Original Article

Nasolacrimal duct obstruction in children: outcome of primary intubation

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Abstract

Objective: To evaluate the outcome of nasolacrimal intubation as a primary treatment of congenital nasolacrimal duct obstruction (NLDO) in children upto 4 years of age.

Methods: During the 3 years period from July 2008 to June 2011, in the Paediatric Ophthalmology Department. Alshifa Trust Eye Hospital, Rawalpindi, 65 eyes of 59 children, aged 12 to 48 months with congenital NLDO and no prior Nasolacrimal duct surgery were enrolled. After written informed consent, all nasolacrimal intubations using olive tip silicon tube were performed under general anaesthesia. The planned tube retention was at least 3 months. The study outcome visit was timed 1 month after tube removal and treatment success was analyzed. Intra operative and post operative complications were also noted. Data were analyzed by SPSS 16. Frequencies and percentages were calculated for categorical variables. Mean ± SD were computed for age and duration of intubation. Chi-square test was used to compare proportion of outcomes in different age groups and duration.

Results: The overall success rate of Nasolacrimal intubation as a primary treatment of congenital NLDO was 89% in children between 12 to 48 months age (mean25.8± 9.8months).The success was 92% in children under 2 years of age (P <0.0001) and 90% in children between 2-3 years of age (P <0.0001).The procedure remained less successful in children between 3-4 years of age(P <0.2860) as compared to children under 3 years of age. The success rate was consistently high (92.3%) when the tube was left in situ for more than 3-6 months (P <0.0001).

Conclusion: Nasolacrimal intubation with Olive tip silicon intubation tube is a successful procedure as a primary treatment of Nasolacrimal duct obstruction in children under 4 years of age.

Keywords: Naso lacrimal duct, Congenital Nasolacrimal duct obstruction, Primary intubation. (JPMA 62: 1329; 2012)

Introduction

Congenital Nasolacrimal Duct Obstruction (NLDO) is prevalent in approximately 6% of new borns.[1,2] In as many as 90%, the membrane that obstructs Hasner's valve at the end of the nasolacrimal duct dissolves spontaneously in the first 6 months with conservative treatment alone.[3] Conservative treatment includes lacrimal sac compression and massage, lid hygiene and topical antibiotics.[4,5] Several studies[1,6-8] have found probing to be successful in 70% to 97% of children whose obstruction did not resolve spontaneously. Nasolacrimal intubation has been popular since its introduction in the late 1960s for the treatment of persistent NLDO after failed probing.[9-13] This procedure involves probing of the nasolacrimal duct followed by placement of a silicon tube stent in one or both canaliculi. Intubation has also been used for primary treatment of NLDO in older children or in those having the procedure under general anaesthesia or when the duct feels tight during probing.[10,14,15] Increasing experience with the technique and the introduction of intubation have led to the use of intubation as a primary procedure for NLDO in younger children.[16,17] Success rate from 79% to 96% have been reported for intubation as a primary procedure in several case series.[15-18]

We observed the out come of Nasolacrimal intubation as a primary treatment of NLDO in children upto 4 years of age with planned tube retention for 3-6 months.

Patients and Method

During the 3 years period from July 2008 to June 2011, 59 patients (65 eyes) were enrolled in Paediatric Ophthalmology Department of Alshifa trust Eye Hospital, Rawalpindi. It was a convenience sampling interventional study. The eligibility criteria included children aged 12 to 48 months with NLDO, onset of NLDO symptoms prior to 6 months of age, presence of epiphora, increase tear film, and/or mucopurulent discharge in the absence of an upper respiratory infection. Children with previous surgical history of probing or intubation, obvious mid facial structural abnormalities or with Down's syndrome were not included in this study. The approval was obtained from ethical review committee of Alshifa trust eye hospital.

After written informed consent from parents, all nasolacrimal intubations were performed under general anaesthesia. Following induction of anaesthesia, the upper and lower puncti were dilated and the lacrimal system probed using '0' or '00' gauge bowman probe. Following successful probing, silicon intubation tube with 'olive tip' (Eagle lab.USA) was introduced through each punctum and retrieved from the nose using an intubation hook. Tubes were then tied together.

Antibiotic drops were prescribed for 1 week post operatively or longer if needed and patients were followed up 1month, 3months and 6months after intubation.

In our study, duration of tube retention was an open ended parameter. Common practice was to remove the tube 3-6 months after intubation but in cases with persistent symptoms of NLDO,we retained the tube for a longer period. Tube was removed in the clinic under sedation by cutting the tube at medial canthus and pulling it out of the upper punctum. The study outcome visit was timed 1 month after the date of tube removal and clinical examination was performed for the presence or absence of the three clinical signs of NLDO (epiphora, increase tear film or mucous discharge). Based on this examination, treatment success for the analysis was the absence of all three signs. Patients who had one or more signs at the outcome examination or required additional nasolacrimal duct surgery prior to the outcome examination were classified as treatment failure. Intra operative and post operative complications were also noted.

Data were analyzed by SPSS 16. Frequencies and percentages were calculated for categorical variables like gender and treatment success. Mean ± SD were computed for age and duration of intubation. Chi-square test was used to compare proportion of outcomes in different age groups and duration.

Results

Nasolacrimal duct intubation was performed as a primary treatment for NLDO in 65 eyes of 59 patients. Age

Table-1: Baseline patient demographic characteristics (n=59) (65 eyes).

	Frequency	Percent
Gender		
Male: Female = 1.8: 1		
Male	38	64.4
Female	21	35.6
Age		
Mean	25.8 ±9.8 months	
Min - Max	12 - 48 months	
12 - 24	33(38)	56
25 - 36	20(20)	34
37-48	6(7)	10
Laterality		
Right	30	50.8
Left	23	39
Bilateral	6	10.2
Duration of tube retention		
Mean	6.9 ±3.4 months	
Min - Max	1 - 18 months	
< 3	6(6)	10.2
3 - 6	26(26)	44
7 - 12	23(28)	39
> 12	4(5)	6.8

Table-2: Success rate of Nasolacrimal intubation by age group.

Age group	Eyes intubated n=65	Successful intubation n=58 (%)	P-values
12-24 months	38	35(92%)	< 0.0001
25-36 months	20	18(90%)	< 0.0001
37-48 months	7	05(71.4%)	0.2860

Table-3: Success rate of Nasolacrimal Intubation versus duration of Intubation.

Duration of tube retention	Eyes intubated n=65	Successful intubation n=58 (%)	P-values
<3 months	6	5(83.3%)	0.0837
3-6 months	26	24(92.3%)	< 0.0001
7-12 months	28	25(89%)	< 0.0001
>12 months	5	4(80%)	0.3

of the patient at the time of surgery ranged from 12 to 48 months with a mean of 25.8±9.8 months. Baseline Characteristics are shown in Table-1.

Treatment was classified as successful when all three clinical signs of NLDO such as epiphora, mucous discharge and increase tear lake were absent and no additional surgery was required. These conditions were met at the outcome visit in 58 eyes (89.2%). Seven eyes (10.8%) had treatment failure due to presence of one or more clinical signs of NLDO.

For most eyes, surgery was performed when the child was between 12 to 36 months of age (Table-2). The success rate for silicon intubation was 92% in children under 2 years of age (P <0.0001) and 90% in children between 2-3 years of age (P <0.0001).The procedure was less successful (71%) in children between 3-4 years of age. (P <0.2860).

The time for which the tubes remained in place varied from 1 month to 18 months (mean 6.9±3.4 months). By 12 months after intubation, 90% of the tubes had been removed. In 6 (9.2%) of the 65 eyes, children pulled out the tube and presented with lateral displacement of the tube from puncti. In these children tube was removed prior to the planned minimum retention time of 3 months. Complete resolution of symptoms occurred in 5 eyes (83.3%).

In current study the success rate was 83% for tubes left in situ for less than 3 months, improved to 92.3% when tube was left in situ for 3-6 months (P <0.0001) and 89%for 7-12 months (P <0.0001). Details are shown in Table-3.

The intra operative complications of the lacrimal intubation included bleeding from nasal mucosa in 3 eyes (4.6%) and difficult retrieval of the tube from the nose due to slipping off of tube from its metal probe in 2 eyes (3%). The most common post operative complication was lateral displacement of the tube seen in 10 eyes (15.4%).

Discussion

Management of the child with persistent symptoms despite successful nasolacrimal probing is difficult. Some consider DCR in childhood to be less successful than in adult life,[19] and therefore a less invasive procedure which is successful in the majority of these cases would be advantageous. Silicon intubation has been recommended as the primary procedure in patients who are older than 18-24 months because of the reduced success rate of probing with age[20] and to avoid a potential second operation under general anaesthesia.

This study shows a prospective evaluation of primary surgical treatment of congenital NLDO in children 12 to 48 months of age and found the success rate of nasolacrimal intubation to be 89%.Our success rate compares favourably with the study conducted by Michael et al[18] for intubation as a primary treatment for congenital NLDO. They reported a study on 182 eyes (age range 6-45months) and found an overall success rate of 91%.Another study conducted by Yazici et al,[21] on 50 eyes treated with bicanalicular intubation (26 eyes as primary treatment) had an overall success rate of 86%. Engel and colleagues[17] reported a retrospective case series of 635 patients (6-104 months) with monocanalicular intubation as primary treatment of congenital NLDO, in whom they found an over all success rate of as high as 96%.

In our study we observed that the success rate of nasolacrimal intubation decreased with increasing age at the time of surgery. The success rate for silicon intubation was 92% in children under 2 years of age (P <0.0001) and 90% in children between 2-3 years of age (P <0.0001) which reduced to 71% in children between 3-4years of age. (P <0.2860). These results are consistent with some previously reported studies[15,17,22] in which they described lower success rates with increased age at the time of treatment. Lim and coworkers[15] reported the success rate of intubation 83%-100% in children between 1 and 4 years of age and 71%-75% in children older than 4 years. Engel and colleagues[17] reported 97% success rate for treatment performed in infants younger than 24 months of age, declining to 90% in children older than 24 months. Welsh and Katowitz[21] found reduction in success rate from 100% in 6-13 months age group to 79.6% in the over 24 month age group.

Tube removal before 3 months was performed in 6 eyes, but 5 eyes out of them showed resolution of symptoms. The treatment success was 83%. Engel and colleagues[17] found no impact on the success from premature loss of tube in their large series of primary intubation. Migliori and Putterman[23] found that retention for only 6 weeks was sufficient for a satisfactory outcome. Paterson et al[24] observed that premature tube displacement and removal

prior to day 31 does not increase the risk of persistent epiphora or reoperation in children younger than 24 months but children older then 24 months have poorer outcome. Mean age of our patients with premature tube removal was 28.5 months (range 19-36months).

In the current study, symptoms of NLDO resolved in 26 eyes 3-6 months after intubation and tube was removed while 23 eyes had persistent symptoms and tube was retained for a longer period. We observed that, leaving the tube in place for 3-6 months was associated with a higher success rate of 92%. The success rate was 89% when tube was left in situ for 7-12months (P <0.0001) and then reduced to 80% in patients more than 12 months of tube retention. Welsh and Katowitz[21] in their study suggested a greater likelihood of a good outcome, if the silicon tube were left in situ for 6 months or more. Lim and coworkers[15] also suggested that tubing should be left in place for a maximum of 12 months because the success rate declines after this period and the risk of failure significantly increases after 18 months of intubation.

Conclusion

Nasolacrimal intubation with olive tip silicon intubation tube is a safe and successful procedure as the primary treatment of nasolacrimal duct obstruction in children under 4 years of age.

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