

A 'look' into conjunctivitis

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Conjunctivitis is a common condition characterised by inflammation of the conjunctiva and is the most likely diagnosis in a patient with a red eye and discharge. Acute conjunctivitis is usually a self-limiting condition or one that is easily treated with topical ophthalmic preparations in most cases. Viral conjunctivitis is the most common cause of conjunctivitis followed by bacterial conjunctivitis. Purulent discharge and adherence of the eyelids upon awakening are strong indicators of bacterial conjunctivitis, however other similarities in presentation of conjunctivitis often leads to misdiagnoses. Acute viral conjunctivitis is most commonly caused by adenoviruses and allergic conjunctivitis is usually caused by seasonal pollens. Acute viral conjunctivitis is treated symptomatically while the use of topical antibiotics are useful in limiting the duration of conjunctivitis with a bacterial aetiology. Allergic conjunctivitis is also treated symptomatically with topical antihistamine/mast cell stabiliser preparations. Conjunctivitis secondary to sexually transmitted diseases such as chlamydia or gonorrhoea require systemic antimicrobials in addition to topical treatment.

Keywords: conjunctivitis, viral conjunctivitis, bacterial conjunctivitis, allergic conjunctivitis

Conjunctivitis is a condition characterised by inflammation of the conjunctiva, the mucous membrane that lines the inside surface of the lids and covers the surface of the globe up to the limbus.¹ It is the most likely diagnosis in a patient with a red eye and discharge. The prevalence of conjunctivitis varies according to the underlying cause which may be influenced by the patient's age as well as the season of the year.¹

Aetiology and clinical manifestations

Acute conjunctivitis can be classified as infectious or non-infectious and further divided into four types as outlined in Table 1.¹⁻³ The condition can also be classified as acute, hyperacute or chronic depending on the mode of onset and severity of clinical response. Furthermore, it can be primary or secondary to systemic diseases such as chlamydia or gonorrhoea, in which case systemic treatment is warranted.⁴

Table 1: Classification of conjunctivitis¹⁻⁴

Infectious	Non-infectious
Bacterial • Acute bacterial • Hyperacute (gonococcal) • Chronic	Allergic • Acute • Seasonal • Perennial
Viral • Acute (adenovirus) • Herpes virus	Non-allergic • Toxin • Foreign object • Chemicals

Clinical experience suggests that most infectious conjunctivitis is viral in both adults and children. However, published studies suggest that the majority of cases in children are bacterial.¹⁻³

Bacterial conjunctivitis

Bacterial conjunctivitis is commonly caused by *Staphylococcus aureus*, *Streptococcus pneumoniae*, *haemophilus influenzae*, and *Moraxella catarrhalis*. *S. aureus* is common in adults and the other pathogens in children.⁵ Bacterial conjunctivitis can be contracted directly from the infected individual or can result from abnormal proliferation of the native conjunctival flora.² Contaminated fingers, oculogenital spread and contaminated fomites are common routes of transmission.^{6,7} The course of the disease usually lasts 7 to 10 days.⁸

Bacterial conjunctivitis presents as a red eye with purulent or mucopurulent discharge and chemosis. The condition usually is unilateral at first, then spreads bilaterally with adherence of eyelids and lack of itching. Severe purulent discharge should always be cultured and gonococcal conjunctivitis be considered. Conjunctivitis not responding to standard antimicrobial treatment in sexually active patients warrants a chlamydial evaluation.⁹ The risk of bacterial keratitis is high in contact lens wearers who should be treated with topical antimicrobials and referred to an ophthalmologist.¹⁰

Hyperacute bacterial conjunctivitis presents with a severe copious purulent discharge and decreased vision. There is often accompanied swelling, pain and preauricular adenopathy.¹¹ It is often caused by *Neisseria gonorrhoea* and carries a high risk of corneal involvement.¹¹ Chronic conjunctivitis involves any bacterial conjunctivitis that lasts more than 4 weeks. The most common causes are *S. aureus*, *Moraxella lacunata* and enteric bacteria which requires ophthalmologic referral.¹¹

Viral conjunctivitis

Viral conjunctivitis is typically caused by adenovirus, with many serotypes implicated.¹² The conjunctivitis may be part of a viral prodrome followed by adenopathy, fever, pharyngitis, and upper respiratory tract infection, or the eye infection may be the only manifestation of the disease. Viral conjunctivitis is contagious and is spread by direct contact with the patient and his or her secretions or with contaminated objects and surfaces.¹³ Viral conjunctivitis typically presents as watery or mucoserous discharge and a burning, sandy, or gritty feeling in one eye. Patients may report crusting particularly in the morning followed by watery discharge, or perhaps some scanty mucous throughout the day.^{12,13} The second eye usually becomes involved within 24 to 48 hours. The tarsal conjunctiva may have a follicular appearance. There may be an enlarged and tender preauricular node. Viral conjunctivitis is a self-limiting process.¹³

Epidemic keratoconjunctivitis is a form of viral conjunctivitis that causes keratitis in addition to conjunctivitis. It is typically caused by adenovirus types 8, 19 and 37.¹⁴ In addition to typical symptoms of viral conjunctivitis, these patients develop a foreign body sensation which can preclude opening the eyes spontaneously and multiple corneal infiltrates which may degrade acuity. Keratitis is potentially vision-threatening and must be referred to an ophthalmologist.¹⁴

Herpes conjunctivitis caused by the *Herpes simplex* virus contributes to 1.3 to 4% of all viral conjunctivitis cases.¹⁵⁻¹⁸ Conjunctivitis is usually unilateral with a thin, watery discharge accompanied by vesicular eyelid lesions. Topical corticosteroids should be avoided as they may potentiate the virus.^{6,19}

Allergic conjunctivitis

Allergic conjunctivitis is caused by airborne allergens contacting the eye that, with specific IgE, cause local mast cell degranulation and release of chemical mediators including histamine, eosinophil chemotactic factors, and platelet activating factor among others.²⁰ It typically presents as bilateral redness, watery discharge, and pruritus. Pruritus is the cardinal symptom of allergy, distinguishing it from a viral aetiology. Patients with allergic conjunctivitis have a history of atopy, seasonal allergy, or specific allergy such as cats. Similar to viral conjunctivitis, allergic conjunctivitis causes a follicular appearance on the tarsal conjunctiva.²¹ Some cases of allergic conjunctivitis may present with marked chemosis (conjunctival oedema).^{20,21}

Drug-, toxin-, or chemical-induced conjunctivitis

A variety of topical medications such as antibiotic eyedrops, topical antivirals and lubricating eyedrops can induce allergic responses largely due to the presence of benzalkonium chloride in eye preparations.²² Cessation of receiving the offending agent leads to resolution of symptoms.^{6,22} A patient with an ocular foreign body that was spontaneously expelled may have redness and discharge for up to 12 to 24 hours.^{6,22}

Diagnosis

A detailed examination should be carried out on patients presenting with acute or chronic conjunctivitis. Additional testing is usually not necessary to diagnose routine cases of conjunctivitis.^{6,8} The diagnosis can be made in a patient with a red eye and discharge only if the vision is normal and there is no evidence of keratitis, iritis, or acute angle closure glaucoma.⁸ The type of ocular discharge and ocular symptoms can be used to diagnose the type of conjunctivitis.^{8,23} A purulent discharge is often indicative of a bacterial conjunctivitis whereas a watery discharge is more characteristic of a viral conjunctivitis; with pruritus mostly associated with allergic conjunctivitis.^{23,24,25} However, the clinical presentation is often non-specific leading to inaccurate diagnosis in many cases. Table 2 illustrates the differences in presentation of each of the types of conjunctivitis to assist in diagnosing the type of conjunctivitis.

Pharmacotherapy

Viral, allergic and nonspecific conjunctivitis are self-limited processes whereby specific therapy reduces symptoms but does not alter the clinical course. Bacterial conjunctivitis is also a self-limited process in most cases, but topical antimicrobial therapy may shorten the clinical course if given before day six.^{27,28} Therapy should be directed at the likely aetiology of the conjunctivitis as suggested by the history and physical exam.²⁷

Allergic conjunctivitis treatment involves avoidance of the offending agent and the use of artificial tears to dilute the allergen.²⁰ Topical vasoconstrictors, antihistamines, mast cell stabilisers, NSAIDs and corticosteroids may be indicated.^{21,29-31} In a large systematic review, both mast cell stabilisers and antihistamines were superior to placebo in reducing the symptoms of allergic conjunctivitis.²⁹ Acute allergic conjunctivitis is usually self-limiting. In mild cases, topical antihistamine and vasoconstrictor combinations are the mainstay treatment.^{32,33} In patients with seasonal and perennial conjunctivitis, dual-acting

Table 2: Signs and symptoms of common types of conjunctivitis²³⁻²⁶

	Viral	Allergic	Bacterial
Laterality	Unilateral, then bilateral	bilateral	Unilateral, then bilateral
Tissue response	Follicles, chemosis, petechial haemorrhage, subepithelial infiltrates	Papillae chemosis, tissue scarring (if severe)	Papillae, subepithelial infiltrates <i>*mixed papillar and follicular response with chlamydia</i>
Discharge	Serous, mucoserous	Serous, mucoserous	Purulent, mucopurulent
Preauricular lymphadenopathy	Common	Unusual	Unusual <i>*Occasional in Neisseria and chlamydia</i>
Symptoms	Tearing, lid crusting upon awakening, sandy, gritty feeling in eyes	Itching, tearing, discharge	Tearing, lid crusting, purulent discharge

topical antihistamines with mast cell stabilising properties are the mainstay of treatment or alternatively a topical mast cell stabiliser.^{32,33} Topical corticosteroids should be used with caution and judiciously as they can cause glaucoma and cataracts.²⁹

Table 3: Pharmacotherapy guide in treating allergic conjunctivitis^{21,27-33}

Class	Agent	Dosing frequency
Antihistamines	• Emedastine	bd
	• Levocabastine	bd
Antihistamine and vasoconstrictor combination	• Antazoline/Naphazoline	qid
	• Antazoline/Tetryzoline	qid
Antihistamines with mast cell stabilising activity	• Azelastine	bd
	• Epinastine	bd
	• Ketotifen	bd
	• Olopatadine	bd
Mast cell stabilizers	• Lodoxamide	qid
	• Sodium cromoglycate	qid

Viral conjunctivitis is treated by supportive treatment including preservative-free lubricants, cold compresses, ocular antihistamines or vasoconstrictors.^{29,34} Viral conjunctivitis caused by *Herpes simplex* or *Herpes zoster* viruses is treated with both topical and oral antivirals to shorten the course of the disease.⁶

Table 4: Ophthalmic therapies for infectious conjunctivitis^{4,6,28,29,34-36,37-42}

Type	Cause	Treatment options	Dosing
Bacterial conjunctivitis			
Acute	<i>S. aureus</i> <i>S. epidermis</i> , <i>H. influenza</i> , <i>S. pneumoniae</i> , <i>S. viridans</i> , <i>Moraxella spp</i>	Chloramphenicol 1% ointment	q8h/5 days
		Chloramphenicol 0.5% drops	q2h-q4h/5 days
		Fluoroquinolones:	q4h/2days then q6h/5days
		Ciprofloxacin 0.3% drops	
		Ofloxacin 0.3% drops	
		Gatifloxacin	
		Moxifloxacin	
	Fusidic acid 1% drops	bd until resolves	
	Aminoglycosides:	q4h	
	Framycetin	oint: q8h/7days	
	Tobramycin		
	Neomycin		
	Bacitracin/polymyxin B ointment	q3h-q4h/7-10days	
Chlamydial inclusion	<i>C. trachomatis</i>	Azithromycin 1 g orally	Once
		Doxycycline 100 mg orally	bd/7days
Gonococcal	<i>N. gonorrhoea</i>	Ceftriaxone 1 g	Once
		Irrigation: sodium chloride 0.9%	
		Dual therapy to cover chlamydia is indicated	
Viral conjunctivitis			
Acute	<i>Adenovirus</i>	Irrigation: sodium chloride 0.9%	
		Cold compress	
		Antihistamines/vasoconstrictors: oxymetazoline 0.025% drops	q6h/7days
		Artificial tears	
Herpes	<i>Herpes simplex virus</i>	Topical acyclovir drops	9xday
		Oral acyclovir 400 mg	5x/d 7-10 d
		Oral valacyclovir 500 mg	q8h 7-10 d
Herpes	<i>Herpes zoster virus</i>	Oral acyclovir 800 mg	5x/d 7-10 d
		Oral valacyclovir 1000 mg	q8h 7-10d

Bacterial conjunctivitis is usually self-limiting in at least 60% of cases within one to two weeks of presentation. Although topical antibiotics shorten the duration of the disease, no differences have been observed in outcomes between treatment and placebo groups.^{28,35} All broad-spectrum antibiotic eye preparations seem to be effective in treating bacterial conjunctivitis. Factors that influence antibiotic choice include availability, patient allergies, resistant patterns and cost.²⁸ Chloramphenicol drops/ointment is usually inexpensive and well tolerated as first choice in the treatment of bacterial conjunctivitis. In contact lens wearers, once keratitis has been ruled out, it is reasonable to treat with a topical fluoroquinolone due to the high incidence of *Pseudomonas* infections in these patients.^{28,35}

In patients with *Chlamydia trachomatis* infection, systemic therapy is required, usually with azithromycin, erythromycin or doxycycline.⁶ Patients and their sexual partners must be treated and a co-infection with gonorrhoea must be investigated.⁶

Treatment of conjunctivitis caused by *N. gonorrhoea* consists of both topical and oral antibiotics.^{11,36} *N. gonorrhoea* is associated with a high risk of corneal perforation.³⁶

Non-pharmacological recommendations

Effective management of conjunctivitis requires appropriate patient education. Patient education regarding proper hygiene

during the infection can help break the chain of transmission. The practitioner should stress the importance of proper hand washing by patients and family members, using of separate linen and towels and avoiding direct contact with infected material.^{6,43} Patients with contact lenses should be advised to discontinue contact lens wear until the eye is white with no discharge.⁴³⁻⁴⁴

Conclusion

Conjunctivitis is a common eye disorder seen by healthcare practitioners, with the most common causes being viral and bacterial conjunctivitis.^{17,18,45-46} Patients with allergic conjunctivitis usually have a history of atopy, seasonal allergy or specific allergies and seldomly seek medical care.^{20,47} The similarities in presentation of the different types of conjunctivitis often leads to inaccurate diagnosis and inappropriate treatment with antibiotics.^{4,6} Conjunctivitis is usually self-limiting with treatment of viral and allergic conjunctivitis aimed at symptomatic relief.⁶ Bacterial conjunctivitis is treated with topical antimicrobials to shorten the duration of the condition, with oral antimicrobials indicated in chlamydial and gonococcal cases.^{32,48}

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