

The rate of symptomatic improvement of congenital nasolacrimal duct obstruction in Japanese infants treated with conservative management during the 1st year of age

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Abstract: This study aimed to examine the rate of symptomatic improvement of congenital nasolacrimal duct obstruction (CNLDO) in Japanese infants treated with conservative management within the 1st year of age. Thirty-five lacrimal ducts in 27 patients diagnosed with CNLDO were included in the study. During the observational period, lacrimal ducts were massaged. As well, antibiotic eye drops, to be administered 4 times a day, were sometimes prescribed for obvious conjunctivitis. Two lacrimal ducts in 2 patients were probed before the 1st year of age because of dacryocystitis or severe blepharitis; these patients were included in the unimproved group. Twenty-nine lacrimal ducts in 21 patients resolved during the period (82.9%); with 16 lacrimal ducts resolving before six months of age. Therefore, a comparatively high percentage of resolution for CNLDO (82.9%) following conservative management was shown before the 1st year of age in Japanese infants.

Keywords: congenital nasolacrimal duct obstruction, symptomatic improvement, conservative management, massage, probing

Introduction

Congenital nasolacrimal duct obstruction (CNLDO) is a representative entity related to epiphora of infants (Young and MacEwen 1997). Twenty percent of all neonates show epiphora during their first month of life (Young and MacEwen 1997). However, during their first year of life, most CNLDO patients resolve spontaneously or with just conservative management such as lacrimal massage or antibiotic eye drops (Young and MacEwen 1997; Kapadia et al 2006). This result is similar to that of early probing (Katowitz and Welsh 1987; Kapadia et al 2006). However, none of the reports reporting the success rate of early probing included a spontaneous resolution control group (Young and MacEwen 1997). Furthermore, the success rate after at least two trials is much less than that of primary probing (Katowitz and Welsh 1987; Hanavar et al 2000). Therefore, conservative management is usually selected before the first year of age (Young and MacEwen 1997; Kapadia et al 2006).

However, in Japan, early probing has been recommended for CNLDO because of its high success rate (Ishikawa et al 1990; Ohki and Yamazaki 1993; Saito et al 1999). There is just one long term observation study regarding the resolution of CNLDO by conservative management in Japanese infants (Noda et al 1991). All patients in this study successfully resolved before 9 months of age. However, this outcome cannot be directly compared with other reports including some unimproved patients (Young and MacEwen 1997; Kapadia et al 2006) since these are from non-Asian countries; it being unclear whether they are applicable to Japanese infants.

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We examined the resolution of CNLDO by conservative management in Japanese infants before their first year of age.

Patients and methods

Thirty-five nasolacrimal ducts in 27 patients (8 patients were bilateral; 15 were on the right side and 20 on the left; 11 patients were males and 16 females), diagnosed with CNLDO were retrospectively examined. Patients were observed every month until 12 months of age at most, and were examined and managed with or without the resolution of epiphora with only conservative management such as lacrimal massage or antibiotic eye drops. Lacrimal sac massage was administered to all children (10 pushes/time, twice daily), following the procedures of Crigler (1923) or Kushner (1982). When patients showed definite conjunctivitis, antibiotic eye drops (levofloxacin 4 times/a day) were prescribed, and used maximally within a week. All patients, except for 1 delivered at 34 weeks, were delivered at normal term. The diagnosis of CNLDO was made from the clinical course and fluorescein disappearance test (MacEwen and Young 1991a). Other forms of epiphora, such as epiblepharon, congenital entropion, congenital glaucoma, keratitis, uveitis and patients with facial malformations (Young and MacEwen 1997; Hanavar et al 2000; Kashkouli et al 2002), were not included in the study. The resolution of CNLDO was judged by the improvement of epiphora and from the fluorescein disappearance test (MacEwen and Young 1991a). Syringing was not performed to confirm CNLDO and its resolution. Patients with symptoms after 12 months of age underwent probing, the success of which was confirmed by syringing using normal saline solution with fluorescein. For these patients, lacrimal massage was continued up to the day probing was undertaken. Statistical analyses were performed with a chi-square test, and a P-value less than 0.05 was judged as statistically significant (SPSS 8.0J : SPSS Japan Inc, Japan).

Results

No patients were excluded because of complete follow-up. However, one side in a patient who presented with dacryocystitis underwent early probing before 12 months of age (Kashkouli et al 2002). In addition, another patient with unilateral symptoms showed discharge throughout the day, because of which severe eyelid erosion was shown. Antibiotic eye drops could not improve this symptom, which was improved by probing before 12 months of age. These 2 sides in 2 patients were included in the non-improved group.

Twenty-nine sides of 21 patients (13 right and 16 left; 10 male patients and 11 female) successfully resolved with just conservative management (82.9%). In the 29 sides, 16 resolved before 6 months of age, and one at 12 months of age (Table 1). Based on these data, the final possibility of resolution in each month was calculated until 12 months of age (Table 1). Eight patients with bilateral symptoms resolved simultaneously or within 3 months after contralateral resolution (Table 2). The patient born at 34 weeks gestation recovered from the symptoms at 10 months of age. Four nasolacrimal ducts in 4 patients without resolution of CNLDO during the observational term (1 male, left side; 3 females, 1 right side and 2 left) underwent probing under topical anaesthesia at 13 months of age, all were confirmed as resolved after the procedure. There were no significant differences in sex ($p = 0.381$) or laterality ($p = 0.452$) for the rate of the CNLDO resolution under conservative management.

Discussion

In the present study, 82.9% of CNLDO in Japanese infants resolved with the conservative management before the 1st year of age. The percentages of spontaneous resolution or resolution of CNLDO by conservative management in other studies were 94.6% (Price 1947), 89%: before 13 months (Petersen and Robb 1978), 94.7% (Nelson et al 1985), 89%: before 16 months (Paul 1985), 93.3% (Nucci et al 1989), 96% (MacEwen and Young 1991b), and 80% (Piest and Katowitz 1991). Noda and colleagues (1991) reported CNLDO in Japanese infants, all resolved with conservative management by 9 months of age. Although the result in the present study showed a little lower rate than that of

Table 1 Numbers of patients in whom CNLDO resolved by conservative management at each month of age and the possibility of resolution before 12 months of age (%)

Months of age	Numbers with resolution	Possibility of resolution before 12 months of age (%)
1	0	82.9
2	1	82.4
3	4	80.0
4	1	79.3
5	4	76.0
6	6	68.4
7	1	66.7
8	1	64.7
9	3	57.1
10	5	33.3
11	2	14.2
12	1	–

Table 2 Months of age at resolution of CNLDO by conservative management in patients with bilateral symptoms

Patient	Right (months of age)	Left (months of age)
1	3	2
2	5	3
3	3	3
4	12	11
5	9	9
6	6	6
7	10	10
8	6	9

other studies, the resolution rate of CNLDO by conservative management in Japanese infants still accounted for a high percentage.

More than half (16 of 29) of the resolutions of CNLDO patients were observed before 6 months of age. However, a considerable number of patients resolved in the final 6 months (Table 1). This outcome is similar to that reported by MacEwen and Young (1991b) and Paul (1985). They also calculated the possibility of resolution in each month until 12 months of age. In MacEwen and Young's study (1991b), patients with CNLDO in the 1st month of age were expected to resolve spontaneously in 96% of the cases before 12 months of age, in 75% at 6 months, in 36% at 9 months and in just 5% at 11 months. Paul's data (1985) with the conservative management showed a similar tendency, ie, 86% of patients with CNLDO at 3 months of age were expected to resolve before 12 months of age, in 70% of those at 6 months and in 52% at 9 months. In each study, a high percentage of the estimated resolutions occurs in the patients' early life periods, but the rate decreases with age. MacEwen and Young (1991b) showed that most spontaneous resolution occurs within the first 6 months, resulting in a low estimated resolution rate in the latter 6. However, according to our results (Table 1), more than 50% of resolution can be expected even in those with CNLDO at 9 months of age, which is similar to the figures in Paul's study (1985).

Bilateral symptoms of CNLDO were found in our study (Paul 1985; Noda et al 1991; Saito et al 1999). However, laterality with regard to the time of resolution has not been reported. In the present study, all CNLDO patients resolved simultaneously or within 3 months after any contralateral resolution. When one side of bilateral symptoms resolves at 10, 11, or 12 months of age, it is reasonable to observe patients for at least 3 months, because spontaneous resolution or resolution by conservative management can be expected after 13 months of age (Young and MacEwen 1997; Schellini et al 2007).

Lacrimal sac massage is usually performed in conservative management for CNLDO (Crigler 1923; Kushner 1982; Noda et al 1991). Putting pressure on the lower part of the nasolacrimal duct by pressing the common canaliculus is a useful procedure (Crigler 1923; Kushner 1982). Although Noda and colleagues (1991) described the efficacy of lacrimal sac massage for the resolution of CNLDO, it was not made clear whether lacrimal content actually moved downward. However, Foster and colleagues (1996) demonstrated this downward movement using lacrimal scintigraphy. Although in that study, lacrimal content did not move toward the nasolacrimal duct in all patients, the study did suggest the efficacy of lacrimal sac massage.

Early probing performed before 12 months of age (Kapadia et al 2006) has been recommended in Japan (Ishikawa et al 1990; Ohki and Yamazaki 1993; Saito et al 1999). This is because fixation of patients is much easier (Ishikawa et al 1990; Zwaan 1997) and prolonged inflammation is thought to promote fibrosis of obstructed sites with a decrease in the cure rate (Broggi 1959). However, no evidence has been shown that early probing has a higher cure rate than that for spontaneous resolution (Young and MacEwen 1997). None the reports that recommended early probing included controls; thus their results may potentially be flawed (Young and MacEwen 1997). As well, there is no evidence (MacEwen et al 1994) that prolonged inflammation promotes fibrosis of obstructed sites (Broggi 1959). In general, prolonged obstruction of the nasolacrimal duct is thought to be caused by a bone malformation of the lacrimal passages (Takagi et al 2005), and not by the membranous obstruction of the lower aperture of the nasolacrimal duct (Young and MacEwen 1997). Although the resolution rate from early probing is 92 to 100% before 12 months of age (Kapadia et al 2006), this result is similar to that of spontaneous resolution or resolution by the conservative management before 12 months of age (Kapadia et al 2006).

Probing sometimes produces false passages. Injuries to the lacrimal duct epithelium may cause a cicatricial stricture and prevent the spontaneous resolution of CNLDO (Young and MacEwen 1997). The cure rate from a 2nd probing is greatly decreased (Katowitz and Welsh 1987; Hanavar et al 2000). When bleeding is observed during a probing, it usually indicates false passage formation (Young and MacEwen 1997). When there is a probing failure, iatrogenic canalicular obstructions occur in 44% of patients (Lyon et al 1991). To prevent such iatrogenic obstructions, a "wait and see" policy with conservative management appears the best option. Based on the findings above, early probing before 12 months

of age should be refrained from unless symptoms such as dacryocystitis or severe blepharitis are presented. Probing is well tolerated from 13th months of age, according to our result.

In conclusion, we have shown that 82.9% of Japanese CNLDO infant patients resolved with just conservative management before their 1st year of age. Since the resolution of CNLDO by conservative management also often occurs between 6 months and the 1st year of age, a “wait and see” policy while implementing conservative management is very useful for CNLDO in Japanese infants.

Disclosure

The authors have no financial interest related to this manuscript.

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