Original Article

Success rate of Nasolacrimal Duct Probing in children with Congenital Nasolacrimal Duct Obstruction after the age of one year

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Author's Contribution

[1,2,3,4,5,6] *Conception of study*
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[1,2] *Analysis/Interpretation/Discussion*
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Abstract

Introduction: The objective of this study was to determine the success rate of nasolacrimal duct probing for congenital nasolacrimal duct obstruction in children after the age of one year.

Materials and Methods: It was a descriptive case series conducted on 145 children presented to Ophthalmology Department, Allied Hospital, Faisalabad with CNLDO. The probing and syringing of the nasolacrimal duct were performed under general anesthesia. The patency of the nasolacrimal system was evaluated by irrigation of saline stained with pyodine through the superior punctum, flow of saline into the nose was confirmed by soaking of throat gauze with pyodine stained fluid and/or oozing of pyodine stained fluid through nose. Patients were advised topical antibiotics and steroids for 3 weeks after the probing and follow-up checkups after 6 weeks. Data were analyzed using SPSS computer software version 17.0. Effect modifier like age and gender was controlled by stratification. The post-stratification chi-square test was applied. P-value <0.05 was considered significant.

Results: In our study, the frequency of success of nasolacrimal duct probing for congenital nasolacrimal duct obstruction in children between 1 to 2 years was 80.3%, children between 2 to 3 years of age were 53.1%, and children between 3 to 4 years of age were 32.4%.

Conclusion: We concluded that the success rate of nasolacrimal duct probing for congenital nasolacrimal duct obstruction is higher in children after the age of one year and decreases gradually as the age progresses.

Keywords: Children, congenital nasolacrimal duct obstruction, Nasolacrimal duct probing, success rate, after one year of age.

Introduction

Nasolacrimal duct obstruction is the more typical nonemergency obstruction to drainage and occurs in about 2-6% of full-term newborns.[1] The lacrimal drainage system consists of puncta, canaliculi, lacrimal sac, and nasolacrimal duct. The nasolacrimal duct carries tears from the conjunctival sac to the nasal cavity (introduction). The lower end of the nasolacrimal duct (valve of Hasner) is the last portion of the lacrimal drainage system to canalize, complete patency usually occurring soon after birth.[2] Usually, a thin mucosal membrane at the lower end of the NLD is the cause.

Some authors classify CNLDO into two main groups–membranous and complex (firm)–based on the sensation while passing the Bowman probe, if the passage of the probe produces a popping sensation with subsequent free passage, it is called a membranous obstruction and if the passage of the probe produces a bony sensation similar to passing the probe through sandpaper, it is called a complex (firm) obstruction. However, this classification is subjective and depends on the feeling during probing and different rates of obstruction types were reported in the same age groups by different authors.[3] The severity of these manifestations may vary from patient and day today.

The most severe cases of NLD obstruction resemble congenital dacryocele in showing a distended sac that can be seen and palpated beneath the skin, just inferior to the media canthal tendon. Unlike with congenital dacryocele, digital pressure usually results in a retrograde discharge of mucopurulent material.

Milder cases with low-grade chronic inflammation typically present with epiphora and a mucoid or mucopurulent discharge.[1] The incidence of symptomatic CNDO is reported to be 6%-20%.[3]

It is said that spontaneous resolution occurs in about 70% of patients by age one year. Recent studies have shown that although the extensive delay is not the treatment of choice, cases with membranous obstruction persisting after the first year of life have success rates with simple probing comparable to those of younger infants.[1] Since long it has been a topic of debate.

Nasolacrimal duct probing is usually considered beyond the age of one year. Other alternate surgical options are silicon intubation in fracture of inferior turbinate and dacryocystorhinostomy (other treatment options).[3,4,5] The timing of surgery for congenital NLD obstruction is controversial(controversy). Studies vary as to whether the delay in probing past 13 months of age might be associated with decreased success. Some ophthalmologists prefer silicone intubation as the initial surgical procedure for older children (older than 18 months) with CNLD.4Failure was more (21.43%) when it was delayed up to the age of 2 while other studies say that the overall success rate was 72%. Children less than 3 have a success rate of 78%; children who are more than 3 years of age had a success rate of 50% after 3 years.[6]

The rationale of this study is to determine, the results of nasolacrimal duct probing in children one year and older in our settings. The disparity in literature in the literature indicates the lack of consensus on the approach for primary management of CLNDO in older children as there is no clear-cut guideline for the treatment of CNLD obstruction in older children. CNLD obstruction is a common problem in our community and probing of the nasolacrimal duct as a primary treatment is frequently performed procedure after one year of age when massage and other conservative treatment fail. Congenital epiphora should be taken as a serious problem as if not treated at the proper time, the price will be heavy to pay for the patient as a patient has to go through much more invasive procedure like dacryocystorhinostomy.

Materials and Methods

The study comprised a descriptive case series. The sample size was calculated by using the WHO sample size calculator with precision 83.93%[6] and Confidence level 95% non-probability, consecutive sampling. After approval by the ethical review committee, the Ophthalmology Department OPD of Allied Hospital, Faisalabad was selected as the prime site of sampling. It included children of 1-4 years of age of both gender with epiphora since birth and/or mucopurulent discharge or reflux of contents of the lacrimal sac with pressure (Congenital Nasolacrimal Duct Obstruction). Children with a history of prior nasolacrimal surgery, those with a history of trauma, with an ocular surface disease, upper respiratory tract infection or glaucoma, children with congenital dacryocystoceole, punctal agenesis, craniofacial anomalies, and lid anomalies were excluded. ENT consultation was made to rule out nasal pathologies. Inclusion and exclusion criteria were met by taking history and by clinically examining the patient. After detailed history and examination, data was entered in proforma. The procedure was performed by one authorized surgeon after baseline investigations, under general anesthesia. Patients were

advised topical antibiotics and steroids for 3 weeks after the probing and follow-up checkups after 6 weeks. Complete resolution was defined as on the table after syringing if pyodine stained fluid passes out through the nose and/or stains the gauze in the throat + the absence of clinical signs of CNLDO on examination after 6 weeks and not having the parental history of residual symptoms of CNLDO. The result was graded as partial, the parents reported symptoms of intermittent epiphora or mattering, but clinical examination did not show signs of CNLDO. Both complete and partial resolution was defined as an improvement.

Data were analyzed using SPSS computer software version 17.0. Continuous variables like age will be analyzed using means. Categorical variables like gender will be analyzed using frequencies and percentages .effect modifiers like age and gender will be controlled by stratification. Post-stratification chi-square test will be applied. P-value <0.05 will be considered significant.

Results

A total of 145 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the success rate of nasolacrimal duct probing for congenital nasolacrimal duct obstruction in children after the age of one year.

Age distribution of the patients was done, it shows that out of 145 cases, 52.4% (n=76) were 1 to 2 years, 22.1% (n=32) were between 2-3 years of age and 25.5% were between 3-4 years of age. (Table 1)

Gender distribution of the patients was done, it shows that 55.17% (n=80) were male and 44.83%(n=65) were females. (Table 2)

The frequency of success of nasolacrimal duct probing for congenital nasolacrimal duct obstruction in children after the age of one year was recorded in 62.1% (n=90) while 37.9% (n=55) was not successful. (Table 3).

The frequency of success of nasolacrimal duct probing for congenital nasolacrimal duct obstruction in children between 1 to 2 years was 80.3%, children between 2 to 3 years of age were 53.1%, and children between 3 to 4 years of age was 32.4%. (Table 4).

Effect modifier like age and gender was controlled by stratification. The post-stratification chi-square test was applied. P-value <0.05 was considered significant. (Table 1 & 2)

Table 1: Age Distribution (n=145)

Age (in years)	*No. of patients*	*%*
1 -2 years	76	52.4
Above 2 to 3 years	32	22.1
Above 3 to 4 years	37	25.5
Total	145	100

Table 2: Gender Distribution (n=145)

Gender	*No. of patients*	*%*
Male	80	55.17
Female	65	44.83
Total	145	100

Table 3: Frequency of success of Nasolacrimal Duct Probing for Congenital Nasolacrimal Duct Obstruction in children after age of one year (n=145)

Success	*No. of patients*	*%*
Yes	90	62.1
No	55	37.9
Total	145	100

Table 4: Stratification for the frequency of success with regards to age (n=145)

Age	*Successful Nasolacrimal Duct Probing*			
	Yes	Percentage	No	Percentage
1 to 2 years	61	80.3%	15	19.7%
Above 2 to 3 years	17	53.1%	15	46.9%
Above 3 to 4 years	12	32.4%	25	67.6%

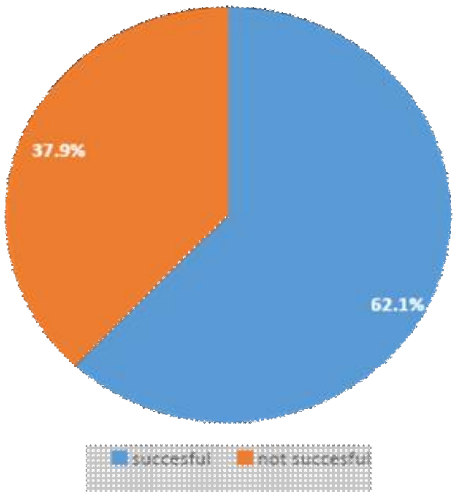

Figure 1: Pie Chart of succesful and non-succesful

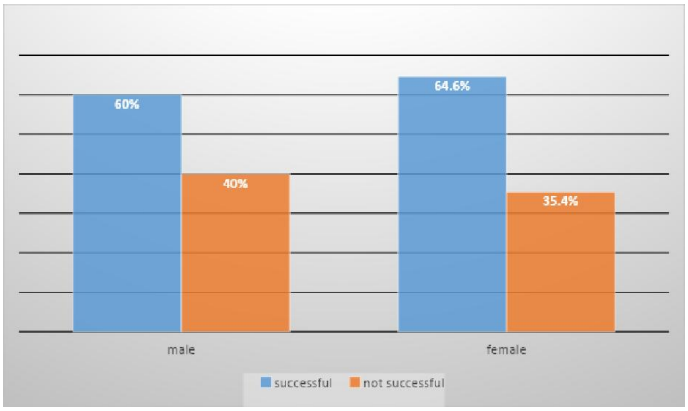

Figure 2: Relationship between gender and success rates

Comparison of success rates between gender of the subjects. The results shown are percentages within the respective category. Overall chi-square value is 0.324 with is at 1 df not significant, p value=0.569

Discussion

Epiphora is defined as the 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. Early probing has been advocated after the age of one year.

This study was planned to determine the appropriate age at which probing is done may give the best results by measuring its success rate at specific age because there is a disparity in the literature about the timing of probing in CNLDO in children.

In our study, the frequency of success of nasolacrimal duct probing for congenital nasolacrimal duct obstruction in children between 1 to 2 years of age was 86.3%, children between 2 to 3 years of age were 53.1%, and children between 3 to 4 years of age was 32.4%. the success rate was decreasing as the age of the patient is increasing.

The findings of our study are in comparison with a study conducted at KIOMS, Hayatabad Peshawar, 2011 showing a success rate of 83.93% after one year of age, and it is decreased to 78.57% in children whom it was done after the age of 2.[5]

Another study showed comparative results with an overall success rate was 72%. Children less than 3 have a success rate of 78%; children who are more than 3 years of age had a success rate of 50% after 3 years.[6]

Thongthong K and others[7] evaluated the success of probing for congenital nasolacrimal duct obstruction in a more elaborated age group in children aged under 10 years. The success rates were 80% in patients 0-1 year of age, 86% in patients 1-2 years of age, 75% in patients 2-3 years of age, 75% in patients 3-10 years of age. They concluded that the success rate of probing for treatment of congenital nasolacrimal duct obstruction varies, depending on the age of the child at treatment, it gradually decreases with age.

Alicia G and others[8] determined the success rates of endoscopic-assisted probing compared to conventional probing. The success rates of endoscopic-assisted and conventional probing were 94.6% and 58.7% respectively. The significantly higher success rates with endoscopic probing are likely due to the ability to observe and treat associated problems, so if probing is done with an endoscopic view it can further help indirect visualization of lacrimal passage through the nose.

Kashkoula MB and others[9] evaluated comparable results of the success rate of initial probing and the factors affecting the success rate for congenital nasolacrimal duct obstruction (CNLDO)in children under the age of 5 years. The cure rates were 92% in the first year, 84.5% in the second year, 65% in the third year, and 63.5% in the fourth and fifth years of age.

Burton J. Kushner[10] reported that the success rate of nasolacrimal duct probing was 91% in children with CNLDO from 6month to 4 years of age.

Rajab AY[11] evaluated the role of early probing in congenital nasolacrimal duct obstruction (CNLDO). The success rate of the initial probing was 84.2% (64 of 76) for all patients, 92.15% (47 of 51) in the 6 to 12 month age group, 75% (12 of 16) in the 13 to 24 months age group, and 55.5% (5 of 9) among individuals older than 24 months.

Mannor GE[12] evaluated the effect of certain parameters on nasolacrimal duct probing. In a retrospective study of 142, the success of nasolacrimal duct probing was negatively correlated with increasing age: 92%, 89%, 80%, 71%, and 42% at age 12, 24, 36, 48, and 60 months, respectively.

Lin AE[13] and others also evaluated the success rate of nasolacrimal duct probing via a systematic review and meta-analysis of randomized control trials. Immediate versus observation/deferred probing had similar rates of success (82.7% vs 81.8%).

These findings are in agreement with our study, though we included only up to 4 years of age for probing the success rate in this age range is in support of our results. We are of the view that congenital epiphora should be taken as a serious problem as if not

treated at the proper time, the price may be heavy to pay for the patient as a patient has to go through much more invasive procedure like dacryocystorhinostomy.

Conclusion

We concluded that the success rate of nasolacrimal duct probing for congenital nasolacrimal duct obstruction is higher in children after the age of one year and gradually decreases with age.

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