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REVIEW ARTICLE

Conjunctivitis: Types, Clinical Manifestation and Management

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ABSTRACT

This narrative review analyses the different types, clinical manifestations, and management strategies for conjunctivitis to facilitate accurate diagnosis and treatment planning. It gathers information on the types of conjunctivitis and their management based on findings from primary and secondary literature sources. Conjunctivitis is broadly categorized into bacterial, viral, allergic, and some less common forms. Each type has unique causes and symptoms. Bacterial conjunctivitis is often characterized by purulent discharge. At the same time, the viral type is characterized by watery discharge. Allergic conjunctivitis presents with itchiness in the eyes. The symptoms vary depending on the underlying cause. Common symptoms include redness, irritation, discharge, and photophobia. Many cases of bacterial conjunctivitis require antibiotic therapy, but viral conjunctivitis is generally managed with supportive care. Allergic conjunctivitis responds well to antihistamines and mast cell stabilizers. Accurate diagnosis protects against the development of resistance to antibiotics and makes sure proper management is delivered. This review emphasizes the importance of precise diagnosis and the development of personalized treatment plans to enhance patient care.
KEYWORDS: Conjunctival inflammation, ocular infection, bacterial conjunctivitis, viral conjunctivitis, allergic conjunctivitis, treatment

INTRODUCTION

Inflammation or infection of the conjunctiva is called "conjunctivitis," but it is often referred to as "pink eye." The conjunctiva, a very thin mucous membrane, lines the inside of the eyelids and the surface of the globe up to the limbus. It is further separated into the bulbar portion that covers the world and the tarsal portion that covers the lids. It is usually clear, but it gets infected and turns pink or red when inflamed, hence the term "pink eye". Conjunctivitis ranges in severity from slight redness to subconjunctival haemorrhage, purulent discharge and edema of conjunctiva or eyelid[1]. It is categorized as either infectious or non-infectious, acute or chronic.

In contrast to chronic conjunctivitis, which lasts more than four weeks, acute conjunctivitis typically lasts only one to two weeks after presentation[2]. Ocular allergy is the most common form of non-infectious conjunctivitis and can significantly decrease productivity and affect patients' quality of life. In some rare but more severe cases, it can threaten vision. The prevalence of ocular allergy, including seasonal and perennial allergic conjunctivitis, has been increasing worldwide[3]. Conjunctivitis triggers inflammation in the conjunctiva. This inflammation occurs when the tiny blood vessels within the conjunctiva swell or become inflamed, resulting in a noticeable red or pink appearance in the eyes. Other symptoms include irritation, burning sensation, pain, swelling, or itchiness. It can affect one or both eyes within a day or two, often causing increased eye discharge or constant tears. The infection can also impact the eyelids, causing them to look swollen or droopy, yet it seldom affects vision. Occasionally, this condition presents itself with a greenish or yellowish discharge[4]. The causative agents include bacteria, viruses, and allergens like pollen, foreign objects, chemical exposure, or various irritating environmental substances. However, timely detection and precautionary measures can effectively limit the spread of conjunctivitis[5]. Apart from being caused by multiple infective agents, conjunctivitis may also be associated with some systemic illnesses, including Stevens-Johnson syndrome, keratoconjunctivitis sicca, nutritional deprivation (especially vitamin A deficiency), congenital metabolic syndromes, such as porphyria and Richner-Hanhart syndrome and immune-related disorders, such as Reiter syndrome[6-7]. This review provides a comprehensive analysis of the types, clinical presentations, and management strategies for conjunctivitis, aiming to facilitate accurate diagnosis and optimize treatment planning.

METHODOLOGY

Study Design: This study employed a narrative literature review to gather and analyze research articles, clinical guidelines, and expert opinions about conjunctivitis.

Study Question: What are the different types of conjunctivitis, their clinical manifestations, and the current approaches to management?

Databases Searched: Comprehensive database searches were conducted across platforms like PubMed, Google Scholar, Scopus, and Web of Science, utilizing a range of keywords like 'conjunctivitis', 'types of conjunctivitis', 'species', 'causing conjunctivitis', 'complications', 'ocular inflammation', 'bacterial conjunctivitis', 'viral conjunctivitis', 'allergic conjunctivitis', 'toxic conjunctivitis', 'non-specific', 'irritants', 'causes', 'symptoms', 'treatment', and 'prevention'.

Study Selection Process

Peer-reviewed articles published in English from the earliest available records to the present were included in the review. Unpublished manuscripts, conference abstracts, dissertations and manuscripts published in languages other than English were excluded.

Eligibility Criteria: The eligibility criteria encompassed studies addressing the pathophysiology, clinical signs and symptoms and treatment and prevention strategies of conjunctivitis.

Data Extraction and Synthesis: Data extraction and synthesis were done to consolidate key findings, facilitate the identification of emerging trends and gaps in current knowledge, and assess the included studies' methodological quality to ensure the synthesized evidence's reliability. It also provides insight into understanding the types, management, and prevention of conjunctivitis.

TYPES OF CONJUNCTIVITIS

Bacterial conjunctivitis

Several bacteria, including Haemophilus influenzae, Moraxella catarrhalis, and Streptococcus pneumoniae, cause a highly infectious eye infection. The most common symptoms of bacterial conjunctivitis mainly include swelling in eyelids followed by a greenish/yellowish discharge, redness, and sticky texture in the eyes. Bacterial infections caused by *Haemophilus influenza* may also result in burning and dryness with severe pain, while *Moraxella catarrhalis* commonly causes eye conditions after an incubation period of 4-5 days. Usually, it is self-limiting, but some types of bacterial conjunctivitis may need specific treatment in severe cases[8-11].

Viral conjunctivitis

Viral conjunctivitis is caused by *Enterovirus 70, Coxsackievirus A24, Varicella-Zoster virus*, and *Adenovirus*. Any person of any age can be affected, and its contagiousness is moderate. The infection causes redness in one or both eyes, pain, irritation, greenish/yellowish discharge, and sensitivity to light. *Adenovirus* is a common causative agent, including potentially serious ocular infections such as epidemic keratoconjunctivitis and pharyngoconjunctival fever. This infection can result in photophobia, foreign body sensation, excessive tearing, or even nasal congestion when it is the case of virus-induced conjunctivitis. Joint association of the *Rubella virus* has been associated with conjunctivitis, which can pose a significant risk to pregnant women, leading to severe complications. *Herpes Simplex Virus* has also been associated with conjunctivitis, which tends to affect children and adults. Another type of viral conjunctivitis is acute haemorrhagic conjunctivitis, also called "diplomats' conjunctivitis", probably due to *Coxsackievirus A24*. This type has an extremely short incubation period characterized by excessive tearing, swelling, and redness. In most cases, patients recover within one to two weeks and have no long-term effects[11-14].

Allergic conjunctivitis

The allergens that cause allergic conjunctivitis include pollen, intake of smoke, fragrant smells and air pollution. Allergies caused by seasonal changes, especially in spring, are quite common. Characteristics of allergic conjunctivitis include redness, burning, swelling, and increased tearing. Symptoms like itching, tearing, and mild redness get worse in the spring due to the increased number of airborne pollutants and can be chronic or acute. Vernal keratoconjunctivitis is a condition that usually occurs during the warm season and is more commonly seen in countries with hot climates. This type is characterized by sticky discharge, photosensitivity, and cobblestone-like lesions on the eyelids. Atopic keratoconjunctivitis associated with atopic eczema may present with itchiness, discomfort, and severe pain in the eye(s). It can later result in visual impairment. Inflammatory tissue lesions cause giant papillary conjunctivitis, most likely caused by the response stimulated in individuals due to the biocompatible materials used to manufacture the contact lenses. This leads to inflammation and swelling of papillae in the upper eyelid, presenting symptoms that can be easily confused with other types of conjunctivitis[15-16].

Irritants/ Chemical splashes

Some potential irritants that can cause conjunctivitis are plant saps, toxic substances, odours, chemical spills, and unpleasant gases. Contact of any of these compounds with the eye(s) causes inflammation of the conjunctiva. This may cause discomfort, irritation and redness in the eyes. It is recommended that the eye be rinsed thoroughly with clean water and that medical assistance be obtained to prevent severe damage[11].

Toxic conjunctivitis

Toxic conjunctivitis, also known as toxic keratoconjunctivitis, occurs when ocular tissues are damaged. Prolonged use of the dangerous substances might cause inflammation of the conjunctiva, resulting in either a papillary or follicular reaction. This might cause the conjunctiva to enlarge, turn red, and retain excess moisture. Allergic and toxic conjunctivitis often have similar symptoms, making them difficult to distinguish[17].

Non-specific conjunctivitis

A red eye condition and discharge can occur without being attributed to infection, allergy, or toxicity. Non-specific conjunctivitis typically disappears within a few days without therapy, as the conjunctiva heals fast. Lubricants like drops or ointments can help improve eye comfort. Preservative-free treatments are more expensive and only recommended for patients with severe dry eyes or allergies to preservatives[18].

TREATMENT

Infectious conjunctivitis includes various types, with viral conjunctivitis being the most common, usually not requiring specific treatment. Bacterial conjunctivitis, affecting all age groups, is typically treated with antibiotics. Studies have shown the efficacy of antibiotics like ciprofloxacin and tobramycin in treating bacterial conjunctivitis[19]. Viral conjunctivitis lacks specific antiviral treatments, and diagnosing it based solely on common signs and symptoms often leads to unnecessary antibiotics, which are ineffective against viral infections. Proper eyelid hygiene and culture-guided antibiotic application are essential for effective treatment. **(Table I)** provides a comparison of significant types of conjunctivitis, including bacterial conjunctivits[9-20-31], viral conjunctivitis[11-20-32-44], Allergic conjunctivitis[20-45-50] and Irritants/ Chemical splashes[1-51], species involved in causing conjunctivitis, symptoms, potential complications and treatment methods.

Table I: Types of Conjunctivitis: Signs, Symptoms and Treatments

Type of Conjunctivitis	Species involved with characteristics	Clinical Signs and Symptoms	Associated complications	Treatment options
Bacterial conjunctivitis	*H. influenzae* (Gram-negative facultative anaerobe), *S. pneumoniae (*Gram-positive facultative anaerobe) and *M. catarrhalis* (Gram-negative obligate aerobe)	Eye redness, mucopurulent discharge, mattered and adhered eyes in the morning, foreign body sensations, burning sensation, dryness and severe pain	Corneal ulcers, eyeball perforation, keratitis	Tetracycline, chloromycetin, 2% of nitrate solution, ceftriaxone, azithromycin, eye drops like gentamycin, ointments like polyfax and ciprofloxacin, Levofloxacin 0.5% (Quixin), Moxifloxacin 0.5% (Vigamox), Ofloxacin 0.3% (Ocuflox), Bacitracin/polymyxin B (Polycin), Erythromycin 0.5%, Gentamicin 0.3% (Gentak), Sulfacetamide 10%, Tobramycin 0.3% (Tobrex), Trimethoprim/polymyxin B
Viral conjunctivitis	*Enterovirus 70* and *Coxsackievirus A24* (Single-stranded positive sense RNA), *Varicella-Zoster virus, Adenovirus* and *Herpes Simplex Virus* (Double-stranded DNA genome)	Redness, watery discharge, itching, irritation, lid swelling. Less frequent symptoms include pain, sensitivity to light, lid vesicles and ulcers, and blurred vision	Keratitis and iritis/uveitis	2% povidone-iodine, povidone-iodine 0.6% and dexamethasone 0.1% (PVP-I/dexamethasone) vs. povidone-iodine 0.6% vs. vehicle (1:1:1) and cidofovir 1%, artificial tears
Allergic conjunctivitis	-	Itching, foreign body sensation, serous or mucous discharge, conjunctival hyperaemia and tarsal papillary reaction	Corneal scarring, pannus, vision-threatening and the presence of giant tarsal papillae adversely affect the prognosis	Topical antihistamine agents, topical H1-receptor antagonists, azelastine or olopatadine, topical lubricant, antihistamines, and topical steroids, Alcaftadine 0.25% (Lastacaft), Bepotastine 1.5% (Bepreve), Epinastine 0.05%, Ketotifen 0.025% (Zaditor),
Irritants/ Chemical splashes	-	Eye pain, foreign body sensation, vision loss and sensitivity to light	Corneal abrasions	Ciprofloxacin or gentamicin and topical bacitracin or erythromycin

Insufficient protection and chronic inflammation may lead to conjunctivitis[52]. Itchiness, burning sensation, redness, pain and excessive eye discharge are the most common symptoms of conjunctivitis[53-54]. Conjunctivitis problems like dry eyes, blepharitis, and keratitis may disturb the ocular surface[55-56]. Conjunctivitis may develop into conditions like corneal scar, corneal neovascularization, and recurrent corneal erosion syndrome, which require cornea transplantation to prevent blindness[57-59]. Ketotifen reduces itching, tears, and other signs of conjunctivitis[60]. Tropical antibiotics may reduce chronic clinical infection by approximately 25%[61].

CONCLUSION

Conjunctivitis can cause discomfort, but its impact can be minimized with proper prevention and management strategies. Understanding the symptoms and preventive measures of conjunctivitis, whether caused by viruses, bacteria, allergies, or irritants, is essential for maintaining ocular health and reducing the spread of infection. Practicing good hygiene, properly caring for contact lenses, and avoiding allergens and irritants can help reduce the risk of developing conjunctivitis. Early recognition of symptoms and seeking medical attention for proper diagnosis and treatment are essential to prevent complications. Spreading awareness and educating others about conjunctivitis and preventive measures can help reduce its impact on the community. By working together and following these strategies, eye health can be protected, and the effect of conjunctivitis can be reduced.

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AUTHOR CONTRIBUTION

Rubab M: Conceived the idea and participated in its design and drafted the initial manuscript
Zahoor S: Supervised the write up and revised the manuscript
Ashraf S: Proof read the manuscript.
All the authors read and approved the final manuscript.

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