the connection between the nasolacrimal duct and valve of Hasner fails to open (3, 4) and can be unilateral or bilateral. Additional factors that can lead to CNLDO are canaliculitis, dacryocystitis, bony nasolacrimal duct and mucocele (5). The most significant differential diagnosis to be excluded is infantile glaucoma, which without treatment can result in severe complications.

The literature reports varying incidences for CNLDO ranging from approximately 20-30% of newborns (6, 7,8) to 50-70% (9). The common finding in all of these reports is that most of the patients with CNLDO are not symptomatic during the first few month of life. Only 5-7% of cases become clinically symptomatic (7,10). During the first year of life approximately 90% of all cases resolve spontaneously but the likelihood of spontaneous resolution by the second year of life significantly decreases (6, 7, 11-13). Among CNLDO cases approximately 30% of them are bilateral (14) with no sex or genetic predilection (5).

Previously early probing before the age of one year was recommended but recent reports confirmed that, as there is high frequency of spontaneous resolution during this time, a conservative therapy as first line of management is recommended for infants' less than one year (5). This comprises of digital massage of the lacrimal sac to push fluid through the distal nasolacrimal duct and force opening. If obstruction persists beyond one year of age probing is as the next intervention therapy. Patients in whom probing fails advanced treatment such as balloon catheter dilation, silicone tube intubation or dacryocystorhinostomy may be considered (9).

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The timing of probing for CNLDO has been also a matter of controversy in recent years (5, 9). Some studies have shown that the success rate of probing as a primary procedure for CNLDO decreases with age (5, 9,15). But some other reports have shown that the success rate of probing not decline with age (16-18). For instance, according to Repka et al. for children < 36 months, probing is a successful primary treatment of NLDO in about 80% of cases, with no decline in treatment success with increasing age (16). This shows that optimal timing for probing also remains controversial (3, l2). But it is important to know appropriate intervention age as it may reduce the occurrence of complication of CNLDO (19).

The literature reports from proponents of late probing have shown that, no significant age related decline in the success rate of probing (10, 3, 15, 20-23). This group argued that the failure associated in the late probing is not because of age rather this discrepancy largely can be explained by the difference between typical membranous obstruction of the duct and diffuse stenosis. Patients with typical obstruction do well with surgery, regardless of age, while those with diffuse stenosis are less likely to improve (20,1,24).

Therefore, as there has been no previous report on outcome of probing for CNLDO from Ethiopia, this study was conducted to determine the success rate of probing and correlation of success rate with age at time of probing. This could potentially serve as a baseline data for future research.

PATIENTS AND METHODS

A prospective study was conducted on 71 children with CNLDO and between 1-9 years of age visiting the Ophthalmic Plastic Clinic at Menellik II Referral Hospital between April 2014 to March 2015. All cases visiting the hospital during the stated period were included in the study. Patients with prior interventions of probing, nasolacrimal malformations or disorders (lid malposition, dacryocystocele, mucocele, dacryocystitis, canaliculitis, punctal agenesis, and associated ocular diseases), history of prior nasolacrimal surgery or trauma, and attempted probing failure at the time of intervention due to canalicular stenosis or atresia were excluded from the study.

The study patients were categorized into three groups according to age at treatment: group A (between 1 to 4 years), group B (between 4 to7 years) and group C (between7 to 9 years). The age demarcating the two groups belongs to upper class. The diagnosis of CNLDO was based on history of tearing and or discharges since the first few weeks or Months of birth and confirmation of these signs on physical examination. Different options of management, complications, and prognosis were discussed with the parents/ guardians and written informed consent was obtained preoperatively. Ethical clearance was obtained from Department of Ophthalmology.

Probing was performed by ophthalmic plastic surgeons under light sedation. Punctal dilator and Bowman's probe 00 sizes were used for the procedure. After ascertaining patency of both canaliculi, probing of the nasolacrimal duct (NLD) was performed through either the upper or lower punctum by Bowman's probe inserted into the canaliculus until the hard stop of the medial wall of the lacrimal fossa was felt. At this time the probe was pulled back a little and turned to the NLD and gently progressed until the resistance of obstruction was felt. Optimal pressure was applied to the probe in order to pass the obstruction. The breaking of the membrane was felt as the probe advanced the obstruction. The patency of the nasolacrimal system was checked by confirming metal to metal contact by a second probe under the inferior turbinate. After probing, each patient received Phenidex (Chloramphenicol 0.5% with Dexamethasone Sodium Phosphate 0.1%) eye drop three times per day for two weeks.

Patients were seen in the clinic at one week and one month after probing. Outcome measures were included an ophthalmologic examination and a parental history of residual symptoms at one week and one month after probing. For those children who did not come for second follow up or additional visit, the data from the previous follow-up (visit at one week) was used for analysis.

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 or one month of the procedure. Statistical analysis was conducted to examine the relationship between age and probing success rate. Association between success rate and age was investigated by chi-square test and Fisher's exact test. Statistical analyses were done by using Statistical Package for Social Sciences software version 17. 0. In all instances, P value less than 0.05 was considered statistically significant.

In this study, complete resolution was defined as the absence of clinical signs of NLDO on examination and parental reporting of no residual symptoms after probing; partial resolution as status of a child after probing, where parents report symptoms of intermittent epiphora, but clinical examination did not show signs of NLDO; successful probing: as status of a

child after probing who has either complete or partial resolution; and failed probing as status of patients with clinical signs of NLDO on examination and having persistent symptoms.

RESULTS

A total of 107 eyes of 71 children were identified and underwent probing (Table 1). The mean age of the patients was 2.06 ± 0.74 years in group A, 4.33 ± 0.72 years in group B and 7.66 ± 0.81 years in group C. Among 107 eyes, 77 (72%) eyes were in group A, 21 eyes (19.6%) were in group B and 9 (8.4%) eyes were in group C.

Table 1: Demographic characteristics of children with congenital Nasolacrimal duct obstruction, Minellik II hospital, Addis Ababa, April 2014 - March 2015

Characteristics	Number	Percent
Age group (Years)		
1-4	50	70.4
4-7	15	21.1
7-9	6	8.5
Mean ± SD	3.06 ± 1.87	
Sex		
Male	37	52.1
Female	34	47.9
Involved eye		
Right	17	23.9
Left	18	25.4
Both	36	50.7

Of the patients who underwent probing, the procedure failed in two (2.8%) children at the time of intervention due to canalicular stenosis or artesia (Table 2). Of those that underwent successful probing two (2.8%) of them failed to appear at the first follow up. These four cases were excluded from the analysis. The remaining 67 patients, with a total of 101 eyes, were included in the analysis.

Table 2: Number of children with congenital nasolacrimal duct obstruction followed-up, Minellik II hospital, Addis Ababa, April 2014 - March 2015

Cases	Number	Percent
Not appeared for first follow up	2	2.8
Appeared for first follow up	67	94.4
Appeared for second follow up	18	25.4

Probing results for the first follow up are shown in Figure 1. From those who attended second follow up, only one failed case in the first follow up demonstrated improvement with partial remission of signs and symptoms of CNLDO. Hence, the overall cure for was 89/101 (88.1%).

The pattern for children belongs to group A and group B shows that success rate was higher than the failure rate. An exponential trend line for the success and failure rate of probing chart is shown in Figure 2.

The number of patients with bilateral CNLDO was not significantly different in the three age groups (p=0.848). There was no significant association between bilaterality and success rate of probing (P =0.197), sex and success rate of probing (p=0.678) and right or left involvement and success rate of probing (p = 0.4).

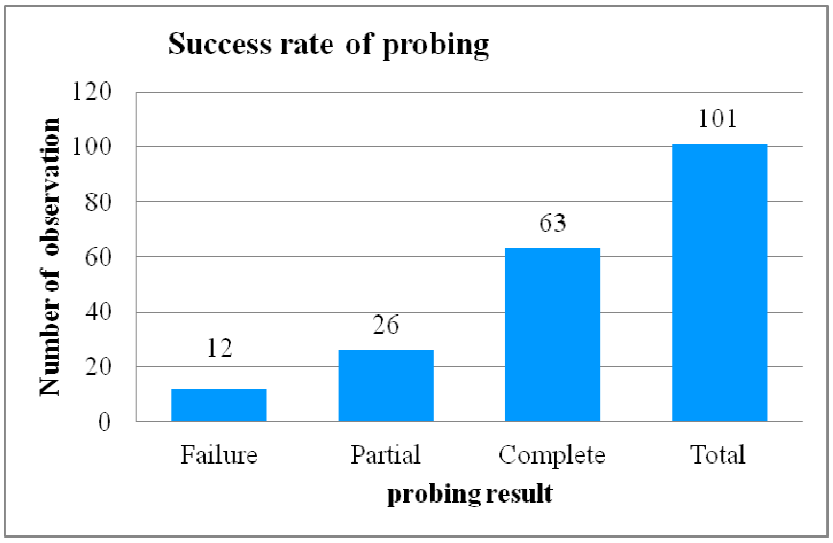

Figure 1: Congenital nasolacrimal duct obstruction probing result after one week at first follow up, Minellik II hospital, Addis Ababa, April 2014 - March 2015

Table 3: Congenital nasolacrimal duct obstruction probing counts and cure by age group, Minellik II hospital, Addis Ababa, April 2014 - March 2015

			Final probing result		Total
			Failure	Success	
Age Group					
	1- 4	Count	3	72	75
		% within Age group	4%	96%	100%
	4 -7	Count	3	14	17
		% within Age group	17.6%	82.4%	100%
	7-9	Count	6	3	9
		% within Age group	66.7%	3.33%	8.91%
Total		Count	12	89	101
		% within Age group	11.9%	88.1%	100%

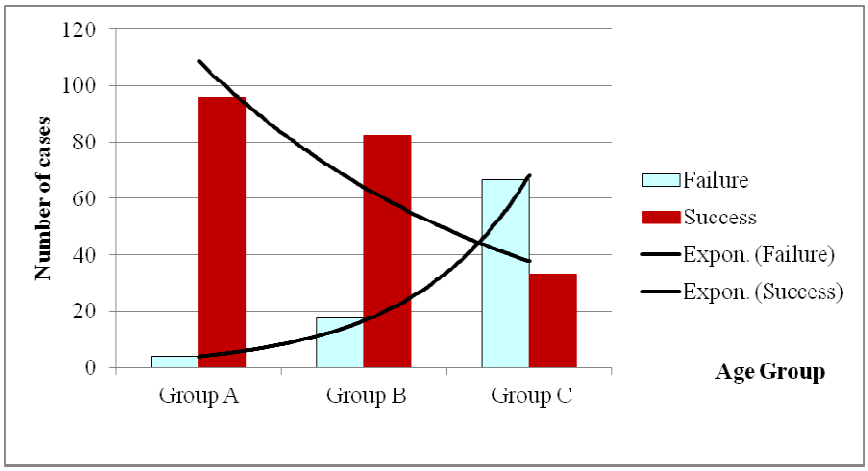

Figure 2: An exponential trend line for success and failure chart in congenital nasolacrimal duct obstruction probing Minellik II hospital, Addis Ababa, April 2014 - March 2015

DISCUSSION

Some ophthalmologists recommend early intervention because prolonged epiphora is annoying to both child and parents and a delay in treatment may increase the risk of infections and long-term damage resulting in poorer success rate of simple probing (25,26). Others recommend late probing because there is no any significant age related decline in the success rate probing.

The results of our study are comparable to that reported by Thongthong et al. who reported the success rate of probing for CNLDO was 85% (15). They considered a total of 59 eyes in 49 patients. They also considered the success rates in four different age groups. Similar to our research they found that there is a decline in the success rate of probing with increasing age.

Similarly, Reza et al (5) reported a cure rate with probing of 85. 8%. They compared the success rate of probing in patients within different ages at the time of the procedure and they suggested that early intervention, preferably in the first two years of age, should be the standard treatment modality for congenital NLDO.

Maheshwari (18) studied forty-nine eyes of 42 children the age range was from 2-7 years and found probing was successful in 39 eyes (79.6%). He also found a statistically significant difference in the success rate of 85% for children less than 5 years and 55.5% for those older than 5 years. Eshragi et al. (17) consider the success rate of probing of 82 patients, aged between 2 to 5 years, by categorizing into three groups. They did not find a significant difference probably because all the patients in their study were less than 5 years.

In this study the number of patients with bilateral CNLDO was not significantly different in the three age groups. Bilateral CNLDO also was not associated with failure of the probing. Similar to our study Kashkouli et al. (20) found that bilateral or unilateral involvement did not have a significant impact on the cure rate. However, Eshragi et al. (17) noted in their study that bilateral CNLDO was significantly associated with failure of probing.

In conclusion, our study clearly showed that in those children in which spontaneous resolution had not occurred within the first year of life, success rate was high in group A (96%) and group B (82.4%) and decreased with age in group C (33.3%). Therefore, we recommend probing as first line of management without compromising success rate for children less than seven years before considering advanced treatment such as balloon catheter dilation, silicone tube intubation or dacryocystorhinostomy. Future studies with large enough sample sizes are paramount to elucidate the optimal time to apply the CNLDO probing.

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