Conjunctivitis in Children: When to Prescribe an Antibiotic?

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Abstract

Conjunctivitis is an extremely common condition. When it comes to differentiating the different causes of conjunctivitis in children it can be really challenging as the spectrum of causes ranges from allergic to infection, which can be either viral or bacterial. Nasolacrimal duct obstruction especially in those less than one year can mimic conjunctivitis and need to be diagnosed to avoid unnecessary antibiotic use.

Keywords
Conjunctivitis; Viral; Bacterial; Nasolacrimal Duct Obstruction

Introduction

Conjunctivitis is an extremely common condition and forms a social and economic burden. The main clinical features of conjunctivitis are a red eye or eyes producing a discharge.

Conjunctivitis tends to be a benign, self-limited process unless the patient’s immune status is compromised; in these patients, conjunctivitis can progress and may threaten the patient’s sight. Most retail health clinicians often see just a few types of conjunctivitis including allergic, viral, bacterial and chlamydial.

Conjunctivitis is defined as inflammation of the mucosal, epithelial membrane lining, both the surface of the globe up to the border where the sclera meets the cornea (also known as the limbus) as well as the inner surface of the eyelids. It is more common in children and comprises 30% of eye-related emergency department visits [1].

Nasolacrimal Duct (NLD) Obstruction

This is the most common cause of eye discharge and excessive tearing in children younger than 1 year of age and occurs in up to 20% of infants. Tears are produced by the lacrimal glands, and the lacrimal drainage system consists of two puncti on the medial surface of the upper and lower eyelid. These openings lead to two canaliculi, which then come together in the common canaliculus, which drains into the lacrimal sac through the Nasolacrimal duct into the nose, exiting under the inferior turbinate. Incomplete canalization of the Nasolacrimal duct at the distal end under the turbinate is the commonest cause for Nasolacrimal duct obstruction [2].

It is a clinical diagnosis. If the obstruction is at the end closer to the nose, the discharge is usually mucopurulent and there is significant matting of the eyelashes. If the obstruction is more proximal, the discharge more often is watery. Although the history tends to be more chronic in nature and the patient is otherwise asymptomatic,
tearing often is worse with a concurrent upper respiratory infection, cold air, or wind. Notably, as long as there is no concurrent infection, the conjunctiva should not be red or injected, and this will help distinguish dacryostenosis from the various types of conjunctivitis [3].

NLD obstruction is always in the differential diagnosis for conjunctivitis during the first year of life. Effort should be made to rule out NLD obstruction as the cause of the patient’s symptoms. Patients with NLD obstruction present with less conjunctival injection than patients with bacterial conjunctivitis.

A definitive diagnosis of NLD obstruction can be made by digital massage of the lacrimal sac. When massaged, the Nasolacrimal duct will produce a reflux of mucous from the puncti. The fluorescein dye disappearance test is most helpful when the condition is unilateral. After fluorescein dye has been administered to each eye, the dye will take longer to clear from the eye with NLD obstruction.

First-line therapy consists of conservative management with massage from the top of the Nasolacrimal sac to the bottom. This increased hydrostatic pressure may lead to rupture of the distal membrane. Most cases should resolve by 1 year of age [4].

Referral to ophthalmology should be made when conservative management fails by 6 months of age [5].

If a dacryocystocele is suspected, Urgent ophthalmology referral is needed. Dacryocystocele is a cyst that occurs when there is simultaneous obstruction of both the proximal and distal portions of the lacrimal drainage system. This should be suspected when there is painless, asymmetric swelling near the medial canthus, leading to upward slanting of the nasal palpebral fissure. A dacryocystocele typically involves a bluish discoloration and can present anytime during the neonatal period and beyond. Dacryocystocele require urgent ophthalmologic referral because of the high risk of infection and because associated intranasal cysts can cause bilateral nasal obstruction and, subsequently, respiratory distress, especially during feeding, since infants are obligate nose breathers.

Allergic Conjunctivitis

Allergic conjunctivitis is extremely common and may affect as many as 40% of all people [6].

It is a clinical diagnosis. Allergic conjunctivitis is caused by an acute type I hypersensitivity to common allergens. Patients with allergic conjunctivitis have an increased number of mast cells on their conjunctiva compared to the normal population and can be prone to other allergic conditions as well [7].

The eye is not immune privileged, and when the eye initially is exposed to an allergen, this activates antigen-presenting cells and leads to antibody production via an immunological cascade. Once the patient has a repeat exposure to the allergen, this leads to the release of preformed inflammatory mediators, causing an inflamed conjunctiva with dilated and tortuous vessels. Various pollens, animal dander, dust mites, and other environmental antigens are said to be some of the most common allergens that cause allergic conjunctivitis [8].

Giant papillary conjunctivitis is a type of allergic conjunctivitis caused by the chronic presence of a foreign body in the eye. People who wear hard or rigid contact lenses, wear soft contact lenses that are not replaced frequently, have an exposed suture on the surface of the eye or have a prosthetic eye are more likely to develop this form of conjunctivitis.

The most common symptoms of allergic conjunctivitis are itching, tearing, burning or foreign body sensation, and occasionally mild photophobia. Signs include watery discharge, lid swelling, conjunctival erythema, and edema, which can become severe chemosis.

In terms of differentiating allergic conjunctivitis from the infectious types especially viral which causes a similarly watery discharge, is that the complaints can usually recur within short periods of time which is uncommon if viral or bacterial cause is suspected also, a distinguishing characteristic of allergic conjunctivitis, compared to infectious conjunctivitis, is that the onset is bilateral and pruritic in nature and that the discharge is clear. The condition can be seasonal [9].

The most effective treatment is avoidance of the offending agent. However, completely avoiding some airborne allergens is virtually impossible. Staying indoors and using air conditioning can help reduce airborne allergen exposure. For children allergic to dust mites, frequent cleaning, linen and towel changes, and trading carpets for hardwood or tile floors can help reduce the burden of allergens.

Once allergic conjunctivitis has occurred, the patient should not rub their eyes even if they itch because this intensifies the allergic reaction and inflammation.

Cool compresses and use of artificial tears or saline solution to dilute and remove the offending agent
also are treatment options. Topical antihistamines and mast cell stabilizers alleviate the signs and symptoms associated with allergic conjunctivitis in the short term, but data on long-term efficacy are lacking. Topical nonsteroidal anti-inflammatory drugs and low-dose steroids also are treatment options [9].

**Viral Conjunctivitis**

Viral conjunctivitis is a very common form of conjunctivitis [9]. It is more common in older children and adults than it is in preschool-aged children.

It is caused most commonly by adenovirus, but herpes simplex can sometimes be the cause. Viral conjunctivitis can occur independently, but often it is just one component of a constellation of viral syndrome findings, which may include fever, pharyngitis, upper respiratory infection findings, and lymphadenopathy.

Initially unilateral, evolving to bilateral (within 24 to 48 hours), conjunctival injection, mild to moderate usually watery discharge, and early morning crusting all can be seen. Most viral conjunctivitis is contagious before the patient shows any symptoms. The average duration of viral conjunctivitis symptoms caused by adenovirus is reported to be two to three weeks [10].

Viral conjunctivitis is a clinical diagnosis. Treatment generally involves supportive care, including cold compresses and artificial tears. Most viral conjunctivitis is extremely contagious. Good eye and hand hygiene are essential to preventing disease transmission.

Using topical antibiotic is highly controversial considering that secondary bacterial infection is rare, using eye dropper may infect the other eye and it may complicate the condition causing allergy and toxicity yet, others advocate using topical antibiotic as differentiating bacterial from viral cases depending on history and symptoms only is not enough and because most day care centers send children with conjunctivitis home.

Herpes simplex conjunctivitis can be problematic and steroids are contraindicated. It’s almost always unilateral and very painful. Patients may have vesicles on their eyelids. It should be considered in any patient not responding to theapy. Referal to ophthalmologic care is always warranted.

**Bacterial Conjunctivitis**

Acute bacterial conjunctivitis is most frequently observed among infants, toddlers, and preschool-aged children. The most common causes of bacterial conjunctivitis are S. aureus, S. epidermidis, Streptococcus pneumoniae, Moraxella catarrhalis, Pseudomonas aeruginosa, and Haemophilus influenza. As vaccination against Haemophilus has increased, incidence of conjunctivitis due to H. influenza has decreased [10]. Bacterial conjunctivitis involves unilateral or bilateral conjunctival injection, mild to moderate discharge that generally is more purulent, and early morning crusting [10].

**When Differentiating Bacterial from Viral Conjunctivitis One should Consider The Following**

- Bacterial conjunctivitis affects younger children than viral causes, usually preschool children. The younger the patient, the more common bacterial etiology.
- Viral tends to last longer, if a patient is not responding to antibiotic treatment, the physician should consider a viral etiology
- Bacterial conjunctivitis usually has a mucopurulent discharge with matting of the eyelids; viral on the other hand usually has a watery discharge.
- Bacterial conjunctivitis is usually bilateral (may start in one eye then spread to the other), viral is usually unilateral. Both are highly contagious.

Differentiating between viral and bacterial conjunctivitis is difficult. Researchers who have looked for differentiating signs report that patients who awaken with eyes “glued” shut are 3 times more likely to have a bacterial infection than a viral infection if one eye is affected and 15 times more likely if both eyes are affected.

Obtaining conjunctival cultures is generally reserved for cases of suspected infectious neonatal conjunctivitis, recurrent conjunctivitis, conjunctivitis recalcitrant to therapy, conjunctivitis presenting with severe purulent discharge, and cases suspicious for gonococcal or chlamydial infection [12].

The majorities of cases of bacterial conjunctivitis is self-limited and are said to last one to two weeks. However, antibiotics are said to shorten the course of illness [11].

Most cases are treated empirically initially. Topical antibiotics commonly used include trimethoprim-polymyxin B, erythromycin, and tobramycin

Contact lens wearers, especially those noncompliant with wearing and cleaning regimens, are at
increased risk for corneal ulcers, which can threaten vision. These patients should be instructed to remove their contacts and only wear their glasses. Topical fluoroquinolones are used in contact lens wearers for *Pseudomonas* coverage. All contact lens patients with conjunctivitis should receive urgent ophthalmology follow-up.

**Neonatal Conjunctivitis**

Neonatal conjunctivitis is defined as conjunctivitis occurring in the first month of life.

Neonatal conjunctivitis most commonly is caused by normal skin flora. However, gonorrhea, *Chlamydia*, and HSV are causes that must be considered. They are acquired mostly during vaginal delivery but also can be associated with prolonged rupture of membranes. Neonatal conjunctivitis caused by gonorrhea vs. Chlamydia can be distinguished by the age of onset and associated discharge. For gonococcal conjunctivitis the discharge is usually purulent and profuse, and usually manifests within 2 to 4 days of life. It requires urgent ophthalmoscopic evaluation. It can be treated with single parenteral ceftriaxone to be followed with 14 days of oral erythromycin.

On the other hand, *Chlamydia* conjunctivitis discharge is usually scanty and mucoid, appearing on day 5 to 14 of life, yet it also requires ophthalmoscopic evaluation. It can be treated with erythromycin for 14 days or azithromycin for 3 days and single dose of ceftriaxone. HSV usually will have the classic dendrite pattern on fluorescein exam. Neonates will not necessarily have other systemic signs; the eye discharge is serous and thin. Usually occurs only in one eye and it requires full sepsis screen. Can be treated with ayclovir for 14 days and topical ganciclovir.

**Summary and Conclusion**

Nasolacrimal duct obstruction may mimic conjunctivitis especially in first year of life and must be excluded before further approach to the patient. Viral conjunctivitis usually does not require treatment; the signs and symptoms at presentation are variable. Bacterial conjunctivitis with most uncomplicated cases resolving in 1 to 2 weeks. Mattering and adherence of the eyelids on waking, lack of itching, and absence of a history of conjunctivitis are the strongest factors associated with bacterial conjunctivitis. Topical antibiotics decrease the duration of bacterial conjunctivitis and allow earlier return to school. Conjunctivitis secondary to Chlamydia and gonorrhea requires systemic treatment in addition to topical antibiotic therapy. Allergic conjunctivitis is encountered in up to 40% of the population, but only a small proportion of these individuals seek medical help; itching is the most consistent sign in allergic conjunctivitis, and treatment consists of topical antihistamines and mast cell inhibitors.

**References**


