

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on “**Nasolacrimal Duct Obstruction**” These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.peds-cases.com/podcasts.

Nasolacrimal Duct Obstruction

Developed by Bo Bao and Dr. Natashka Pollock for PedsCases.com.
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Introduction:

Hi everyone, my name is Bo Bao and I am a medical student at the University of Alberta in Edmonton, Canada. In conjunction with Dr. Natashka Pollock, a pediatric ophthalmologist at the Stollery Children’s Hospital, I have created this podcast to provide you with an approach to nasolacrimal duct obstruction.

After listening to this podcast, the learner should be able to:

1. Define nasolacrimal duct obstruction
2. Develop a differential diagnosis for an infant with persistent tearing
3. Recognize the clinical signs and symptoms of nasolacrimal duct obstruction
4. Discuss management of patients with nasolacrimal duct obstruction
5. Discuss indications for referral to an ophthalmologist

Clinical Case

Let’s start with a case. Jack is a 3-month-old boy who comes to the pediatric community clinic with his mother. His mother tells you that Jack’s right eye has been constantly tearing since birth. He has a small amount of watery discharge on his right eyelid that the mother wipes away multiple times per day. During the examination, he is found to have excessive tear lake in the right eye with overflow onto the cheek. There is also dry crust on the right eyelashes. The conjunctiva, sclera, and cornea are normal. No conjunctival injections is noted. Examination of the left eye is within normal limits. The child was born at 39 weeks to a 30-year-old gravida 1, para 1, healthy mother. His mother had regular prenatal care with protective serologies and has no history of sexually transmitted infections. There were no complications during child birth. The child is otherwise growing and developing normally, reaching his normal milestones. His mom is concerned about his excessive tearing and is wondering if you have any suggestions of what to do next. What is on your differential for an infant with persistent tearing from the eye?

Epidemiology

Symptoms of nasal lacrimal duct obstruction (NLDO) occur in approximately 6% of newborns, making it the most common cause of persistent tearing and discharge in infants. Luckily, 90% of these obstructions resolve spontaneously by the first year of life⁵. While NLDO is a relatively benign diagnosis, it is important to differentiate it from other vision-threatening conditions that can affect infants.

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Differential Diagnosis

A list of potential differential diagnoses for persistent tearing in infants include: childhood glaucoma, conjunctivitis, corneal abnormalities, foreign body, trauma, and lid abnormalities. Of these, it is especially important to distinguish NLDO from congenital glaucoma as it can potentially lead to blindness. There should be a high suspicion for glaucoma when an infant present with chronic tearing, photophobia, and corneal clouding. Another sign of glaucoma includes buphthalmos, an enlargement of the eye that is pathognomonic for congenital glaucoma. As well, since a high intraocular pressure can lead to increase in corneal size in children under age of 3, a horizontal corneal diameter of greater than 12mm is suggestive of glaucoma and prompts referral to an ophthalmologist. This presents with a widened diameter of the pupil and iris which lay below the cornea. Additionally, neonatal conjunctivitis is another vision threatening condition that can present with persistent tearing and discharge. Neonatal conjunctivitis occurs during the first month of life and is typically secondary to gonorrhea, chlamydia or infection due to bacteria native to the skin or gastrointestinal tract. Conjunctivitis can be distinguished from nasolacrimal duct obstruction by redness of the sclera or the white part of the eye. Copious discharge at two to five days of age would suggest gonococcal conjunctivitis, whereas chlamydial conjunctivitis presents with stringy mucopurulent discharge within the first 10 to 14 days of life. Regardless of etiology, patients suspected of neonatal conjunctivitis should be treated aggressively in conjunction with referral to ophthalmology to prevent complications such as sepsis, pneumonitis, corneal ulceration and perforation. Culture and sensitivity of the discharge should be obtained to tailor antibiotic therapy. Of note, both chlamydial and gonococcal conjunctivitis require treatment with systemic antibiotics, either oral or intramuscular. Topical antibiotic eye drops are not sufficient!

Pathophysiology

Let's start with a refresher on the physiology of the lacrimal system. The nasolacrimal duct is a part of the drainage system responsible for tear disposal. Under normal circumstances, the lacrimal gland secretes approximately 10mL of tears in a 24-hour period. While most of the tears are lost by evaporation, the remaining tears flow medially across the surface of the eye and drain through small openings called puncta. They then flow through the nasolacrimal duct into the nasal cavity. As such, an obstruction of the nasolacrimal duct leads to reduced tear elimination into the nose, and they instead backup and cause excessive tearing, also known as epiphora. In children, the most common cause of obstruction is due to an imperforate membrane at the Valve of Hasner, at the distal end of the lacrimal duct. This condition is called congenital nasolacrimal duct obstruction. Other causes of obstruction may include craniofacial abnormalities, trauma, chronic fibrosis or previous surgery.

Clinical Presentation

Now that we have defined nasal lacrimal duct obstruction, let's review how it presents in the clinic. Typically, a history of chronic tearing and discharge in a child less than 1 year of age is highly suggestive of nasolacrimal duct obstruction. As a result of decreased drainage into the nose, the higher tear lakes may overflow onto the eyelashes, eyelids and down the cheek. On inspection and palpation, facial asymmetry may suggest a congenital or traumatic etiology for duct blockage. Palpation over the lacrimal sac may also result in a reflux of mucous discharge through the puncta. Other signs may involve complications of nasal lacrimal duct obstruction such as dacryocystitis, which is characterized by purulent discharge, erythema, swelling, warmth, and tenderness over the lacrimal sac.

Investigations

Diagnosis of nasolacrimal duct obstruction typically involves history and physical examination alone. To help confirm the diagnosis, fluorescein dye disappearance test can be used. Place a drop of fluorescein dye in the affected eye and look to see if it disappears from the tear film. If the dye remains in the eye, it is diagnostic of an obstruction, because normally the fluorescein should drain into the nose. Since congenital nasolacrimal duct obstruction is a diagnosis of exclusion, always check for the absence of corneal and conjunctival abnormalities.

Treatment

Approach to management for NLDO is determined on a case-by-case basis and will depend on the severity and duration of symptoms as well as the age of patient. Typically, management involves watchful waiting since 90% of obstructions will resolve spontaneously by first year of life. Tear duct massage and use of antibiotic ointment may also be offered to parents as needed. While the effectiveness of tear duct massage is debatable, parents can be instructed to regularly clean the lids and massage the lacrimal by applying downward pressure over the lacrimal sac. Picture yourself trying to milk the tears downwards into the nose. Antibiotic use for nasal lacrimal duct is typically not indicated. However, some patients can develop bacterial overgrowth in the stagnant tears, which can lead to mild conjunctivitis and purulent discharge. In these cases, topical antibiotic eye drops such as tobramycin ointment may be used. The use of antibiotic ointment is only for symptomatic management and does not help open the tear duct. When symptoms persist past 6-12 months and do not improve following conservative measures, correction of obstruction can be achieved with a simple probing procedure. The procedure is typically performed by an ophthalmologist under general anesthesia and takes only 2 to 3 minutes. The procedure involves gently inserting a small blunt probe into the punctum and advancing it carefully through the lacrimal drainage system until it is pushed through the membranous obstruction. Irrigation with saline is one way to ensure patency of the canal after probing. In 10% of cases, initial probing may be unsuccessful⁵. Further management for these infants includes an alternative approach, using either a nasolacrimal duct intubation or balloon dilation (dacryoplasty). Nasolacrimal duct intubation involves placing a temporary silicone stent within it to prevent stenosis. The stents will be removed after 2 to 6 months. Alternatively, balloon dacryocystoplasty can be performed, where a balloon along with a stent is passed into the distal tear duct. Inflation of the balloon helps to widen the duct.

Indications for referral

While most congenital nasal lacrimal duct obstruction can be diagnosed and managed in a primary care setting, particularly during the first year of life, referral to an ophthalmologist should be considered if:

- The diagnosis is uncertain, especially if considering a diagnosis of congenital glaucoma (which requires urgent referral to ophthalmology).
- Symptoms of obstruction persisting beyond 9-12 months of age
- Signs and symptoms of acute dacryocystitis
- Recurrent conjunctivitis requiring ongoing antibiotic treatment
- Signs and symptoms of dacryocystocele (bluish swelling of the lacrimal sac)

Of note, there is some controversy regarding the optimal time for referral. Some ophthalmologists will advocate for repair after 6 months of age. However, at our center the recommendation is to refer at 9-12 months of age to give patients the maximal amount of time for the NLDO to spontaneously resolve.

Conclusion

Now let's go back to the case with Jack, the 3-month-old boy with a history of chronic tearing and discharge. You proceed to counsel Jack and his family on maintaining good eye hygiene habits and possibly a trial of tear duct massage. You discuss with family the potential for an ophthalmology referral if symptoms persist past 9-12 months of age. In the meantime, you decide to have the patient follow-up with you in 2 months to see if his symptoms have improved.

Take home points

Let's review a few of the key take home points:

1. NLDO is the most common cause of chronic tearing and discharge in infants. However, other important diagnoses such as congenital glaucoma and neonatal conjunctivitis should not be missed.
2. Diagnoses are usually made through history and physical exam alone. However, it can be confirmed through fluorescein disappearance test.
3. 90% of obstructions resolves spontaneously, without ever requiring treatment.
4. Treatment for NLDO may involve tear duct massage, topical antibiotic eye drops, and probing. Surgical intervention rarely occurs prior to 12 months of age.

Thank you for listening to our podcast on nasolacrimal duct obstruction. Shout out to Dr. Natashka Pollock for your support and expertise on this subject. Stay tuned for more podcasts to come!

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