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RESEARCH ARTICLE

CURRENT CONCEPTS IN ALLERGIC EYE DISEASES: MODERN AND AYURVEDIC PERSPECTIVES AND MANAGEMENT

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Abstract

Allergic eye diseases (AEDs) are a group of inflammatory conditions affecting the conjunctiva and ocular surface, triggered by hypersensitivity responses to environmental allergens. Ocular allergy affects nearly 40% of the worldwide population and is a major contributor to ocular morbidity. Clinical presentations vary from mild seasonal discomfort to severe chronic conditions that may lead to corneal involvement and visual impairment. This review highlights the current understanding of allergic eye diseases, including their classification, pathophysiology, clinical manifestations, diagnosis, and management from both modern and Ayurvedic viewpoints. Contemporary treatment approaches include allergen avoidance, artificial tears, antihistamines, mast cell stabilizers, corticosteroids, immunomodulatory agents, and allergen immunotherapy. Ayurveda focuses on avoiding causative factors, dietary modifications, Netra Kriya Kalpa, systemic therapies such as Panchakarma, and oral medications. Nevertheless, further well-designed clinical studies are required to validate the long-term safety and effectiveness of integrative therapeutic approaches.

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Introduction:-

Allergic Eye Diseases (AEDs) represent a range of hypersensitivity-related conditions involving the conjunctiva and ocular surface. They are among the most prevalent¹ eye disorders globally, affecting nearly 40% of individuals and commonly occurring alongside allergic rhinitis, asthma, and atopic dermatitis. The incidence of ocular allergies has risen in recent years, largely due to factors such as environmental pollution, urban development, climatic alterations, and greater exposure to airborne allergens. Clinical features may vary from mild seasonal irritation to persistent inflammatory conditions that can lead to corneal damage and visual disturbances when not treated appropriately. According to Ayurveda, allergic ocular conditions may be associated with Abhishyanda, especially KaphajaAbhishyanda and PittajaAbhishyanda², which present with symptoms such as itching, redness, excessive lacrimation, and ocular irritation. Ayurveda explains these disorders as a consequence of aggravated Kapha and Pitta Doshas resulting from unsuitable dietary habits, environmental triggers, seasonal influences, and disruption of physiological equilibrium. Whereas modern medicine primarily aims to control allergic inflammation and reduce the risk of ocular complications, Ayurveda focuses on avoiding etiological factors, correcting Dosha imbalance, and

promoting systemic well-being. The integration of scientifically validated conventional treatments with supportive Ayurvedic interventions may offer a broader and more effective strategy for managing allergic eye diseases.

Methodology and Search Strategy:-

This review is based on a comprehensive narrative literature search conducted using electronic databases such as PubMed, Google Scholar, Scopus, and relevant Ayurvedic classical texts. The search focused on keywords including “Allergic Eye Diseases,” “Ocular Allergy,” “Vernal Keratoconjunctivitis,” “Atopic Keratoconjunctivitis,” “GPC,” and Ayurvedic terms such as “Abhishyanda,” “KaphajaAbhishyanda,” and “PittajaAbhishyanda.” Relevant peer-reviewed articles, review papers, and clinical studies published in English language were included. Classical Ayurvedic references from Sushruta Samhita, Charaka Samhita, and Ashtanga Hridaya were also reviewed to understand the conceptual correlation and management principles. Studies focusing on pathophysiology, clinical features, diagnosis, and treatment modalities of allergic eye diseases were selected. Emphasis was given to literature discussing integrative approaches combining modern ophthalmology and Ayurvedic interventions. Duplicate studies, non-relevant publications, and articles without full-text availability were excluded. The collected data was systematically analyzed to provide a structured overview of allergic eye diseases from both modern and Ayurvedic perspectives.

Classification of Allergic Eye Diseases³:-**The major allergic eye diseases include:-**

1. Seasonal Allergic Conjunctivitis (SAC)
2. Perennial Allergic Conjunctivitis (PAC)
3. Vernal Keratoconjunctivitis (VKC)
4. Atopic Keratoconjunctivitis (AKC)
5. Giant Papillary Conjunctivitis (GPC)
6. Contact Allergic Blepharoconjunctivitis
7. Drug-Induced Allergic Conjunctivitis

Giant Papillary Conjunctivitis is typically regarded as a multifactorial disorder, most commonly linked with the use of contact lenses, ocular prosthetic devices, and chronic mechanical irritation of the ocular surface, although immunological or allergic mechanisms may also play a role in its pathogenesis.

Etiology and Risk Factors:-**Common Allergens:-**

Allergic Eye Diseases (AEDs) comprise a spectrum of hypersensitivity disorders affecting the conjunctiva and ocular surface. These are among the most common ocular conditions worldwide, with an estimated prevalence of nearly 40% of the population, and they often occur in association with allergic rhinitis, asthma, and atopic dermatitis. The increasing incidence of ocular allergies has been linked to environmental pollution, urbanization, climatic changes, and increased exposure to airborne allergens. Clinical manifestations range from mild seasonal irritation to chronic inflammatory disease, which may lead to corneal involvement and visual impairment if not properly managed.

From the Ayurvedic perspective, allergic ocular disorders can be correlated with Abhishyanda, particularly Kaphaja and Pittaja Abhishyanda. These conditions are characterized by symptoms such as itching, redness, excessive tearing, and ocular discomfort. Ayurveda attributes these disorders to the aggravation of Kapha and Pitta Doshas due to improper diet, environmental irritants, seasonal variation, and disturbance of physiological balance. While modern medicine focuses on controlling allergic inflammation and preventing complications, Ayurveda emphasizes removal of causative factors, restoration of Dosha equilibrium, and improvement of overall health. An integrative approach combining evidence-based modern therapy with supportive Ayurvedic management may provide a more comprehensive strategy for allergic eye diseases.

Risk Factors:-

- Family history of allergy
- Allergic rhinitis
- Bronchial asthma
- Atopic dermatitis
- Genetic predisposition

- Urban residence
- Environmental pollution
- Prolonged contact lens wear

Pathophysiology⁴:-

The pathophysiology of allergic eye diseases is driven by immunological mechanisms initiated after exposure to environmental allergens:-

1. **Sensitization Phase:-**During the first exposure to an allergen, T-helper 2 (Th2) cells activate B lymphocytes, leading to the production of allergen-specific IgE antibodies⁵. These IgE molecules attach to mast cells in the conjunctiva, thereby sensitizing the ocular surface for future reactions.
2. **Early-Phase Response:-**On subsequent exposure to the same allergen, mast cells undergo degranulation and release inflammatory mediators such as histamine, prostaglandins, and leukotrienes. These substances are responsible for acute symptoms including itching, redness, tearing, chemosis, and eyelid swelling.
3. **Late-Phase Response:-**This phase is characterized by infiltration of inflammatory cells, particularly eosinophils and T lymphocytes, into the conjunctival tissue, resulting in sustained inflammation and prolonged clinical symptoms.
4. **Chronic Inflammation:-**In more severe forms such as Vernal Keratoconjunctivitis (VKC) and Atopic Keratoconjunctivitis (AKC), both Type I and Type IV hypersensitivity reactions are involved. This leads to persistent inflammation, structural tissue changes, and possible corneal involvement.

Clinical Features:-**Common Symptoms:-**

- Intense itching
- Redness
- Watering
- Burning sensation
- Foreign body sensation
- Photophobia
- Mucous discharge

Common Clinical Signs:-

- Conjunctival hyperemia
- Chemosis
- Papillary hypertrophy
- Eyelid edema
- Mucous strands
- Corneal involvement in severe disease

Disease-Specific Findings:-**Vernal Keratoconjunctivitis (VKC):-**

- Giant cobblestone papillae on upper tarsal conjunctiva
- Horner-Trantas dots
- Shield ulcers
- Corneal epithelial defects

Atopic Keratoconjunctivitis (AKC):-

- Eyelid eczema
- Chronic blepharitis
- Keratitis
- Corneal vascularization
- Conjunctival fibrosis

Diagnosis:-

Diagnosis is primarily clinical and includes:-

- Detailed patient history
- Slit-lamp biomicroscopic examination
- Assessment of allergen exposure
- Evaluation of associated systemic allergic disorders

Investigations:-

- Tear eosinophil analysis
- Conjunctival scraping for eosinophils
- Serum total and specific IgE levels
- Skin prick testing
- Impression cytology
- Tear film analysis (selected cases)

Modern Management:-

1. Allergen Avoidance⁶

- Avoid exposure to known allergens wherever possible.
- Maintain proper environmental hygiene and cleanliness.
- Wear protective eyewear when outdoors.
- Minimize exposure to smoke, dust, and air pollutants.

2. Antihistamines

Common topical antihistaminic agents include:-

- Epinastine
- Azelastine

These medications act quickly to reduce itching and conjunctival redness.

3. Artificial Tears⁸

Lubricating eye drops help in diluting surface allergens, stabilizing the tear film, and providing symptomatic relief.

4. Corticosteroids

Topical corticosteroids are generally reserved for moderate to severe cases and should be used under strict ophthalmological supervision.

Examples include:-

- Loteprednol
- Fluorometholone

Prolonged use may lead to adverse effects such as:-

- Increased intraocular pressure
- Glaucoma
- Cataract formation

Among these, Loteprednol is considered to have a comparatively lower risk of steroid-induced elevation of intraocular pressure.

5. Immunomodulators

In chronic or severe cases, steroid-sparing immunomodulatory agents may be indicated.

Examples include:-

- Cyclosporine A (0.05–0.1%)
- Tacrolimus (0.03–0.1%)

These agents help in controlling persistent inflammation and reducing dependence on corticosteroids.

6. Allergen Immunotherapy

In selected patients, particularly those with associated allergic rhinitis or systemic allergic conditions, allergen-specific immunotherapy may provide long-term benefit.

Ayurvedic Perspective:-

In Ayurveda, allergic ocular disorders are considered to result from the imbalance of Kapha and Pitta Doshas. The clinical features closely correspond to Abhishyanda, especially Kaphaja and Pittaja Abhishyanda. According to Ayurvedic concepts, factors such as improper dietary habits, seasonal changes, environmental irritants, and disturbance of physiological balance play a key role in the development of these conditions.

Ayurvedic Management:-

1. Nidana Parivarjana (Avoidance of Causative Factors)

- Avoid exposure to dust, smoke, and environmental pollutants.
- Limit excessive exposure to sunlight.
- Identify and stay away from known allergens.
- Dietary Modifications

Recommended:-

Chakshushya Phala

Chakshushya Shaka

Adequate fluid intake: Shita Jala / Drava Dravya

Light, easily digestible foods: Laghu Ahara

To be avoided: Ati-Katu Rasa / Vidahi Ahara Guru / Abhishyandi Ahara Paryushita Ahara Shukta / Vidah

• Ocular Procedures (Netra Kriyakalpa):-

Local therapies act directly on ocular tissues to reduce itching, redness, and congestion.

- Aschyotana (Eye Drops)⁹: Acharya Sushruta in the context of treating advanced KaphajaAbhishyanda and Adhimantha, the deployment of Rooksha AschyotanaSamvidhana (dry, moisture-absorbing, or Kapha-pacifying topical eye drop protocols) is strongly advocated alongside systemic therapies to conquer the aggravated disease.
- Seka/Parisheka (Ocular Irrigation)¹⁰: Gentle eye washing with Ksheer Saindhava or Yashtimadhu decoction helps reduce local inflammation.
- Bidalaka (Eyelid Application)¹¹: External application of herbal pastes such as MukkadiChurna or Lodhra helps relieve swelling and burning sensation.

3. Systemic Therapies (Shodhana& Shamana):-

These therapies aim at addressing the root cause and preventing recurrence by eliminating Ama and balancing Doshas.

- Virechana (Therapeutic Purgation)¹²: Helps regulate Pitta and Kapha Doshas, promotes Rakta Shodhana, and reduces hypersensitivity.
- Internal Medicines¹³: Preparations such as GuduchyadiKashayam, PatolakaturohinyadiKashayam, and Haridra Khanda provide anti-inflammatory, immunomodulatory, and supportive antihistaminic effects.

Ayurvedic Drugs with anti-allergic properties

Drug Category	Dravya	Botanical Name
1. Vishaghna	Shirisha ¹⁴	Albizia lebbeck
2. Kandughna	Haridra	Curcuma longa
3.Chakshushya	Amalaki	Phyllanthus emblica
	Yastimadhu	Glycyrrhiza glabra
4. Shothahara&Rasayana	Punarnava ¹⁵	Boerhaviadiffusa

Discussion:-

Allergic eye diseases are among the most frequently encountered ocular conditions and can have a considerable impact on quality of life. Their development is primarily driven by IgE-mediated hypersensitivity reactions that result in conjunctival inflammation and ocular discomfort. In modern medicine, symptom control is effectively achieved through allergen avoidance, antihistamines, corticosteroids, and immunomodulatory agents. In Ayurveda, these conditions are associated with Kaphaja and Pittaja Abhishyanda, with management focusing on avoidance of causative factors, dietary regulation, and ocular therapeutic procedures. A combined or integrative approach may offer additional therapeutic benefit; however, further well-designed clinical research is required to establish the safety and effectiveness of Ayurvedic interventions in allergic eye diseases.

Conclusion:-

Allergic eye diseases may present as mild seasonal allergic reactions or progress to severe chronic inflammatory conditions that can potentially compromise vision if not managed appropriately. Timely diagnosis and proper treatment are important to prevent associated complications. In modern medicine, effective therapies are available for symptomatic relief and disease control, whereas Ayurveda provides supportive approaches aimed at maintaining systemic balance and reducing the likelihood of recurrence. Further rigorous clinical studies are needed to develop and validate evidence-based integrative management strategies for allergic eye diseases.

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