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Outcome of Probing and Syringing in Congenital Nasolacrimal Duct Obstruction in Children Under Local Anesthesia

Nusrat Sharif, Muhammad Sajid Munir*, Muhammad Arshad, Shahid Nazir***, Muhammad Usman Sadiq****, Rabya Rehman*****

Al-Shifa Trust Eye Hospital, Rawalpindi Pakistan, *Niazi Medical & Dental College, Sargodha Pakistan, **Bahawal Victoria Hospital, Bahawalpur Pakistan, ***Pak Red Crescent Medical & Dental College, Kasur Pakistan, ****Mohi-ud-Din Islamic Medical College, Mirpur, Azad Jammu Kashmir, Pakistan, *****Sargodha Medical College, Sargodha Pakistan

ABSTRACT

Objectives: To evaluate the success rate of probing and syringing for congenital nasolacrimal duct obstruction in children under local anaesthesia.

Study Design: Cross-sectional study.

Place and Duration of Study: Ophthalmology Department, Niazi Medical Dental College, Sargodha Pakistan, from Jul 2018 to Dec 2019

Methodology: Forty-five children were included in the study, of which five had bilateral epiphora. Children of 8-12 months of age were included in this study. Probing and syringing were done under topical local anaesthesia. In this study, special modified straight 25D lacrimal probe cannula was used. Post-operative steroids and antibiotics were given to all the children for two weeks.

Results: Forty Children (45 Eyes) of 8-12 months of age (less than one year) were included in this study. Single successful probing was achieved in 40 eyes (88.88%). Probing was repeated in five cases. Repeated successful probing was achieved in 3 eyes (60%) as the remaining two eyes (40%) where success was not achieved had a bone abnormality which needed an ENT examination and further intervention like Dacryocystorhinostomy (DCR) with close intubation.

Conclusion: Topical local anaesthesia is a good alternative to general anaesthesia as it is not available, particularly in remote areas of Pakistan. It saves the children from the hazards of general anaesthesia and is a good choice for children who are not fit for general anaesthesia.

Keywords: Congenital Nasolacrimal duct obstruction, Dacryo-cystorhinostomy, Lacrimal probe, Local anesthesia, Epiphora, probing, Syringing.

How to Cite This Article: *Sharif N, Munir MS, Arshad M, Nazir S, Sadiq MU, Rehman R. Outcome of Probing and Syringing in Congenital Nasolacrimal Duct Obstruction in Children Under Local Anesthesia. Pak Armed Forces Med J 2022; 72(4): 1415-1419.*

DOI: https://doi.org/10.51253/pafmj.v72i4.8160

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INTRODUCTION

Congenital nasolacrimal duct obstruction (CNLDO) is a frequent problem that causes epiphora, defined as excessive tearing in a newborn during the first few years of life. Excessive tearing may also result in mucoid discharge from the eyes. Children usually present with sticky watery eyes, especially in the mornings. There may be matting of the eyelashes and discharge on the skin and medial canthal area. These signs are aggravated if the child suffers from an upper respiratory tract infection. This disease affects 20% of children less than one year of age.[1] 5–30% of children with Down's syndrome have associated congenital nasolacrimal duct obstruction.[2]

The lacrimal system comprises the upper and lower punctum, the canaliculi, the lacrimal sac and the nasolacrimal duct. The nasolacrimal duct opens under the inferior turbinate on the medial side of the nose, and at its end, there is a thin membrane, the valve of Hasner, which is responsible for the obstruction of the nasolacrimal duct.[3] The pathology of CNLDO is due to a lack of canalization of the nasolacrimal duct at the point of the valve of Hasner. The canalization of the lacrimal drainage system ends here. It becomes completely patent soon after birth. Spontaneous resolution usually occurs in 95% of cases within 12 months that is regarded as a normal variant.[4]

Children with congenital nasolacrimal duct obstruction may have associated conjunctivitis, dacryocystitis, mucocele or pyocele formation, and chronic disease may lead to lacrimal fistula formation. CNLDO can lead to serious complications, i.e., acute dacryocystitis, preseptal cellulitis, orbital cellulitis and frequent respiratory tract infections.[5] Untreated, it can affect the development of vision and refraction. Children with CNLDO have a higher prevalence of anisometropia and amblyopia.[6] Although acute Dacrocystitis very rare, it mostly resolves with topical and systemic antibiotics Parents may also complain that the eye

Correspondence: Dr Nusrat Sharif, House No 443, Street 16, Chaklala Scheme 3, Rawalpindi Cantt, Pakistan.

Received: 11 Feb 2022; revision received: 21 Mar 2022; accepted: 24 Mar 2022

looks smaller, basically due to excessive watering or superadded infection. CNLDO, besides being an ocular problem, is also very disturbing for the children and their parents psycholo-gically and socially.

Parents' lack of knowledge about the success of conservative management with Crigler massage and lack of proper massage technique leads to the failure of the conservative treatment.[7] Most of them think that it is an infection and antibiotics can resolve the problem. Doctors need to emphasize parents' education regarding the cause and treatment of their child's ailment. Diagnosis can be made by applying pressure over the lacrimal sac, which leads to regurgitation. It is extremely important to rule out other causes for watering like congenital glaucoma, corneal disease, eyelids or eyelash abnormality.[8]

It has generally been observed that the parents lack the education and the knowledge of the benefit of massage and want the ophthalmologists to proceed surgically as early as possible. They are unaware of the complications of general anaesthesia and surgical intervention. Children with persistent obstruction or failure of the massage in reliving the obstruction beyond the age of one year are candidates for probing.[9]

The dispute about the best possible timing of probing remains unresolved. Most studies reveal that the best timing is at 12 months of age and beyond that success rate eventually decreases.[10] Numerous studies have been carried out and show this age-dependent decrease in the success rate of early probing under general anaesthesia. Therefore, this study was done to show that the complications of general anaesthesia can be prevented in CNLDO, and probing and syringing can be done under local anaesthesia with a similar outcome.

METHODOLOGY

This cross-sectional study was conducted at Niazi Medical Dental College, Sargodha Pakistan from July 2018 to December 2019. The Ethical Committee approved the study protocol (IERB Approval Certificate # NMDC/PMC/1190/21). The sample size was calculated using the WHO calculator, taking a confidence level of 95%, margin of error of 10%, and reported success rate of 84.2%.[4] The minimum estimated sample size came out to be 36 patients. Forty patients were included, among which five patients had epiphora in both eyes. Sampling was done through the non-probability consecutive convenience sampling technique.

Inclusion Criteria: Children of age 8-12 months with the complaint of epiphora were included in the study.

Exclusion Criteria: Children who had a previous intervention on the lacrimal duct, history of trauma to the nasolacrimal duct, lid abnormality, craniofacial abnormality, eyelid position disorders, abnormality of the nasal bone, lacrimal sac fistula or having agenesis or ectopic punctum were excluded from the study.

Signed informed consent was taken from the parents for the participation of their child in the study. In addition, detailed counselling with the parents regarding the procedure and its outcome were done. Probing was done after two weeks of medical treatment, which included hydrostatic lacrimal massage. All cases were done under topical anaesthesia without any general anaesthesia or sedation.

Before probing, the airway and the respiratory system were thoroughly checked. After putting a few drops of topical anaesthesia, i.e. Procaine, the child was laid on the couch, and the head stability of the child was attained with the help of an assistant. Two assistants were involved in stabilizing the child. Throat packing was not done.

During the procedure, firstly, both the upper and the lower punctum were dilated using a punctum dilator to enlarge the opening of the puncti vertically and then horizontally. A modified lacrimal probe cannula was used in this technique. Because the whole procedure was done under topical anaesthesia, so the time for the procedure was short and needed more precision. With the help of a lacrimal cannula, we could do probing and syringing simultaneously. It was a 25G straight lacrimal probe cannula (Figure-1).

Figure-1: Lacrimal Probe Canula

It was connected to a 5ml syringe after filling it with a 4ml mixture of Saline and Flouroscin. After fully dilating the punctum, this cannula was inserted

through the lower punctum. Advancing it first vertically and then horizontally until a hard stop was felt means that the probe has successfully reached the lacrimal sac and touched the medial wall of the lacrimal sac. This excludes the whole obstruction of lacrimal canaliculi.

In probing cases done under topical anaesthesia, this is an important step of the whole procedure, i.e. to gain a hard stop. It is a crucial step at this point that one can accidentally make a false pathway in the lacrimal canaliculi, which is a known complication and difficult to treat. In the second step, we changed the position of the cannula at the right angle to the canaliculi, reached almost in line with the nasolacrimal duct, and pushed it until resistance was felt. Then, the probe exerted pressure to pass through the obstruction. The level of blockage is analysed by the intensity of force applied to the lacrimal probe. In membranous obstruction, one encounters minimum resistance, while in the case of bony obstruction, firm pressure needs to be applied. Lacrimal pathway patency is further evaluated by syringing Flouroscein stained via the punctum and confirmed by direct visualization of dye from the nostril. In patients having bony obstruction or lacrimal bone abnormality, you cannot overcome the resistance even with the help of a firm probe pressure. Although such cases are fewer in number in such cases, we have to plan for a Dacryocystorhinostomy with intubation. After the procedure, antibiotics and steroid combination were prescribed for two weeks. Nasal decongestants are also very useful after probing in patients having allergic rhinitis. The patients' follow-up time was three months. The resolution of symptoms of patients is the criterion of success. The procedure was repeated in five cases after six weeks.

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 21. Mean and standard deviation were calculated for quantitative variables, i.e. age. In addition, qualitative variables like gender and laterality were calculated by frequency and percentage.

RESULTS

The total number of patients was 45, among which 25 (37.5%) were male, and 15 (62.5%) were female. The mean age of the patients is 9.80±1.067 months. Out of the total 40 children, five cases had bilateral involvement, so the number of eyes was 45 (Figure-2). Out of which 22 (48.89%) were right eyes and 23 (51.11%) were left eyes (Figure-3).

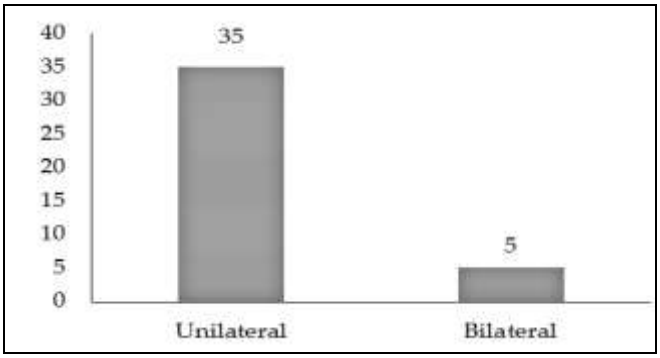

Figure-2: Distribution According to Laterality (n=40)

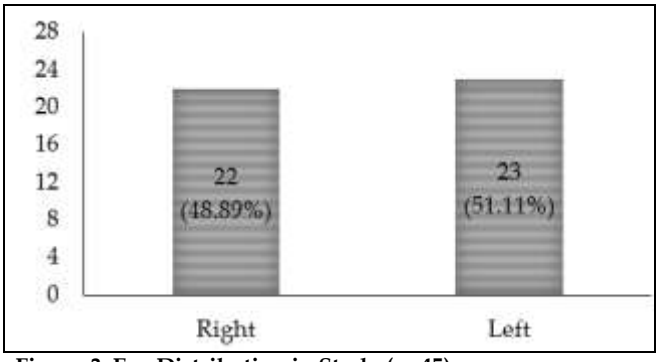

Figure-3: Eye Distribution in Study (n=45)

Single successful probing was achieved in 40 (88.9%) eyes (Table-I). Probing was repeated in five cases. Repeated successful probing was achieved in 3 eyes (60.0%) as the remaining two eyes (40.0%) where success was not achieved had a bony abnormality which needed an ENT examination and further intervention like Dacryocystorhinostomy (DCR) with close intubation (Table-II).

Table-I: Success Rate after First Probing & Syringing (n=45)

Successful Outcome	40 (88.9)
Un-successful Outcome	5 (11.1)

Table-II: Success rate after 2nd probing & syringing (n=5)

Successful Outcome	3 (60.0)
Un-successful Outcome	2 (40.0)

DISCUSSION

The cause of congenital NLDO is the inability of the ectodermal cord to canalize at the time of birth. Conservative treatment initially consists of regular massage known as Crigler massage,[11] it is the primary conservative treatment of choice thru which 95% of the cases resolve if done properly through the first year of life. If conservative treatment does not resolve the problem during the 1st year of life, then surgical intervention is needed consisting of probing and syringing, which is the method of choice.[12] However, the exact

timing of probing and syringing is always a matter of discussion.[13]

In this study, we selected children up to 12 months of age and preferred early probing because the outcome is good.[14] One of the reasons to do probing and syringing at an early age was that all of the cases were under local anaesthesia hence avoiding the complications of General anaesthesia. We gathered some interesting facts from this study. The major fact was that better compliance of the parents after good counselling. Parents were educated that the procedure would be done under local anaesthesia and that every medical centre in our country does not have the availability of general anaesthesia, especially most Tehsil headquarter hospitals that still have a shortage of anaesthesia facility and lack trained staff. Moreover, most of our population lives in rural areas, so doing the procedure under local anaesthesia was an excellent option. Parents were also told that their stay in the hospital would only be for a few hours, and they would avoid the complication of general anaesthesia in the child.

Most anaesthetists in smaller setups are hesitant to give anaesthesia to a child under the age of 12 months due to a lack of skill and backup facilities in case of any complication.

In secondary care hospitals, the number of paediatric Ophthalmologists is still less. Therefore, the general ophthalmologists mostly pass on the patients to the tertiary care hospital due to the facilities of anaesthesia and post-operative care. Due to the limitations of our health care system and to avoid the complications of general anaesthesia, topical local anaesthesia is a good option to carry out probing and syringing of the child. The key step while probing and syringing is to achieve the hard stop of the lacrimal bone. Intra-operative patency of probing was confirmed when metal-to-metal contact of the probe and forceps was observed. In this procedure, the canalicular system is the most fragile part of the lacrimal system and can easily be damaged, or a false passage can be created, so one has to be very careful. Punctual tears are another procedure complication, but it is very rare. These complications are not common in the hands of the experts working in the pediatric ophthalmology department.

There was not much difference in the results of probing and syringing after general and topical or local anaesthesia. Studies conducted by Richard M. Robb,[15] with 90% success rate, and EL-Mansoury *et al.*[16] with 93.5% success rate after first probing. The results of these studies were almost similar to our study, in which the overall success rate after first probing and syringing was 88.88%

Similarly, Stager *et al.*[17] reported a 94% success rate in patients less than nine months of age with a single session of probing under topical anaesthesia. The average age of patients in our study was 9.80 ± 1.067 months, with almost similar results. In another study, John D. Baker.[18] reported a 94% cure rate in 860 eyes of children aged 3-14 months, with probing done under topical anaesthesia. Al-though the results in this study are almost similar to ours, we waited for spontaneous resolution of Conge-nital Nasolacrimal Duct Obstruction for the first eight months.

In another study by Miller *et al.*[19] in most cases, probing of the nasolacrimal duct performed in the office successfully cures NLDO in children aged 6 to 15 months. However, when bilateral illness or more than one symptom of NLDO is present, the success rate is reduced. In our study, the age bracket was different, and there was no difference in results in patients with bilateral involvement. We had to repeat probing in five cases in which the success rate was 60%. The problem was the bony abnormality in two cases that did not have a successful outcome.

LIMITATIONS OF STUDY

Intubation was also not done in our study as it has more success rate in failed cases, but it requires general anaesthesia.

CONCLUSION

Early probing of the nasolacrimal duct under local anaesthesia is quick, safe and a suitable procedure both for the family of the child and also for the concerned doctors. It prevents the complications related to general anaesthesia. For good compliance, counselling of parents is very important. Opting for the procedure under topical/local anaesthesia can reduce the workload on the heavy lists of paediatrics ophthalmology departments in tertiary care centres. There is no significant difference in outcomes between these two types of anaesthesias.

Conflict of Interest: None.

Author's Contribution

NS:, MA: Substantial contributions to the conception, Drafting, Final approval, SN:, MUS: Study design, Data analysis, Final approval, RR: MSM: Conception, Data analysis, Final approval.

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