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Conjunctivitis

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Abstract

Conjunctivitis is inflammation on conjunctiva Which can due to by infection bacteria, viruses, allergies, or irritation and is one of the most common eye diseases and can be contagious. This article aims to provide a comprehensive review of the epidemiology, etiology, pathophysiology, classification, diagnosis, and management of conjunctivitis based on literature latest. Writing abstract done with method literature review to various source scientific Which relevant. Results show that Conjunctivitis can be classified into infectious and non-infectious, with the diagnosis being based on history and clinical examination, while additional examinations such as Gram staining or microbiological culture are performed in selected cases. Management varies according to etiology, ranging from supportive therapy to topical antibiotics or antihistamines, with a generally good prognosis, although complications such as keratitis or corneal perforation can occur in poorly managed cases. Therefore, correct diagnosis and appropriate therapy are essential to prevent complications and improve the patient's quality of life, while education on prevention and personal hygiene is needed to reduce the spread of infectious conjunctivitis.

Introduction

Conjunctivitis is an inflammatory condition on conjunctiva, that is a thin membrane that lines the inside of the eyelids and the sclera. Conjunctivitis, often referred to as "pink eye" is one One condition medical Which general occurs in the eye. This disease is characterized by inflammation on conjunctiva, that is transparent layer that lines the inside of the eyelids and the surface of the eyeball. Conjunctivitis can occur in all age groups and can be contagious, depending on on its etiology. Conjunctivitis can be caused by various factors, such as infection, allergies, or irritation. Although often time considered as condition mild, conjunctivitis can cause significant discomfort and potentially infectious, especially in the environment that congested like school or place work (Sonawane et al., 2023; Suryani et al., 2021; Bradford & Melson, 2021; Iqbal et al., 2024; Wu te al., 2025).

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Conjunctivitis has long been a concern in ophthalmology and public health. public Because its high prevalence in the community. Other studies highlight the importance of differential diagnosis to distinguish conjunctivitis from other eye conditions such as keratitis or uveitis (Prajna et al., 2022; Gupta et al., 2024; Farswan et al., 2024).

The medical literature also notes that the management of conjunctivitis should be tailored to its specific etiology to ensure optimal clinical outcomes.

Various studies have identified the causes, pathophysiological mechanisms, and clinical management of this condition. A thorough understanding of conjunctivitis is important to reduce the impact. disease This to quality patient's life.

Review Library

Definition

Conjunctivitis is an inflammation or infection of the conjunctiva, the transparent membrane that lines the inside of the eyelids and the surface of the eyeball. This condition is characterized by redness of the eye, discharge, itching, and sometimes swelling of the eyelid.

Conjunctivitis can occur in one or both eyes and usually does not permanently affect visual acuity (Vitaloka et al., 2024; Baware et al., 2023).

Epidemiology

Conjunctivitis is Wrong one of the most common eye diseases worldwide. Based on existing data, in 45% of visits to eye disease departments in the United States, 30% are complaints of conjunctivitis due to bacteria and viruses, and 15% are complaints of allergic conjunctivitis The prevalence of adenoviral conjunctivitis is found to be 20% - 91% of conjunctivitis worldwide (Wandini et al., 2024; Alatawi et al., 2022; Sonawane et al., 2023; Afrasiabi et al., 2023).

The prevalence of conjunctivitis in Indonesia ranks second (9.7%) among the 10 major eye diseases, with a prevalence of conjunctivitis patients of 6.4% (Pada et al., 2024; Suryani et al., 2021; Nzioka, 2022; Umar et al., 2022). The prevalence is very high in dense environments such as schools, daycare centers, and dormitories. Conjunctivitis can occur in various age but tend most often occurs at the age of 1 - 25 years. The majority of incidents occur in preschool children and school-age children due to lack of sanitation, system immunity their bodies are not fully developed and the habit of touching their face or eyes without washing their hands first (Klar et al., 2022; Ayamga, 2022; Mbakaya, 2022).

Bacterial conjunctivitis is often found in children, while allergic conjunctivitis is more common in individuals with a history of atopy. Seasonal factors also play a role, with allergic conjunctivitis occurring more frequently during the spring or fall when the amount of allergens in the air increases (Tanaya, 2023; D'Amato et al., 2023; Nabavizadeh et al., 2025; Sheng et al., 2022).

Etiology

According to the American Academy Of Ophthalmology (2019), Conjunctivitis occurs due to conjunctival infection. This causes dilation of the conjunctival blood vessels which results in conjunctival hyperemia and edema. Conjunctivitis can be divided into causes infection And non infection. Virus and bacteria are the most common causes of infection. Non-infectious conjunctivitis includes allergic, toxic, and secondary inflammatory conjunctivitis. Causes of secondary to systemic conjunctivitis include immune-mediated diseases and neoplastic processes (Kim & Tuft, 2022; Shivaji, 2024).

The causes of conjunctivitis vary depending on the type (Hashmi et al., 2024): 1) Infection Viruses: Adenovirus, Herpes simplex; 2) Bacterial Infection: Staphylococcus aureus, Streptococcus pneumoniae, Haemophilus influenzae and Clamidia trachomatis; 3) Infection Mold: Candida spp; 4) Allergies: Exposure allergen like pollen, dust, or animal dander.; 5) Irritation: Exposure to chemicals, smoke, or environmental pollutants; 6) Disease Systemic: Autoimmune.

Factor Risk

Risk factors for conjunctivitis include lack of personal hygiene, contact with person Which suffer conjunctivitis, sharing towels or other objects with an infected person, exposure to high-pressure ultraviolet light. In addition, irritant chemicals or poor environments such as high levels of dust, seasonal allergies or contact with known allergens are risk factors for conjunctivitis (Hudaiva, 2020; Ireri et al., 2022; Hashmi et al., 2023).

Pathophysiology

Infection by microorganisms (viruses, bacteria, fungi) and allergens are very likely to occur in the anatomical location of the conjunctiva, which is the outermost structure of the eye. There are several mechanisms of protection against the surface of the eye from external substances, such as the Tear Film.

Tear film consists of 3 components, namely lipid, aqueous and mucin, which function For dissolve dirt And toxic substances from the surface of the eye, which are then drained into the inferior meatus through the lacrimal sac. Tear film dilutes bacterial infections, mucus traps debris and pumps the eyelids, then flows into the lacrimal duct with tears .

Tear Film also contains antimicrobials, like Ig A, Ig G, beta lysine, and lysozyme, which function to stop the development of germs. If disease-causing microorganisms can get past these defenses, they will cause conjunctivitis (Wandini et al., 2024).

The presence of damaging agents can cause damage to the conjunctival epithelium followed by epithelial edema, conjunctival stromal chemosis, stromal lymphoid epithelial hypertrophy, or granuloma. Inflammatory cells enter the surface through the epithelium. These inflammatory cells join with fibrin And pussy goblet cell For make exudate conjunctiva, which make adhesion edge palpebra upon waking up (Vitaloka et al., 2024).

In infectious conjunctivitis, pathogens enter through direct contact or droplets, infect the conjunctiva, and trigger an immune response.

In viral or bacterial conjunctivitis, the pathogen attacks the epithelial cells of the conjunctiva. so that trigger response body immunity in the form of local blood vessel dilation (vasodilation) and infiltration of inflammatory cells such as neutrophils or lymphocytes into the area. This causes redness of the eyes (hyperemia) and discharge from the eyes as a defense mechanism of the body to remove pathogens.

In allergic conjunctivitis, a type I hypersensitivity reaction occurs, causing histamine release and inflammation. In irritant conjunctivitis, exposure to chemicals damages the conjunctival epithelium, causing local irritation and inflammation.

This causes local itching and swelling (Ramadirta et al., 2023).

This inflammation of the conjunctiva causes the posterior conjunctival vessels to dilate, which causes hyperemia of the fornix. With the presence of hyperemia, papillae usually swell And hypertrophy, which often accompanied by with flavor object foreign and scratched, hot, or itchy, which stimulates tear secretion. Hyperemic blood vessels also produce mild transudation, which increases the amount of tears (Gin et al., 2024).

Classification And description clinical

Patients with conjunctivitis usually complain of symptoms such as red eyes, itching or burning in the eyes, discharge (either clear or purulent), and swelling of the eyelids. In certain cases, patients may also experience photophobia (sensitivity to light). Red eyes are the main sign that is seen clinically, while the type of discharge can help determine the etiology of the disease.

The clinical Figure of various types of conjunctivitis can be seen in the table below. Table 1.

Table 1. Differential Characteristics of Conjunctivitis Etiologies

Description	Viral	Bacterial	Gonorrhea	Chlamydia	Allergic
Hyperemia	Comprehensive	Comprehensive	Comprehensive	Comprehensive	Comprehensive
Itching	Minimum	Minimum	Minimum	Minimum	Great
Conjunctival Reaction	Follicles	Follicles	Membrane formation	Follicles	Papillae
Eye Discharge	Serous	Mucopurulent	Hyperpurulent	Mucopurulent	Mucoid
Clinical Signs and Symptoms	High fever, unilateral onset, preauricular lymphadenopathy, conjunctival injection, herpetic lesions (HSV) or dermatomal lesions (VZV)	Eyelid edema, foreign body sensation, photophobia when cornea involved	Severe eyelid edema, pronounced chemosis, possible corneal infiltration leading to perforation	Presence of Herbert pits and pannus	Marked itching, bilateral photophobia; key allergic signs: cobblestone papillae and Trantas dots (VKC), giant papillary reaction (GPC), phlyctenular

					reaction (history of TB)

Following description clinical typical each classification of conjunctivitis:

Viral Conjunctivitis

Figure 1. Secret serous

Figure 2. Herpes shingles which forms dermatomal lesions

Bacterial Conjunctivitis

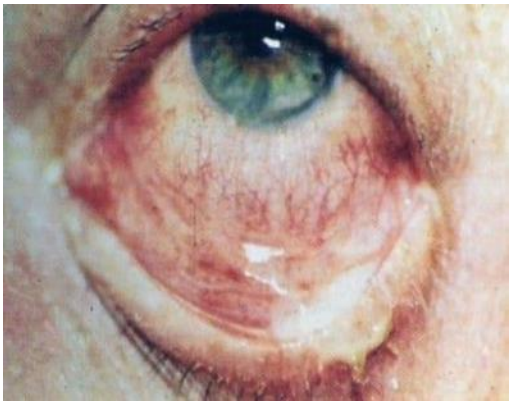

Figure 3. Mucopurulent discharge

Conjunctivitis Gonorrhea

Figure 4. Hyperpurulent discharge

Figure 5. Membrane

Chlamydia Conjunctivitis

Figure 6. Secret face purulen

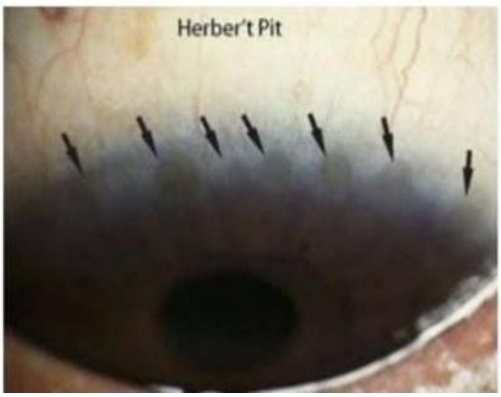

Figure 7. Herberts pit

Figure 8. Pannus

Allergic Conjunctivitis

Figure 9. Mucoid secretion

Figure 10. Cobble stone

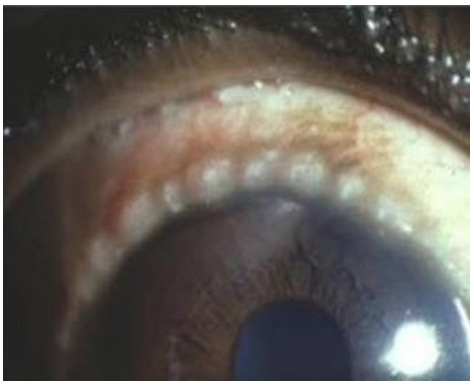

Figure 10. Trans dot

Figure 11. Giant papylari

Figure 12. Phlyctenularis

Inspection

The examination of conjunctivitis includes anamnesis and physical examination of the eye. The core history includes a history of symptoms, risk factors, and possible exposure to infectious agents or allergens. The examination physique done with Direct inspection to see if there is hyperemia (redness), edema (swelling), and the type of fluid coming out of the eye is key in carrying out the examination. In addition, slitlamp biomicroscopy examination can be performed for greater clarity (AAO, 2019).

In certain cases, additional tests such as microbiological culture or Gram and Giemsa staining may be needed to determine the cause of infection. Additional tests such as fluorescein staining may be performed to rule out the type of corneal ulcer (Hashmi et al., 2024).

Diagnosis

In establishing a diagnosis, anamnesis and examination (both physical examination and eye examination) must be carried out comprehensively. It is necessary to ask about the onset, location (unilateral or bilateral), duration, accompanying diseases such as upper respiratory tract disorders. on, symptom accompanying like photophobia, previous medical history, and family history.

The diagnosis of conjunctivitis is made based on typical clinical symptoms such as redness of the conjunctiva, discharge from the eyes, and itching or pain (Hashmi et al., 2024).

In the results of a clinical examination of conjunctivitis, it can be found that the vision is not reduced, conjunctival hyperemia, epiphora, pseudotosis, papillary hypertrophy, follicles, chemosis, membranes or pseudomembranes. And a number of can preauricular adenopathy occurs, namely enlargement of the preauricular lymph nodes (PPK, 2013).

The diagnosis of bacterial conjunctivitis can be confirmed by additional microscopic examination and culture, which is recommended for cases where the discharge is purulent. membranous or pseudomembrane. Gram stain of conjunctival scrapings and Giemsa staining usually show numerous polymorphonuclear neutrophils.

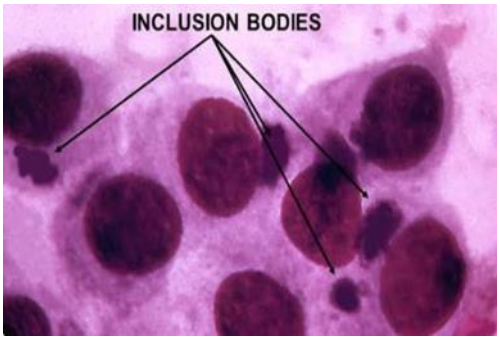

Figure 13. Incusion body Giemsa staining in chlamydial conjunctivitis

The diagnosis of viral conjunctivitis can be confirmed by Gram stain (to identify the organism) and Giemsa stain (to determine cell type and morphology).

In viral conjunctivitis, many mononuclear cells, especially lymphocytes, are usually found in large numbers.

Diagnosis of allergic conjunctivitis is important to emphasize in patients with a history of allergies and atopy in the family so that they have a tendency to experience allergic conjunctivitis. In addition, laboratory examination of allergic conjunctivitis found eosinophil cells (Ramadirta et al., 2023).

In general, the diagnosis of conjunctivitis is based on anamnesis and physical examination. Viral conjunctivitis is suspected if there are symptoms of upper respiratory tract infection, while bacterial conjunctivitis is characterized by purulent discharge. Conjunctivitis allergy characterized by severe pruritus and eyelid edema (Insani et al., 2017).

Differential Diagnosis

Several other conditions can mimic the symptoms of conjunctivitis and require differential diagnosis to determine the cause. Blepharitis (inflammation of the eyelids), keratitis (inflammation of the cornea), uveitis (inflammation of the uvea), and acute glaucoma are some of the conditions that need to be considered in the differential diagnosis because they require different treatments.

In addition, the differential diagnosis of conjunctivitis is scleritis, episcleritis and dry eye syndrome, the symptoms of which are similar to conjunctivitis but are caused by a deficiency in tear production (PPK, 2013).

Governance

In general, the treatment for viral conjunctivitis is supportive therapy such as cold compresses and the use of artificial tear drops. This is usually sufficient because the disease will heal itself within a few days to weeks without serious complications.

Bacterial conjunctivitis usually requires topical antibiotics in the form of eye drops or ointments to kill the causative pathogen. In cases of allergies, topical antihistamines can be used to relieve itching and redness. In addition, allergen avoidance is a major step in prevention. relapse (Ramadir et et al., 2023).

In addition, conjunctivitis treatment is needed depending on the cause: a) Viral Conjunctivitis: Generally self-limiting or heals on its own. And only need supportive therapy like compress cold And artificial tears ; b) In addition, antibiotics can be given to prevent secondary infections. For viral conjunctivitis caused by herpes simplex, acyclovir eye ointment 3% is given 5 times a day for 10 days ; c) Bacterial Conjunctivitis: Antibiotics are given topical like chloramphenicol drops eye 0.5% as much as 1 drops 6 times a day or gentamicin ointment eye 0.3% 4 times a day for 3 days ; d) Conjunctivitis Gonorrhea: On baby Chloramphenicol eye drops 0.5% can be given as much as 1 drop every hour. In adults can given ceftriaxone 250 mg IM SD or doxycycline 100 mg twice daily for 7 days ; e) Chlamydia conjunctivitis: Given antibiotics azithromycin 1000 mg PO SD or doxycycline 100 mg twice daily during 3 week and ointment tetracycline or erythromycin eye drops for 2 months ; f) Allergic Conjunctivitis: Topical antihistamines such as ketotifen 0.035% or mild corticosteroids are given if symptoms are severe. Corticosteroids that can be used namely fluorometholone 0.1% drops eye 2 time a day. Besides That, artificial tears can be given 4 times a day; g) Irritant Conjunctivitis: Eliminate the causative factors and provide artificial tears.

Prognosis

Prognosis patient with conjunctivitis is generally good if the diagnosis is made correctly and treatment is given according to the etiology. Most cases recover within one to two weeks without leaving serious complications. However, untreated or recurrent conjunctivitis can cause complications such as keratitis or secondary infections (Septiana & Nugrahani, 2022) .

Complications

Complications of acute conjunctivitis are rare. However, patients with herpes simplex conjunctivitis have the highest risk of complications. Approximately 38.2% of patients with herpes simplex virus develop corneal complications, and 19.1% develop uveitis. Patients with conjunctivitis caused by Neisseria gonorrhoeae are also at high risk of developing involvement cornea and secondary corneal perforation. Chlamydial conjunctivitis in newborns can lead to pneumonia. And otitis media. Besides That, can cause corneal erosion to scarring (Hashmi et al., 2024).

Conclusion

Conjunctivitis is inflammation of the conjunctiva which can be caused by various factor, including infection viruses, bacteria, or allergic reactions. This condition is characterized by symptoms such as red eyes. red, the exit secret, itching, and discomfort.

Based on Based on its etiology, conjunctivitis is classified into infectious (viral or bacterial) and non-infectious (allergic or irritant). Management of conjunctivitis must be adjusted to the cause. In bacterial conjunctivitis, the use of topical antibiotics such as aminoglycosides or fluoroquinolones is often necessary, while in allergic conjunctivitis, antihistamines and vasoconstrictors used For reduce symptoms. Therapy supportive like water eye Artificial eye drops and cold compresses can also help relieve symptoms in all types of conjunctivitis.

Education to patient very important to prevent transmission, especially in conjunctivitis infectious Which can spreads easily through direct contact. Although most cases of conjunctivitis do not cause serious complications, some specific forms, such as conjunctivitis

consequence gonorrhea, can potentially threaten vision If not handled properly. With proper management Good And understanding about etiology and governance Which in accordance, impact negative conjunctivitis to health eye can be minimized effectively.

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