Introduction

 Conjunctivitis refers to various diseases involving inflammation of the conjunctival tissue of the eye.¹ The inflammation causes the conjunctiva, which is a transparent membrane, to appear pink or red.² Acute conjunctivitis usually has a rapid onset of symptoms and may be classified as infectious or non-infectious.²,³ Infectious conjunctivitis may be bacterial or viral in origin, whereas non-infectious conjunctivitis occurs because of allergies or toxin exposure, but may also be nonspecific in origin.² Most cases of infectious conjunctivitis are viral (approximately 80%), followed by bacterial conjunctivitis.¹,³ Allergic conjunctivitis is the most common cause of non-infectious conjunctivitis and may be managed with topical therapies including antihistamines, mast cell stabilisers, vasoconstrictors, or combinations thereof. Acute bacterial conjunctivitis is generally self-limiting, but management with topical antibiotics may reduce the duration of symptoms and possibly the spread of the infection.

 Allergic conjunctivitis may also be associated with contact lens use.⁵

 Bacterial conjunctivitis

 The most common bacteria involved in bacterial conjunctivitis include *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus* species.⁷ Bacterial conjunctivitis is highly infectious and often occurs in healthy individuals after being directly exposed to an infected person, or after fomite contact (e.g., infected pillowcases, towels).⁸ Immunosuppression, eye trauma or previous ocular disease can increase the risk of developing bacterial conjunctivitis.⁸ Contact lens wearers are also at risk of developing bacterial conjunctivitis if proper contact lens care and protocols are not maintained.⁸

 Diagnosis of bacterial and allergic conjunctivitis in the pharmacy

 The two predominant features associated with acute conjunctivitis is a red eye(s) and discharge.⁶ Differentiating between viral, bacterial and allergic conjunctivitis can be challenging. Therefore, to effectively aid in the management of the patient and identifying any red flags, a thorough history and the presenting clinical signs and symptoms should be reviewed (Table I).²,⁴

 Identifying red flags

 Patients presenting with a red eye(s) in the pharmacy and who have any of the following features should be referred to a doctor or specialist for immediate evaluation:¹⁰,¹²

 - Vision loss or reduction
 - Deep pain in the eye – other than grittiness, superficial itchiness and superficial soreness
 - Injury due to trauma or chemical exposure
 - Photophobia

 Abstract

 Conjunctivitis is associated with a red eye(s) and is commonly encountered in the pharmacy setting. It may be infectious or non-infectious in origin, and the effective management of the patient depends on a correct diagnosis and treatment. A pharmacist should take note of the patient’s history, differentiating symptoms and any red flags that warrant immediate referral for treatment. Most cases of infectious conjunctivitis are viral. Therefore, antibiotic therapy is not appropriate. Allergic conjunctivitis is the most common cause of non-infectious conjunctivitis and may be managed with topical therapies including antihistamines, mast cell stabilisers, vasoconstrictors, or combinations thereof. Acute bacterial conjunctivitis is generally self-limiting, but management with topical antibiotics may reduce the duration of symptoms and possibly the spread of the infection.

 © Medpharm S Afr Pharm J 2021;88(5):10-15

 Allergy or infection? A red-eye review

 L Steyn
 Amayeza Information Services, South Africa

 Corresponding author, email: lynda@amayeza-info.co.za

 | S Afr Pharm J 2021;88(5):10-15 | 10 |

 Introduction

 Conjunctivitis refers to various diseases involving inflammation of the conjunctival tissue of the eye.¹ The inflammation causes the conjunctiva, which is a transparent membrane, to appear pink or red.² Acute conjunctivitis usually has a rapid onset of symptoms and may be classified as infectious or non-infectious.²,³ Infectious conjunctivitis may be bacterial or viral in origin, whereas non-infectious conjunctivitis occurs because of allergies or toxin exposure, but may also be nonspecific in origin.² Most cases of infectious conjunctivitis are viral (approximately 80%), followed by bacterial conjunctivitis.¹,³ Allergic conjunctivitis is the most common cause of non-infectious conjunctivitis.¹ Misdiagnosis of viral or allergic conjunctivitis as being bacterial in origin often leads to the unnecessary prescribing of antibiotics which impacts the patient, as well as antibiotic stewardship initiatives.¹ A study estimated that nearly 60% of all patients diagnosed with acute conjunctivitis received topical antibiotics in the United States.⁵

 This article reviews the distinguishing features and management of bacterial and allergic conjunctivitis.

 Allergic conjunctivitis

 A type 1 hypersensitivity reaction to a particular allergen results in allergic conjunctivitis.² Allergic conjunctivitis may be classified as seasonal or perennial depending on the allergen. Mould spores or the pollen from trees and grasses are the main allergens responsible for seasonal allergic conjunctivitis (SAC), which tends to peak in the spring, late summer and early autumn.⁵ Perennial allergic conjunctivitis (PAC) occurs year-round as a result of indoor allergens, such as dust mites and animal dander.⁵ Less common, yet more severe, forms of allergic conjunctivitis include atopic keratoconjunctivitis (AKC), giant papillary conjunctivitis (GPC) and vernal keratoconjunctivitis (VKC).⁶
REVIEW

Foreign body or foreign body sensation in the eye(s) – other than a gritty sensation

Contact lens use – suspected infection

As most cases of infectious conjunctivitis are viral in origin, it is important to note the differences between viral and bacterial conjunctivitis, as well as the differences between infectious and non-infectious conjunctivitis. Table II lists the clinical signs and symptoms to help distinguish between infectious (viral or bacterial) and non-infectious (allergic) conjunctivitis.

Management and treatment of allergic conjunctivitis

The majority of cases of allergic conjunctivitis resolve spontaneously within 24 hours and long-term therapy is not required. This is usually where the patient is allergic to a specific allergen (e.g., cat allergy) and the symptoms resolve when the allergen is avoided, and they are no longer exposed.

Non-medical management of allergic conjunctivitis involves identifying and removing the offending antigen.

Table I: Review of the history and presenting symptoms

<table>
<thead>
<tr>
<th>Symptom onset and duration?</th>
<th>Sudden onset of symptoms and a duration of less than 4 weeks is indicative of acute conjunctivitis. Symptoms lasting longer than 4 weeks is chronic.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any vision impairment or changes?</td>
<td>Loss of vision or visual disturbance is a medical emergency requiring immediate ophthalmic referral. While vision may be temporarily obscured due to pus formation, conjunctivitis does not affect vision significantly, as the conjunctival membrane does not cover the cornea.</td>
</tr>
<tr>
<td>Any recent upper respiratory tract infection (URTI), such as sinusitis?</td>
<td>Viral conjunctivitis is often associated with URTI infections.</td>
</tr>
<tr>
<td>Contact lens wearer?</td>
<td>Contact lens wearers should be referred for an immediate evaluation of the eye due to the risk of corneal involvement or bacterial keratitis.</td>
</tr>
<tr>
<td>Systemic allergies?</td>
<td>Concomitant symptoms such as nasal congestion, sneezing and rhinorrhea may suggest allergic conjunctivitis.</td>
</tr>
<tr>
<td>Exposure to chemical agents or trauma?</td>
<td>Refer patient for immediate treatment.</td>
</tr>
<tr>
<td>Medication history?</td>
<td>Certain medications can adversely affect the eye causing dry eye and/or increased ocular pressure (e.g., anticholinergics, antihistamines). Long-term use of topical vasoconstrictors may cause rebound conjunctival redness and inflammation. Ocular redness and irritation may also occur due to the preservative or other component in an eyedrop solution (conjunctivitis medicamentosa).</td>
</tr>
<tr>
<td>Any eye discharge?</td>
<td>Evaluation of the type and amount of discharge can help distinguish between viral, bacterial, and allergic conjunctivitis.</td>
</tr>
<tr>
<td>Itchiness, pain, and/or grittiness in the eye?</td>
<td>Conjunctivitis is often associated with superficial itching, a feeling of grittiness or irritation and, in some cases, soreness on the surface of the eye.</td>
</tr>
<tr>
<td>Unilateral or bilateral eye involvement?</td>
<td>Establishing whether one or both eyes are affected can help distinguish between different causes of conjunctivitis as well as other causes of eye conditions.</td>
</tr>
<tr>
<td>Any photophobia?</td>
<td>Photophobia may be a sign of underlying pathology of the eye and the patient should be referred for evaluation.</td>
</tr>
</tbody>
</table>

Table II: Distinguishing factors between viral, bacterial and allergic conjunctivitis

<table>
<thead>
<tr>
<th>Viral</th>
<th>Bacterial</th>
<th>Allergic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocular discharge</td>
<td>Clear and watery Profuse tearing rather than discharge Morning crusting may occur, but followed by watery discharge during the day</td>
<td>Purulent discharge (more so than in viral) Discharge returns at eyelid margins and eye corners very soon after wiping away Pus/matter is generally white, but may be green or yellow Reports of one or both eyes “glued” shut upon waking</td>
</tr>
<tr>
<td>Itching</td>
<td>Typically, no itching Main complaint is grittiness, burning or irritation</td>
<td>Typically, no itching</td>
</tr>
<tr>
<td>Appearance of eye</td>
<td>Minimal eyelid oedema Pink or red conjunctiva May start with unilateral eye involvement, but spreads to second eye within 24–48 hours</td>
<td>Typically, unilateral eye involvement, but often spreads to other eye Pink or red conjunctiva Moderate eyelid oedema</td>
</tr>
<tr>
<td>Other symptoms</td>
<td>May also be associated with symptoms of adenovirus infection, such as sore throat, fever and/or general malaise</td>
<td>Mild pain in the eye(s), foreign body sensation</td>
</tr>
</tbody>
</table>

*If eyes are not itching, then the diagnosis is unlikely to be allergic in origin

- Foreign body or foreign body sensation in the eye(s) – other than a gritty sensation
- Contact lens use – suspected infection

Non-medical management of allergic conjunctivitis

The majority of cases of allergic conjunctivitis resolve spontaneously within 24 hours and long-term therapy is not required. This is usually where the patient is allergic to a specific allergen (e.g., cat allergy) and the symptoms resolve when the allergen is avoided, and they are no longer exposed.

Non-medical management of allergic conjunctivitis involves identifying and removing the offending antigen.
Symptoms may be relieved through supportive measures such as:\textsuperscript{13,14}
\begin{itemize}
  \item Rinsing eyes with cold water
  \item Making use of ice packs or cold water compresses
  \item Using topical lubricants (artificial tears) may help provide a barrier, dilute and flush the allergens from the tear film
  \item Patients should be instructed not to rub eyes, as this action causes the mast cells to degranulate, thereby worsening the symptoms
\end{itemize}

**Medical management** of allergic conjunctivitis may be necessary when symptoms are severe and cannot be managed through avoidance or removal of the offending allergen.\textsuperscript{13}

SAC and PAC are predominantly IgE-mediated hypersensitivity reactions.\textsuperscript{3} Mast cell activation results in increased levels of histamine, prostaglandins and leukotrienes.\textsuperscript{3}

Management of allergic conjunctivitis treatment may therefore include:\textsuperscript{13}

\begin{table}[h]
  \centering
  \begin{tabular}{|l|l|l|l|}
    \hline
    Table III: Classification, action, and examples of topical therapies available for allergic conjunctivitis\textsuperscript{2,3,5,6,13-17} \\
    \hline
    \textbf{Topical therapies} & \textbf{Action} & \textbf{Examples} & \textbf{Notes} \\
    \hline
    Antihistamines (some with mast cell stabilising properties) & H1 receptor antagonists reversibly bind to histamine receptors, preventing histamine from binding, thereby relieving signs and symptoms associated with histamine release & Single-acting H1 receptor antagonists: antazoline 0.5% levocabastine 0.5% emedastine 0.05% & Topical antihistamines work quickly to relieve itching and redness, but only for a short duration \\
    & & H1 receptor antagonists with mast cell stabilising properties (dual action): olopatadine, ketotifen, azelastine, epinastine & Dual action of the antihistamine allows for quick onset of action to relieve symptoms, while the mast cell stabilising properties allow for a longer duration of action as compared to single-acting antihistamines \\
    \hline
    Vasoconstrictors/ocular decongestants (alone or in conjunction with an antihistamine or astringent) & Ocular decongestants activate alpha-adrenergic receptors in blood vessels leading to vasoconstriction and reduced conjunctival oedema Antihistamine component reversibly blocks histamine receptors in conjunctiva Zinc sulphate has astringent properties, which decreases excessive lacrimation associated with allergic or irritated eyes & Ocular decongestants include: phenylephrine, naphazoline, oxymetazoline and tetryzoline Vasoconstrictor/antihistamine combinations include: Tetryzoline/antazoline Vasoconstrictor/astringent combinations include: Naphazoline 0.05 mg/zinc sulphate 0.2 mg & Ocular decongestants offer short-term relief of symptoms, but do not treat the cause of the symptoms Chronic use of vasoconstrictors, especially phenylephrine, leads to rebound conjunctival congestion which results in conjunctivitis medicamentosa \\
    \hline
    Mast cell stabilisers & Inhibit degranulation, reducing the release of histamine, tryptase and prostaglandin D\textsubscript{3} & Sodium cromoglycate 2%, lodoxamide tromethamine 0.1% & Act prophylactically, therefore administer before antigen exposure Do not relieve existing symptoms Take a few weeks before becoming effective Require long-term use Should be continued until after symptoms have subsided Useful for patients suffering from SAC who cannot tolerate other therapies and are able to start therapy 2–4 weeks before symptoms begin \\
    \hline
    Nonsteroidal anti-inflammatory drugs (NSAIDs) & Act on cyclooxygenase metabolic pathway, inhibiting the production of prostaglandins and thromboxanes & Ketorolac tromethamine & Ketorolac is registered for ocular itching associated with SAC. However, topical NSAIDs have been associated with sight-threatening corneal adverse effects in some patients Less effective in managing allergic conjunctivitis as compared to topical antihistamines \\
    \hline
    Glucocorticoids & Suppresses late-phase reaction of allergic inflammation & Loteprednol etabonate, dexamethasone, fluorometholone, prednisolone, betamethasone & Used for short term use only for refractory symptoms associated with allergic conjunctivitis Use needs to be initiated and monitored by ophthalmologist Risk of cataract formation, increased intraocular pressure, and bacterial and viral infections of cornea and conjunctiva Can cause a flare-up of latent ocular herpes simplex virus infections \\
  \end{tabular}
  \caption{Classification, action, and examples of topical therapies available for allergic conjunctivitis\textsuperscript{2,3,5,6,13-17}}
\end{table}
Topical therapies

Topical therapies used in the management of allergic conjunctivitis include the use of antihistamines, mast cell stabilisers, vasoconstrictors, or combinations thereof (Table III). Topical nonsteroidal anti-inflammatory drugs (NSAIDs) and glucocorticoids are also sometimes used.

Oral antihistamines

Oral antihistamines can be used to alleviate ocular symptoms associated with allergic conjunctivitis, especially if the patient is also experiencing other allergic symptoms, such as rhinorrhea. However, if only ocular symptoms are present, use of topical preparations are preferable due to a quicker onset of action and fewer systemic side-effects.

Second-generation antihistamines are preferred as they have fewer systemic side-effects. Examples of oral second-generation antihistamines include:

- Fexofenadine
- Cetirizine
- Levocetirizine
- Loratadine
- Desloratadine
- Mizolastine

Allergen immunotherapy

Sufferers of allergic rhinoconjunctivitis may benefit from allergen-specific immunotherapy, where clinical tolerance is induced. Allergen-specific immunotherapy involves inducing protective immunologic responses by gradually exposing the patient to increasing amounts of the offending allergen.

Management and treatment of bacterial conjunctivitis

Acute bacterial conjunctivitis is highly contagious, but is generally self-limiting, resolving within 7–10 days without any intervention. The mainstay treatment of acute bacterial conjunctivitis is topical antibiotic therapy. Antibiotic therapy reduces the duration of symptoms and is also likely to reduce the spread.

Use of topical steroid/antibiotic combinations are discouraged, as steroids may not only exacerbate the underlying infection, but are also associated with an increased risk of corneal melting and elevated intraocular pressure.

Topical anti-infectives include:

- Chloramphenicol
- Fusidic acid
- Aminoglycosides, e.g. Framycetin, Tobramycin, Neomycin
- Fluoroquinolones, e.g. Ciprofloxacin, Ofloxacin, Gatifloxacin, Moxifloxacin
- Sodium sulfacetamide (bacteriostatic ointment available over-the-counter)
- Propamidine isthionate 0.1% drops (available over-the-counter)

In South Africa, standard treatment guidelines for acute bacterial conjunctivitis consists of:

- chloramphenicol 1% ointment as first-line treatment
- fluoroquinolone ophthalmic drops (e.g. ciprofloxacin 0.3%) as second-line treatment

Various factors may influence the choice of topical antibiotic therapy, including:

- Local availability of drug
- Patient allergies
- Cost
- Resistance patterns

Patient counselling for patients with infectious conjunctivitis:

The spread of infectious conjunctivitis may be prevented through strict hand hygiene measures, especially after touching the infected eye. Avoid the sharing of towels, pillows, and other linens and avoid swimming pools while infected.

Proper contact lens care should be adhered to. Contact lenses use should be discontinued, and the lenses and solution be discarded if bacterial conjunctivitis is diagnosed. Contact lenses may be worn again 24 hours after completion of treatment when the infection has cleared completely.

Sticky discharge from the eye can be gently removed with cotton wool pads soaked in water.

Patients should be aware that most cases of infectious conjunctivitis are viral.

Antibiotics are not effective in treating viral conjunctivitis. Refer patients treated with topical antibiotics who do not show an improvement in symptoms within a few days after initiation of therapy.

Conclusion

Most often, a red eye is due to a benign, self-limiting condition known as conjunctivitis. Pharmacists are ideally positioned to advise patients who present in the pharmacy with eye complaints. To avoid misdiagnosis and the inappropriate prescribing of antibiotics, the pharmacist should take a careful...
Pharmacists also need to be aware of red flags indicating a possible serious eye condition requiring immediate referral.9

References


