

CONJUNCTIVITIS

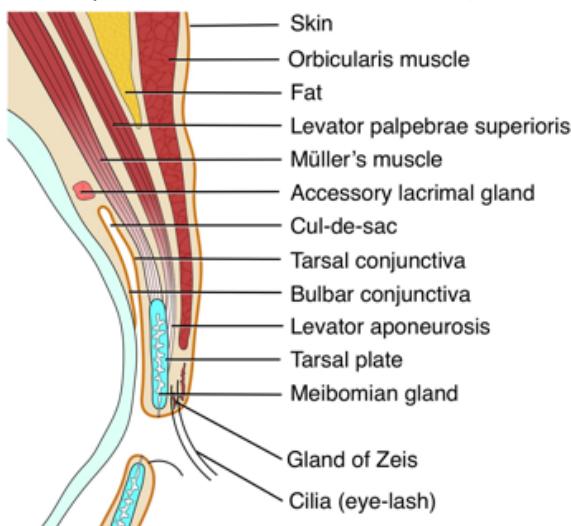
INTRODUCTION (ELISE PERLMAN, MD. 2/2018)

Conjunctivitis is defined as inflammation or infection of the conjunctiva. In pediatric patients, acute conjunctivitis is usually benign and self-limited or can be easily treated. Causes can be categorized as infectious (viral vs. bacterial) and non-infectious (allergic vs non-allergic). Viral conjunctivitis is more common in adults and school aged children while bacterial conjunctivitis is more common in neonates and infants. The focus of this PEM Guide is on acute infectious conjunctivitis.

ANATOMY

Conjunctiva are the mucus membranes that line the inside surface of the eye lids (tarsal or palpebral conjunctiva) and cover the surface of the globe (bulbar conjunctiva) up to the limbus (the junction of the sclera and the cornea). The conjunctiva is usually transparent, but when inflamed, the vessels dilate, resulting in hyperemia and edema such that they can appear diffusely pink or red. Inflammation of the posterior conjunctival vessels results in diffuse palpebral and bulbar conjunctival injection.

Ciliary flush, a ring-shaped erythema at the limbus, is suggestive of keratitis, iritis, or angle closure. The eyelids contain loose connective tissue and may become swollen with conjunctivitis. The eyelid swelling of conjunctivitis is typically soft and non-tender in contrast to the indurated, warm and tender eyelid swelling that can occur in periorbital and orbital cellulitis (See: [PEM Guide:Infections: Periorbital and Orbital Cellulitis](#)).



[Orbital Cellulitis](#)).

CLINICAL ASSESSMENT

Clinical assessment involves a focused ophthalmologic history and examination as well as an assessment of systemic signs and symptoms. The focus of assessment is determining if infection is limited to the conjunctiva or extends to the cornea and below. Keratitis is inflammation/infection of the epithelial layer of the cornea. Keratitis can lead to corneal perforation and is sight threatening. Patients at high risk of keratitis include those with contact lenses and those with herpes simplex virus infection. These patients may complain of moderate to severe eye pain, a marked foreign body sensation, photophobia and a decrease in visual acuity. The cornea may appear hazy but pupillary response is preserved in the absence of anterior uveitis. Suspicion of keratitis

warrants on ophthalmology consultation. Fluorescein staining, slit lamp examination, ophthalmoscopy, and/or intraocular pressure measurement may be helpful. If there is normal vision and no suspicion of keratitis, iritis or open angle glaucoma (severe headache, nausea), then the focus becomes identifying the etiology of conjunctivitis so that appropriate treatment can be initiated. Patients symptoms and exam findings do not reliably distinguish between viral, bacterial and allergic conjunctivitis.

FOCUSED OPHTHALMOLOGIC ASSESSMENT

HISTORY	EXAM
Time course	Pupillary reaction to light
Change in visual acuity	Discharge, quality and quantity
Sensation: Pain, foreign body, itching	Unilateral vs Bilateral
Discharge: Quality, quantity	Pattern of redness
Photophobia	Corneal lesions on Fluorescein exam
Trauma	Proptosis, extraocular muscle movements
Contact lens use	Preauricular adenopathy
Ill contacts	Conjunctiva texture e.g. Follicular
Associated systemic symptoms	Visual acuity

VIRAL CONJUNCTIVITIS

Viral conjunctivitis is spread by secretions acquired through direct contact or contact with a contaminated surface. It is highly contagious with an estimated communicability of 10-14 days. Viral conjunctivitis usually begins with unilateral conjunctival injection and a watery discharge with bilateral involvement within 24-48 hours. Patients may also have concurrent URI symptoms or exposure to a sick contact. Patients will often complain of a burning or sandy feeling in one or both eyes. Exam may reveal a follicular appearance on the tarsal conjunctiva and possibly lymphadenopathy. Clinical course follows that of an upper respiratory infection with gradual resolution over several days.

Adenovirus infection is responsible for more than half of viral conjunctivitis. The combination of sudden onset of high fever, non-exudative pharyngitis, bilateral conjunctivitis and preauricular lymph node swelling is characteristic of "pharyngoconjunctival fever" due to adenovirus. Adenovirus epidemic keratoconjunctivitis involves the epithelial layer of the cornea (keratitis). Patient may present with a severe foreign body sensation and photophobia limiting the ability to open the eye. Suspicion of keratitis warrants an ophthalmology consultation. Viral conjunctivitis is self-limited, and treatment is limited to supportive care. Treatment may include warm compresses, ocular lubricant drops (e.g. artificial tears) and possibly topical antihistamines for symptomatic relief. Topical antibiotics are not indicated. The use of topical antibiotics in a patient with viral conjunctivitis exposes the patient to the risk of antibiotics without an associated benefit. However, some caregivers choose to treat viral conjunctivitis because clinical distinction between viral and bacterial conjunctivitis is unreliable and treatment facilitates return to daycare or school.

HSV AND VARICELLA: Herpes simplex virus conjunctivitis is associated with a high risk of keratitis. Patients present with a unilateral red eye, watery discharge and complain of a foreign body sensation and photophobia. A vesicular rash may be seen on the ipsilateral eyelid or in the distribution of the first and second branches of the trigeminal nerves. Hutchinson's sign is a vesical on the tip of the nose (V2).

Fluorescein exam reveals a classic dendritic pattern of corneal involvement. It is typically self-limited, though duration can be reduced with topical and/or oral anti-viral agents. These patients require ophthalmology follow up. Corticosteroids should be avoided.

HISTORY EXAM

Time course Pupillary reaction to light

Change in visual acuity Discharge, quality and quantity

Sensation: Pain, foreign body, itching Unilateral vs Bilateral

Discharge: Quality, quantity Pattern of redness

Photophobia Corneal lesions on Fluorescein exam

Trauma Proptosis, extraocular muscle movements

Contact lens use Preauricular adenopathy

Ill contacts Conjunctiva texture e.g. Follicular

Associated systemic symptoms Visual acuity

BACTERIAL CONJUNCTIVITIS

Bacterial conjunctivitis, similar to acute otitis media, is most commonly caused by Streptococcal pneumoniae, non-typable H influenza and M catarrhalis in children. In adults, staph aureus is also a common pathogen. Similar to viral conjunctivitis, it is spread by secretions which may be acquired through direct contact or contact with a contaminated surface. Bacterial conjunctivitis is more commonly unilateral though involvement of both eyes can occur. Patients may complain that their eye is "stuck shut" in the morning (matting) and have a thick discharge produced throughout the day. Examination may reveal purulent discharge particularly at the lid margins and corners of the eye that reappears after wiping. It is estimated that approximately 50% of bacterial conjunctivitis will resolve without antibiotics though antibiotics may decrease symptom duration and increase the rate of clinical and microbiologic cure in patients with culture proven bacterial conjunctivitis. Treatment includes topical antibiotics. Those who wear contact lenses should remove their contacts and discard the lenses and contact lens case.

Ointments are typically used for young infants or at bedtime. Ointments are not for patients who need to read or see clearly. A variety of topical antibiotics drops are available for use. Common classes include:

fluoroquinolones, macrolides, sulfonamides and combination agents. Fluoroquinolones are preferred for contact lens wearers who are at higher risk for pseudomonas infections. Combination antibiotic and corticosteroid drops should not be used. Steroids may increase the duration of symptoms and transmissibility in adenovirus infection and potentiate corneal involvement in those with bacterial or herpes infection.

All broad-spectrum antibiotics appear to have similar efficacy. A single blinded clinical trial included 144 patients randomized to Polymyxin B-trimethoprim (Polytrim) 4 times a day for 7 days or Moxifloxacin (Vigamox) 3 times a day for 7 days (Williams, J Pediatrics 2013, [PubMed ID: 23092529](#)). Clinical cure at 4-6 days was statistically similar between the 2 groups (Polytrim (Trimethoprim/Polymixin B) 72% versus Vigamox (Moxifloxacin) 77%). The authors concluded that "Polymyxin B-trimethoprim continues to be an effective treatment for acute conjunctivitis with a clinical response rate that does not differ from moxifloxacin. Use of Polymyxin B-trimethoprim for the treatment of conjunctivitis would result in significant cost savings compared with fluoroquinolones".

GONOCOCCAL CONJUNCTIVITIS: Both sexually active adolescents and neonates of mothers with untreated infections are at risk for conjunctivitis in the postnatal period due to *Neisseria gonorrhoea*. Neonatal gonococcal conjunctivitis is rare in developed countries due to routine prophylaxis after delivery. It typically occurs within the first week of life. Patients present with profuse (hyper-acute) purulent discharge. Adolescents may have symptoms of a concurrent urethritis. Examination may reveal chemosis, eyelid swelling with tender preauricular adenopathy. Gram stain of discharge reveals gram negative diplococci. Complications include keratitis and corneal perforation. This is an ocular emergency and patients are treated as an inpatient with both topical and intravenous antibiotics (Ceftriaxone). Adolescents should also be treated for Chlamydia.

CHLAMYDIAL CONJUNCTIVITIS: Inclusion conjunctivitis is caused by *chlamydia trachomatis* serotypes D to K, and is transmitted perinatally in newborns, or via sexual contact in adolescents/adults. It is characterized by a chronic and indolent conjunctivitis. Patients present more commonly with unilateral conjunctivitis for weeks to months that has failed other treatment including topical antibiotics. Diagnosis is made with Giemsa or direct fluorescent antibody staining of conjunctival smears or by PCR. Conjunctivitis in neonates typically occurs 1-2 weeks after delivery. The conjunctiva is often friable, and discharge may be bloody. Neonates have a high rate of concurrent lung and nasopharyngeal infection.

Pneumonia may present from 1-3 weeks with a characteristic paroxysmal staccato cough. Chest XRAY reveals hyperinflation and symmetric interstitial infiltrates. Neonates are admitted. Conjunctivitis is treated with oral antibiotics (Erythromycin or Azithromycin) based on culture/PCR results. Pneumonia is treated based on clinical and/or XRAY findings.

Trachoma is caused by *chlamydia trachomatis* serotypes A, B, and C. Infection is spread through secretions and is considered the leading infectious cause of blindness worldwide. Active infection is most commonly seen in young children. It is usually mild and self-limited. The major findings on exam are the characteristic follicles on the superior tarsal conjunctiva. The diagnosis is made based on clinical manifestations of infection and the severity is determined according to the simplified world health organization trachoma grading system (WEB LINK: [TRACHOMA GRADING](#)) which uses the number of follicles, degree of inflammation, scarring, eyelash rubbing and corneal involvement. Treatment includes a single dose of azithromycin (20 mg/kg) or topical tetracycline (BID x 6 weeks).

PSEUDOMONAS: Pseudomonas infections can occur in individuals who utilize extended-wear contacts. Patients will present with a red eye, mucopurulent discharge and complain of blurred vision, pain and foreign body sensation. Examination may reveal corneal opacities/infiltrates and with a positive fluorescein test. These patients are at risk of ocular perforation and require ophthalmology consultation.

ADDITIONAL CAUSES OF CONJUNCTIVITIS

Conjunctivitis may represent an upper respiratory tract infection or a sign of a systemic disease. In Kawasaki disease conjunctivitis is bilateral, non-exudative, includes the bulbar injection only and is limbus sparing) (See: [PEM Guide: Rheumatology: Kawasaki Disease](#)). Parinaud's oculoglandular

INFECTIOUS CONJUNCTIVITIS IN THE NEONATE		
FINDINGS	N. GONORRHOEAE	C. TRACHOMATIS
Transmission	30-40%	20-50%
Presentation	2-5 days after birth	5-14 days after birth
Discharge	Purulent	Watery, may become purulent
Other findings	Swelling of the eyelids	Swelling of the eyelids, chemosis, +/- bloody discharge
Diagnosis	Gram stain, Culture, should also be screen for C. Trachomatis due to high rate of coinfection with gonococcal disease	Culture, PCR
Treatment	Cefotaxime 100 mg/kg x 1 IM/IV	Erythromycin 50 mg/kg/day PO divided QID x 14 days Azithromycin 20 mg/kg/day PO Once x 3 days

syndrome is unilateral granulomatous conjunctivitis, fever and ipsilateral preauricular lymphadenopathy.

Most cases are caused by cat-scratch disease. Occasionally it may be caused by other infections such as tularemia. Stevens-Johnson syndrome may involve any mucous membrane including the conjunctiva. Conjunctivitis is a prominent manifestation of measles

DISPOSITION

RETURN TO SCHOOL/WORK: Committee on pediatric infectious disease Red Book

Recommendations: "Those infected with viral/bacterial conjunctivitis are presumed contagious until symptoms resolve though transmission can be minimized by proper hand hygiene. Infected individuals can return to school/work once indicated therapy is initiated, though should remain at home if there are concurrent signs of systemic infection." Most day cares and schools required 24 hours of treatment prior to returning.