

# Comparison between Early and Late Nasolacrimal Stents for Congenital Nasolacrimal Obstruction

Muhammad Moin, Asif Mahmood Khokhar, Jamshaid Hameed

*Pak J Ophthalmol 2016, Vol. 32, No. 3*

See end of article for authors affiliations

Correspondence to:  
Dr. Asif Mahmood Khokhar  
Postgraduate Trainee  
Lahore General Hospital,  
Lahore.  
E-mail:  
drasifkhokhar@gmail.com

**Purpose:** To compare the success of silicone tube stents for treatment of congenital nasolacrimal obstruction in children between the age of 1 – 3 years and 3 – 5 years.

**Study Design:** Quasi experimental study.

**Place and Duration of Study:** Mayo Hospital and Lahore General Hospital from 2007 to 2016.

**Material and Methods:** It is a retrospective review of 98 children with epiphora due to congenital nasolacrimal obstruction. All patients less than 5 years with failed probing were included in the study. Patients with traumatic nasolacrimal duct obstruction were excluded from the study. Patients were divided into 2 groups. In group 1 children between 1–3 years and In group 2 children between 3–5 years were included. Patients were seen at follow up at 1 week, 4 weeks and one year at the time of tube removal. Success was defined as resolution of epiphora completely or patients having mild epiphora.

**Results:** Group 1 included 46 patients and group 2 included 52 patients. The success rate in group I (with younger children) was 91% while in group II (with older children) the success rate was 82%. Complications included cheese writing in 3 patients and mild nasal bleeding in 18 patients.

**Conclusion:** Our study shows that nasolacrimal stent intubation is better option in children with persistent epiphora after failed probing between 1 – 3 years.

**Keywords:** Epiphora, nasolacrimal stent, congenital nasolacrimal obstruction, silastic nasolacrimal intubation.

The most common cause of epiphora in children is congenital nasolacrimal obstruction. It occurs in approximately 5% of newborns<sup>1</sup>. The most common cause of obstruction in congenital cases is imperforate membrane at the valve of Hasner.

In 90% of the cases the obstruction resolves spontaneously with massage within first year of life<sup>2</sup>. In case of non-resolution of epiphora probing is performed between 1-2 years. Nasolacrimal stents and balloon dacryoplasty are the two most commonly used modalities in cases of failed probing. These techniques are minimally invasive and help in opening the natural tear passage of the patient without any

external incision. As the child gets older the success rate of nasolacrimal stents decreases and dacryocystorhinostomy is the procedure of choice after 5 years.

The rationale of our study was to compare the success rates of nasolacrimal stents for the treatment of congenital nasolacrimal duct obstruction in children between the age of 1 and 5 years in case of failed probing by dividing them into two groups.

## MATERIALS AND METHODS

It was a quasi experimental study of 98 children with

epiphora due to congenital nasolacrimal obstruction. We divided them into 2 groups. In group 1 the children were between 1-3 years and in group 2 the children were between 3-5 years. The patients presented in Mayo hospital and Lahore General Hospital between 2007 to 2016. All children less than 5 years of age having failed probing for congenital lacrimal duct obstruction were included in the study. Patients with traumatic nasolacrimal duct obstruction were excluded from the study. Duration of symptoms and time of previous probing was recorded. Epiphora was graded as mild (increased tear lake and occasional watering), moderate (Continuous watering) and severe (continuous watering with regurgitation positive). They were operated by a single ophthalmologist. Bicanalicular nasolacrimal stents were placed and their ends secured in the nose with small piece of silicone tyre. Patients were seen at follow up at 1 week, 4 weeks and one year at the time of tube removal. Success was defined as resolution of epiphora completely or patients having mild epiphora.

## RESULTS

There were 46 patients in group 1 and 52 patients in group 2. The success rate in group 1 was 83% while in group 2 success rate was 64%. The male to female ratio was 3:1 between the two groups. Complications included cheese wiring in 3 patients and mild nasal bleeding in 18 patients. Results are shown in table 1 and 2.

## DISCUSSION

In most cases of nasolacrimal obstruction, spontaneous resolution occurs during the first year of life. During this period observation and conservative therapy (massage and topical antibiotics) is recommended. Zia et al<sup>2</sup> studied that spontaneous resolution of nasolacrimal duct obstruction occurs in most cases with conservative treatment and massage. In another study Nasir et al<sup>3</sup> showed that spontaneous resolution of nasolacrimal duct obstruction occurs in most infants. They also showed that in majority of cases not

**Table 1:** Demographic data and outcome.

		Group 1(Total 54)	Group 2 (Total 44)	P value
Gender	Male	35 (65%)	30 (68%)	
	Female	19	14	
Laterality	Unilateral	44 (81%)	34 (77%)	
	Bilateral	10	10	
Primary Success	Successful	45 (83%)	28 (64.0%)	0.0280
	Failed	9	16	

**Table2. Age Outcome Cross tabulation**

		Outcome		Total
		Failed	Successful	
Age	12 - 18 months	2	20	22
	19 - 24 months	3	4	7
	25 - 30 months	1	1	2
	31 - 36 months	3	20	23
	37 - 42 months	2	7	9
	43 - 48 months	4	12	16
	55 - 60 months	10	9	19
Total		25	73	98

resolving spontaneously, probing and irrigation is successful. After 12 months of age probing is successful in 70% to 97% of cases<sup>4,5</sup>. Kashkouli et al<sup>6</sup> proved that even in older children probing should be adopted as the primary procedure. It is successful even in older children with complex blockage of the nasolacrimal duct. The study conducted by Mirza et al<sup>7</sup> and Eshragi et al<sup>8</sup> have shown that even in significant number of adults probing can be considered as an initial treatment.

When probing fails and epiphora persists different options have been recommended. Traditionally DCR (with or without intubation) is not recommended under the age of 5 years. The rationale is incomplete development of nasal bones at this age. Another useful technique is dilation of the nasolacrimal duct with a balloon catheter which is quite expensive<sup>9</sup>. Due to these reasons nasolacrimal stent intubation has been adopted as the procedure of choice. In this procedure a specially designed silicone tube is placed in the lacrimal drainage system. A loop of tube passes through the two puncti followed by passage of the long ends through canaliculi, lacrimal sac and nasolacrimal duct with creation of no new passage. The obstruction in the passage is broken with the help of guiding steel wires. Winn et al<sup>10</sup> and some others<sup>10</sup> have adopted this procedure as first choice even before probing. Most of the studies recommend probing as first choice and if probing fails then closed intubation as a second procedure<sup>11, 12, 13, 14</sup>. Various types of tubes for intubation have been used including Crawford<sup>15</sup> and Retleng<sup>16</sup>. In our study simple bicanalicular stents were used. Saeed et al<sup>17</sup> has reported closed intubation with silicone tube as an effective treatment modality for children of age between 1 to 5 years with a follow up of 1 year. Rehman et al<sup>18</sup> operated on 200 children and reported closed intubation with silicone tube as an effective treatment modality for children between 1 to 4 years of age. Our study included 83 children with epiphora due to congenital nasolacrimal obstruction between ages 1 to 5 years. Our success rate compares favourably with the study conducted by Migliori et al<sup>19</sup> for intubation who reported success rate of 91% with intubation as primary procedure. Yazici et al<sup>16</sup> have also reported a success rate of 86%. Engel and colleagues have reported a success rate of 96%<sup>20</sup>.

In our study the silicone tube was removed after 12 months. However, there is little agreement in the ophthalmic literature on the optimum length of time for removal of silicone tubes after closed intubation.

Memon et al<sup>11</sup> removed tube before 3 months in 6 eyes with resolution of symptoms in 5 eyes. They recommended at least 6 months for retention of tube. Engel et al<sup>20</sup> reported that there is no impact on the success from premature loss of tube in their large series of cases who underwent primary intubation. Migliori et al<sup>19</sup> recommend that only 6 weeks are sufficient for retention of tube for a satisfactory outcome. Another study reported that in children younger than 24 months early removal was not significant but in children older than 24 months early removal resulted with poor outcome<sup>21</sup>.

Pediatric Eye Disease Investigator Group<sup>9</sup> evaluated nasolacrimal intubation after dilation with a balloon catheter in cases with failed probing. Their success rate was 74% in balloon dilation group compared to 84% in simple intubation with balloon dilation. Dortzbach et al<sup>14</sup> reported that silicone intubation should be procedure of choice for congenital or acquired nasolacrimal duct obstructions in children after failure of medical therapy and nasolacrimal duct probings. This has been shown in different studies from Pakistan<sup>22, 23</sup>.

## CONCLUSION

Our study shows that nasolacrimal stent intubation is better option in children with persistent epiphora after probing. Nasolacrimal stents should be procedure of choice for congenital nasolacrimal duct obstructions in children after failure nasolacrimal duct probing. Early stents are more favourable as very few cases (9%) need to repeat the procedure.

## Authors Affiliation

Prof. Muhammad Moin  
MBBS, FRCS, FRCOphth  
Postgraduate Medical Institute, Lahore  
Lahore General Hospital

Dr. Asif Mahmood Khokhar  
MBBS, MCPS  
Lahore General Hospital, Lahore

Dr. Jamshaid Hameed  
MBBS  
Lahore General Hospital, Lahore

## Role of Authors

Prof. Muhammad Moin  
Study Design, Data Collection, Review.

Dr. Asif Mahmood Khokhar  
Manuscript Writing.

Dr. Jamshaid Hameed  
Data Analysis.

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