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Effectivity of nasolacrimal probing for the treatment of congenital nasolacrimal duct obstruction: a retrospective study

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鼻泪管探通术治疗先天性鼻泪管阻塞的疗效观察

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摘要

目的:研究探通术与灌溉对儿童先天性鼻泪管阻塞(congenital nasolacrimal duct obstruction,CNDO)的成功率及相关因素。

方法:从 2005/2011,患有 CNDO 的儿童 235 例 261 眼行鼻泪管探通术。患者按年龄分为 3 组:组 1,131 眼为 12~24 月龄;组 2,82 眼为 24~48 月龄;组 3,48 眼为 48~120 月龄。在全身麻醉下进行上、下泪小点探通术。术后 1d;1、2wk;1、3mo 进行随访。通过 Mann Whitney *U* 检验和卡方检验分析手术成功率与年龄的相关性。

结果:儿童 235 例(女性 122 例,男性 113 例)的平均年龄为 27.6±10.7(12~120)mo。3 组患儿一次探通术后的成功率分别为 90.1%、85.4% 和 47.6%,并且组 1、组 2 成功率显著高于组 3(P<0.05)。患儿 53 例(20.3%)再次行探通术,3 组的成功率分别为:61.5%、58.3% 和 25.0%。

结论:鼻泪管探通术是治疗 CNDO 的有效方法,特别是对于小于 2 岁的患儿。手术成功率随着年龄增加而降低,但是上下泪小管二次探通术可以提高术后效果。

关键词:先天性;鼻泪管阻塞;治疗;探通术

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Abstract

• AIM: To investigate the success rate and relevant factors for probing and irrigation in children with congenital nasolacrimal duct obstruction(CNDO).

• METHODS: A total of 261 eyes from 235 children were treated surgically with probing due to CNDO between 2005 and 2011. Patients were classified into three groups with respect to age. Group 1 (12-24 months), group 2 (24-48 months) and group 3 (48-120 months) consisted of 131, 82 and 48 eyes respectively. Probing was performed for upper and lower punctum under general anesthesia. Postoperative control visits were performed on 1st day, 1st and 2nd weeks, 1st and 3rd months. Success rate and correlation with age were analyzed using Mann Whitney *U* and Chi-square tests.

• RESULTS: The mean age for the 235 patients (122 females, 113 males) was 27.6±10.7 (12-120) months. The rates of success after one probing in groups 1, 2 and 3 were 90.1%, 85.4% and 47.6% respectively and the procedure was significantly more successful in groups 1 and 2 (P<0.05). Probing was repeated in 53 (20.3%) patients and rates of success in groups 1, 2 and 3 were 61.5%, 58.3% and 25.0% respectively.

• CONCLUSION: Probing is an effective treatment for CNDO especially in children < 2 years of age. Rate of success decreases with advancing age, but second probing and application both through upper and lower canaliculi are measures that may improve the outcome.

• KEYWORDS: congenital; nasolacrimal duct obstruction; treatment; probing

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INTRODUCTION

Congenital nasolacrimal duct obstruction (CNDO) is a common problem in the early years of life. It may present with typical findings such as epiphora, increased tear lake, and mucous discharge starting around 3-4 weeks of life[1-3]. Actually, 70% of the newborn infants have CNDO but almost 80%-100% of cases resolve by 12 months. The incidence of symptomatic CNDO is reported to be 6% - 20%[1,2,4].

Standard management in the first months of life involves hydrostatic massage of the lacrimal sac and topical antibiotics. In cases that persist beyond several months, early office probing or hospital based probing around the age of 1 year provides good result. The optimal timing of probing and irrigation for the treatment of CNDO has been controversial. Some studies suggest that delaying the operation, especially after age 2, is associated with higher failure rates. Some authors reported that increasing age significantly decreased the success rate of probing beyond the age of 1 year[1-3].

After 12 months of age, the likelihood of spontaneous resolution decreases, and most patients are treated with probing of the nasolacrimal drainage system to relieve the blockage mechanically and with irrigation with dilute fluorescein solution to confirm patency. Other surgical alternatives include nasolacrimal silicone intubation and dacryocystorhinostomy[1-3].

We investigated both the success rate of probing as the primary treatment of CNDO and the relevant factors that may correlated to the outcome.

MATERIALS AND METHODS

Subjects This retrospective study was performed in the ophthalmology department of a tertiary care center. Medical records of 235 children, aged 1-10 years, treated surgically due to CNDO were studied retrospectively after the approval of Institutional Review Board. A total of 261 eyes underwent probing between 2005 and 2011. Three groups were constituted with respect to age: group 1 (12-24 months), group 2 (24-48 months) and group 3 (48-120 months) consisted of 131, 82 and 48 eyes respectively. All the cases had been mainly suffering from epiphora and results for fluorescein disappearance test (FDT) were negative. Only cases in which probing was the initial surgical treatment were included.

Patients with a history of lacrimal sac mucocele, acute dacryocysititis, dacryocutaneous fistula, nasolacrimal system trauma, punctual, canalicular, craniofacial or eyelid anomalies and cases who had undergone probing before age one were excluded from the study. The diagnosis of nasolacrimal duct obstruction was confirmed with history, clinical findings and FDT. The initial examination included evaluation of the size and placement of the lacrimal puncta, assessment of anomalies of the lids or face, and ruling out conjunctivitis or allergic inflammation.

Topical proparacaine HCl was applied on fluorescein paper and rubbed bilaterally onto the lower fornices of patients. The level of fluorescein on the lower lid was checked five minutes later. Observation of fluorescein on the side of eyelid was interpreted as FDT negative. All parents were informed about the operation in detail and consent forms were obtained in all cases. Upper and lower punctums were dilated under general anesthesia and lacrimal irrigation was performed with saline. The Bowman probe was advanced forward first vertically from the upper punctum to ampulla and then in a horizontal direction after ampulla. Probe was carried forward until the bony portion of the nasal wall of lacrimal gland. It was directed 90° vertically backwards to the molar teeth, laterally to the nasolabial sulcus and carried forward to rupture of membrane. The same procedure was repeated in the lower punctum. To control the passage, nasolacrimal system was irrigated with the lavage fluid containing rifampicin and the fluid was aspirated from the nasal cavity to control the patency. Probing was regarded successful if the red color of rifampicin solution was observed. After probing, lacrimal system was irrigated with dexamethasone in order to alleviate the inflammation and avoid re-obstruction.

Topical tobramycin 4 times per day, and topical dexamethasone 4 times per day were used after the operation for 2 weeks. Control visits were performed on the 1st day, 1st and 2nd weeks, 1st and 3rd months postoperatively. Epiphora complaint was questioned and the fluorescein disappearance test was repeated during controls. The cases with positive FDT result that did not suffer from epiphora were regarded successful. Probing was re-performed at least 2 months after the initial intervention in refractory cases.

Statistical Analysis Statistical Package for Social Sciences (SPSS, Chicago, IL) version 13.0 for Windows was used for the statistical analyses. Comparison of quantitative data was performed via Mann Whitney *U* and Chi-square tests. The results were evaluated in 95% confidence interval and level of significance was set at $P<0.05$.

RESULTS

The whole group of 235 patients consisted of 122 females (51.9%) and 113 males (48.1%) with an average age of 27.6±10.7 (12-120) months. Epiphora occurred on the right eye in 111 patients (47.2%), on the left eye in 98 patients (41.7%) and bilaterally in 26 patients (11.1%). The success rate of probing after the first intervention in groups 1, 2 and 3 were 90.1% (118 eyes), 85.4% (70 eyes) and 47.6% (20 eyes) respectively. Groups 1 and 2 had benefit from probing better than group 3 ($P<0.05$). In total, a second probing was required in 53 (20.3%) patients and the rates of success after the second probing in groups 1, 2 and 3 were 61.5%, 58.3% and 25.0% respectively (Figure 1). The second intervention was found to improve the success rate in groups 1, 2 and 3 from 90.1% to 96.2%, from 85.4% to 93.9% and from 47.6% to 56.3%, respectively. During the procedure, ossification of nasolacrimal canal was felt in 26 of 31 cases with failure. In the remaining 5 cases, failure was attributed to the abnormal direction of nasolacrimal duct. No complications due to surgery and anesthesia were detected in this series.

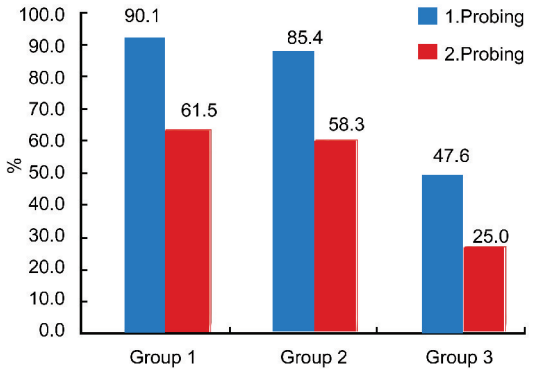

Figure 1 Success rates after 1st and 2nd probing interventions.

DISCUSSION

Congenital nasolacrimal duct obstruction is the most common cause of epiphora in pediatric age group[2,4]. Even though there is no consensus for the time of surgical treatment in CNDO, we preferred to perform probing after age 1, since 80% -100% of cases may improve spontaneously in the first year of life[5]. FDT is a non-invasive test with sensitivity as high as 90% - 100% in the diagnosis of lacrimal duct obstruction[6]. We have utilized FDT rather than dacrcyocystography to confirm the diagnosis of lacrimal duct obstruction.

Probing is generally applied through upper punctum. In majority of cases, the horizontal parts of canaliculus enlarge to form the common canaliculus that opens into the sac with a certain angle. This forms the Rossenmüller valve, which avoids the reflux from the sac. In the remaining 10% of cases, the upper and lower canaliculi enter the sac separately. In these circumstances, mucosal folds existing between the sac and canaliculus prevent reflux from the sac[6-8]. Congenital nasolacrimal duct obstruction generally develops due to the imperforated membrane at the level of Hasner valve[7]. We think that the membranes beside the mucosal folds between the canaliculus and the sac may be responsible for CNDO. Therefore, we applied probing through both upper and lower canaliculi. We did not come across with any complications in the punctums during this procedure.

Rates of success for medical therapy in children <1 year was reported to vary between 60% -91. 2%[9]. Success rates for probing ranged between 75% - 100% with a tendency to decrease with the advancement of age[5,7,10-12]. The age after which success rate for probing significantly diminishes is obscure. Some publications state that probing can be delayed to ages of 2 or 3 years[1,3,6]. In contrast, some authors suggest that probe failure risk increases with age, doubling every 6 months. This risk of failure may be due to self-selection and lacrimal duct probing at age 4 months in the office is the most cost - effective strategy[13]. We think that expectation or medical treatment until age one is sufficient because spontaneous resolution may have occurred. Any delay beyond this period may result in recurrent infection and inflammation, which may subsequently cause calcification of the canaliculi. Increasing age after 13 months not only decreases the cure rate but also increases the number and complexity of future procedures. Age > 36 months, bilateralism, dilatation of lacrimal sac, fibrous type of obstruction, severity of epiphora and canalicular stenosis were poor prognostic factors in this aspect[14-16]. Repetition of probing was found to improve the therapeutic success[17]. Our findings are in parallel to these data.

There are two possible explanations for the lower cure rate of probing in the older children with CNDO. This may be either due to the prolonged inflammation and fibrosis in the lacrimal drainage system with increasing age or a consequence of accumulation of complex obstruction with time since cases with less severe obstruction resolves spontaneously is obscure. The complex (firm, non - membranous, or complicated) CNDO has been identified as a major risk factor predictive of the failure of probing[16]. The outcome of the nasolacrimal duct probing at 1 week follow up is an indicator of the final outcome[16].

Our success rates were comparable to those in the literature, and we attribute our "acceptable" outcomes to application of probing through both upper and lower canaliculi. We advocate this safe, practical and effective technique to achieve better outcomes. In our opinion, the reason for failure of probing in older children may be due to obstruction, ossification or abnormal direction of nasolacrimal duct. The cause of ossification in the older age group may arise from calcification of membranous tissue due to recurrent infections. Achievement of improved rates of success after the second intervention may be explained by the fact that these procedures were mostly carried out by more experienced surgeons. Another possibility may be exertion of a higher force during probing in secondary interventions.

A stepwise probing combined with nasal endoscopy to find and treat the different types of the CNDO. Some investigators have also suggested intranasal endoscopy with probing or silicone intubation especially in patients with previous failed probing[18].

The main limitation of this study is the retrospective nature, since we had to rely on the accuracy and completeness of medical records. Since some of the successful, uncomplicated cases may be lost to follow up, problematic cases may be represented to a relatively higher ratio in the cohort. Therefore, true success rate of probing may be even higher than reported in this study.

In conclusion, our study demonstrates that probing with irrigation is a successful primary treatment for CNDO in children between 1 and 10 years of age. Based on our data and the results of numerous other studies, probing should be

tried before more invasive methods such as dacryocystorhinostomy. Patient age is inversely proportional to the success rate and second probing as well as application of probe through both upper and lower canaliculus may improve the outcome. Further studies should be focused to determine the selection criteria and stepwise algorithm for CNDO treatment.

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