

**SUCCESS RATE OF PROBING FOR THE TREATMENT OF NASOLACRIMAL DUCT OBSTRUCTION IN CHILDREN UNDER TOPICAL ANESTHESIA.**

Ayesha Khan<sup>1</sup>, Khan Muhammad Nangrejo<sup>2</sup>, Ali Muhammad Abbasi<sup>3</sup>, Arif Dahri<sup>4</sup>, Attaullah Shah<sup>5</sup>, Shahid Jamal Siddiqui<sup>6</sup>.

**ABSTRACT**

**Background:** Nasolacrimal duct obstruction (NLDO) is one of the most frequently reported medical condition in newborn babies which mainly occur due to the lack of perforation through the membrane at the valve of Hasner in the lacrimal drainage system. **Objective:** To evaluate the success rate of probing intervention in newborn babies under the influence of topical anesthesia and their recovery with the passage of time. **Methods:** It was a prospective study comprised of total n=60 cases recruited from the Department of Ophthalmology, PMC hospital Nawab shah, Pakistan within the duration of one year dated from July 25, 2018 to December 31, 2019. Informed consent was obtained from the parents before the procedure. Probing was performed under the influence of topical anesthesia in all selected cases.

**Results:** The success rate was 91.6% shows improvement after the single attempt of probing intervention.

**Conclusion:** The surgical procedure of probing under the influence of topical anesthesia was proven to be a successful intervention with a rapid rate of recovery for the treatment of NLDO in newborn babies.

**Keywords:** Nasolacrimal, Probing Intervention, Topical Anesthesia, Prospective Study

**How to Cite This Article:** Khan A<sup>1</sup>, Nangrejo KM<sup>2</sup>, Abbasi AM<sup>3</sup>, Dahri A<sup>4</sup> Shah A<sup>5</sup>, Siddiqui SJ<sup>6</sup>.

**SUCCESS RATE OF PROBING FOR THE TREATMENT OF NASOLACRIMAL DUCT OBSTRUCTION IN CHILDREN UNDER TOPICAL ANESTHESIA.** *JPUMHS*; 2021;11:01,114-117.  
<http://doi.org/10.46536/jpumhs/2021/11.01.303>

1. Senior Registrar, Department of Ophthalmology PUMHS Hospital Nawabshah.
2. Professor & Head, Department of Ophthalmology PUMHS Nawabshah.
3. Assistant Professor, Department of Ophthalmology PUMHS Nawabshah.
4. Associate Professor, Department of Ophthalmology PUMHS Nawabshah.
5. Assistant Professor, Department of Ophthalmology, KMC khairpur Mirs.
6. Professor, Department of Ophthalmology, KMC khairpur Mirs.

**Correspondence to:** Ayesha Khan. Email ID: [aknangrejo@gmail.com](mailto:aknangrejo@gmail.com)

*Received on: Dec 5, 2020, Accepted On 15 March 2021, Published On 31 March 2021.*

**INTRODUCTION**

Nasolacrimal duct obstruction (NLDO) or dacryostenosis is considered as one of the most frequent medical condition of the lacrimal drainage system found in newborn babies.<sup>1</sup> The prevalence of NLDO in newborn is reported to be around 20-30%.<sup>2</sup> Out of them, nearly 70% of the affected cases became successful in recovering spontaneously within the period of three months.<sup>3</sup> While approximately 80-90% babies show resolution of the disease at the end of the completion of one year.<sup>4</sup> However, there are 2-4% cases which continue to persist the obstruction of nasolacrimal duct even after the end of second year.<sup>5</sup>

Production of Tears basically done by the machinery of main and accessory lacrimal glands. These tears drained into the puncta which eventually move through the canaliculi into the lacrimal sac, flowing through the nasolacrimal duct and enter the nose.<sup>6</sup> However, the pumping mechanism created by the contraction and relaxation of orbicularis muscles is responsible for inducing the flow of tears through the lacrimal system. The congenital nasolacrimal duct obstructions are reported as a common lacrimal complication in pediatric ophthalmology clinics.<sup>7</sup>

The aetiology of NLDO is commonly associated with the obstructions found at the proximal and distal regions of lacrimal system. The obstruction of distal portion is located at the

junction of nose and nasolacrimal duct. Although, the obstruction of the proximal portion is situated at the junction of lacrimal sac and canaliculus. This proximal obstruction sometimes served as one-way valve and promotes the accumulation and aggregate formation of the cellular debris, mucus and tears.<sup>8</sup> However, a membranous structure formed between lacrimal duct and inferior meatus of the nasal mucosa known as valve of Hasner, which helps to resist the reflux of nasal material into the lacrimal duct. The lack of perforation through this membrane at the valve of Hasner is the ultimate cause of NLDO development in newborn babies.<sup>9</sup>

Eventually, the symptoms of NLDO observed within initial stages of life can be either unilateral or bilateral. Among them, epiphora is found to be one of the most leading disorders. Others include mucoidal discharge, high tear meniscus, crusting formation at the eyelid and regurgitation of mucopurulent material.<sup>10</sup>

Although, these symptoms occur variably therefore, a completely full assessment of the lacrimal system is crucial to eliminate irrelevant causes. Mostly, lacrimal sac massage is evidently helpful in clearing the blockage of the duct by generating hydrostatic pressure. However, the subjects that didn't respond to the directed interventions are recommended to undertake syringing and probing treatment in order to clear the obstructions.<sup>11</sup> Mainly,

probing is performed under the influence of general anesthesia in order to ease the discomfort but is prone to develop a physical and emotional fear of hospital in children.<sup>2, 12</sup> thus, the present study was conducted to evaluate the success rate of probing in newborn babies under the influence of topical anesthesia and their recovery with the passage of time.

**METHODS**

It was a prospective study comprised of approximately n=60 cases recruited from the Department of Ophthalmology, PMC hospital Nawab shah, Pakistan within the duration of one year dated from July 25, 2018 to December 31, 2019. The children included in this study were confined within the age group of 12-24 months and failed to recover from the conventional interventions. In order to achieve the high success rate, parents were suggested to use antibiotic drops to avoid unnecessary infections and lacrimal sac massage to infer hydrostatic pressure on their children affected eye for fifteen days before the time of probing intervention.

The children were diagnosed for NDLO on the basis of their prior history of consistent watery eyes since the birth or after a while, along with or without mucosal discharge and lacrimal swelling. In addition, a detailed ocular examination was also undertaken for the anomalies of lids, puncta, bacterial infections and conjunctivitis for each case of the study.

After obtaining the written informed consent from the respective parents, the surgical procedure of probing was done using topical anesthesia. Initially, punctum was subject to dilation by punctum dilator under observation in microscope. After which, Bowman’s probe was introduced into the upper layer of punctum in vertical position then slightly shifted to

horizontal position until the beginning of hard stop of lacrimal bone medial wall. The probe was further infused in nasolacrimal duct inferiorly, posteriorly and laterally till the bony canal. Accomplishment of probing was followed by syringing using the solution of pyodine to ensure the patency of nasolacrimal duct. After the procedure, patients were examined in follow ups for two weeks, three and six months to ensure their complete recovery. After the successful probing, data was obtained and assessed using statistical tools.

**RESULTS**

Table 1. Represents the distribution of age ranges broadly categorized into two groups. It was found that approximately 63.3% babies were 12-16 months old in first group and 36.7% babies were 16-24 months old in second group.

Table 2. Describes the distribution of gender among the patients of the study. It was observed that males were predominant with 56.7% prevalence as compared to females with 43.3% prevalence among the affected cases of NLDO.

Table 3. Represented the predominant distribution of affected eye in the present study. It was observed that 43.3% cases were diagnosed in left eye and 33.3% cases were identified in right eye. While, there are 23.4% cases which show affected predominance in both eyes.

Table 4. Suggests the overall outcome of probing intervention obtained by this study. It was found that approximately 91.6% cases show improvement just after the single probing and 6.7% cases respond to recovery after two times probing. However, 1.7% cases were failed to respond to the probing intervention undertaken by topical anesthesia.

Table 1. Age Distribution of Patients		
AGE GROUPS	NO. OF PATIENT	PERCENTAGE
12-16 Months	38	63.3%
16-24 Months	22	36.7%
Total	60	100%

Table 2. Gender Distribution of Patients		
GENDER	NO. OF CASES	PERCENTAGE
Male	34	56.7%
Female	26	43.3%
Total	60	100%

Table 3. Predominance of Affected Eye		
AFFECTED EYE	NO. OF PATIENT	PERCENTAGE
Right Eye	20	33.3%
Left Eye	26	43.3%
Both Eyes	14	23.4%
Total	60	100%

Table 4. Outcomes of Probing		
PROBING	NO. OF EYES	PERCENTAGE
After Single Probing	55	91.6%
After Two Probing	4	6.7%
Not Improved	1	1.7%

## DISCUSSION

Probing is the next recommended intervention after the failure of the conservative management strategies for NLDO in children. This prospective study conducted on total n=61 children in between the age of 6-24 months subjected to the treatment of probing under the influence of topical anesthesia. Present study has predicted the success rate of 91.6%. Thus, the findings of this study were supported by previous comparable investigations which also reported the similar success rate of 90%, 93% and 93.5% just after the first probing intervention.<sup>12,13,14</sup>

The probing has emerged as an effective time proven intervention for the quick recovery of NLDO. However, the relation of probing period and its predicted outcome with the age of children is still a controversial discussion.<sup>14,15,16</sup> Traditionally, probing was recommended with topical anesthesia in 4-6 months older or with general anesthesia in 12 months older for the proper management and observation of NLDO in children.<sup>17,18</sup>

Clearly, the fastest recovery of probing was seen in those cases that were subjected to early intervention before the age of 12 months.<sup>18</sup> In present study, 63.3% cases were diagnosed at the age of 12-16 months and 36.7% cases were in between the age of 16-24 months. Earlier intervention could be helpful to relief symptoms, anxiety and complications which could lead to the progression of acute dacryocystitis, cellulitis, conjunctivitis and chronic infections which might produce fibrosis and scarring in the nasolacrimal drainage system which ultimately enhanced the complexity of the disease and makes it difficult to cure.<sup>9</sup> A trend of higher efficacy at early ages and lower efficacy at later ages was also significantly proven by multiple studies.<sup>2,12,18,19</sup>

Present study has suggested the high success rate of 91.6% just after the intervention of single probe was probably due to the early diagnosis of the patients. Previously, it was reported that 88.1% children showed speedy recovery in between the age of 1-2 years while it became gradually decreased to 80.9% in children that were greater than the age of 2 years.<sup>17,18</sup> Sharma and others also provided supporting data in their study by revealing the success rate of 97% in between the age of 5 1/2 to 7 months children.<sup>2</sup> Similarly, another study conducted by Shrestha

and others<sup>20</sup> reported success rate of 94% within the age group of 7-12 months just after the first attempt. In addition, Medghalchi and authors<sup>21</sup> suggested the success rate of 91% in between 9-12 months of children whereas, Isaza and Arora has also indicated supporting investigations with a success rate of 90.2% in children less than 2 years of age.<sup>22</sup>

In most of the studies, probing was recommended to be performed under the influence of general anesthesia in order to refrain the chances of traumatic injury to the delicate structures of the lacrimal system.<sup>12</sup> But this method has some disadvantages which includes emotional and physical fear of one day stay in hospital, injections, eight hours long fasting brings the anxiety and nervousness which might leads to create complications in children.<sup>20</sup> Therefore, the intervention of probing under the influence of topical anesthesia was proven to be a successful alternative way to overcome these fears by just having 30 minutes to one-hour hospitalization with no pre-operative precautionary measures or fasting as an indeed requirement.<sup>23</sup>

## CONCLUSION

Overall, it was concluded that the surgical procedure of probing under the influence of topical anesthesia was proven to be the successful intervention with a rapid recovery for the treatment of NLDO in newborn babies. The success rate of 91.6% was achieved just after the first attempt which became increased up to 98.3% after the second attempt. Thus, this study proves that probing serves as a safest surgical procedure.

**ETHICS APPROVAL:** The ERC gave ethical review approval

**CONSENT TO PARTICIPATE:** written and verbal consent was taken from subjects and next of kin

**FUNDING:** The work was not financially supported by any organization. The entire expense was taken by the authors

**ACKNOWLEDGEMENTS:** We would like to thank the all contributors and staff and other persons for providing useful information.

**AUTHORS' CONTRIBUTIONS:** All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

**CONFLICT OF INTEREST:** No competing interest declared.

**REFERENCES**

1. Vagge A, Ferro Desideri L, Nucci P, Serafino M, Giannaccare G, Lembo A, Traverso C. Congenital Nasolacrimal Duct Obstruction (CNLDO): A Review. *Diseases*. 2018; 6:96-106.
2. Sharma VK, Vaidya S, Shrivastava S. Syringing and Probing Under Local Anesthesia in Infants. *The Internet Journal of Ophthalmology and Visual Science*. 2006; 3:1-5.
3. Perez Y, Patel BC, Mendez MD. Nasolacrimal Duct Obstruction. InStatPearls [Internet] 2019 May 5. StatPearls Publishing.
4. MacEwen CJ, Young JD, Barras CW, Ram B, White PS. Value of Nasal Endoscopy and Probing in the Diagnosis and Management of Children with Congenital Epiphora. *British Journal of Ophthalmology*. 2001; 85:314-318.
5. Kerstein RC. Congenital Lacrimal Abnormalities. *Principles and Practice of Ophthalmic Plastic and Reconstructive Surgery*. 1996; 2:731-747.
6. MacEwen CJ. Congenital Nasolacrimal Duct Obstruction. *Comprehensive Ophthalmology Update*. 2006; 7:79-87.
7. Saleem AA. Congenital Nasolacrimal Duct Obstruction and the Visual System. In *Frontiers in Ophthalmology and Ocular Imaging 2019* Apr 30. IntechOpen.
8. Cochran ML, Czyz CN. Anatomy, Head and Neck, Eye Nasolacrimal. InStatPearls [Internet] 2019 Jan 4. StatPearls Publishing.
9. Kapadia MK, Freitag SK, Woog JJ. Evaluation and Management of Congenital Nasolacrimal Duct Obstruction. *Otolaryngologic Clinics of North America*. 2006; 39:959-977.
10. Shen GL, Ng JD, Ma XP. Etiology, Diagnosis, Management and Outcomes of Epiphora Referrals to an Oculoplastic Practice. *International Journal of Ophthalmology*. 2016; 9:1751-1755.
11. Fierson WM. Dilemmas: Eye Problems in the Newborn. In *Common Problems in the Newborn Nursery 2019* (pp. 215-226). Springer, Cham.
12. Sharma HR, Sharm AK, Kotval V. Probing Under Local Anesthesia for Congenital Nasolacrimal Duct Obstruction. *International Journal of Scientific Study*. 2015; 3:74-77.
13. Robb RM. Probing and Irrigation for Congenital Nasolacrimal Duct Obstruction. *Archives of Ophthalmology*. 1986; 104:378-379.
14. El-Mansoury J, Calhoun JH, Nelson LB, Harley RD. Results of Late Probing for Congenital Nasolacrimal Duct Obstruction. *Ophthalmology*. 1986; 93:1052-1054.
15. Kashkouli MB, Beigi B, Parvaresh MM, Kassaei A, Tabatabaee Z. Late and Very Late Initial Probing for Congenital Nasolacrimal Duct Obstruction: What is the Cause of Failure? *British Journal of Ophthalmology*. 2003; 87:1151-1153.
16. Piest KL, Katowitz JA. Treatment of Congenital Nasolacrimal Duct Obstruction. *Ophthalmology Clinics of North America*. 1991; 4:201-209.
17. Maheshwari R. Results of Probing for Congenital Nasolacrimal Duct Obstruction in Children Older than 13 Months of Age. *Indian Journal of Ophthalmology*. 2005; 53:49-51.
18. Syed SH, Arif M, Mahmood MS. Syringing and Probing Results for Congenital Nasolacrimal Duct Obstruction. *Annals of Punjab Medical College (APMC)*. 2009; 3:67-70.
19. Honavar SG, Prakash VE, Rao GN. Outcome of Probing for Congenital Nasolacrimal Duct Obstruction in Older Children. *American Journal of Ophthalmology*. 2000; 130:42-48.
20. Shrestha JB, Bajimaya S, Hennig A. Outcome of Probing under Topical Anesthesia in Children Below 18 Months of Age with Congenital Nasolacrimal Duct Obstruction. *Nepal Medical College Journal: NMJ*. 2009; 11:46-49.
21. Medghalchi A, Mohammadi MJ, Moghadam RS, Dalili H. Results of Nasolacrimal Duct Probing in Children between 9-48 Months. *Acta Medica Iranica*. 2014; 52:545-551.
22. Isaza G, Arora S. Probing without Irrigation in Children with Congenital Nasolacrimal Duct Obstruction. *Clinical and Investigative Medicine*. 2013; 36:158-162.
23. Schnall BM. Pediatric Nasolacrimal Duct Obstruction. *Current Opinion in Ophthalmology*. 2013; 24:421-424.