

Repeated probing results in the treatment of congenital nasolacrimal duct obstruction

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PURPOSE. *To assess the results of our protocol of repeated probing for the treatment of congenital nasolacrimal duct obstruction in various presentations.*

METHODS. *A total of 1600 patients (1748 eyes) with congenital dacryocystitis (850 boys, 750 girls; age range, 1 month to 48 months [mean 16.54 ± 12.21 months]) were included. Diagnosis was confirmed by history of tearing, crusting of lids, and a boggy swelling over inner canthal region, which on pressure ejected mucopurulent discharge through punctum. Antibiotic eye drops were instilled five times a day for a week in affected eyes after the mother pressed the sac area and cleaned the discharge. The cases that were not relieved were subjected to sequential probing dilating with an increasing diameter probe repeated in failed cases second and third times at 1-week interval.*

RESULTS. *Medical treatment was effective in only 60 eyes (3.43%). Probing and syringing achieved successful results in 790 eyes (100%) aged 1 month to 12 months; 330 eyes (99.40%) aged 12 months to 18 months; 200 eyes (98%) aged 18 months to 24 months; 150 eyes (95.24%) aged 24 months to 36 months; and 158 eyes (89.87%) aged 36 months to 48 months. The cure rate with first probing was 98.10%, second probing was 99.64%, and third probing was 100%.*

CONCLUSIONS. *Our protocol of medical regime and early probing repeated two to three times was very effective in the treatment of nasolacrimal duct obstruction at all ages. A second and third probing was recommended after 1 week of the first probing with successful results if first probing failed. (Eur J Ophthalmol 2004; 14: 185-92)*

KEY WORDS. *Acute, subacute, and chronic dacryocystitis, Repeated probing, Protocol, Congenital nasolacrimal duct obstruction, Fistula, Lacrimal abscess*

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INTRODUCTION

Congenital dacryocystitis and its various forms following nasolacrimal duct obstruction is a well-established entity. An incidence of 5 to 6% has been reported in infants and children (1, 2). The diagnosis is based on regular time epiphora (tearing), crusting of lids, and a boggy swelling on inner canthal area, which

on pressure regurgitates discharge from the punctum. Many modalities of treatment have been recommended. Some (3-11) used local antibiotic drops and pressure massage for a period of 3 months to 3 years with uncertain cure rates. Some met with success in congenital nasolacrimal block with spontaneous resolution (8, 12-14). Others (15, 16) used syringing of nasolacrimal passages with antibiotic solution and achieved

inconsistent results. Some workers (17, 18) performed office probing of nasolacrimal duct obstruction under local anesthesia in such cases and reported good results. Others (12, 19-33) tried probing under general anesthesia using imidazoline and ketamine and met with a higher success rate. Some tried to fracture inferior turbinate (34-37) and met with equally good success rate. Endoscopically controlled endonasal retrograde probing was reported (23, 36-38) with an increase in success rate as it could correct the end of probe going submucosally by rerouting it (36-38). However, others advocated early endoscopic probing in such cases and recommend against waiting (23, 36-38). Silicone intubations (36, 39-49) and balloon dilatation (50, 51) of nasolacrimal duct obstruction exponents noted a higher percentage of success in routine and failed cases of other procedure.

There is no set protocol to treat cases of congenital dacryocystitis. There is a diversity of opinion about the ideal time of intervention and number of times to probe in such cases. The aim of this study is to report results of our protocol for treatment with repeated probings in such cases.

METHODS AND MATERIALS

A retrospective and prospective study of consecutive cases was done by the authors over the period 1978 to 2003 at the Guru Gobind Singh International Eye Research and Cure Centre. A total of 1748 eyes treated with congenital dacryocystitis were subjected to treatment from 1600 patients. In 148 patients, the block was bilateral. There were 850 male and 750 female patients. The age of the patients ranged from 1 month to 48 months (mean 16.54 ± 12.21 months). The presentation of the cases is given in Table I. All the cases of chronic dacryocystitis with tearing were examined clinically and dacryocystitis was confirmed by presence of a boggy swelling over the inner canthus of the eye with history of discharge from the angle of the eyes since birth. After an eversion of lower punctum, gentle pressure was applied to the sac area, which led to regurgitation of the discharge (serofibrinous to mucopurulent). All these patients were given appropriate antibiotics eyedrops (framycetin in older series and ciprofloxacin in later series) and the mothers were taught to give pressure massage 5 times a

day on the inner canthal area and clean the discharge and then apply eyedrops. This protocol was followed for 1 week and if there was no relief, these children were subjected to probing and syringing with a dilute solution of gentamicin and dexamethasone ($1/2$ cc each in 1 mL saline). Patients with subacute, acute dacryocystitis, and lacrimal fistula were given systemic antibiotics besides local treatment and under cover of systemic antibiotics, probing was carried out as laid down in the protocol. The lacrimal fistula was not cauterized and it healed on its own after nasolacrimal duct obstruction was cleared. Successful probing on the operating table occurred when the probe went without any resistance and the syringing showed no block. The first probe used was no. 00 and the second probe was 0 and 1. Passing the largest probe enlarged the passages. Second and third probing was performed after a week in the failed cases, which was guided by endonasal examination with a nasal speculum and endoscope.

Parents were told to continue antibiotic drops and pressure massage for 1 week postoperatively or until the discharge and tearing stopped. Examination of cases was done at 1, 2, 3, 4, 8, 16, and 24 weeks and patients were asked to report for checkup if any tearing or discharge appeared. A telephone survey was carried out by a questionnaire about tearing after 6 months to 2 years after the treatment. Postoperatively, a successful case was one that had no epiphora or discharge on compression of the lacrimal sac for a period of 4 weeks to 6 months.

RESULTS

The data of the cases are summarized in Tables I to VI.

Medical treatment as laid down in protocol cured only 60 out of 1748 eyes (3.43%). This was seen in 40 of 400 eyes at 1 to 6 months, 20 of 450 eyes between 6 and 12 months, and there was no improvement in patients older than 12 months (Tab. II).

In this series the probing cured 1656 of 1688 eyes (98.10%) with the first probing. The probing was successful in all 790 eyes (100%) between 1 and 12 months of age. However, this decreased to 99.40% in the 1 to 1.5 year group, 98% in the 1.5 to 2 year group, 95.24% in the 2 to 3 year group, and 89.87% in the

3 to 4 year age group (Tab. III). The older age cases (32 eyes) in which probing failed were subjected to second probing after a week, which resulted in cure in 26 of 32 eyes (81.25%). In the cases in which the second probing failed, third probing after 1 week resulted in cure (Tab. V).

In most cases (94.79%), symptoms subsided within a week postoperatively after probing, while in the rest (5.21%) within 2 weeks of the probing (Tab. VI) and there was no recurrence in long follow-up.

DISCUSSION

Conservative treatment such as antibiotic drops and hydrostatic massage on sac had been used (3-11). The rationale of this treatment stemmed from the presentation of cases of nasolacrimal duct obstruction as acute, subacute, chronic dacryocystitis with cellulitis and fistula formation. This concept was further supported by demonstration of *Streptococcus pneumoniae* and *Haemophilus influenzae* in the culture of these cases (8, 52, 53). Some observers (54) even had reported a pure and mixed fungal infection by *Candida* and *Aspergillus* from the sac discharge, which was different from the flora in the nose and conjunctiva. We used conservative treatment in our protocol for a week before the probing, which met with success in a small number of cases (3.5%). Contrary to this, MacEwens et al (55) noted the same type of bacterial flora in nasolacrimal duct obstruction and non nasolacrimal duct obstruction cases with spontaneous resolution in equal number and found no case of acute dacryocystitis, cellulitis, or ocular inflammation. They opined that bacterial flora had no role to play in nasolacrimal duct obstruction. We disagree with their observation as we noted in our series cases with acute, subacute, and chronic dacryocystitis, lacrimal abscess, and fistula (Tab. I). Opinions similar to ours have been expressed by other workers (8, 14, 31, 40, 41, 52-54, 56-64). We recommended against waiting and abandoned a conservative treatment extending more than 1 week as it was uneconomical and required prolonged waiting for cure with an increased risk of serious immediate (65) and late complications (66). However, many workers noted a successful cure rate between 29% and 93.3% with conservative treatment ranging from 1 month to 36 months (3-6, 8-12, 16, 67).

TABLE I - CLINICAL PRESENTATION OF CONGENITAL DACRYOCYSTITIS

Presentation	No. of eyes	%
Chronic dacryocystitis	1548	88.56
Subacute dacryocystitis	130	7.44
Acute dacryocystitis	60	3.43
Lacrimal sac fistula	10	0.57
Total	1748	100.00

TABLE II - ONE WEEK MEDICAL TREATMENT IN CONGENITAL DACRYOCYSTITIS (pressure massage and antibiotic drops)

Age	No. of eyes	Failure		Success	
		No. of eyes	%	No. of eyes	%
1 - 6 mo	400	360	90.00	40	10.00
6 mo - 1 yr	450	430	95.56	20	4.44
1 yr - 2 yr	530	530	100.00	0	0.00
>2 yr - 3 yr	210	210	100.00	0	0.00
>3 yr - 4 yr	158	158	100.00	0	0.00
Total	1748	1688	96.57	60	3.43

TABLE III - RESULTS OF FIRST TIME PROBING AND SYRINGING IN CONGENITAL DACRYOCYSTITIS

Age at intervention	Total cases	Failure		Success	
		No. of eyes	%	No. of eyes	%
1 - 6 mo	360	0	0.00	360	100.00
6 mo - 1 yr	430	0	0.00	430	100.00
1 yr - 1.5 yr	330	2	0.60	328	99.40
1.5 yr - 2 yr	200	4	2.00	196	98.00
>2 yr - 3 yr	210	10	4.76	200	95.24
>3 yr - 4 yr	158	16	10.13	142	89.87
Total	1688	32	1.90	1656	98.10

TABLE IV - RESULTS OF SECOND PROBING AND SYRINGING IN CONGENITAL DACRYOCYSTITIS

Age, yr	No. of eyes	Failure		Success	
		No. of eyes	%	No. of eyes	%
1 - 1.5	2	0	0	2	100.00
1.5 - 2	4	0	0.00	4	100.00
>2 - 3	10	2	20.00	8	80.00
>3 - 4	16	4	25.00	12	75.00
Total	32	6	18.75	26	81.25

TABLE V - RESULTS OF THIRD PROBING AND SYRINGING IN CONGENITAL DACRYOCYSTITIS

Age, yr	No. of eyes	Failure		Success	
		No. of eyes	%	No. of eyes	%
>2 - 3	2	0	0.00	2	100.00
>3 - 4	4	0	0.00	4	100.00
Total	6	0	0.00	6	100.00

TABLE VI - RELATIONSHIP OF DISAPPEARANCE OF EPIPHORA DISCHARGE TO POSTOPERATIVE FOLLOW-UP OF 1688 EYES

Week	No. of eyes cured	%
1	1600	94.79
2	1688	100.00
3	1688	100.00
4 to 1 yr	1688	100.00

Kim et al (15) had tried repeated syringing of the nasolacrimal duct with antibiotic solution and had 96% success as compared to 84% success with probing. Bellard (16) also noted that the cases resolved without intervention but took a long time. However, the parents could not carry out prolonged treatment and their compliance was reduced as they wanted a speedy cure that would be safe and effective. In our opinion this was a too prolonged treatment with an added risk of sac developing acute dacryocystitis, lacrimal sac abscess, and fistula, and exposure of patient to severe septicemia. Our protocol of 1 week of medical treatment could not be compared to any one of the nasolacrimal duct obstruction group. The antibiotic solution and pressure on the sac for a week might not have made the sac presumably bacterial free but made it safer for intervention.

The orthograde probing was preferred at all ages because it was an easy and simple procedure with dramatic results. Probing as a therapeutic modality had been used with 87 to 95% success rate "Robb (19), 92%; El Monsoury et al (20), 93.5%; Xiao et al (21), 98.2%; Clark (22), 92%; Orhan et al (23), 94.4%; Burns and Kipioti (24), 97%; Yap and Yip (25), 89.5%". However, the timing of performing the elective procedure has been controversial. Some advo-

cated immediate interference after 2 days to 1 week of conservative treatment (3, 14, 40, 58-61, 66). Others preferred this to be performed after 3 to 4 months (1, 6, 24, 57, 67, 68), 4 to 6 months (28, 69), before 9 months (6, 10, 13, 18, 25, 28, 57, 65, 70, 71), 13 months (13, 19, 20, 25-27, 31, 56, 65, 67, 68, 72), 24 months (32, 65, 70), 36 months (70), and before 4 years (17) of conservative treatment. Others recommended this at all ages (9, 12, 17, 22, 30, 56).

Although some workers (31, 55, 58, 69) performed probing in a small series of cases of acute, subacute, chronic dacryocystitis and lacrimal fistula as an early modality, none had matched our protocol in all types of presentation of nasolacrimal duct obstruction. Our protocol opened doors to immediate cure in 100% of cases if done before 1 year and was cost effective and freed the patients from developing likely severe complications of acute dacryocystitis, lacrimal abscess, fistula, and cellulitis. We achieved excellent results in our series of 1688 cases and never met with failure in our cases by following this protocol.

We noted a higher rate of success with first probing at all ages because of a better protocol of management. The success rate showed a decrease with increasing interventional age. A similar observation was made by Mannor et al (26), who noted that success of nasolacrimal duct probing was negatively correlated with increasing age: 92%, 89%, 80%, 71%, and 42% at age 12, 24, 36, 48, and 60 months, respectively. Zwaan (27) also noted in his study of 110 eyes that successful results varied with age: 97% below 1 year, 93% up to 2 years, 88% over 2 years. Da Pozzo et al (28) noted in 77 eyes that results of probing varied with age (under 1 year, 96.2%; older than 1 year, 85.7%). Paul and Shepherd (67) noted that the best age for probing was 4 months as it could be done under topical drops and was cost effective. Khasanov et al (56, 73) noted 93% success rate below 2 years, 50% at 3 years, and 33.3% at 3 to 4 years. Others have noted a low rate of success "Honavar et al (29) 73.3% and Young et al (70) 74%". The low success rate was due to delay in probing and selecting older age group patients or methodology of probing. Similar results have been described by others (22, 26-28, 67) who noted decrease in success rate in increasing age at probing.

We believe that if probing fails once, a second and third chance at probing must be given, as it cures

failed cases. A similar view was expressed by Robb et al (30), who noted 90% success of first probing and additional 60% with second probing in 107 eyes, and they used probing at all ages. We carried out probing in failed cases repeated one to three times in our protocol with an interval of 1 week with 100% success rate. However, Baggio et al (69) carried out an early probing two times with 91.3% success rate and Xiao et al (21) performed it one to three times in their study of 172 cases and achieved success in 98.2%. In such cases endonasal endoscopic examination had been found useful as these cases were tackled by cutting the fibrotic end of nasolacrimal duct obstruction with periosteal elevator and marsupialization of nasal cysts (40-42). However, we did not encounter such cases in our series.

A variable criterion of success of probing has been mentioned but consensus existed on the absence of symptoms of tearing and discharge. We noted in our study success in most cases 1 week postoperatively. Burns and Kipioti (24) in a retrospective study noted that most patients improved within 3 months of probing and suggested only 3 months of follow-up. Yap and Yip (25) suggested 1 month follow-up. Kim et al (15) regarded a success of treatment when over 4 weeks epiphora or mucous discharge disappeared and saline passed without resistance on irrigation. Similarly, Honavar et al (29) advocated cure when there was a remission of symptoms within 3 weeks that continued for 6 months. Some (22) have defined successful treatment as a negative dye disappearance test 2 weeks after probing and absence of epiphora at last contact.

This study was comprised of a large series of congenital nasolacrimal duct obstruction (1748 cases) presenting as chronic dacryocystitis, subacute and acute dacryocystitis, abscess, and fistula (Tab. I). We used the same protocol at all age group presentation of the patients and achieved 98.10% success with first probing, 99.64% with second probing, and 100% with third probing. Similarly, early intervention in these cases with a good success rate had been reported by others (14, 31, 57-60, 62-64). However, their series were comprised of only 1 to 54 eyes.

The present study is unique as in its protocol medical treatment in the form of antibiotic drops and hydrostatic massage to sac area was given only for a week, which cured only 3.43% of cases. Hence se-

quential probing repeated one to three times at 1-week interval was considered to be the treatment of choice. Our first time probing failure of 3.5% cases was due to fibrotic resistance at the lower end of nasolacrimal duct obstruction, which was however cleared in third repeat probing. We did not note any case in which the probe went submucosally as seen by some authors (33, 36-38) or failed to rupture membrane in the nose (44). We did not allow our failed cases of probing to be exposed to the silicon intubation or balloon dilatation because of the risks of many complications such as displacement of the tube (43, 49, 74), premature extrusion (43), corneal abrasion (43), or corneal ulcer (39, 43, 44). In a comparative study on balloon dilatation and probing, Gunton et al (72) noted equal results with both procedures.

We have not met with any complication during or after probing. However, Cibis and Jazbi (33) noted high incidence of false passage after lacrimal sac probing. Lyon et al (75) noted canalicular stenosis as a complication of probing in 44% (29 of 66 eyes), which, however, was not seen in our series. Contrary to other observations (34, 35, 39, 46), we did not encounter a case in which there was a need to fracture the inferior turbinate. Our protocol of repeated probing is simple, safe, practicable, economical, of shorter duration, and highly dependable at all ages with all types of presentation of nasolacrimal duct obstruction. If a cure is not obtained with this protocol, the other options of waiting with conservative medical treatment and hydrostatic pressure are available.

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