Fortnightly review

Managing congenital lacrimal obstruction in general practice

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Every year thousands of infants are taken to their general practitioner because they have developed a persistently watering or sticky eye. Congenital nasolacrimal duct obstruction is by far the most common cause of these symptoms, and an understanding of the natural course of this condition is the key to planning the management of affected infants. While most children can be managed without referral to a specialist ophthalmic service, it is important to recognise that watering and discharge can occasionally be among the presenting features of rarer, more serious conditions.

Methods

This review is based on the information acquired in the course of our longstanding clinical and research interest in managing congenital lacrimal obstruction. Additional literature was searched for manually in journals and as a computer search of Medline to January 1977 (Ovid Technologies) with the heading "lacrimal duct obstruction" and the textwords "congenital nasolacrimal duct obstruction" and "epiphora."

Fig 1 The lacrimal drainage system. Congenital nasolacrimal duct obstruction is usually caused by a persistent membranous obstruction at the lower end of the nasolacrimal duct

Summary points

Twenty per cent of infants develop the symptoms of congenital lacrimal obstruction during their first month of life

Spontaneous resolution is the commonest outcome, without treatment only 0.7% of infants will still be affected by their first birthday

After considering the differential diagnosis, general practitioners can manage the condition until infants are 12 months old

Use of antibiotics should be minimised

If symptoms are still present at 12 months hospital referral is indicated

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Natural course and the options for management

Natural course

The lacrimal passages develop in a column of surface ectoderm buried in the naso-optic groove. Canalisation to form the nasolacrimal duct is not complete at the lower end until birth, and a membranous obstruction may persist in up to 70% of neonates (fig 1).¹ If this impatency persists the parents may observe watering and discharge from the eye; symptoms reported in 6-20% of all infants.^{2,3} Other causes of lacrimal obstruction occur less commonly and do not alter the early management within general practice.

Several studies have shown that there is a high rate of spontaneous resolution of congenital lacrimal obstruction, with about 70% of affected children being free of symptoms by 3 months of age and over 90% having resolved by their first birthday.⁴⁻⁸ In a large prospective cohort study 96% of children with congenital lacrimal obstruction showed spontaneous resolution by 12 months of age (fig 2).³ This incidence is so high and spontaneous resolution so common that, for most of those affected, the condition could be regarded as within the range of normal development.

Fig 2 Spontaneous resolution of congenital lacrimal obstruction during the first 12 months of life. In a birth cohort of 4792 infants, 20% of eyes had symptoms of congenital lacrimal obstruction. By 12 months only 41 eyes of 34 children were still affected (adapted from MacEwen and Young³)

Spontaneous resolution may also occur later than 12 months of age.^{4,8,9} Examples of spontaneous resolution in the third year of life have also been recorded. No correlation between outcome and the severity of symptoms and signs has been identified.^{3,9} Even infants with severe persistent discharge or a mucocoele of the lacrimal sac may resolve without treatment.

Interventional treatments for congenital lacrimal obstruction

There is an extensive literature advocating treatments for congenital lacrimal obstruction, but few randomised or controlled studies. Spontaneous resolution is so common that, without control groups, studies are liable to have overestimated the benefits of treatment.

Topical antibiotics

Repeated courses of topical and sometimes systemic antibiotics are widely used to treat the discharge associated with congenital lacrimal obstruction. However, there is no evidence to support this practice, and there are only isolated anecdotal reports of serious infections considered secondary to obstruction of the nasolacrimal duct.¹⁰ None of the large, prospective, observational series in which surgical treatment has been delayed reported serious infective complications,^{3,5-7} and there is no evidence that chronic infection has a role in the aetiology of severe stenosis or that it decreases the chances of cure.¹¹

Intermittent attacks of conjunctivitis may occur, with increased discharge and a hyperaemic bulbar conjunctiva, for which a course of topical antibiotic is indicated. However, much of the time children with congenital lacrimal obstruction have white bulbar conjunctivae, and their parents often realise before their doctor that topical antibiotics have no sustained effect on the symptoms. Antibiotics should only be given when there is clinical evidence of infection.

Simple lid cleaning

Accumulated discharge on the eyelids may be irritating, encourage rubbing, and perhaps increase the frequency of episodes of secondary conjunctivitis and skin excoriation. Most ophthalmologists advise that the discharge should be removed by cleaning the lids regularly.

Massage of the lacrimal sac

Gentle pressure on the lacrimal sac will encourage retrograde flow of the contents into the conjunctival sac, and this has been recommended by some authors.^{4,6} Its value is not known.

A more specific technique attempts to rupture the membranous obstruction at the lower end of the nasolacrimal duct.¹² This is done by occluding the common canaliculus and then putting firm pressure on the sac, sending a hydraulic pulse down the nasolacrimal duct. The technique has been assessed in a single randomised controlled trial, which showed a significant improvement in the cure rate of the treated group.¹³ This study needs to be repeated before its recommendations are implemented.

Probing the lacrimal system in the first year of life

For many years, the standard surgical treatment for congenital lacrimal obstruction has been to pass a fine wire probe down the tear outflow passages to rupture the membrane at its lower end. Patency is then confirmed by recovering fluorescein from the nose after it has been syringed through the lacrimal passages. In Britain this procedure is performed under general anaesthetic, which permits a detailed assessment of the lacrimal system and identification of any more complex anomalies that might require alternative management. The optimal age for the procedure has been in dispute for many years.

Probing can be immediately successful, and there have been retrospective studies with high success rates (Information and Statistics Division, National Health Service in Scotland and Office for Population Consensus and Surveys, 1994, unpublished data).¹⁰ Many authors have recommended that probing should be carried out during the first year of life, commonly at about 6 months of age but varying between the first weeks of life to after 13 months.⁷⁻¹⁰ A recent American meta-analysis suggested 4 months as the optimal age for probing.¹⁴ Infants are often probed in the doctor's consulting room. In Britain, most probings are performed under general anaesthesia on children between their first and second birthdays (Information and Statistics Division, National Health Service in Scotland and Office for Population Consensus and Surveys, 1994, unpublished data).

There are no controlled studies that show the benefit of probing during the first year of life. Advocates of early probing claim that parents may prefer the quick cure it offers rather than a prolonged wait without certainty of cure. However, the risks of probing have never been fully evaluated. Damage to the lacrimal epithelium might produce stenosis and actually prevent later spontaneous resolution. This may explain the report of a 44% incidence of canalicular stenosis after failed probings, a rare finding at a first probing.¹⁵ In our own prospective study bleeding from the punctum, which might be a sign of trauma further down the system, occurred in 20% of 60 probings.⁹

On the basis of the available evidence we consider that there is no reason to suggest a first probing for congenital lacrimal obstruction before 12 months of age.

Probing the lacrimal system after 12 months of age

A recent prospective study compared probing at around 12 months of age with no treatment up to 24

months.⁹ Probing was found to be significantly superior in the short term but, with continuing spontaneous resolution, there was no longer any significant difference between the groups at 24 months.

We conclude that delay in surgical intervention is a viable option up to the age of 2 years, or later if the parents wish it. In most cases this will avoid the need for surgery. In the presence of severe discharge or mucocele such prolonged delay may be unreasonable for parents and child. We consider that probing should be the medical advice when symptoms are severe at 12 months and in milder cases at 18 months.

Other surgical procedures

More complex surgical interventions may be required if probing fails. These include turbinate fracture,¹⁶ intubation,¹⁷ and balloon dilatation of the nasolacrimal duct.¹⁸ Nasal endoscopy permits direct visualisation of the lower end of the nasolacrimal duct, increasing the accuracy of these procedures.

Each one has also been used as a first procedure, but none is supported by evidence from controlled trials and they may carry greater risk of iatrogenic stenosis. After the age of 2 years, the cure rate for primary probing falls to about 50%, as all except the more severe obstructions will have resolved spontaneously.^{9 10}

Alternative (uncommon) presentations of congenital lacrimal obstruction

Some infants are born with an easily observed tense swelling of the lacrimal sac, a congenital dacryocystocele. This occurs when there is a combination of congenital lacrimal obstruction and a congenital obstruction to retrograde flow through the canaliculi, and, while uncommon, it is not rare. These swellings usually have a definite blue coloration, making them liable to misdiagnosis as a vascular lesion (fig 3). Their clinical course is distinct from that of uncomplicated congenital lacrimal obstruction: acute inflammation is

Fig 3 Congenital dacryocystocele: the distinct blue coloration may lead to misdiagnosis of this uncommon lesion as a vascular abnormality. (Reproduced with parents' permission)

common, developing in and around the lacrimal sac within a few days of birth in 20-60% of patients.^{19 20} In a minority of cases there is a communication down the nasolacrimal duct to a large intranasal cyst; this is a well documented cause of neonatal respiratory obstruction, which may require urgent treatment.^{19 21} An ophthalmic opinion should be obtained as soon as the diagnosis of congenital dacryocystocele is suspected.

There are few studies to guide management. While some reports have advised immediate probing of lacrimal passages, most recommend a delay of 5-7 days as spontaneous resolution may occur.^{19 20} If signs of inflammation develop immediate probing of an awake swaddled infant should be performed and treatment with systemic antibiotics started.²²

Assessment of infants with persistent watering and discharge from the eye

Presentation

The characteristic presentation of congenital lacrimal obstruction is persistent watering (epiphora) and mucopurulent discharge observed from the first month of life.³ This usually affects only one eye, although both eyes may be affected in up to 20% of cases.³ The affected eye is usually white with no evidence of inflammation, although episodes of increased discharge with conjunctival hyperaemia may occur, indicating a secondary conjunctivitis. Crusting on the lid margin is common, and parents will often report the eyelids being stuck together on waking.

While the commonest explanation by far for these symptoms will be congenital nasolacrimal duct obstruction, it is vital to consider the possibility of other causes. For example, a watery eye in infancy can, rarely, be one of the presenting signs of congenital glaucoma, keratitis, or uveitis. Any features other than epiphora and discharge put the diagnosis of congenital lacrimal obstruction in doubt; in particular, beware of definite photophobia, persistent eye rubbing, marked hyperaemia of the bulbar conjunctiva, or systemic upset. With attention to this aspect of the infant's history and the steps in clinical examination recommended below, more serious conditions are unlikely to escape recognition. If there is still doubt about the diagnosis ophthalmological advice should be sought urgently.

Structured clinical examination

We recommend a four step approach.

(1) Examine to confirm apparently normal visual function and ocular appearance for the age group

Vision can be tested by observing slow pursuit eye movements to a face or toy, if possible with each eye separately. Usually the eye will be white, but some conjunctival hyperaemia is acceptable, especially in the lower fornix if the parents have noted that the eye has been sticky. Check that each cornea seems clear and of normal size with sharp iris detail and that corneal reflexes are central. With an ophthalmoscope, confirm the presence of a red reflex in both eyes.

(2) Look for signs supporting a diagnosis of lacrimal obstruction

These include crusting on the lid margins, a thick tear film that often overflows, and sometimes a swelling at

the inner canthus denoting the presence of lacrimal sac mucocele. Gentle pressure on the swelling may express mucopus from the canaliculi, confirming a diagnosis of nasolacrimal duct obstruction. The absence of these signs does not exclude the diagnosis.

(3) *Look for signs of the commonest mimics of congenital lacrimal obstruction*

(a) *Any lash or lid abnormality*—The commonest mimic is congenital epiblepharon, in which a skin fold along the lower lid rotates the lashes into contact with the cornea and produces some epiphora and sometimes mild photophobia. This condition is usually left until the child is 6-12 months old before any corrective surgery, as most cases resolve spontaneously and the soft infantile lashes do not damage the cornea.

(b) *Chlamydial conjunctivitis*—Pull the lower lid down to examine the lower fornix. A sticky eye and a plushy, hyperaemic appearance of the lower lid conjunctiva are typical and can continue to over 8 months of age. If in doubt take swabs for chlamydia studies.

In both cases the fluorescein disappearance test (see below) should be normal, excluding congenital nasolacrimal duct obstruction.

(4) *Obtain objective confirmation of lacrimal obstruction*

The test used by ophthalmologists to confirm lacrimal obstruction in infants is the fluorescein dye disappearance test. This test is suitable for use in general practice, by means of drops of fluorescein and a pen torch with a blue filter. These items are also valuable in assisting the diagnosis of corneal abrasion or ulcer.

Technique—Instil a single drop of 1% sodium fluorescein into each conjunctival sac and, 5-10 minutes later, inspect the tear film along the lower lid in blue light with the room lights off. Fluorescein remaining in the tear film is visible as a bright yellow-green strip (fig 4). In infants with normal lacrimal drainage the fluorescein is rapidly cleared from the tear film and, at 5 minutes, only a fine line at most remains; anything more than this indicates partial or complete obstruction of lacrimal outflow. Ignore fluorescein that has spilled onto the lid skin.

This test is highly specific. A normal result is a signal to reassess the eye for an alternative explanation for the symptoms.²³

How to manage congenital lacrimal obstruction in general practice

Our review shows that most affected children will achieve spontaneous resolution without ill effect by 12 months of age, and that ophthalmologists are unlikely to undertake treatment before that age. Management should consist of the following steps:

- Discuss the aetiology and prognosis with the parents. If they are to support a policy of non-intervention they need to understand the probability of spontaneous resolution (a sample information leaflet is on the *BMJ*'s home page at www.bmj.com). Parents should also know that some cases fail to resolve and do require probing and that we have no means of identifying these cases from those that do resolve
- Encourage the parents to limit treatment to simple cleaning of discharge from the lids

Fig 4 Fluorescein disappearance test. A drop of fluorescein was instilled into each eye 10 minutes before photograph was taken. Complete clearance of the dye on the left indicates normal lacrimal drainage, nicely confirmed by its appearance in the nose. Retention of the dye in the lower lid tear film on the right confirms lacrimal obstruction. (Reproduced with parents' permission)

- Treat episodes of acute conjunctivitis as they occur. Avoid antibiotic treatment for the usual presentation of mild discharge from a white eye
- Refer for ophthalmological assessment if the obstruction is still present at 12 months of age.

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