

Use of Oil as a Lubricant makes Lacrimal Sac Massage Efficient in Congenital NasoLacrimal Duct Obstruction (CNLDO)

Prachi Pawar^{1*}, Aruna Patil², Mihir Patel³ and Saurabh Shah⁴

¹Professor, Dept of Ophthalmology, Dr. V. P. Medical College, Nashik, Maharashtra; pawarprachi@rediffmail.com

²Assistant Professor, Statistics, Dr. V. P. Medical College, Nashik, Maharashtra; dr.arunapatil@yahoo.co.in

³PG Resident, Dept of Ophthalmology, Dr. V. P. Medical College, Nashik, Maharashtra; dr.map.rdj@gmail.com

⁴PG Resident Doctor, Dept of Ophthalmology, Dr. V. P. Medical College, Nashik, Maharashtra; drsns88@gmail.com

Abstract

Introduction: Congenital NasoLacrimal Duct Obstruction (CNLDO) is a frequent entity in the paediatric age. CNLDO has a 20% to 30% incidence rate out of which only 1% to 6% become symptomatic.¹ The 4% of premature infants are affected with CNLDO.² The management of failed Crigler's Sac massage is probing, secondary probing, external DCR and with or without intubation is well known to all. To avoid the sequelae of CNLDO, cure of CNLDO is mandatory. Hence the aim of the study is primary cure for CNLDO by using specific treatment of Crigler's Sac massage with Oil is emphasised.

Method: This study was about 140 eyes and in each group, 70 eyes were enrolled with lost to follow up considerations. Patients had been selected and randomised alternatively when visited ophthalmology OPD. The CNLDO patients were selected from the age group ranged 1 to 9 months. Follow up of all patients was taken every month up to 15 months of age. Each and every patient from both the groups had to complete the formality of clinical consultation, doctors counselling to parents specially mothers explaining the procedure of sac massage and taking a live demonstration by mother/ parent hence confirming the proper technique to be followed at home. **Results:** In group A, Standard Crigler's Method was used only on 54 eyes out of enrolment of 70 eyes. In group B, Standard Method with add on therapy of oil massage had been given to 66 eyes out of 70. In group B, cure rate was found in 60(91%) which was significantly differing from the cure rate of group A 30(56%) by Standard Crigler's Method at $P < 0.001$. Complications were found in 20 eyes in group A and in group B only one patient showed complication unrelated to the treatment of CNLDO used by the patients in this group. No significant difference was seen in the sex distribution in relation to CNLDO at $P > 0.05$. **Conclusion:** The primary need of Crigler's Sac Massage using Oil has given the importance towards good compliance and success of curing CNLDO.

Keywords: Paediatric, Crigler's Method, Lacrimal Sac Massage, Baby Oil, CNLDO.

1. Introduction

Congenital NasoLacrimal Duct Obstruction (CNLDO) is a frequent entity in the paediatric age. CNLDO is perhaps better termed as Delayed Canalization. The obstruction

is the result of incomplete opening of the duct, which forms embryologically as an invagination of the surface ectoderm along the side of the nose between the inner canthus of the eyelids and the inferior turbinate of the nasal cavity. The usual obstruction is at the lower end of

*Author for correspondence

the duct, where the epithelium of the lacrimal duct and the mucosa of the nose about each other and form an imperforate membrane³.

CNLDO has a 20 to 30% incidence rate out of which only 1 to 6% become symptomatic^{1,2}. The 4% of premature infants are affected with CNLDO². The symptoms are usually like epiphora, redness, discharge later leading to dacryocystitis, amblyopia, anisometropia, etc.¹ In Dacryocystitis, the secondary infection is mainly due to Pneumococcal, Streptococci, Staphalococci⁴. To avoid the sequelae of CNLDO, cure of CNLDO is mandatory. The only management is probing, secondary probing, external DCR and with or without intubation is well known to all. Hence the importance of curing CNLDO has been shown by various evidences in the studies done by Crigler, Kushner, Stephenson^{5,6}.

Crigler was the first to describe the most popular procedure in the treatment of CNLDO is the simple home massaging of the lacrimal sac area by parents⁷. However, old experiences say that most of the times home massaging turn out to be a futile exercise as most of the parents either don't do it properly or don't do it at all⁵.

Whatever numbers of babies that are claimed to be cured by home massaging are actually those where the obstruction opens up on its own^{6,8}. Unlike this old experience, the parents were found to be sincere and committed to the advice of daily sac massage for their baby. Hence, the initial response to the treatment of CNLDO was different as it showed skin excoriation response over the lacrimal sac area on the every first follow up.

With the past evidence of literature, the compliance of the Crigler's Massage was poor⁵⁻⁸, on this basis the complication encountered was surprising and thus it led to the study of add on therapy of Crigler's massage using oil as lubricant in the view of preventing skin excoriation over sac area.

Hence a randomised control study was performed to highlight the complications of the sincere use of the sac massage technique in total 140 eyes. Hypotheses for this experimental study were as follows:

H₀₁: The CNLDO is equally affected on both sexes in both groups.

H₀₂: There is no difference between conventional Criglier's Lacrimal sac massage and add on therapy of using oil in Criglier's Lacrimal sac massage as a lubricant in CNLDO.

H₀₃: The proportion of complications is not significant in both the groups.

2. Materials and Methods

This randomised controlled study was conducted on total 140 eyes of infants equally randomised (1:1) into two groups. The population setting was done 100 km radius of the hospital. The CNLDO patients were selected from the age group ranged 1 month to 9 months. Patients had been selected and randomised alternatively when visited first in ophthalmology OPD. The proper consent was taken from the parents/mothers of all patients. Follow up of patients was advised every month up to 15 month of age. Patients above the age of 9 months and those who denied their consent, were excluded from the study.

In Group A, Standard Crigler's Method was used on 54 eyes out of 70. In Group B, Standard Crigler's method with add on therapy of using oil had been given to the 66 out of 70 (Figure 1).

Group A consisted of the eyes undergoing treatment of Conventional Crigler's Sac Massage, where as Group B consisted of eyes which were undergoing treatment with Crigler's Sac Massage with Oil.

Each and every patient from both the groups had to complete the formality of clinical consultation, doctors counselling to parents/mothers specially mothers explaining the procedure of sac massage and taking a live demonstration by mother/parent hence confirming the proper technique to be followed at home.

Group A had simple technique which was most widely used technique originally described by Crigler. The procedure of sac massage consists of steps like placing a finger on the internal edge of the infant's eye i.e. medial canthus, to obstruct the common canaliculae, preventing reflux when pressing the sac. Subsequently, exerting

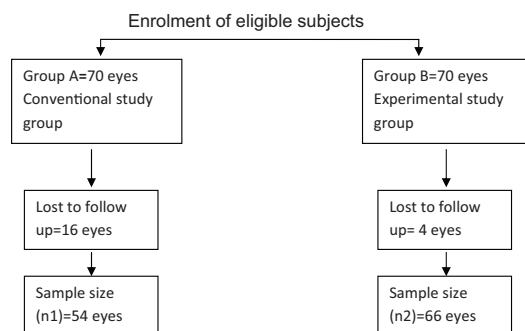


Figure 1. Flow chart shows the distribution & enrolment of study subjects.

pressure on the sac, the finger is moved downwards, thus producing an increase in the hydrostatic pressure which is transmitted to the inferior portion of the nasolacrimal duct, which would lead to causing the rupture of the obstructions. The Crigler's sac massage technique is illustrated in the Figure 2^{5,7}.

Group B had the similar technique using Oil, as add on therapy. The mothers of this group were instructed to apply oil on their suitable/index finger used by her for sac massage on the patient's eye.

The mothers' were also instructed to use lukewarm any baby oil & take precaution that the oil does not enter the conjunctival sac. It would just act as a lubricant during friction and pressure massage on the skin over the sac area. After the massage, the patient's face should be washed with normal or lukewarm water.

Parents/mothers of both the groups were instructed to wash the hands prior to the treatment in order to maintain hygiene. Simultaneously, as a medical line of treatment a broad spectrum antibiotic drop was prescribed to all patients. The patients were studied for both the treatment modalities and complications were studied from the respective group patients.

2.1 Materials

Standard baby oil was used by the parents/mothers as per their preference. Zeiss Company's Hand Held Paediatric Slit Lamp was used for anterior segment examination, and Tobramycin Eye Drops were used in all patients.

2.2 Ethical Considerations

An Institutional Ethical Committee approval was obtained before beginning of the study.



Figure 2. Crigler's sac massage technique.

3. Results

In Group A, mean age of patients was 6 months \pm 15 days. The male patients were 38(54%) while females were 32(46%). In Group B, mean age of patients was 5 months \pm 15 days. The male patients were 36(51%) while females were 34(49%). There was no significant difference in the sex distribution in relation to CNLDO at $P > 0.05$.

3.1 Interpretation (A)

In this study, while comparison of genders in both groups in relation to CNLDO, the null hypothesis accepted. The CNLDO was equally affected on both sexes, in both Group A and Group B at $p > 0.550$ & $p > 0.905$ respectively (Table 1 and Figure 3).

Group A underwent Conventional Crigler's Method for sac massage on 70 eyes, out of which 30(56%) were completely cured, 24(44%) eyes were uncured. A total number of 54 eyes completed the treatment, were as the 16 eyes had lost to follow up (Table 2).

In Group B, the Lacrimal Sac Massage was used with Oil on equal number of 70 eyes, out of which 60(91%) were completely cured, 6(9%) eyes were uncured. A total number of 66 eyes completed the advised treatment, were as 4 eyes had lost to follow up (Table 2).

Table 1. Test proportion between genders in relation to CNLDO

Groups	Gender	N	Binomial Test ^a		p value
			Observed Proportion	Test Proportion	
Group A	Male	38	0.54	0.5	0.550 (NS)
	Female	32	0.46		
Group B	Male	36	0.51	0.5	0.905 (NS)
	Female	34	0.49		

a. Based on Z Approximation. NS- Not Significant

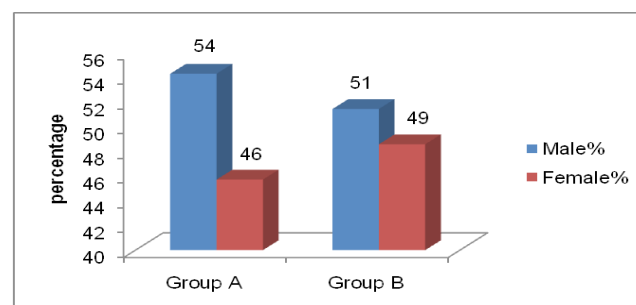


Figure 3. Sex wise distribution in both groups.

3.2 Interpretation (B)

While comparison of cure rate between two groups (Figure 4), the null hypothesis is rejected. The Lacrimal sac massage was significantly efficient with using oil as a lubricant in CNLDO at the level of significance $p < 0.001$.

In Group A, significant number of 20 eyes showed complications of excoriation, erythematous rash of the skin over the lacrimal sac area. This complication was observed on the very first or second follow up of CNLDO treatment (Figure 5).

In Group B, only one eye showed complication of boil on skin over the sac area (Figure 6).

3.3 Interpretation (C)

In comparison of complications in both groups, the null hypothesis rejected. The complications were significantly reduced in CNLDO patients of group B as compared to Group A at $p < 0.0001$ (Table 3).

4. Discussion

Bardoloi⁷, experience says that most of the times home massaging turn out to be a futile exercise as most of the parents either don't do it properly or don't do it at all. In contrast to this observation, our study we experienced

Table 2. Following statistics shows the status of the results from the both groups

Groups	Cured	Uncured	Treatment Completed	Lost to follow up	Total enrolled cases (N)	Z test
(A) By Std Crigler's Method	30(56%)	24(44%)	54(100%)	16	70	Z statistic =4.593
(B) By Crigler's Method with oil massage	60(91%)	6(9%)	66(100%)	4	70	P < 0.001
Total	90(75%)	30(25%)	120(100%)	20	140	(Highly Significant)

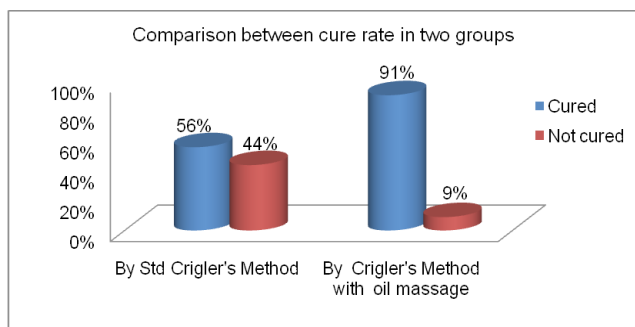


Figure 4. Comparison between cure rates in two groups.

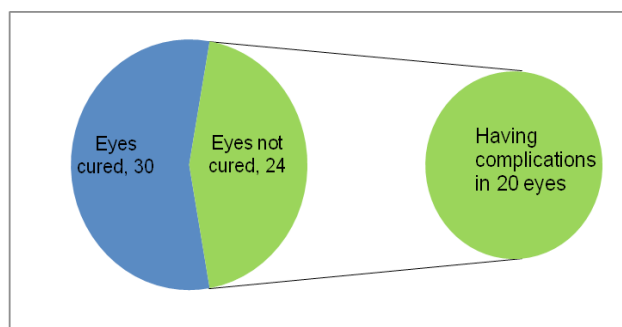


Figure 5. Complications in group A (std. crigler's method).

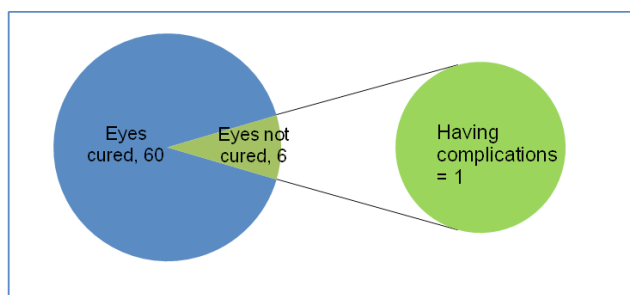


Figure 6. Complications in group B (by crigler's sac massage with oil).

Table 3. Comparison between proportions of complications in both groups

Groups	Complications	No complications	Total	Z test
(A) By Std Crigler's Method	20(37%)	34(63%)	54(100%)	Z statistic =5.153
(B) By Crigler's Method with oil massage	1(2%)	65(98%)	66(100%)	P< 0.0001***
Total	21(18%)	99(82%)	120(100%)	(Highly Significant)

***Highly significant

over sincerity of the parents for doing sac massage at home.

As a result of massaging by parents we found skin excoriation, redness, swelling over the sac area. This observation led to the thought that the complication was probably due to sac massaging over the dry skin. There are several studies done emphasising the sac massage as a treatment modality of CNLDO and its compliance, but not a single study on stating the importance of using lubricant over the skin as add on to crigler's sac massage. Thus, this fact encouraged us to take up this experimental study.

As observed by Shivpuri⁴, the technique of massage generally advised to parents was not followed properly. In his study parents were asked to demonstrate the technique of massage being practiced, most parents were found to massage either at the wrong place (over the nasal bone), or too gently, or in the wrong direction (up and down) and he has also emphasized that a proper demonstration and appropriate time has to be spent by the clinician to explain the technique of sac massage to the parents. As per the observations and suggestions of Shivpuri⁴, we induced detailed demonstration and counseling by the clinician giving extra time and effort in view of eliminating the wrong method followed by parents .

In our study, the success rate of cured 60(91%) eyes was significantly high in Group B at $p < 0.001$, which showed the good compliance to treatment by parents and correlated result. Only one eye showed complication of boil over the skin of sac area. The detail history and analysis elicited that the complication had occurred due to accidental abrasive trauma on the region, thus was not related to the treatment advised.

Group A showed significant complication in 20 eyes. The dry lacrimal sac massage done by the parents showed the skin reaction to the repetitive skin friction with pressure. The basic pathology to elicit the cause is generalised dryness of the infant skin⁹.

4.1 Complications

Out of the 20 eyes, 6 eyes showed severe skin eruption and in the first follow up, it was observed that all the mothers

doing treatment were working in farms, the hygiene of fingers, nails was found to be poor¹⁰.

4 eyes also showed similar picture but were found to be premature having delicate skin¹¹.

5 eyes were found to be over doing the strokes of sac massage.

Rest of the 5 eyes were simply found to have infected sac along with CNLDO thus leading to excoriation due to pressure friction over the skin, and probably secondary infection from the infected discharge mainly observed by Pneumococcal, Streptococci, Staphylococci⁴.

Similar cases of infected sac were present in the Group B but have not encountered any complication, this explains the skin erosion due to dry friction and secondary infection/infective organism present the lacrimal or conjunctival sac fluid or the skin itself.

Thus the presence of these organisms around the sac area was prone to give the secondary infection in the surrounding structure like skin. The penetration of organism was due to simple skin abrasions¹².

This skin abrasion was avoided in the sac massage with Oil in group B. Hence further complications were prevented and that helped to continue & complete the management of CNLDO by parents/mothers during the first year of life¹³.

The complication of skin excoriation was treated by the use of antibiotic ointment/powder and the manure of sac massage was stopped completely. This led to non-compliance of the treatment, which further led to increased failure rate in Group A as compared to Group B.

5. Statistical Analysis

In the above study, the statistical methods for qualitative data, frequency count N and percentage were put in a tabular and graphical manner.

To analyze the data, appropriate statistical tests were applied to compare the two methods: Z test for difference between two proportions was applied. To compare an observed proportion of cases to the expected proportion, under a binomial distribution with a specified probability

parameter 0.5 for both groups, binomial test was applied. Other data were displayed by various tables and charts.

The statistical analysis was done by using the software, SPSS (Version 16.0).

6. Conclusion

The increased success rate due to sincerity and good compliance of CNLDO treatment has evolved the concept of add on therapy with standard Crigler's Sac Massage. The complication rate in add on therapy of sac massage was negligible. Hence the primary need of Crigler's sac massage using Oil has given the importance towards good compliance and success of curing CNLDO.

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