Management of Congenital Nasolacrimal duct Obstruction

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Epiphora from the Greek meaning downpour refers to overflow of tears down the face and does not distinguish between hyper secretion and outflow obstruction.

Epiphora in context to this article refers to obstruction of the lacrimal drainage system.

Obstruction of the nasolacrimal drainage system is extremely common in pediatric age group, occurring in as many as 30% of new borns.

The article reviews the management of a child with epiphora.

Evaluation

Observation is a simple and reliable tool with the clinician. The level of tears, position of puncta, lids and eyelashes should be noted. Obstruction of the tear drainage system can be acquired or congenital, it is important to rule out acquired causes of tearing such as corneal, lid or lash abnormalities. Lacrimal obstruction problems can be divided as related to upper (puncta to lacrimal sac) or lower (sac to the opening of the nasolacrimal duct) system *(Fig 1).*

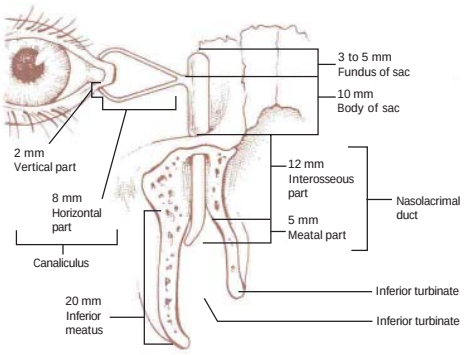

Figure1: Normal anatomy of the nasolacrimal system.

In children, parents provide information about the amount of tearing, whether constant or intermittent, and the type of regurgitation. Expression of mucoid material through the puncta on pressure over the lacrimal sac confirms the diagnosis of congenital nasolacrimal duct obstruction *(Fig 2).* Dye disappearance test is a quick and easy test to confirm the diagnosis of nasolacrimal duct obstruction.

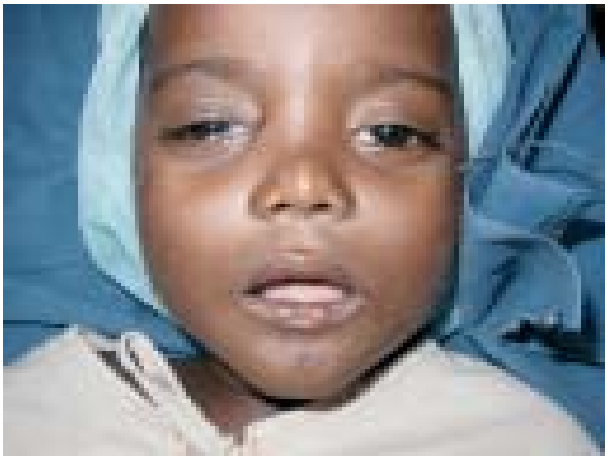

Figure 2: Child with nasolacrimal duct obstruction in right eye.

Dye Disappearance test.

Instill single drop of 2% fluorescein into the anesthetized conjunctival cul-de-sac. Excess fluid is wiped out and the tear meniscus is observed over a 5min period. In a normal eye the tear meniscus will become relatively unstained within 5 minutes, where as when lacrimal obstruction is present, the stained meniscus either will increase or be diluted only shortly.

Lower system block (Dacryostenosis).

Dacryostenosis or atresia of the nasolacrimal duct is the most common cause of epiphora in the pediatric population. It is thought to result from failure of canalization of the nasolacrimal duct. The most common site is at the mucosal entrance at the inferior meatus in the nose. The obstruction can be either membranous or osseous. Other rare causes can be migration of the duct to an abnormal passage.

Treatment

Dacryostenosis should be managed conservatively whenever possible. Traditional approach has been to combine massage of the nasolacrimal sac and duct with topical antibiotic.

Parents should be carefully instructed as to how to perform massage properly. It is better to demonstrate the technique of massage to the mother. It is advisable to place one forefinger over the medial canthal area on the inferior part of the anterior lacrimal crest and slide the finger in an inferior direction, placing moderate pressure over the lacrimal sac and

nasolacrimal duct. I recommend 20 to 25 strokes three times daily. An antibiotic ointment can also be used which also acts as a lubricant.

Conservative management is continued until epiphora resolves, tearing persists beyond 12 months of age, no improvement for 3-4 months or recurrent infections and anxious parents.

Probing

Probing of the nasolacrimal duct system is a standard procedure in the management of congenital nasolacrimal duct obstruction. However, the timing for initial probing has been a matter of controversy. I personally defer probing until the child's first birthday.

This is based on earlier studies, which report a high rate of spontaneous resolution in the first year of life. The best data on the subject is from McEwen and Young who did a

Prospective study in a Scottish community in 1988. A cohort of 4792 children born during one calendar year were observed, and 942 (20%) had evidence of defective lacrimal drainage system at some time during there first year of life. By the age, one 930 (98.72%) children had cleared their obstruction. Any decision to probe before one year should take this high rate of spontaneous resolution into account. However, recurrent infection and discharge and the attendant lid irritation may occasionally prompt the decision to probe early, as the need for anesthesia at an early date for some other procedure.

Another major point of debate is whether to probe infants in the office or under general anesthesia in a hospital setting. This primarily applies to initial probing procedures. The most important concern is the risk of general anesthesia for small children. For straight forward nasolacrimal duct obstruction, it is unnecessary to perform probing in patients younger then 6 months of age; therefore with increasing availability of good anesthetic facility, I personally recommend probing to be done under general anesthesia.

It is difficult to attempt probing and irrigation of the infant in office setting and for obvious reasons has a high risk of traumatizing the lacrimal passage.

The technique of probing an infant's nasolacrimal system must be gentle because of the delicate punctum and canaliculus. As this is a blind procedure, good knowledge of the anatomy of the lacrimal system is necessary, so that at any given time one is aware of the path the probe is taking.

I perform all probing under general anesthesia and feel this is safer and comfortable to both the patient and surgeon. A Bowman's 00 (0.90mm) or 0 (1.00mm) probe has the

right diameter and stiffness for pediatric use. Wider diameter probes are hazardous because they can cause trauma to the puncta or canaliculus. I prefer to probe from the upper canaliculus, a location that makes it easier to turn from the lacrimal sac to the nasolacrimal duct (Fig 3, 4). One important landmark is to feel the hard touch of the medial wall of the sac before making the turn. Once the probe is in the nasolacrimal duct it is passed until the resistance is felt. Once the probe is entered in the canaliculus, it is passed till the hard feel of the medial wall of the lacrimal fossa is felt, at this time the probe is turned to enter the nasolacrimal duct and gently advanced

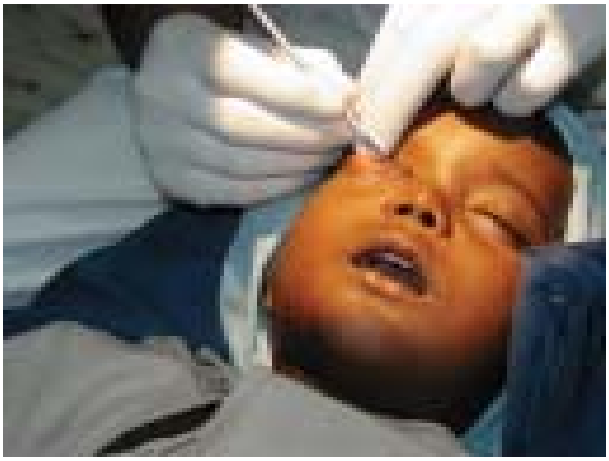

Figure 3: Dilatation of the upper puncta with punctum dilator.

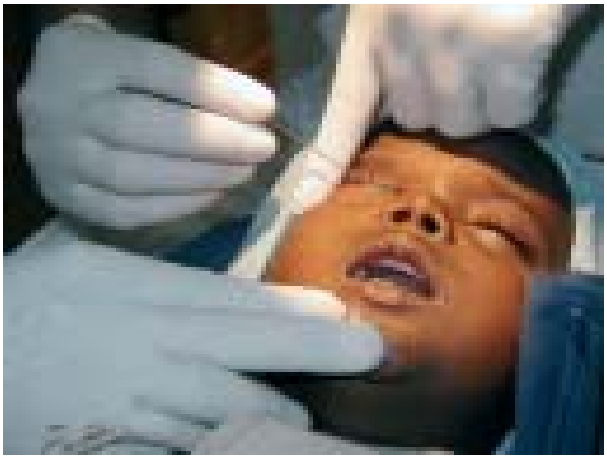

Figure 4: Bowman's probe is passed gently in the direction of the canaliculus; note that the lid is pulled laterally to straighten the canaliculus, thus avoiding any false passage.

till resistance is felt. The breaking of the membrane is felt as the probe advances the obstruction (Fig 5). There are two types of obstructions encountered during probing, simple and complex. In simple obstruction the resistance is easily bypassed with the help of Bowman's probe and post, probing syringing reveals a patent lacrimal system. While in complex obstruction the probe is not bypassed and there is firm resistance to the passage of the probe. Post

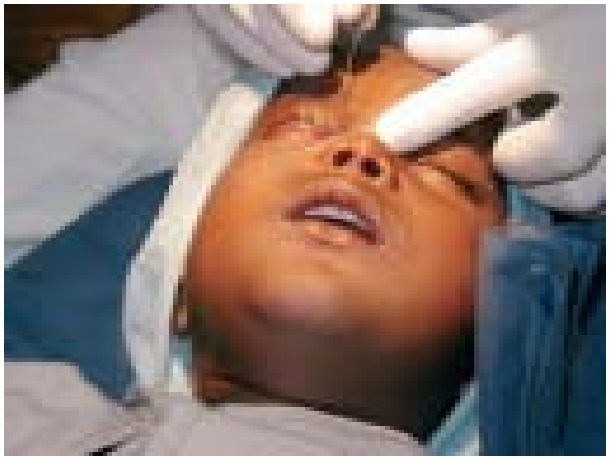

Figure 5: After the hard touch of the medial wall of the sac, the probe is directed downward, backward and medially in the direction of the nasolacrimal duct.

probing syringing is not patent in these patients. The patency of the nasolacrimal system checked by obstruction of the upper puncta by punctum dilator and irrigation of saline from the lower puncta.

The saline is colored with sterile fluorescein strip. Flow of saline in the throat is confirmed by placement of pediatric size suction catheter in the throat and passage of flourescein stained saline through it (Fig 6). Only a small amount of saline is required to ensure the free flow of saline, also small amount is less likely to cause laryngospasm or aspiration if the procedure is performed under ketamine anesthesia. Each patient receives antibiotic drops four times daily for three weeks. The patient is seen again after 1-2 week. The results at first follow up are suggestive of the outcome of the procedure. Subsequent follow up is at 1, 3 and 6 months. Those who cannot come for follow up can be enquired about any recurrence of symptoms.

Failed probing

Patients with failed probing can be divided into 3 groups. In the first group, there is a complex type of obstruction, which prevents the passage of probe beyond the obstruction. The second group is one that opened with probing and showed patency of the passage on saline

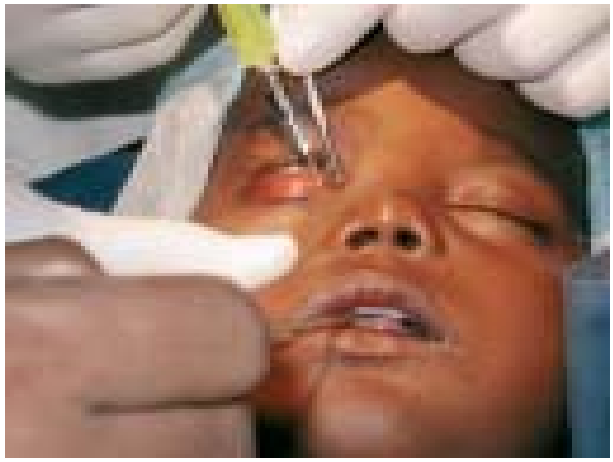

Figure 6: The upper puncta is blocked with punctum dilator and fluorescein colored saline is pushed from the lower puncta. Flow of fluorescein colored saline confirms the patency of the system.

irrigation but in the post operative period again closes. This is

often associated with a laterally displaced inferior turbinate bone compromising the opening of the inferior meatus. I personally have no experience on turbinate in fracture, but in this procedure, the inferior turbinate bone is rotated medially and superiorly, causing an increase in the space in the inferior meatus. The third group comprises children who underwent probing elsewhere, and there is uncertainty of the adequacy of the procedure or details of the anatomy as revealed by the first attempt. Repeat probing can be performed after an interval of two to three months.

Pediatric Dacryocystorhinostomy

Dcaryocystorhinostomy in pediatric age group is not as predictive as in adults due to developmental changes and vigorous response to healing. There are few published reports of DCR in pediatric patients. The poorly defined and rapidly changing anatomy, along with tendency for scar formation is challenging for the managing physician. The reported success rate of major lacrimal surgery in children has ranged from 78.9% to 96% in various studies. In a large series of 1060 external dacryocystorhinostomy performed by the author, 35 (3.30%) were in pediatric patients with a success rate of 97.2% (mean follow up 4.6 months). The first attempt is the one most likely to succeed, so should be done with proper technique and by an experienced lacrimal surgeon.

My surgical technique for pediatric DCR is same as for adults. I perform the surgery under microscope, to give a better view of the surgical site. The skin incision

is 10-12mm over the anterior lacrimal crest below the medial palpebral ligament thus preserving the attachments at the medial canthus. A large osteotomy and good mucosal anastomosis of the anterior flaps of the lacrimal sac and nasal mucosa ensures good surgical results. Intubation for pediatric DCR is again a matter of individual preference. The superior and inferior canaliculi are separately intubated and the probe is retrieved from below the inferior turbinate. Once the nasolacrimal duct is intubated, the tubes are fixed in the nose. The recommended time for removal of tube is between 3-6 months. I

Personally do not intubate my cases of external DCR and the high success rate without silicone intubations suggest that routine intubation is not required for pediatric DCR.

I prefer nasal decongestants one day before surgery and continue for 2 days in the postoperative period along with systemic and topical antibiotics for all pediatric patients.

Summary

Epiphora in pediatric patients is a common problem and requires a detail check up to rule out other causes of watering in children. Congenital nasolacrimal duct obstruction can be managed by conservative methods in most patients until the first year of life. A congenital dacryocele is an exception and should be probed with in the first few weeks of life.

If tearing persists beyond 12 months of age, probing under general anesthesia should be performed. If probing is unsuccessful depending upon the type of obstruction it can be tried again after an interval of 6-8 weeks. Dacryocystorhinostomy is indicated in cases with failed probing and complex lower system obstruction and the surgery can be performed in children at around 4 years of age with high success rate.

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