

Outcome of Nasolacrimal Probing Without Syringing in Congenital Nasolacrimal Duct Obstruction Under Inhalational Anaesthesia in Infants of 6-12 Months of age

IFTIKHAR AHMED¹, ZUBAIR SALEEM², WAQAR AHMED³

ABSTRACT

Aim: To evaluate the results of early probing in congenital nasolacrimal duct obstruction without syringing from lower punctum under inhalational anaesthesia in 6-12 months old infants.

Study design: A descriptive case series.

Methods: 44 eyes of 36 infants between 6 to 12 months of age with complaints of constant epiphora with or without discharge and regurgitation on pressure over the lacrimal sac were included in the study. Patients with history of previous probing, declared unsuitable by the ENT specialist or the anaesthetist were not included in the study. After the written consent of the parents, all underwent probing of the nasolacrimal passage from the lower punctum under inhalational anaesthesia. Patients were sent home after a few hours with conservative treatment and were followed up for 1 month post-operatively and the procedure was repeated after 2 months in unsuccessful cases.

Results: Success of probing was defined as complete remission of the symptoms and a negative regurgitation test throughout the period of follow up. 20 (55%) infants were male and 16 (45%) females. The incidence was more (72%) in 6-9 months age group and more unilateral (77.7%) than bilateral (22.3%). 37 (84.09%) infants presented with epiphora with mucoid or mucopurulent discharge and 7 (15.90%) presented without discharge. Fluorescein dye disappearance test (FDDT) was absent in all the patients and regurgitation test was positive in 39 (88.63%) eyes. 34 out of 44 (77%) eyes were cured after the 1st, 7 out of remaining 10 (70%) after the 2nd and 0 (0%) out of 3 eyes after the 3rd probing. The overall success rate was 93% and the procedure failed in 7%.

Conclusion: Early probing between the age of 6-12 months is advantageous because it is cost effective, less apprehensive to the parents, provides instant relief, decreases the incidence of complications and thus avoids months of morbidity.

Keywords: Epiphora, congenital nasolacrimal duct obstruction, regurgitation,

INTRODUCTION

Anatomically the lacrimal drainage system consists of the puncta, the canaliculi, the lacrimal sac and the nasolacrimal duct. The canaliculus is approximately 10 mm in the lower lid and 8 mm in the upper lid. The two canaliculi fuse and form the common canaliculus which opens into the lacrimal sac¹. Epiphora from the Greek meaning downpour refers to overflow of tears from the face and in context to this article refers to obstruction of the nasolacrimal system. Congenital nasolacrimal duct obstruction (CNLDO) or dacryostenosis is the most common cause of epiphora in the pediatric population and accounts for 20-30% of all otherwise normal newborns². However, only up to 6% of the infants exhibit clinical

phenomenon of nasolacrimal duct obstruction³. It is believed to result from the failure of cannalization or persistence of a membrane at the extreme lower end of the nasolacrimal duct at the mucosal entrance underneath the inferior turbinate⁴. A watery and sticky eye, matting of the eyelashes, chapped periocular skin with or without regurgitation of mucoid or mucopurulent discharge on pressure in the lacrimal sac area and negative fluorescein dye disappearance test confirm the diagnosis. In this context the other causes of epiphora such as buphthalmos, lid and lash abnormalities and corneal abrasions are to be ruled out^{5,6}. Fortunately a significant number of patients undergo spontaneous resolution during the early course of the disease⁷. Some become symptom free with conservative treatment by frequent local hydrostatic massage and topical antibiotic drops⁸ but those who remain unresponsive, require probing of the nasolacrimal passage. Still in a few cases probing may not be successful and silicon tube intubation⁹, balloon catheter dilatation¹⁰ or even the delayed

¹Assistant Professor, Department of Ophthalmology, Continental Medical College, Lahore

^{2,3}Assistant Professor, Department of Ophthalmology, Lahore General Hospital, Lahore

Correspondence to Dr. Iftikhar Ahmed, H. 759, Askari- 9, Zarrar Shaheed Road, Lahore Cantt. Email: driftikhar759@gmail.com

dacryocystorhinostomy^{11,12} is required when the child is > 10 years of age.

The timing of surgical intervention by probing for congenital NLD obstruction is tricky and has been a matter of great controversy. A common consensus on the time and method of the procedure has not yet been evolved^{2,13,14}. Some authors advocate early probing and syringing in an office setting, whereas others recommend that the procedure be performed under general anaesthesia when the child is at least one year old. In our set up the causes of failure of long term conservative treatment include poor parent's compliance, faulty technique of hydrostatic massage, poor socioeconomic status of the parents, poor hygiene and lack of education. The complications of the condition include dermatitis of the lower eyelid and cheek, repeated attacks of conjunctivitis, dacryocystitis, mucocele or pyocele and lacrimal fistula formation. Approximately 75% of the complications occur before the age of 1 year and 60% in the first 6 months¹⁵. So, before making decision about the timing of probing all these factors have to be taken in to consideration. The purpose of this study is to evaluate the results of probing without syringing in congenital nasolacrimal duct obstruction from the lower punctum under inhalational anaesthesia in 6-12 months old infants.

MATERIALS & METHODS

Forty four (44) eyes of thirty six (36) infants with symptoms of congenital nasolacrimal duct obstruction were selected from the out patient department for study. The age ranged from 6 – 12 months . All underwent probing of the nasaolacrimal passage without syringing from the lower punctum under inhalational anaesthesia by a single surgeon. The study was carried out at the department of ophthalmology Ch. Rehmat Ali Memorial Trust Hospital, Continental Medical College, Lahore from April 2008 to December 2011. All the data was collected on a preforma and the results were analyzed and entered by SPSS. The parents were informed about the study and an informed consent was taken. An approval from the ethical committee was taken prior to the start of the study.

The diagnosis of congenital nasolacrimal duct obstruction was based on history of epiphora with or without discharge since birth or during first few weeks of life with or without discharge, clinical signs of increased tear lake, conjunctivitis and positive regurgitation test. The diagnosis was further confirmed by fluorescein dye disappearance test (FDDT). A drop of 2% fluorescein instilled in to the eyes will normally disappear over 5 minutes if the duct is patent. Initial clinical examination was done to

rule out other causes of lacrimation in infants like facial malformations, epiblephron, congenital entropion, abnormal site of lower punctum, keratitis and congenital glaucoma. The criteria for selection of cases was strictly observed. Patients with history of previous probing and having any bony abnormality in the nose were not included in the study. Infants below the age of 6 months and above 1 year were also not included. In Infants presenting below the age six month, conservative treatment was prescribed and advised to report back at the age of 6 months.

Patients presenting with active infection showing mucopurulent or purulent discharge were given broad spectrum systemic and topical antibiotics to control the infection before doing the probing. All the patients were referred to ENT specialist to exclude any bony abnormality of the nose and with base line investigations to the anaesthetist for pre-anaesthesia assessment.

Written consent was taken from the parents. 10% phenylephrine eye drops were instilled in the conjunctival sac after every 5 minutes for 15 minutes. This blanches the mucosa in the lacrimal passage and thus decreases the chances of traumatic bleeding. The probing of the nasolacrimal passage was performed under planned inhalational anaesthesia from the lower punctum because in my experience it is easier and if done carefully in an immobilized patient does not harm the nasolacrimal passage. Syringing at the end of procedure appears unnecessary to me and was not done at the end of procedure.

Step 1: The lower punctum is dilated Fig. 3) with a Nattleship punctum dilator (Fig. 1).

Step2: A Bowman's probe (Fig.2) of 1 or 2 size is introduced first vertically and then horizontally till the hard stop at the medial wall of lacrimal sac is felt. The lower lid is kept stretched laterally to straighten the canaliculus when this step is done.(Fig.4a,b)

Step3. The probe is then directed downward, backward and medially in the direction of nasolacrimal duct gently and firmly till it gets engaged in the bony canal. At this stage one can feel the loss of resistance or at times a peculiar sound is heard on breaking the obstruction (Fig.5).

Step 4. After removing the probe, the passage is filled with a small quantity of viscoelastic substance to keep the passage patent.

The patients were sent home after a few hours with the advice to continue antibiotic eye drops and local massage for another 4 weeks. Post-operatively the patients were examined to access the clinical success on 1st post-operative day, 1st post-operative week and finally the 1st post operative month. All the patients who did not report for post-operative follow up were excluded from the study.



Fig.1 Nattleship punctum dilator



Fig.2 Bowman probe



Fig 3: Left eye- Lower punctum dilatation

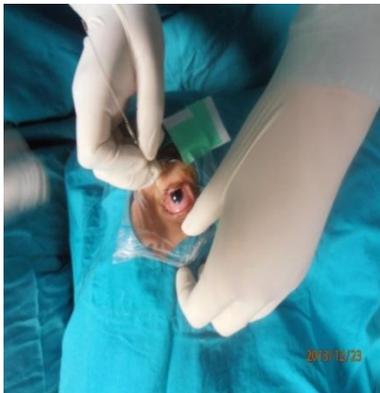


Fig 4a : Left eye- Probing step -1



Fig 4b: Left eye- Probing step-2



Fig 5: Left eye- Probing step- 3

RESULTS

A total of 44 eyes of 36 patients were included in the study. Out of 36 patients, 20(55%) were male while 16 (45%) were female, the male to female ratio being 1.25:1 (Table 1). 28(77.7%) patients had unilateral while 08(22.3%) patients had bilateral epiphora (Table 2). Among 36 patients, 26 belonged to age group 6–9 months and 10 patients were from age group 9–12 months (Table 3). Epiphora was the common presenting complaint. 37(84.09%) patients presented epiphora with mucoid or mucopurulent discharge and 7(15.90%) presented with discharge. FDDT was negative in all the patients and regurgitation test was positive in 39(88.63%) eyes (Table 4).

All the patients were followed up at 1st post op day, after 1st post op week and after 1st post op month. After 1st Probing, 34 eyes showed relief of epiphora while Probing was repeated in the rest of uncured eyes and after 2nd Probing 7 more eyes showed relief of epiphora. A third probing was done in rest of 3 eyes but these eyes still remained watery (Table 5).

It was interesting to note that all those eyes that were not cured after 1st Probing belonged to age

group 9 – 12 months. The complications that were encountered during and after the procedure included bleeding from the punctum in 4 eyes and lower lid bruising in 3 eyes.

So, out of 44 eyes, 41 eyes were free of epiphora after one month of follow up. The success rate of early probing in relieving the epiphora was calculated to be 100% in age group 6 – 9 months while it was 70% in age group 9–12 months. The overall success rate was calculated to be 93% while the overall complication rate was 20% (Table 6).

Table 1: Gender distribution (n=36)

| Gender | Incidence | %age |
|--------|-----------|------|
| Male | 20 | 55 |
| Female | 16 | 45 |

Table 2: Laterality of epiphora (n=36)

| Laterality | Incidence | %age |
|------------|-----------|------|
| Unilateral | 28 | 77.7 |
| Bilateral | 08 | 22.3 |

Table 3: Age group distribution (n=36)

| Age Group | Incidence | %age |
|--------------|-----------|------|
| 6 – 9 Months | 26 | 72 |
| 9 –12 Months | 10 | 28 |

Table 4: Clinical signs on presentation

| Clinical presentation | Signs at | No. of eyes | %age |
|----------------------------|----------|-------------|-------|
| Epiphora with discharge | | 37 | 84.09 |
| Epiphora without discharge | | 7 | 15.90 |
| Regurgitation test | | 39 | 88.63 |
| FDDT | | 44 | 100 |

Table 5: Success rate of early probing

| Success Rate | No. of cured eyes | %age |
|-------------------------------|-------------------|------|
| After 1 ST Probing | 34 out of 44 Eyes | 77 |
| After 2 ND Probing | 7 out of 10 Eyes | 70 |
| After 3 RD Probing | 0 out of 3 Eyes | 0 |

Table 6: Overall success rate

| | Inference | %age |
|-------------------|--------------|------|
| No. of eyes cured | 41 out of 44 | 93 |
| Uncured eyes | 3 out of 44 | 7 |

DISCUSSION

The nasolacrimal drainage apparatus begins to develop at 6 weeks of gestational age from the cord of epithelial cells that originates in the nasal–optic fissure (lacrima groove) and extend from the eyelids to the nose. The canalization of the cord starts at approximately 3.5 months of gestational age in the upper part of the cord and then proceeds downward. This process of canalization usually completes at the 8 months of foetal life^{16,17}. But there is commonly a

delay in this process which results in residual membrane tissue at the lower end of nasolacrimal duct (dacryoadenosis) underneath the inferior turbinate⁵. This persistent obstruction by the membrane of Hasner or unopened valve of Hasner occurs in 20-30% of all normal newborns¹⁸ and is the most common cause of epiphora. However, only up to 6% of newborn infants exhibit the clinical phenomenon of nasaolacrimal duct obstruction³. Severe obstructions are usually associated with systemic abnormalities in 25% of cases⁵. There is no sex predilection or genetic predisposition and more commonly unilateral than bilateral¹⁹. We studied 44 eyes of 36 infants, 20(55%) infants were male and 16(45%) female. 28 (77.7%) were unilateral and 8 (22.3%) bilateral. These figures are comparable to Nazullah et al²⁰ who reported 62% male, 35.8% female, 76.5% unilateral and 23.5% bilateral. Halipota et al²¹ observed 65% of the cases were male 35% female, 71% unilateral and 29% bilateral. Also the incidence was high (72%) in infants of 6-9 months of age.

Epiphora which develops soon after or a few weeks after birth with or without mucoid or mucopurulent discharge is the most common presenting complaint. Other features include sticky eyes, crusting of the eyelids, chapped skin in the periorcular region and cheeks, increased tear lake, recurrent attacks of dacryconjunctivitis and a boggy swelling over the inner canthal region from which pus may be expressed out on slight pressure. The diagnosis is straight forward and based on history, clinical presentation, positive regurgitation and negative fluorescein dye disappearance (FDDT) test²² but other causes of epiphora in infants have also to be excluded. In our study, epiphora with discharge was presented in 37(84.09%) eyes and in 7(15.9%) eyes there was no history of discharge. Regurgitation test was positive in 39(88.63%) eyes and FDDT was negative in all (100%) the infants.

The rate of spontaneous resolution with or without conservative treatment by local hydrostatic massage and topical antibiotic drops during the first few months of life is fortunately very high^{7,8}. The cases with persistent symptoms require probing. Probing of the nasolacrimal passage is the standard treatment for those cases that do not show improvement with conservative treatment, although the optimal timing and setting of the first treatment is the subject of debate. There are two major schools of thought concerning this controversy. The “early probing” school^{23,24} of thought favours early probing because failure rates of the procedure although varying widely decrease with increasing age. In our study all the successful cases (93%) were 6-9 months old and all the unsuccessful (7%) cases were

9-12 months of age. Early surgical intervention by probing also provides instant relief and avoids months of morbidity due to epiphora and recurrent infections²⁴. The early probing success rate in our study was 93% while the failure rate was only 7%. These figures are comparable with a study carried out by Stager et al²⁵ who reported 94% success rate. The most common concern against the early probing has been the risk of general anaesthesia. In our study, probing in all 36 infants was done uneventfully under inhalational anaesthesia and thus avoiding any risk factor associated with general anaesthesia^{24,26}. The "late probing" school of thought recommend waiting until the patient is at least 1 year old as maximum time is given to the spontaneous resolution to take place²⁷. But the postponement of the procedure may result in decreased success rate due to chronic inflammation and secondary fibrosis.

The technique of probing in infant's nasolacrimal system must be gentle because of the delicate punctum and canaliculus. As this is a blind procedure, good knowledge of the anatomy of the nasolacrimal system is necessary. Probing is done under general anaesthesia with a Bowman's 00 (0.9mm) or 0(1.0mm) lacrimal probe after dilating the punctum with a Nattleship punctum dilator. The probing is a blind procedure and bleeding is sometimes observed during procedure which usually indicates formation of false passage²⁸. The punctum and lacrimal canaliculus may be torn, bruising of the skin may occur and injury to the duct epithelium may cause a cicatricial stricture^{5,16}. In this study we experienced bleeding in 4 and bruising in 3 cases.

CONCLUSION

Early probing without syringing between the ages of 6-12 months is advantageous as results are very satisfactory. It is cost effective, less apprehensive to the parents, provides instant relief, decreases the incidence of complications and thus avoids months of morbidity. It is easier to perform the procedure by the lower punctum with fewer or no complications.

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