Effectiveness of non-surgical management of Congenital Nasolacrimal Duct Obstruction

by Jana Publication & Research

Submission date: 29-Jan-2025 08:58PM (UTC-0800)
Submission ID: 2565131764
File name: IJAR-50074.docx (144.13K)
Word count: 2801
Character count: 15627

Effectiveness of non-surgical management of Congenital Nasolacrimal Duct Obstruction.

Abstract:

Background: Congenital nasolacrimal duct obstruction is the common disorder leading to epiphora and is usually due to the failure of canalization of nasolacrimal duct. Canalization of the nasolacrimal duct usually occurs by six months of intrauterine life. Common causes of nasolacrimal duct obstruction are absence or atresia of canaliculi and puncta, congenital atresia of duct, presence of membrane at the valve of Hasner, absence of valves, lacrimal sac mucocele, clogging, craniofacial abnormalities etc.

Methods: 100 babies (108 eyes) below 2 years of age diagnosed as congenital nasolacrimal duct obstruction were included in the study. Hydrostatic sac massage was performed weekly by the clinician and proper technique was explained to the parents for massaging at home. All babies were followed weekly for 6 months. Successful hydrostatic sac massage was documented when complete resolution of symptoms occurred.

Results: The most common sign of congenital nasolacrimal duct obstruction was mucopurulent discharge (62.96%) followed by epiphora (31.48%), mucocele (3.70%) and lacrimal abscess (1.85%). The overall effectiveness of hydrostatic sac massage in babies below 2 years of age was 80.55% and it was most effective in 6-12 months age group (88.23%). The success rate decreases with increasing age.

Conclusion: Hydrostatic sac massage of the nasolacrimal duct is a safe and viable option as a primary treatment modality for congenital nasolacrimal duct obstruction in babies below 2 years of age. Results of the study may encourage us to proceed for early non-surgical intervention of CNLDO by hydrostatic nasolacrimal sac massage rather than waiting for spontaneous resolution.

Keywords: Congenital Nasolacrimal Duct Obstruction; Epiphora; Hydrostatic sac massage.

Correspondence to: Dr (Major) Santosh Verma

Tel: +91-7887425951.

e-mail: drsantoshvermaballia@gmail.com

Full postal address: Department of Ophthalmology, Heritage Institute of Medical Sciences, Varanasi. U.P.

INTRODUCTION:

Epiphora is abnormal overflow of tears due to excessive secretion of tears or obstruction in lacrimal drainage passage[1]. Congenital nasolacrimal duct obstruction (CNLDO) is the most common cause of epiphora and is usually due to failure of its distal end canalization[2, 3]. Canalization of the nasolacrimal duct (NLD) usually occurs at the end of six months of intrauterine life, but it may be delayed for many weeks or months even after birth[2, 3]. Various other factors as abnormalities within the nasal passage, complete osseous obstruction etc may also result in obstruction of the nasolacrimal duct[4]. CNLDO is a common disorder that affects about 20% of all newborns. It is observed that about 30% of full term infants have nasolacrimal duct obstruction at birth, out of which only 2 to 4% present with symptoms[5]. The majority of cases (96%) usually resolves and become asymptomatic by the age of 1 year[5, 6]. Few cases of nasolacrimal duct obstruction (NLDO) may present delayed due to failure of early recognition as tears are normally produced a few weeks after birth[7]. Various causes of CNLDO are atresia or absence of canaliculi and puncta, mucocele of lacrimal sac, atonic lacrimal sac, presence of membrane at the valve of Hasner, malformed valves, congenital atresia of NLD, cloggin, craniofacial disorders etc[6, 7]. Many controversies are there in view of the natural course and management of CNLDO, in general, spontaneous resolution is expected[4]. Crigler had described a technique of applying pressure in a specific manner over the nasolacrimal sac area followed by topical antibiotics if active infection is present[8]. Various studies had reported success rate of CNLDO resolution without surgery from 32% to 95% by 13 months of age[8, 9]. It is further reported that about 90% of the infants respond to nasolacrimal duct massage in first year of life and 60% respond in their second year of life[9, 10, 11]. The purpose of the present study was to evaluate the effectiveness of Hydrostatic Lacrimal Sac Massage in CNLDO in various age groups below 2 years of age.

MATERIAL AND METHODS:

This prospective interventional study was conducted in a tertiary care rural hospital in Central India from Jan 2017 to April 2019. 100 babies (108 eyes) below 2 years of age diagnosed as CNLDO were included after taking informed written consent from the parents and approval from the institutional ethical committee. The babies were divided into 4 age strata as Group 1: infants below 6 months of age, Group 2: infants between 6 to 12 months, Group 3: toddlers between 12 to 18 months of age and group 4: older toddlers between 18 to 24 months.

Inclusion Criteria:

1. Babies below 2 years of age diagnosed as CNLDO (unilateral/bilateral).
2. Babies below 2 years of age with previous diagnosis of CNLDO and failed conservative treatment.
3. Babies below 2 years of age with congenital dacryocele that did not resolve within a few weeks.
4. Babies below 2 years of age with copious mucopurulent discharge.

Exclusion Criteria:

1. Infants with acute dacryocystitis.
2. Any secondary cause of watering eye as blepharitis, congenital glaucoma , conjunctivitis.
3. Ocular abnormalities as punctal stenosis, agenesis, ectopic puncta, congenital ectropion.
4. Any congenital craniofacial anomalies as Goldenhar's syndrome, Crouzon's syndrome or Treacher-Collins syndrome.
5. Any nasal disorder or history of nasal or sinus surgery or exposure of radiation to the nasal area.

The diagnosis of CNLDO is based on the history of watering or discharge from unilateral or bilateral eye within the first few weeks after birth. Other symptoms such as crusting, mucopurulent discharge, stickiness of lids and redness may be associated. Parents may give history of stickiness of lashes in morning or after the child takes a nap. The tear meniscus may be high in the eye with CNLDO[12].

The diagnosis of CNLDO was confirmed by gently pressing over the nasolacrimal sac area and observing reflux of fluid from punctum[13]. In doubtful cases, the dye disappearance test[13] was done. After instilling a topical anesthetic, a drop of 2% fluorescein dye was placed in the inferior fornix and tear film was observed with cobalt blue light of slit lamp bio-microscope or direct ophthalmoscope in uncooperative babies. Delay in clearance of the dye after 5 minutes indicated outflow obstruction of lacrimal appratus[14, 15].

Other causes of watering eye as congenital glaucoma, lid abnormalities like ectropion, entropion and epiblepharon, lash abnormalities like trichiasis and distichiasis, corneal surface abnormalities and conjunctivitis or keratitis[16] were carefully ruled out. Watering eye with history of photophobia is indicative of possible congenital glaucoma or ocular

surface disease. Puncta were inspected to rule out stenosis. Corneal transparency was evaluated and corneal diameter was measured to rule out buphthalmos.

All the babies with CNLDO included in the study, received conservative non-surgical management of CNLDO as proper Hydrostatic Nasolacrimal Sac Massage weekly by a clinician. In addition, parents were instructed to perform hydrostatic nasolacrimal sac massage 4 times per day (each time 10 strokes of massage) at home along with instillation of topical antibiotic drops whenever a mucopurulent discharge was present. This conservative medical management was continued for 6 months in all the babies and discontinued only if there was complete resolution of symptom (epiphora).

Proper technique of Hydrostatic Lacrimal Sac Massage[8, 9]:

Lacrimal sac massage was first described by Crigler. After trimming nails and washing hands, upper and lower puncta were blocked with thumb and index finger of one hand then with index finger of other hand sac massage was given firmly in such a manner that fluid collected into the sac did not escape through puncta and was forced downward along the direction of NLD so that pressure created by the flow of fluid could open the blocked NLD by rupturing any obstruction due to membrane formation or clogging **(Photo 1)**. Following this procedure, topical antibiotic drops were instilled. Parents were advised to bring their babies for follow up every week for 6 months. Successful hydrostatic sac massage was documented on complete resolution of watering and discharge together with no reflux from puncta on lacrimal sac pressure.

Photo 1: Technique of effective lacrimal sac massage (Upper and lower punctum blocked and downward massage with index finger).

RESULTS:

Age-wise distribution: A total of 100 babies (108 eyes), including 37 male babies and 63 female babies **(Figure 1)** were included into the study. These included 38 infants below 6 months of age, 32 infants between 6-12 months, 22 toddlers between 12-18 months and 8 older toddlers between 18-24 months of age **(Table 1).**

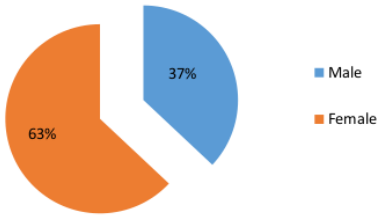

Figure 1: Gender-wise distribution of babies.

Table 1: Age wise distribution of babies and eyes.

Group	Age	No. of babies	No. of eyes
1	Below 6 months	38(38%)	44(40.74%)
2	6-12 months	32(32%)	34(31.48%)
3	12-18 months	22(22%)	22(20.37%)
4	18-24months	8(8%)	8(7.41%)
		100(100%)	108(100%)

Maturity at birth and mode of delivery wise distribution: A pre-term birth is one that occurs before the start of the 37th week of pregnancy[17]. Out of total 100 babies, 14 were delivered pre-term and 86 were delivered at full term of pregnancy. Out of total 100 babies, 48 were delivered by LSCS and 52 were delivered by NVD **(Table 2).**

Table 2: Maturity at birth and mode of delivery wise distribution.

Term	Mode of delivery	No. of babies (%)	Total
Pre-term	LSCS	12	14
	NVD	02	
Full-term	LSCS	36	86
	NVD	50	
Total		100	100

Onset of symptoms wise distribution: Onset of the symptoms was before 4 weeks of age in 18 babies and after 4 weeks of age in 82 other babies, out of 100 babies.

Laterality wise distribution: Unilateral obstruction was present in 92 babies, whereas bilateral obstruction was present in 8 other babies, to sum up total 108 eyes.

Signs of CNLDO: The most common sign was mucopurulent discharge in 62.96% (68 eyes). The next common signs were epiphora in 31.48% (34 eyes), mucocele in 3.70% (4 eyes) and lacrimal abscess in 1.85% (02 eyes). There was regurgitation of mucopurulent or watery fluid on pressure over the lacrimal sac in 102 babies, 4 babies had mucocele and 02 babies had lacrimal abscess with no regurgitation (**Figure 2).**

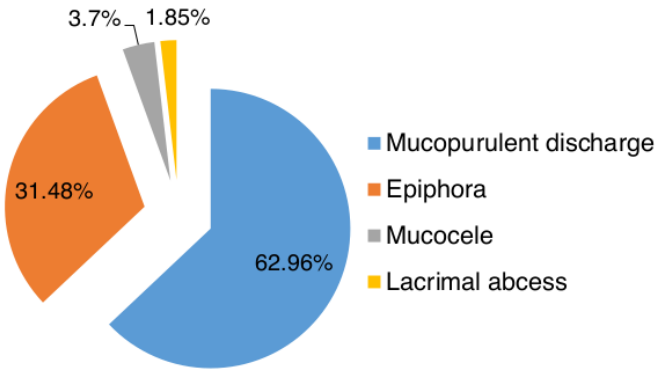

Figure 2: Signs of CNLDO

Effectiveness of non-surgical management in CNLDO: Effectiveness of non-surgical management (Hydrostatic nasolacrimal sac massage) in CNLDO among babies below 6 months of age was 81.82% (36 eyes), in 6-12 months age group it was 88.23% (30 eyes), in 12-18 months age group it was 72.73% (16 eyes) and in 18-24 months age group it was 62.50% (5 eyes) **(Figure 3).**

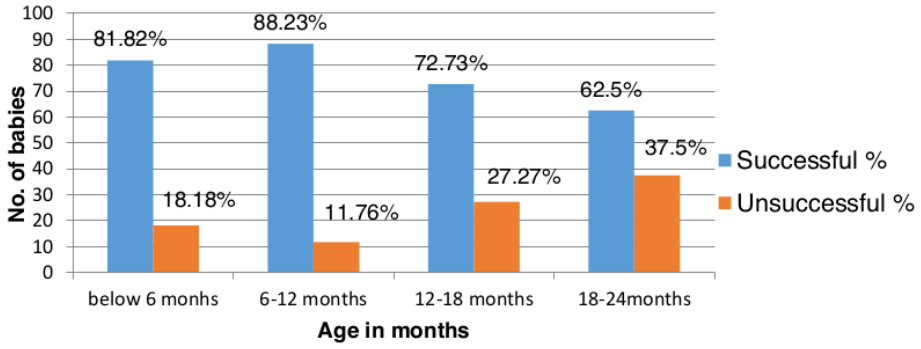

Figure 3: Effectiveness of non-surgical management in CNLDO:

The overall effectiveness of hydrostatic sac massage in babies below 2 years of age was 80.55% (87 eyes) **(Figure 4)**. ($p<0.05$, Chi square test). $p = 0.007$ for comparison of success rate among the age groups.

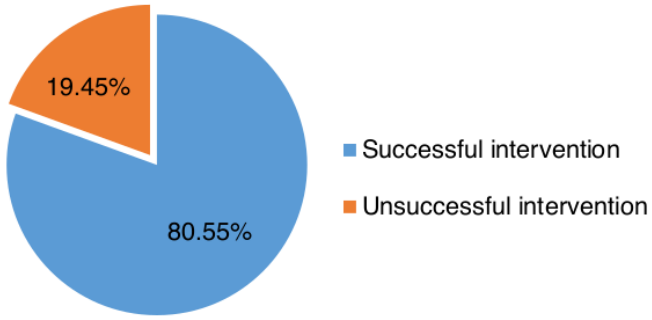

Figure 4: Overall Effectiveness of non-surgical management in CNLDO:

DISCUSSION:

The present study was to assess the effectiveness of non-surgical management (Hydrostatic Lacrimal Sac Massage) in infants with congenital nasolacrimal duct obstruction below 2 years of age. It was found that hydrostatic lacrimal sac massage and use of topical antibiotics was the most effective in the age group of 6-12 months. 30 eyes (88.23%) were reported by parents to be asymptomatic at 6 months of this conservative management. Various studies[19-23] in the literature reported similar rates of NLDO resolution with non-surgical management. In a prospective study of infants upto 6 months of age, Paul[16] reported that 70% of eyes (26 of 37) resolved with conservative treatment by 12 months of age. Findings of the present study 88.23% (95% CI), obtained from comparatively larger sample size, is in consistent with this finding.

Baseline characteristics such as age, sex, laterality, age at onset of symptoms, specific signs of NLDO, history of prior treatment etc were found not associated with resolution of NLDO without surgery. About 12% eyes in which non-surgical management was not successful were re-assessed after 6 months and planned for surgical intervention after confirming the diagnosis by Dacryocystography (DCG).

The strengths of this study were its prospective design and a standardized period of regular follow-up. It is also possible that our rate of resolution might have been on higher side as we emphasized on Crigler hydrostatic lacrimal sac massage method[8] very intensively and specifically demonstrated to parents which they followed at home and on weekly basis massage was given by the clinician. But without a control group,

it is not possible to determine that to what extent resolution was related to the lacrimal massage, antibiotics use or simply the spontaneous resolution on passage of time.

In a study conducted by Ballard including infants reported that tearing and discharge appears at 2 weeks of age in about 20% of the cases[2] which is in consistent with the present study, where 18% of cases had onset of symptoms before 4 weeks of birth and 82% had symptoms after 4 weeks of age. Lacrimal sac inflammation within a week of birth can cause epiphora and results reflex tearing mimicking CNLDO. This may be reason of 188 out of 443 cases (42.43%) developing symptoms during one week after birth in the study conducted by Ffookes[24].

CONCLUSION:

Knowing that about 88% the CNLDO cases in infants below 2 years of age will resolve within 6 months with non-surgical management is an important component in decision making for clinicians to plan early or deferred surgical management and help parents more effectively to discuss treatment options. Our results may encourage one to proceed for early non-surgical intervention of CNLDO by intensive hydrostatic sac massage rather than waiting for spontaneous resolution. Hydrostatic sac massage may be considered as a standard therapy for the management of CNLDO. However, effectiveness of Hydrostatic sac massage depends on its proper technique, frequency and early intervention after onset of CNLDO.

Scope of further study: Nasal endoscopy is recommended in all the cases of CNLDO for better visualization of the blockage in the form of stenosis, atresia, inferior turbinate position, direct observation of fluorescein dye outflow and localization of site of obstruction. Based on findings of nasal endoscopy, conservative or surgical management should be planned. Further study including a control group may again refine the results.

Recommendation: Therapeutic hydrostatic nasolacrimal sac massage should be utilized for all the infants who suffer from NLDO. Further, a training program regarding therapeutic hydrostatic nasolacrimal sac massage should be designed for the clinicians, pediatric nurses and infant's caregivers.

Conflicts of Interest: None.

REFERENCES:

1. MacEwen CJ, Young JD. Epiphora during the first year of life. Eye (Lond) 2001;5:596-600.

2. Ballard EA. Excessive tearing in infancy and early childhood. The role and treatment of congenital nasolacrimal duct obstruction. Postgrad Med 2000;107:149-154.

3. Snell RS. Clinical anatomy by regions. 8th ed. Philadelphia: Lippincott Williams & Wilkins; 2008.

4. Karti O, Karahan E, Acan D, Kusbeci T. The natural process of congenital nasolacrimal duct obstruction and effect of lacrimal sac massage. The International Journal of Clinical Ophthalmology and Visual Sciences (2016).

5. Tan AD, Rubin PAD, Sutula FC, Remulla HD. Congenital nasolacrimal duct obstruction. Int Ophthalmol Clin. 2001 Fall;41(4):57-69.

6. Kushner BJ. Congenital nasolacrimal system obstruction. Arch Ophthal 1982,100:597-600.

7. Noda S, Hayasaka S, Setogawa T. Congenital nasolacrimal duct obstruction in Japanese infants: its incidence and treatment with massage. J Pediatr Ophthalmol Strabismus. 1991;28(1):20–22PubMed.

8. Crigler LW. The treatment of congenital dacryocystitis. JAMA 1923,81:23-24.

9. Shivpuri.D, Puri A. Congenital nasolacrimal duct obstruction: The proper technique of massage. Indian Pediatrics. Volume 31March 1994:337-40.

10. Nelson LR, Calhoun JH, Menduke H. Medical management of congenital nasolacrimal duct obstruction. Ophthalmology 1985;92:1187-90.

11. American Association for Pediatric Ophthalmology and trabismus Nasolacrimal Duct Obstruction. Retrived at 4 October 2015. [PubMed]. American Association for Pediatric Ophthalmology.

12. Peterson RA, Robb RM. The natural course of congenital obstruction of the nasolacrimal duct. J Pediatr. Ophthalmol Strabismus 2000;15:246-50.

13. Jones LT, Wobig JL. Surgery of the eyelids and lacrimal system. 1st ed. Birmingham: Aesculapius Publishing Co;1976.

14. Busse H, Muller KM, Kroll P. Radiological and histological findings of the nasolacrimal passage of newborns. Arch Ophthalmol 1980;98:528-532.

15. Kersten RC. Congenital lacrimal abnormalities. In: Bosniak S (ed). Principles and practice of ophthalmic plastic and reconstructive surgery, Vol 2. 1st ed. Philadelphia: W.B. Saunders; 1995:731-747.

16. Paul TO. Medical management of congenital nasolacrimal duct obstruction. J Pediatr Ophthalmol Strabismus 2009;22:68-70.

17. Eric AB, Yassir A, Geoffrey ER. Pediatric dacryocystorhinostomy for nasolacrimal duct obstruction Ophthalmology 2013; 108:1562-1564.
18. Ghuman T, Gonzales C, Mazow ML. Treatment of congenital nasolacrimal duct obstruction. Am Orthopt J. 1999; 49:163-168.
19. Omayma M, Okby, Jaklein R, Younis. Therapeutic hydrostatic nasolacrimal massage vs routine hospital massage: Effect on Infants with congenital nasolacrimal duct obstruction. Journal of Nursing and Health Science Nov-Dec. 2016;5(6)40-48.
20. Pediatric Eye Disease Investigator Group. A randomized trial comparing the cost-effectiveness of 2 approaches for treating unilateral nasolacrimal duct obstruction. Arch Ophthalmo 2012; 130:1525-33.
21. Stolovitch C, Michaeli A. Hydrostatic pressure as an office procedure for congenital nasolacrimal duct obstruction. JAAPOS 2006;10: 269-272.
22. Bageja S, Grover AK, Bansal M. Congenital nasolacrimal duct obstruction. DOS Times Apr 2007;12(10).
23. Panwar N, Sharma V, Kumari K. Role of office sac massage for congenital nasolacrimal duct obstruction in various age-groups. International Journal of Ocular Oncology and Oculoplasty April-June, 2016;2(2):106-108.
24. Ffooks OO. Dacryocystitis in infancy. Br J Ophthalmol, 1962; 46:422-434.

Effectiveness of non-surgical management of Congenital Nasolacrimal Duct Obstruction

ORIGINALITY REPORT

37%	34%	20%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.ncbi.nlm.nih.gov Internet Source	13%
2	jamanetwork.com Internet Source	4%
3	ksos.in Internet Source	3%
4	d.docksci.com Internet Source	2%
5	docplayer.net Internet Source	2%
6	www.innovativepublication.com Internet Source	1%
7	www.iosrjournals.org Internet Source	1%
8	sciencescholar.us Internet Source	1%
9	A. K. Grover, Shaloo Bageja, Amrita Sawhney, Anurag Mittal. "Chapter 23 Congenital	1%

	Nasolacrimal Duct Obstruction", Springer Science and Business Media LLC, 2024 Publication	
10	eacademic.ju.edu.jo Internet Source	1 %
11	aimdrjournal.com Internet Source	1 %
12	www.crs.org Internet Source	1 %
13	www.oftalmoloji.org Internet Source	1 %
14	Alexander D. Tan, Peter A. D. Rubin, Francis C. Sutula, Heidi D. Remulla. "Congenital Nasolacrimal Duct Obstruction", International Ophthalmology Clinics, 2001 Publication	1 %
15	Kürsad Ramazan Zor, Erkut Küçük, Zeynep Yılmaz Öztorun. "Outcomes and comparison of nasolacrimal probing for patients older than 12 months", Therapeutic Advances in Ophthalmology, 2020 Publication	<1 %
16	Submitted to London School of Hygiene and Tropical Medicine Student Paper	<1 %
17	journalcra.com Internet Source	<1 %

18	M B Kashkouli. "Late and very late initial probing for congenital nasolacrimal duct obstruction: what is the cause of failure?", British Journal of Ophthalmology, 9/1/2003 Publication	<1 %
19	journals.lww.com Internet Source	<1 %
20	mafiadoc.com Internet Source	<1 %
21	Gregg T. Lueder. "Balloon Catheter Dilation for Treatment of Older Children With Nasolacrimal Duct Obstruction", Archives of Ophthalmology, 2002 Publication	<1 %
22	cyberleninka.org Internet Source	<1 %
23	mail.jpma.org.pk Internet Source	<1 %
24	Brian G Mohney, Saraniya Sathiamoorthi, Ryan D Frank. "Spontaneous resolution rates in congenital nasolacrimal duct obstruction managed with massage or topical antibiotics compared with observation alone", British Journal of Ophthalmology, 2021 Publication	<1 %

25	Güler Zilelioğlu, Banu M. Hoşal. "The Results of Late Probing in Congenital Nasolacrimal Duct Obstruction", Orbit, 2009 Publication	<1 %
26	ebin.pub Internet Source	<1 %
27	link.springer.com Internet Source	<1 %
28	www.ipinnovative.com Internet Source	<1 %
29	Evelyn Li Min Tai, Yee Cheng Kueh, Baharudin Abdullah. "The Use of Stents in Children with Nasolacrimal Duct Obstruction Requiring Surgical Intervention: A Systematic Review", International Journal of Environmental Research and Public Health, 2020 Publication	<1 %
30	J. D H Young. "Fortnightly review: Managing congenital lacrimal obstruction in general practice", BMJ, 08/02/1997 Publication	<1 %

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		