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Review Article

A review on pathophysiology and managements of allergic conjunctivitis

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ABSTRACT

Background: Allergic disorder is a serious issue affecting 40% of the population. The most well-known visual illness in clinical practise is undoubtedly visual sensitivity. The impact of numerous variables, including genetics and pollution, is taken into account by experts. Therefore, this review is intends to provide the detailed description related to pathophysiology and managements of allergic conjunctivitis.

Materials and Methods: The study was performed by literature survey of original research articles published in Pubmed, Science direct, Web of Science, Scopus and Google etc.

Results: The two primary types of allergic conjunctivitis are perennial allergic conjunctivitis (PAC) and seasonal allergic conjunctivitis (SAC). The common effects of SAC and PAC are shivers, weeping, mucus production, and redness; nonetheless, these structures do not impair vision. However, vernal keratoconjunctivitis (VKC) and atopic keratoconjunctivitis (AKC) are the most alarming types of visual allergic conjunctivitis, which impact the cornea and can impair vision if not properly recognised and treated. Allergic conjunctivitis symptoms include itchy, stinging red eyes and yellow pus during sleep. The major objectives of treatment for allergic conjunctivitis are to lessen and manage symptoms and raise quality of life. This involves minimising itchiness, as well as redness, tears, edoema of the conjunctiva or the eyelids, and other related disorders. Breaking the pattern of inflammation and reducing it are additional therapy objectives for patients with chronic allergen exposure and persistent illness. Mast cell stabilisers, corticosteroids, antihistamines, NSAIDs, dual-acting antiallergics, anti-leukotrienes, anti-IgE, and some other drugs are used to treat allergic conjunctivitis.

Conclusion: There are the different types of allergic conjunctivitis among which the more prevalence types of allergic conjunctivitis are SAC and PAC while the more severe types are VKC and AKC. There are different types of medicines available for treatment of allergic conjunctivitis.

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1. Introduction

One of the most prevalent eye conditions in clinical practise is ocular allergies. There is no single cause for this allergy, and scientists believe that a number of variables, including genetics, pets, urban air pollution, and early childhood exposure, may be at play.¹ Conjunctivitis, often known

as pink eye, is an inflammation of the conjunctiva, the mucous membrane that covers the surface of the eyelid and extends to the cornea in the front of the, it forms the barrier between the eyelid and the eyeball, the cornea protects the iris, (coloured portion of the eye) and the pupil, (dark area in the centre of the eye) while the conjunctiva covers the white portion of the eye.² Except for newborns, conjunctivitis is not a major issue despite being highly prevalent. Conjunctivitis, a broad word for inflammation of

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the conjunctiva that results in hyperemia, general malaise, and other symptoms, simply means inflammation of the conjunctiva. There are different etiologies of conjunctivitis, such as viral, bacterial, allergic, eyelid and skin conditions associated with toxic contact lenses, which cause similar presentations and can be difficult to differentiate.³

An inflammatory condition of the conjunctiva that can be brought on by a number of different conditions is referred to as allergic conjunctivitis. "Pink eye" is a common name for it. The allergic conjunctivitis is most frequent causes, with more prevalent in the summer.⁴ Many people are affected by conjunctivitis, which has a negative economic and societal impact. According to Udeh et al. (2008), 6 million persons in the US are thought to experience acute conjunctivitis each year.⁵ Few research have examined the economic impact of this condition separate from allergic conjunctivitis in terms of the direct and indirect expenses of allergic conjunctivitis. In a 2004 study, Pitt et al. compared a group of oxford-based public healthcare patients with seasonal allergic conjunctivitis (SAC) to a control group in the pollen season to determine their financial and living expenses. According to the study, the annual cost per patient varied between £64 and £124, and also, 2.3 hour weekly productivity loss.⁶ A similar study with patients from private centres and an estimated cost of 348.50 EUR/year with SAC patient was conducted in Spain in 2003.⁷ Rather than an eye care specialist, primary care doctors typically treat conjunctivitis patients at first. According to Shields et al. (1991), conjunctivitis accounts for about 1% of office visits in primary care in the United States.⁸ According to Kaufman et al. (2011), 70% of patients with acute conjunctivitis need both primary care and emergency treatment.⁹



Figure 1: Eye with conjunctivitis

2. Pathophysiology of Allergic Conjunctivitis

Tears are produced by the conjunctiva in collaboration with the eyelid and lacrimal glands. The watery component of tears is made by the lacrimal glands. Tears are formed when the watery liquid, conjunctival mucus, and glandular oil from the eyelids come together.¹⁰ The fornix and the marginal tarsal arch both send blood to the conjunctiva of the eyelid. The fornix conjunctiva receives blood from the proximal arcade, which runs along the upper edge

of the eyelid. This blood vessel later develops into the postconjunctival artery and provides blood to the bulbar conjunctiva.^{11,12} Allergic conjunctivitis is a self-limiting, bilateral inflammatory condition. Direct contact between the allergen and the sensitised patient's conjunctival surface triggers an immune response that is primarily IgE-mediated, also known as an immediate hypersensitivity immune response, which causes mast cells to become activated and release a variety of mediators like histamine. However, additional processes and mediators, such as neurogenic mechanisms, adhesion molecules, and other systemic immunological mechanisms, are also implicated in this inflammatory process and help to produce the signs and symptoms of the disease.¹³

3. Types of Allergic Conjunctivitis

Allergic conjunctivitis can be classified into four groups. Seasonal allergic conjunctivitis (SAC) and perennial allergic conjunctivitis (PAC) are the two mildest and most prevalent types. Both SAC and PAC do not possess a threat to vision, but patients with both conditions frequently experience symptoms like itching, watery eyes, mucus production, and redness. Rubella keratoconjunctivitis (RKC) and atopic keratoconjunctivitis (AKC), on the other hand, impact the cornea and can be sight-threatening if correctly not recognised and treated in time.^{14,15}

3.1. Seasonal and perennial allergic conjunctivitis

The two most prevalent types of ocular allergy are seasonal allergic conjunctivitis (SAC) and perennial allergic conjunctivitis (PAC). These types of allergies are thought to afflict at least 15% of the population, however estimates vary. Specific IgE antibodies to seasonal or perennial allergens can be shown in almost all instances of SAC and PAC.¹⁶ Aeroallergens of the plant cycle, such as tree, grass, and weed pollens, which are present in huge amounts in spring and late summer, are responsible for causing seasonal allergies.¹⁷ When an allergen interacts with IgE that is linked to sensitive mast cells, it triggers an inflammatory response that leads to allergic conjunctivitis, which is one of the clinical signs of ocular allergy. Increased amounts of histamine, striptase, prostaglandins, and leukotrienes are brought about by mast cell activation in the tear film. According to Leonardi et al. (2007), this immediate or early response is clinically lasting 20 to 30 minutes.¹⁸ Vascular endothelial cells get activated as a result of mast cell degranulation, and these cells then express chemokines and adhesion molecules such as intercellular adhesion molecules (ICAM) and vascular cell adhesion molecules (VCAM), among others. A delayed ocular response is caused by these substances, which start the recruitment phase of inflammatory cells to the conjunctival mucosa.¹⁹

3.2. Vernal kerato conjunctivitis (VKC)

Warm climates and warm months are conducive to VKC. In tropical areas than in northern climates, it occurs more frequently. In this form, a nonspecific overreaction takes place, which explains the diversity of the eye symptoms brought on by nonspecific stimuli like wind, dust, and sunshine and how they are unrelated to the amount of allergens in the environment. Common allergens test negative in both these skin tests and serum IgE antibody assays.²⁰ Its symptoms include ocular discharge, redness, swelling, and itching. The itchiness may even be incapacitating and fairly strong. Patients frequently experience extreme photophobia. A big papilla on the conjunctiva of the upper eyelid is the most distinctive symptom.²¹

3.3. Atopic kerato conjunctivitis (AKC)

It is a bilateral chronic inflammatory illness of the eyelids and ocular surface also known as atopic keratitis (AK). Chronic mast cell degranulation mediated by IgE and immunological mechanisms mediated by cytokines produced by Th-1 and Th-2 lymphocytes are examples of pathologic mechanisms. Eosinophils and other inflammatory cells additionally contribute. According to Bonini (2004), this is assumed to be the ocular equivalent of atopic dermatitis.¹⁶ Atopic cataracts were more prevalent before approval of corticosteroids for medical use. AKC individuals frequently have cataract surgery while they are young.²² The physical characteristics of VKC and AKC seem to be comparable. Both Trantas spots and gigantic papillae may be connected. The two ailments might have a little in common. VKC, on the other hand, vanishes by the age of 20, although AKC may last a lifetime. On skin or allergy tests for common allergens, many people with AKC test negative.²³

3.4. Contact allergy

Typically, allergens are just low-molecular-weight, straightforward compounds that bind to skin proteins to produce complete allergens. In contrast to the allergic disorders previously discussed, contact allergy, also known as allergic contact dermatitis, is not an IgE-mediated allergy. The interaction of antigens with the Th1 and Th2 cell subpopulations and the consequent release of cytokines result in a type IV delayed hypersensitivity reaction. According to Friedlaender (1998), contact allergies can have an impact on the periocular skin, eyelids, and ocular surface.²⁴

3.5. Giant papillary conjunctivitis (GPC)

GPC resembles upper tarsal conjunctival papillary hypertrophy, which resembles spring conjunctivitis but

does not significantly impact the cornea. Given that the irritants of the papillary conjunctival alterations are inert chemicals rather than allergens, GPC is not an allergic illness and the frequency of systemic allergy in people with GPC is comparable to that of the general population. For instance, limbal sutures, contact lenses, ocular prosthesis, and limbal aldermol may all lead to CPG.²⁵

4. Symptoms of Allergic Conjunctivitis

1. Painful red eye.
2. Yellow pus leaks from the eye, making it sticky.
3. During sleep, this substance makes the eyelids stick.
4. Difficulty in opening of eye during wake up.
5. Viral conjunctivitis is also associated with upper respiratory tract infections and often occurs in outbreaks (known as "pinkeye"). It usually lasts 2 to 3 weeks and can be very contagious, so care must be taken not to infect others.

5. Diagnosis of Allergic Conjunctivitis

Ocular allergy is primarily diagnosed clinically, however a number of laboratory tests can be utilised to confirm the diagnosis. Skin tests for certain allergens can be done by allergists using scratch tests or intradermal injections of the allergen. It is common practise to test for IgE antibodies to particular allergens in vitro. Testing for allergies makes it possible to distinguish between intrinsic and extrinsic forms, which make treatment easier.²³

5.1. Skin prick test (SPT)

The easiest, quickest, and least expensive method for determining allergen sensitivity in people with ocular allergies is still the skin prick test (intradermal). Within 20 minutes of being applied to the skin, the skin prick test shows specific sensitivity to an environmental allergen. The presence of fever and blisters confirms the patient's allergy to the particular allergen. Despite not always being connected with ocular surface allergic sensitization, the test has a high sensitivity for detecting systemic allergies, including allergic rhinitis and allergic asthma. To determine susceptibility to certain ocular surface allergens, further local in vivo tests, like the conjunctival excitation test, may be necessary in exceptional instances. The skin test is still just a verification procedure. Measurement of serum specific IgE should be taken into consideration when SPT is equivocal or contraindicated by the clinical history, or as an alternative to SPT to quantify allergen-specific IgE from native or purified components.²⁶

5.2. Patch test

If palpebral conjunctivitis or eczematous blepharitis is present, a delayed response can be conceivable; patch

testing could be necessary to identify the specific antigen. Several potentially sensitising aluminium- or cellulose-based chemical agents are applied to the back skin in this procedure; these are taken off after 48 hours, and the patches are examined periodically. Preservatives like thimerosal and benzalkonium chloride, which are present in contact lenses and ophthalmic solutions, are frequently to blame. The specific solution in question can be used in a patch test if a topical agent is suspected. Because of the depth of the epithelium and dermis, the lower amount of mast cells and the reduced exposure to the environment compared to the eyelids, the skin of the orbit is very different from other areas, such as the skin of the back. It is even possible that exposure to sunlight will only exacerbate the specific and nonspecific hyperreactivity of eyelid skin.²⁷

5.3. Conjunctival provocation test (CPT)

Conjunctival provocation testing (CPT), also referred to as conjunctival allergen challenge (CAC), is a type of ocular skin test in which a known quantity of a particular allergen is injected onto the surface of the eye, to ensuing sensitive reaction is calculated over a 15-30 min period, similarly to the skin test. In samples of tears, modulator release and cell invasion are quite simple to quantify. However, it may be used to describe allergens that appear to be restricted to the ocular surface. This technique is mostly used to assess new medications for the treatment of ocular allergies. The same indicators of redness, pus, swelling of the eyelids, and symptom like itch and tear that person realize following being naturally exposed to antigen characterise immediate positive reactions. Positive effects typically end within 20 minutes. Depending on the patient's sensitivity and the allergen dose, late inflammatory reactions may also happen.²⁸

5.4. Nonspecific provocation test

Histamine or high-molar solutions have been used to provoke the eyes in order to test allergic patients for nonspecific conjunctival hyperreactivity. Although this is still in the experimental stage that patients with spring keratoconjunctivitis have been observed to respond to decreased histamine concentrations.²⁹

5.5. Measurement of total IgE in tears

The blood-articular barrier means that typical tear IgE concentrations are frequently low, below 3 g/ml. The development of local antibodies is indicated by the presence of measurable tear IgE levels, supporting the diagnosis of allergic conjunctivitis.

5.5.1. Tear osmolarity test

To confirm the diagnosis of tear film malfunction, the osmolarity of the tears should be measured. A high

osmolarity is a sign of dry eyes.

5.5.2. Schirmer tear test

The most popular and straightforward tear secretion test for determining dry eye is the Schirmer tear test. The Schirmer tear test detects abnormalities at 5 mm of wetting after 5 minutes and evaluates both basal and reflex tear secretion. Only basal tear secretion is measured by the Schirmer II tear test, which exhibits abnormalities as 3 mm of wetness after 5 min.³⁰

5.6. Ocular surface staining test

5.6.1. Staining with fluorescein

In order to analyse the precorneal tear film, conjunctiva, and cornea, fluorescein a hydrophilic stain, which colour to the corneal epithelial degeneration and binds them to surface irregularities. The fluorescein dye gives off a blue tint in a deep green colour when it is passed through a cobalt blue filter. In order to improve vision, upgraded slit lamps which contain yellowish filter instead of bluish filter. To prevent long-term lens staining, soft contact lenses should be taken out prior to the fluorescein infusion, after an hour, they can be inserted again. Fluorescein staining is the most often used clinical diagnostic procedure for detecting abnormalities on the corneal epithelial surface in cases of persistent ocular allergies.

5.6.2. Staining with rose bengal

It is a fluorescein-based red dye which only stains the dead and deteriorating epithelium of the conjunctiva and cornea not the precorneal tear film is called as Rose Bengal. It also provides a more accurate diagnostic tool for assessing the conjunctiva and tear membranes, staining granules, filaments, and mucus patches more vividly than fluorescein.

5.6.3. Staining with lissamine green

Lissamine green staining is employed in clinical and pharmaceutical studies because it is less abrasive than rosacea staining and fades rapidly. For the best visualisation after staining, a 1-2 minute wait is required.³¹

5.7. Conjunctival cytodiagnosis

The quantity and distribution of leukocytes on the surface of the eye must be evaluated during the conjunctival inflammatory active phase to decide how to proceed with diagnostic tests. While the absence of eosinophils does not rule out an allergic diagnosis, the presence of even one is a significant indicator of an allergic lesion. On a slide, the specimen is examined. Impression cytology employing nitrocellulose membranes is typically used for tear film pathology in order to assess the morphology of the superficial conjunctival epithelium by light or electron microscopy. Impression cytology is a technique for

extracting cells from the bulbar conjunctival surface. The large variety of various inflammatory biomarkers can be evaluated using this quick and painless method.³²

6. Treatment of Allergic Conjunctivitis

Treatment for allergic conjunctivitis focuses mostly on reducing and controlling symptoms and also enhancing quality of life. This includes minimising lacrimation, edoema, itching, and other conjunctival or eyelid-related symptoms. In patients with prolonged exposure to allergens and prolonged symptom duration, another goal of treatment is to prevent the inflammatory cycle.⁴

Every patient should receive instruction in basic allergy eye care. They should be told not to wipe their eyes because doing so can aggravate symptoms and trigger mast cell degranulation. They should be advised to often apply cold compresses and artificial tears. Exposure to recognised allergies should be minimised or eliminated if possible. A mixture of antihistamine and vasoconstrictive drops or over-the-counter antihistamines can be used to treat mild acute forms in the relatively short term. Patients who use eye drops containing vasoconstrictors should be warned about self-effacing conjunctival rebound. Antihistamines and mast cell stabilising drops should be used in conjunction to treat seasonal and perennial allergic conjunctivitis. The most effective nonsteroidal anti-inflammatory agents are topical drops. Corticosteroid drops are a practical alternative for refractory patients when used for a brief period (less than two weeks) in conjunction with specialised consultation and follow-up. In refractory cases and when patients exhibit systemic symptoms rather than only localised ocular symptoms, systemic antihistamines and steroids also play a limited role.^{33,34}

Preventive environmental measures are helpful but not sufficient to fully control the signs and symptoms of allergic conjunctivitis. There are different types of medications used in the treatment of conjunctivitis.

6.1. Ocular surface lubricating agents

Using ocular surface irrigation, allergens are diluted, removed, and the impact of antigen introduction to the outside of eye is reduced. Additionally, certain varieties of synthetic tears offer relief by lubricating to outside of eye using mixture of physiological solution having wetting ingredients and viscous components. Evening ointments or sustained-release tear substitutes may offer a more long-lasting solution for hydrating the outer side of eye while the patient is sleeping, if tear replacements are insufficiently effective. Both potential allergic responses and the activity of inflammatory mediators are not treated by these drugs. They should therefore only be used to treat modest forms of ocular allergy irritation, such as those that are seasonal or intermittent or more severe, chronic kinds. An aqueous fat

emulsion makes up a more recent artificial tear formulation. Emulsions' key advantage is the oil added to the tear film, which lessens evaporation.^{35,36}

6.2. Antihistamines

As H1 receptor antagonists, antihistamines are the primary line of treatment for ocular allergies. Topical antihistamines of the second generation (cetirizine, epastine, and loratadine) are as efficient. Levocabastine and emedastine prevent conjunctival epithelial cells and fibroblasts from releasing IL-8 and IL-6.³⁷

A novel H-1 antihistamine with anti-inflammatory effect called mozustine was prepared to treat allergic conjunctivitis. Due to the reduction of histamine release and synthesis during the late stages of an allergic reaction, it has a high efficacy in treating ACS and CAP. According to Bielory et al. (2005), the substance EV-131 stabilises mast cells, inhibits the production of vascular adhesion molecules, and prevents neutrophil and eosinophil chemotaxis in addition to binding to free histamine.³⁷

6.3. Topical antihistamine with decongestant agents

Despite having different modes of action, antihistamines and decongestants work well together. These two drug categories work better together than they do separately. However, the duration of these combinations' effects is frequently brief, and sustained usage of decongestants may still result in unwanted side effects such rebound hyperemia. To reduce potential side effects including conjunctivitis, it is advised that these medications only be used for a short duration. Children 3 years of age and older should take the medication 1 to 4 times per day. Topical decongestants, however, have been shown to cause eye flutter, dryness, lacrimal orifice occlusion, and iritis.^{38,39}

6.4. Mast cell stabilizers

These medications diminish histamine release as well as arachidonic acid cascade response mediators. Nedocromil and cromolyn sodium are compounds that prevent histamine release and cell degranulation. It may also inhibit eosinophils while stabilising conjunctival mast cells. N-acetylaspartate dipeptide, which suppresses the formation of leukotrienes, histamine from mast cells, and anaphylatoxin produced from complement, has also been demonstrated to be utilised as a topical ocular treatment for VKC and GPC in Europe.⁴⁰

6.5. Dual-action anti-allergic drugs

These medicines prevent mast cell histamine release and histamine binding to H1 receptors. Mediators, basophils, and neutrophils release from Mast cells are diminished by ketotifen. Additionally, it prevents eosinophil chemotaxis

and neutrophils' generation of PAF. ICAM-1 expression and inflammatory cell infiltration are decreased by azelastine in the conjunctival epithelium. A novel class of medications for allergic conjunctivitis is epinastine.⁴¹

6.6. Non-steroidal anti-inflammatory drugs

A COX inhibitor called ketorolac works by preventing the production of prostaglandins, specifically PGD₂, which is known to cause severe and rapid allergic reactions. However, according to Deschenes et al. (1999), it appears to have less clinical efficacy than olopatadine.⁴²

6.7. Corticosteroids

When treating allergic illnesses, corticosteroids should only be used as a last choice; yet, in VKC and AKC, their usage is occasionally unavoidable. They have the ability to cause the onset of infections, glaucoma, cataracts, and corneal melting. According to Tabbara et al. (1999), flomiron can lessen the signs and symptoms of VKC, including as tears, discharge, conjunctival redness, and papillary hypertrophy.⁴³

6.8. Anti-leukotriene

As it lessens the signs and symptoms of ocular allergies, oral montelukast is an excellent treatment for patients with asthma and spring conjunctivitis.⁴⁴

6.9. Anti-IgE

Omalizumab targets the binding domain of IgE receptors while human IgE pentapeptide (HEPP), a synthetic anti-allergy drug, prevents the binding of IgE to cell receptors. It offers a possibility for the treatment of more severe ocular allergies by preventing antibody binding to mast cells.⁴⁵

6.10. Immunomodulators

Treatments for VKC and AKC that work well include tacrolimus and cyclosporine. By inhibiting calcineurin and preventing cell division, they prevent mast cells to releasing histamine. Folliculitis, acne, and herpes simplex are potential side effects of these medications.⁴⁶ Tacrolimus 0.1% and ciclosporin 2% drops were beneficial in the treatment of VKC, according to preliminary data released in 2012. Recently, the EU and Canada approved topical ciclosporin 0.1% for the treatment of severe VKC as an orphan medication. Eyelid skin with atopic dermatitis can be treated with topical creams containing tacrolimus or picoline, but it's crucial to remember that dermatological preparations frequently irritate the conjunctival surface if they splash into the conjunctiva.^{47,48}

6.11. Chemokine inhibitors

Specifically blocking VLA-4, which is necessary for lymphocyte and eosinophil adherence to endothelial cells before extravasation that is selectively blocked by natalizumab (a monoclonal antibody against 4-integrin). The human IgG4 monoclonal eotaxin-1 antibody bertilimumab (CAT-213) is still under research and development. In a mouse model of ocular allergy, it prevents the activation of the early and late phases of inflammation.⁴⁹

6.12. Newer drugs

Olopatadine, ketotifen, azelastine, epinastine, and bepolastine are a few multimodal anti-allergy medications that have recently been developed. These medications have a variety of pharmacological effects, including histamine receptor antagonist action, stabilisation of mast cell degranulation, and inhibition of eosinophil activation and infiltration.⁵⁰

6.13. Ocular surface treatment

Applying one drop at a time while briefly closing the eyelids after each application is advised for topical eye therapy. To ensure optimal drug absorption into the eye tissue and prevent redness, 4-5 minutes should pass between dosages when many eye drops are necessary. A drop of medication containing more than 20 μ l may leak and leave behind residue. The volume of one drop is roughly equal to 10 μ l. Due to prolonged, repeated blinking; the topical drug leaves the ocular surface more quickly, increasing absorption into the ocular tissue.

6.14. Complementary treatments

Many of the substances found in most herbal medicines have a variety of physiological and pharmacological effects that can be both beneficial and harmful. Some eye drops sold in Europe contain chamomile extract, which interacts with ragweed and may make some symptoms. Numerous marketed products have comparable clinical effects and adverse reactions because they have the same basic chemicals with one or two slight variances. In order to give exact knowledge about the toxicity, effectiveness, and quality control of commonly use herbal medicines, the World Health Organisation has created a monograph on selected herbal medications. The sector for herbal medicines has not undergone regulatory reform, making it challenging for doctors to advise patients on the best agents to use. It has been demonstrated that using Yu Ping Feng granules along with cromoglicic acid eye drops helps to lessen ocular allergy symptoms.⁵¹

In a study, quercetin was administered to 12 patients with allergic rhinitis, conjunctivitis, or asthma. Within five minutes of treatment, all individuals reported a decrease in

symptoms, which persisted for many hours. After intranasal dosing, ocular symptoms also decrease.⁵²

7. Conclusion

In this study, we concluded that allergic conjunctivitis is a inflammation of conjunctiva which is most frequent causes in new borne and children with more prevalent in spring and late summer. There are four different types of allergic conjunctivitis namely; Seasonal allergic conjunctivitis (SAC) and perennial allergic conjunctivitis (PAC) are the two most prevalent and less severe types, whereas, vernal kerato-conjunctivitis (VKC) and atopic kerato-conjunctivitis (AKC), are the less prevalent, but sight-threatening if correctly not recognised and treated in time. There are many drugs available for the treatment of allergic conjunctivitis such as mast cell stabilisers, corticosteroids, antihistamines, NSAIDs, dual-acting antiallergics, anti-leukotrienes, anti-IgE, and some other plant derivatives are also used to treat allergic conjunctivitis.

8. Authors Contribution

Arvind Kumar Patel: Conceptualization, Investigation, Data collection, Writing draft, Reviewing and editing, Phool Chandra: Conceptualization, Supervision, Reviewing and editing, Neetu Sachan: Conceptualization, Supervision, Reviewing and editing, Neha Singh: Data collection, Writing draft.

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None.

10. Conflict of Interest


None.

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