



Indian survey on practice patterns of lacrimal and eyelid disorders (iSUPPLE) report 1: Congenital nasolacrimal duct obstruction



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ABSTRACT

Background: To assess the preferred practice patterns in the management of congenital nasolacrimal duct obstruction (CNLDO) among oculoplastic surgeons in India. The survey was aimed at obtaining data on the timing of intervention, procedure of choice, and the use of adjunctive techniques such as silicone intubation and nasal endoscopy.

Methods: An anonymized survey that included questions on the management of lacrimal disorders was sent in April 2015 to members of the Oculoplastic Association of India (OPAI), through an e-mail communication. The results were tabulated and analyzed.

Results: A large proportion (84%) of respondents indicated that they advise lacrimal sac compression up to 1 year of age. Fourteen percent (12/87) indicated 2 years as their upper age limit for advising sac compression. One year is the preferred minimum age for advising primary nasolacrimal duct (NLD) probing by majority (45%) of respondents and the upper age limit being 5 years for 62% of respondents. Based on experience, younger surgeons (<10 years experience) when compared to more experienced surgeons are more likely to offer a trial of primary probing in children between 8 and 12 years age (29% versus 8%). Nasal endoscope is used by 50% (44/88) respondents during primary NLD probing. Nearly a third of the respondents (29/88) use intubation in all cases of NLD probing. Eighty one percent (71/88) of the surgeons would rather repeat NLD probing with adjunctive procedures over dacryocystorhinostomy (17%). Balloon Dacryoplasty is rarely used for CNLDO amongst our respondents.

Conclusions: This study highlights the variation in practice pattern in the management of CNLDO across India. While there are certain trends that are global phenomena, such as the shift towards the use of a nasal endoscope; use of silicone intubation in repeated procedures and time of performing primary NLD probing; issues like the use of balloon dacryoplasty showed lesser degree of agreement.

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1. Introduction

Congenital Nasolacrimal Duct Obstruction (CNLDO) is the leading cause for epiphora in children and has a reported incidence that varies from 1.2% to 30% [1–5]. The natural history of CNLDO suggests that in many cases, it resolves without any intervention [1]. During the first year of life, conservative medical management with lacrimal sac compression as suggested by Crigglar, is advocated [6]. However if symptoms persist after conservative

management, nasolacrimal duct (NLD) probing along with irrigation is performed. Success rate of probing depends upon various factors such as type of obstruction (simple versus complex), age at initial treatment, bilateral affliction, functional causes and the use of nasal endoscopy at the time of probing [7–9].

All the same, there are some conflicting views and disagreements: how long to wait to allow obstructions to clear spontaneously; should the procedure be performed in the office or with anesthesia in the operating room; and the appropriate timing for this procedure among other issues. While there have been reports that have suggested good outcomes even in older children, there is a lack of consensus on what is the upper limit for attempting NLD probing and repeat procedures [8–11]. Furthermore, the advent of nasal endoscopy, silicone intubation and balloon dacryoplasty have

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not only improved the outcome rates but also helped us understand the pathophysiology and diagnose masquerades of CNLDO [4,5]. This study was therefore aimed at assessing current practice trends in the management of lacrimal disorders among Indian oculoplastic surgeons. This communication addresses the management of CNLDO.

2. Methods

A survey that included questions on the management of lacrimal disorders was sent in April 2015 to members of the Oculoplastic Association of India (OPAI) through an e-mail communication. The email clearly explained the nature of the survey and its questions and contained a hyperlink to an electronic survey hosted by a third party website: www.surveymonkey.com. Subsequently, a reminder to take the survey was sent after 2 weeks. The survey contained 30 questions – most of which were multiple-choice questions. Respondents were also asked questions that included demographic information of the respondent regarding years of practice, age and practice setting. Respondents were also allowed to skip questions in case they did not want to reply to any particular question. The survey was anonymized and did not contain any identifying information. Institutional Review Board approval was obtained prior to commencement of the study. Association between categorical variables was assessed using Fisher's exact test or Chi-Square test. Continuous data was analyzed using non-parametric test, i.e. Mann-Whitney *U* test. We considered a *p* value < 0.05 as statistically significant. All statistical analysis was performed with GraphPad Prism 6® (GraphPad Inc., La Jolla, CA, USA).

3. Results

3.1. Respondents

The email with the invitation to participate in the survey was sent to the members of the OPAI. Of all members, invites were sent to all 267 members who had valid or active email addresses (as on April 1, 2015; as per the official website www.opai.in). One of the first questions included the nature of the respondent's practice; all respondents who mentioned that they did not practice oculoplasty and who referred all oculoplasty cases to a specialist were automatically directed to the end of the survey and their responses were excluded from analysis. They survey saw a response rate of 46% with 124 respondents, but only 103 responses were considered valid as the rest indicated that they did not practice oculoplastic disorders and therefore chose not to continue with the survey. However, the total number of responses obtained to each question varied, given that respondents were allowed to skip questions; therefore in the analysis, results have been calculated depending on the number of responses received for each question. The average age of the respondents was 39 years (range: 27 to 80; median 38 years). The average experience of the respondents was 10.5 years in practice.

3.2. Conservative management

Respondents were asked up to what age do they advise lacrimal sac compression in children with uncomplicated CNLDO. A large proportion: 84% (73/87) respondents indicated that they advise lacrimal sac compressions up to 12 months of age. 14% (12/87) indicated two years age as their upper limit for advising sac massage. While comparing the responses of surgeons with less than 10 years of experience with those with 10 years or more experience, it was noted that the more experienced group were willing to persist with conservative management up to two years of age (8% versus

20%). This difference though was not found to be statistically significant.

3.3. Timing of nasolacrimal duct probing

The respondents were asked: 'What is the earliest age that you would advise nasolacrimal duct irrigation and probing in children with uncomplicated CNLDO?' Eighty-eight responses were obtained. 45% (40/88) chose 12 months and 43% (38/88) preferred 9 months of age as ideal for probing (Table 1). Based on experience, surgeons with more than 10 years or more of practice commonly preferred probing at 12 months age whereas those with less than 10 years experience preferred 9 months. However, this difference was not statistically significant.

Similarly, respondents were asked the oldest at which they would advise nasolacrimal duct probing in cases of uncomplicated CNLDO (previously untreated). The responses indicated that 62% (51/88) of the responding surgeons would prefer NLD probing in previously untreated children up to 5 years of age (Table 2). On comparing the two groups, surgeons with less than 10 years of experience were willing to advise NLD probing in children older than 8 years of age (up to 12 years): 29% versus 8%. This difference was statistically significant (*p* = 0.015) (Table 3).

3.4. Surgical management of CNLDO

3.4.1. Primary NLD probing

Respondents were asked to indicate whether they use any adjunctive procedure at the time of primary NLD probing. The options given were nasal endoscopy, silicon intubation, balloon dacryoplasty or none. Here, respondents were allowed to choose more than one response. Half the respondents (50%; 44/88), indicated that they use nasal endoscope in all their probings; 33% (29/88) indicated they preferred to intubate all their cases of NLD probing. However, 39% (34/88) indicated that they use no adjunctive technique. 31% (15/49) of surgeons in practice for less than 10 years preferred no additional equipment or procedure as compared to 49% (19/39) of those in practice for more than 10 years. Balloon dacryoplasty was the least preferred adjunctive procedure with only 7% (6/88) indicating their preference.

3.4.2. Failed NLD probing

Respondents were asked to indicate their plan of treatment after failed primary probing: 81% (71/88) indicated that they would repeat a NLD probing with the use of additional techniques as enumerated above, 17% (15/88) would prefer to perform a dacryocystorhinostomy (DCR) at later age. There was no difference in response based on years of experience.

3.4.3. Adjunctive procedures in repeat probing.

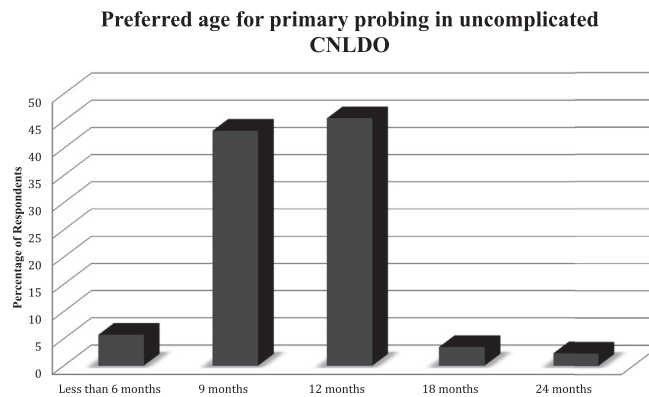
For repeat probing after an initial failed attempt, 36% of the respondents (32/88) preferred to use nasal endoscopy (if it was not used initially); 34% (30/88) indicated that they would use silicone intubation at the time of repeat probing; 26% (23/88) preferred none of the above methods. There was no difference based on experience.

3.5. Dacryocystorhinostomy (DCR)

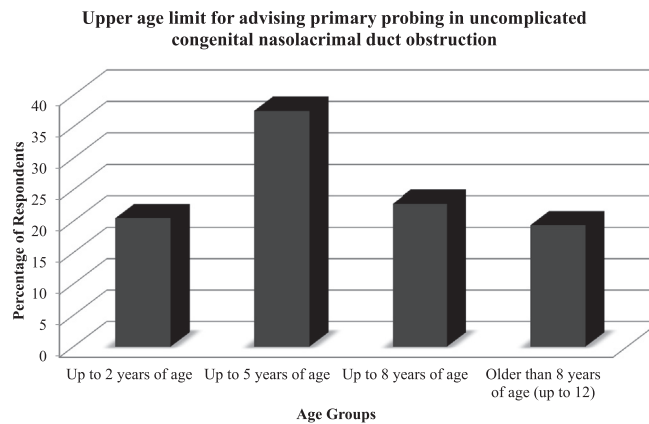
Although 24% (21/86) of the respondents said they were trained in and could perform endoscopic DCRs, it was the surgery of choice for NLD for only 10% (9/88), with 86% (76/88) citing external DCR as their preferred surgical treatment in NLDO. Nonendoscopic endonasal DCR and Transcanalicular LASER assisted DCR were least favored by respondents.

Table 1

Distribution of responses for preferred age for primary probing in uncomplicated congenital nasolacrimal duct obstruction.

**Table 2**

Distribution of responses based on upper age limit for advising primary probing in uncomplicated congenital nasolacrimal duct obstruction.



4. Discussion

This study presents the trends in the management of CNLDO among oculoplastic surgeons in India. The reported probabilities of spontaneous resolution by month until 12 months of age are 80–90% at 3 months of age, 68–75% at 6 months of age, and 36–57% at 9 months of age [3,12–14]. Lacrimal sac compression in young infants can lead to resolution of symptoms in two-third children at 2 months [12]. Similarly Katowitz and Welsh reported resolution rate of 54% with lacrimal sac compression between 0 and 6 months of age but it declined to 17% if started after 6 months age [15]. In our survey, most of the respondents indicated that they advise lacrimal compression up to 12 months of age. Furthermore, majority of the respondents (45%) indicated 12 months as earliest age at which they would advise probing in cases of uncomplicated CNLDO. This probably reflects the conventional wisdom that CNLDO is known to resolve spontaneously before one year of age in most cases and that effect of hydrostatic lacrimal sac compression can be seen up to one year of age [15]. This is similar to the consensus that was seen among ophthalmologists treating CNLDO across the Americas and Great Britain. Schellini and colleagues conducted a survey among ophthalmic plastic surgeons practicing in Latin American countries and found most members (64%) use lacrimal sac compression as their initial approach for CNLDO till 12 months of age [16]. In another survey, more than 90% of pediatric

ophthalmologists across North America preferred to intervene surgically around one year of age [17]. A similar survey conducted in Great Britain, showed that three-fourth of the surveyed ophthalmologists preferred probing between 12 and 15 months of age [18].

With regards to the oldest age up to which probing can be attempted, our survey showed 5 years of age as the upper limit for most respondents. Success of NLD probing has been negatively correlated with increasing age [8,19]. The reported success rate of first probing was 92%, 89%, 80%, 71%, and 42% at 12, 24, 36, 48, and 60 months age respectively [19]. Recent reports however show that probing is a viable option with good results even in older children up to 5 years of age with success rates ranging from 60% to 98% [20,21]. There is lack of consensus on this issue although it is largely believed that in previously untreated CNLDO, a trial of probing should be attempted before considering DCR; especially in children less than 5 years of age [14,22].

Silicone intubation in cases of CNLDO has been advocated, more commonly after a failed probing [14]. The rationale is that the silicone tube prevents formation of granulation-related obstruction around the tract that is now patent as a result of the repeat probing [1,23]. In our survey, it was found that 33% (29/88) of the respondents prefer to place silicone tube at the time of primary procedure. Of the others, 50% (30/59) of the specialists preferred to intubate only in cases of previously failed probings. In all, 67% (59/88) of the surveyed ophthalmologists placed silicone tubes at some

Table 3

List of questions in the questionnaire pertaining to the management of congenital nasolacrimal duct obstruction.

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1. **How old are you? (in years)**
 2. **How many years of oculoplasty practice do you have?**
 3. **In your practice, which of the following do you perform most frequently for primary nasolacrimal duct obstruction?**
 - a. External DCR
 - b. Endoscopic Endonasal DCR
 - c. Non-endoscopic Endonasal DCR
 - d. Laser DCR
 4. **Do you perform endonasal DCR?**
 - a. Yes
 - b. No
 5. **What is the EARLIEST age that you advise Nasolacrimal duct probing in children with complaints of watering (uncomplicated CNLDO)?**
 - a. <6 months
 - b. 9 months
 - c. 12 months
 - d. 18 months
 - e. 24 months
 6. **What is the OLDEST age at which you advise NLD probing as a primary mode of treatment for uncomplicated CNLDO?**
 - a. Up to 2 years
 - b. 2–5 years
 - c. 5–8 years
 - d. 8–11 years
 - e. 12 years and older
 7. **Upto what age do you prescribe Criggler's sac compression/massage in children with Congenital Nasolacrimal Duct Obstruction?**
 - a. 1 year
 - b. 2 years
 - c. 3–5 years
 - d. 6 years and older
 8. **Do you use any of the following adjunctive procedure along with primary Nasolacrimal duct probing & irrigation in children for CNLDO? (You may choose more than one option)**
 - a. None
 - b. Nasal Endoscopy
 - c. Balloon Dacryopasty
 - d. Silicone Intubation
 9. **What is your plan of treatment after failed primary probing (when done without any adjunctive procedure) for CNLDO?**
 - a. Observe and perform a DCR at an older age
 - b. Continue sac compression and hope for resolution
 - c. Repeat probing with adjunctive procedures
 10. **Out of the following adjunctive procedures which one you use most often for repeat probing and irrigation in CNLDO?**
 - a. Combine with nasal endoscopy if not used earlier
 - b. Balloon dacryoplasty
 - c. Silicone Intubation
 - d. None
-

point in their treatment protocol. This figure is largely similar to the survey by Puvanachandra and colleagues [18] where 65% of the ophthalmologists intubated the nasolacrimal system at some stage of the management protocol [17]. The Latin American study showed a similar consensus with 69.4% respondents performing intubation if sac compression or initial probing had failed [16]. Dotan and colleagues reported that among American pediatric ophthalmologists, 50% respondents elected to perform silicone intubation after failed initial probing [17].

Balloon dacryoplasty was the least preferred procedure at the time of primary as well as repeat probing: 7% use it at the time of primary procedure and only 3% respondents preferred it during repeat probing according to our survey. Similarly, more than 90% of the ophthalmologists from Latin America do not use a balloon catheter to treat CNLDO [16]. This is in contrast to the American survey results which showed that 23% chose balloon dacryoplasty as the preferred treatment in cases of previously failed NLD probing and 9% used balloon dacryoplasty combined with silicone intubation during repeat procedures [18]. The relatively lower success rates of balloon dacryoplasty as primary procedure (76–83%) and

high cost compared to silicone intubation could be possible reason for less preference in developing countries like India [24].

Regarding the use of nasal endoscope, half of the respondents in our survey indicated that they routinely use nasal endoscope at the time of primary probing. Its utilization when performing second procedure was preferred by about three-fourth of respondents. This reflects the increasing global trend towards the use of endoscope in cases of CNLDO. As discussed earlier, the use of nasal endoscopes has widened the understanding of complex CNLDO. For example 'buried probe' which has been identified as a variant of complex CNLDO in older children needs nasal endoscopic guidance which is crucial not only for its diagnosis but subsequent treatment and satisfactory outcome as well [25,26]. Also other variants of complex CNLDO such as impacted inferior turbinate, dacryocoele with intranasal cyst and NLD misdirection need endoscopic guidance [26].

The surgeon's experience was a factor that was found to be influential in decision-making in CNLDO management in our study. Younger oculoplastic specialists (those with less than 10 years experience) prefer NLD probing in children aged 8–12 years more

frequently when compared to specialists with more than 10 years experience. Having more years of experience would translate into higher number of treated patients with their results being the guiding principle behind decision-making [17]. It is possible that the poor outcomes of NLD probing in older children over the years have shaped this opinion. Other instances where a difference in practice pattern observed was continuation of lacrimal sac compression up to two years of age by more senior surgeons compared to younger surgeons (20.5% vs. 8%) However, this difference was not statistically significant.

Pediatric DCRs is an area that requires special mention. There are many grey areas with a general lack of consensus on various issues surrounding pediatric DCRs: the optimal age to operate; should older children be given a trial of probing? Which route to prefer: endoscopic or external DCR? Traditionally, it has been believed that in the pediatric age group the nasal passages are very narrow; therefore, endoscopic DCR in small children can be a technically difficult procedure. Furthermore, in cases of abnormal bony anatomy, or long-standing dacryocystitis with extensive scarring, the transcutaneous approach to a DCR is indicated as it gives superior visualization of the lacrimal sac and medial orbital wall anatomy [27]. However, recently these concepts have undergone a paradigm shift: while it is true that craniofacial abnormalities are more commonly observed in children than in adults undergoing a DCR; newer techniques, safer anesthesia, better instrumentation have improved the success rates of pediatric endonasal endoscopic DCRs [28]. Gioacchini et al. in their comprehensive review on endoscopic DCRs in children concluded that despite the nasal anatomy being more complex and narrower in children than in adults, En-DCR gives similar results in terms of success compared to the external approach. They reviewed twelve studies and estimated the average success rate, with a mean follow-up period of 15.2 months to be 87% (95% CI: 0.80–0.91) [29]. Even children as young as 14 months old have shown good results underscoring the possible benefits of minimally invasive endoscopic DCR in children [30].

A survey always carries with it the inherent shortcoming of self-reporting and a selection bias. Our survey had fair response rate (46%), which possibly reflects the indifference that clinicians nowadays have towards completing online surveys, which have become very commonplace. Previous surveys have noted a large number of pediatric ophthalmologists and ENT specialists treating CNLDO rather than oculoplasty specialists. However, in India, the pattern observed in all large eye hospitals is that it is the oculoplastic surgeon who primarily treats CNLDO. Furthermore, our study can act as a springboard for further studies where practice trends among ENT surgeons can be discussed and their treatment protocols be compared with those presented here. This is extremely important: as standardized management guidelines are not present and debate and discussion are the first steps in consensus formation.

To conclude our study highlights the variation in practice patterns in the management of CNLDO across India. While there are certain trends that are global phenomena such as: shift towards the use of nasal endoscopy, use of silicone intubation in repeat procedure and timing of primary NLD probing; other issues like the use of balloon dacryoplasty showed lesser degree of agreement.

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