Is There Any Evidence for Surgical Intervention in Childhood Epiphora?

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Abstract

Epiphora in infants is common, and there is no evidence that surgical interventions during the first year of life have any advantage over the natural history of spontaneous resolution in terms of cure rate. Probing at between 12 and 15 months of age has been shown to provide an earlier improvement than simple observation, but by two years of age there is no difference between those probed and those not probed. There are no good studies comparing the value of endoscopic probing versus the use of intubation and balloon dacryocystplasty either as primary or secondary procedures. External and endonasal dacrycystorhinostomies (DCRs) are both useful procedures, but they have not been directly compared in terms of the benefits of one versus the other.

Keywords

Congenital naso-lacrimal duct obstruction, spontaneous resolution, probing, intubation, paediatric dacrycystorhinostomy (DCR)

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The most common outcome of infantile epiphora is spontaneous resolution,[1–10] although surgical intervention in the form of syringing and probing is advocated for cases that fail to settle.[11–18] More complex surgical procedures such as intubation, balloon dilatation and dacryocystorhinostomy (DCR) may be indicated when the epiphora persists. There is considerable controversy surrounding the management – both conservative and surgical – of childhood epiphora, mainly due to a literature based on the lower levels of evidence such as case reports, expert opinion and non-controlled, mainly retrospective, series. Higher levels of evidence such as systematic reviews, meta-analyses and randomised controlled studies (RCTs) are lacking in this clinical area. The evidence to support some of the surgical options will be explored in this article.

Congenital naso-lacrimal duct obstruction (CNLDO) is caused by a membranous obstruction at the distal end of the NLD.[19,20] Obstruction at other sites is much rarer but becomes clinically more relevant in older children as those with CNLDO spontaneously resolve. These obstructions may be complex and have a different natural history and outcome from CNLDO. However, it is not possible to identify the more complicated causes of epiphora on clinical grounds, although it is this group that may benefit most from surgical intervention.

Syringing and Probing

There is extensive literature on the use of probing in the management of childhood epiphora, and the rates of probing success are between 86 and 96% in mainly retrospective case series in the first year of life.[11,14–18] These are impressive figures for any surgical procedure; however, these results must be viewed in light of a condition that has been shown in both retrospective series and prospective cohort observational studies to have a spontaneous resolution rate of between 89 and 96% by one year of age.[1,3–9] There is no study in children during the first year of life that evaluates the success rate of probing using a control group.

Does probing have the advantage of effecting a more rapid cure than observation? Uncontrolled studies of probing up to six months of age indicate a success rate of 79–98%[2,11,15] compared with a natural resolution rate of 76–100% during the same time-frame.[1,3,4,6,7,10] This indicates that there is no convincing evidence to demonstrate that probing offers any advantage in terms of the speed of reduction of symptoms and takes place at the cost of probing considerable numbers of children who would spontaneously remit. A prospective observational study found that 90% of those with epiphora at three months of age, 75% of those at six months of age and 36% of those at nine months of age resolved by one year of age.[1]

Does early probing have a higher success rate than when it is performed later? There is some evidence to support this,[15,21] although other work has identified either no difference in success rate of probing at different ages[8,11–13,22,23] or that the higher failure rate in older children is unrelated to age, but is due to a process of natural selection.[9,11,18,24–27] As children grow older, more complex and severe obstructions become increasingly common; this, in turn, reduces the success rate of probing in older children. Studies that have critically evaluated the causes of 'probing failure' and those that have endoscopically viewed the distal end of the NLD during probing have demonstrated that the success of probing is determined more by the nature of the obstruction than by the age of the patient.[25–27]

Resolution continues after one year of age[3,8,28,29] and by 24 months of age 60–79% of symptomatic one-year-olds have been shown to

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have spontaneously improved.[8,29] There is only one prospective, controlled study into the success rate of probing during the second year of life; this identified that probing and syringing between 12 and 14 months of age was more successful than the spontaneous resolution rate in a control group at 15 months, but by two years of age there was no statistical difference in the outcome between those probed and those not probed due to continued spontaneous resolution in the control group.[29] This study indicates that observation is as effective as probing in children up to two years of age, but that probing provides a more rapid result if performed at, or just after, 12 months of age. It also indicates that early and late probing are equally effective and that there is no disadvantage in terms of eventual outcome by delaying probing.

Endoscopic probing was introduced because standard probing is a blind procedure that makes it liable to complication, particularly in systems that are already anatomically abnormal.

Endoscopic Probing

Endoscopic probing was introduced because standard probing is a blind procedure that makes it liable to complication, particularly in systems that are already anatomically abnormal. This involves direct visualisation of the distal end of the NLD and provides information in terms of the nature of the obstruction (stenosis or atresia). It also either observes the passage of the probe directly into the inferior meatus or identifies the development of a false passage and provides an opportunity to rectify this.[30,31] Endonasal studies have identified that the result was converted from failure to success due to an intranasal manipulation when the result was between 11 and 36%.[31–33] Is this justified? There have been no prospective randomised studies comparing blind versus endonasal probing as either a primary or a secondary procedure; these are required to evaluate this development properly, especially in older children who are more likely to benefit.

What to Do If Probing Fails

Studies into the management of persistent epiphora following probing are generally limited due to a lack of consensus regarding what a 'failed probing' means in anatomical terms. Lack of success is usually due to physiological (functional) epiphora, failure to create a patent passage between the NLD and the inferior meatus or complex abnormalities of the upper outflow system. Each of these requires a different management plan varying from observation to re-probing – preferably using endoscopy to aid diagnosis – to a variety of procedures to rectify complicated abnormalities. These include intubation of the lacrimal system with silastic or silicone tubes, balloon dilation and DCR. Evaluation of the role for these other techniques in 'probing failure' is problematic due to the poor definition of this entity.

Intubation and Balloon Dacryocystoplasty

Intubation of the lacrimal system is usually recommended for cases where conservative treatment and probing have failed, with a quoted success rate of between 80 and 97%.[34–37] A retrospective analysis of two groups of children – one that underwent probing and the other that was intubated for continued epiphora after one probing – found no difference in the outcomes of each group.[38] Intubation has also been promoted as a primary procedure, mainly in older children with persistent symptoms.[39–43] The results of these retrospective studies indicate that more than 90% are cured by this intervention; however, these results do not differ from those of late probings.[12,13,22,27]

An alternative to intubation in cases of failed probings is balloon dacryocystoplasty (DCP).[44–46] This process involves passing a balloon catheter into the NLD to dilate a stenosed passage and is successful in between 74 and 94% of cases in retrospective studies.[44–46] This is an expensive procedure,[47] but despite this, and the lack of any concrete evidence of its benefits compared with probing,[12,13,22,27] it has been advocated as a primary procedure instead of probing.[48,49] One prospective non-controlled study identified a success rate of 79%,[48] with this result being unaffected by either the age of the child or the extent of the NLD obstruction. A retrospective review comparing balloon DCP with probing as a primary procedure for CNLDO found that both were equally successful.[50]

A recent prospective randomised trial comparing transnasal endoscopic assisted balloon dilatation with bicanalicular silicone intubation for the primary surgical treatment of congenital nasolacrimal duct obstruction in children over three years of age identified that balloon dilatation was more effective (90%) than intubation (62.5%).[51] Although statistically significant, this study has small groups of 20–24 patients in each arm of treatment.

Dacryocystorhinostomy

External DCR achieves a good success rate in large case series ranging from 83 to 96% in cases of CNLDO with chronic dacryocystitis when medical therapy, probing and silicone intubation have been unsuccessful.[52–54] The complication rate is low (3%) and the procedure is well-tolerated in children.[53] In expert hands, DCR is a successful treatment for appropriately selected paediatric cases with complex lacrimal outflow obstruction in the absence of cannalicular disease.

Currently, there is no evidence to determine the effectiveness of probing in children less than one year of age compared with simple observation.

With the advent of endoscopic techniques and small-diameter endoscopes with wide-angled fields of view, intranasal visualisation has improved and hence allowed DCR to be performed endoscopically. Endoscopic DCR takes much less time and therefore can be carried out safely as an outpatient procedure. The overall success rate of endoscopic DCR ranges from 82 to 88%.[55–57]

Summary

Currently, there is no evidence to determine the effectiveness of probing in children less than one year of age compared with simple observation. An adequately powered RCT of probing versus observation poses a difficult challenge and is probably not feasible. With such high rates of success for probing and natural resolution, a study of huge proportions would need to be performed in order to prove or refute the benefits of probing. There is better evidence to support probing at 12–15 months of age, but the effect is not sustained and there is no benefit by the time children reach two years of age.[29] It is impossible to draw reliable conclusions from the evidence available regarding intubation and balloon DCP. Well-designed RCTs are needed to establish the role of these options. More research is required to clarify what constitutes a 'failed probing' and the role of surgical options in the management of this condition. ■

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