Ocular allergy

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Introduction

• The eye is particularly exposed to the external environment and environmental aggressions,

• Cornea is immunologically protected by the conjunctiva = the part most directly involved in the allergic reactions of the eye.

• Very vascularized and rich in cells involved in allergic inflammation (LT, LB, Langerhan cells, Mast, neutrophils);

• Eosinophils: present only in pathological tissues.

• It is the main target of environmental allergens.
Mechanisms of the allergic reaction

Sensitization phase
**Allergic response**

- **Histamine**
- **Vasodilatation**
- **Rougeurs**
- **Excitation des terminaisons nerveuses**
- **Prurit**
- **Augmentation de la perméabilité capillaire**

**Key role of histamine**

- **Histamine**
- **Recrutement d’eosinophiles**
- **Cytokines pro-inflammatoires**
- **Augmentation des terminaisons nerveuses de l’œil**

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Type I Hypersensitivity reaction

**Mast cells**

- **Histamine**
- **Tryptase**
  - EPR
- **ST PAF**

**Eosinophils**

- **LT**
- **PG**
- **CYTOKINES** (chémotactiques)

**Cytotoxic proteins**

- **MBP**
- **ECP**

Ocular Surface Hypersensitivity Reactions

**Ocular Allergy**

- **IgE-Mediated Immediate Allergy**
  - Annual or Seasonal Allergic Conjunctivitis
  - Vernal Keratoconjunctivitis VKC
  - Atopic Keratoconjunctivitis AKC

**Non Specific Hypersensitivity**

- Giant Papillary Conjunctivitis (GPC)
- Irritative conjunctivitis
- Irritative Blepharo-conjunctivitis

**Non Immediate - Non IgE-mediated**

- Vernal KC
- Atopic KC
- Contact Blepharo-Conjunctivitis

Nouvelle classification basée sur la physiopathologie et les mécanismes d'hypersensibilité
### Seasonal Conjunctivitis: Acute

- Are considered as minor form, their mechanism is only linked to type I hypersensitivity.

- They have an acute symptomatology, are often noisy but never lead to serious corneal complications.

- Contact with large amounts of allergen exacerbation of bilateral symptoms
  - Itching (master symptom)
  - Chemosis* ++, +/- eyelid swelling
  - tearing
  - Redness
  - Photophobia

- The seasonal factor is essential: the allergens most commonly incriminated are grass pollen, trees and herbaceous plants.

<table>
<thead>
<tr>
<th>Type</th>
<th>Terrain</th>
<th>Paupières</th>
<th>Conjunctive</th>
<th>Corneé</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal conjunctivitis</td>
<td>Atopy</td>
<td>Papillae</td>
<td>Chémosis</td>
<td>Punctate keratitis</td>
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<tr>
<td>Perennial conjunctivitis</td>
<td>Atopy</td>
<td>Papillae</td>
<td></td>
<td>KPS, Ulcére, Plaque vernale,</td>
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<tr>
<td>Venal keratoconjunctivitis</td>
<td>Atopy 60%Infants</td>
<td></td>
<td></td>
<td>Ulcére, KPS, néovx</td>
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<tr>
<td>Atopic Keratoconjunctivitis</td>
<td>Atopie 30 – 40 ans</td>
<td></td>
<td>Giant Papillae, Taranta Limbal nodules</td>
<td>Fibrosis of the Inferior Conjunctival fornix</td>
</tr>
<tr>
<td>Contact Blepharo-conjunctivitis</td>
<td>Topical Treatment</td>
<td></td>
<td></td>
<td>Eczéma, madarose</td>
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<td>Eczema</td>
</tr>
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*Chemosis*
Perennial conjunctivitis

- Allergic symptoms more discreet and chronic with a seasonal outbreak.
- Moderated and persistent symptoms
  - Persistent inflammation
  - Hypoaesthetic conjunctiva
- The incriminated allergens are:
  - Dust mites
- Differential diagnosis: dry eye

Severe ocular allergies

- Eye allergy can in some cases cause visual complications.
- Vernal and atopic keratoconjunctivitis are severe either:
  - Directly, by affecting the cornea,
  - Indirectly through the iatrogenic complications;
### Vernal keratoconjunctivitis

- Severe form of ocular allergy that can cause severe visual complications.

- More frequent in the Mediterranean area, central Africa, Japan, India and Australia (warm climates).

- It is an IgE- and T cell-mediated disease, leading to a chronic inflammation in which eosinophil, lymphocyte and structural cell activation are involved.

- Occurs mainly in children and improves at the age of puberty.

- Rarely seen before 3 or after 30 years of age; Incidence is higher in males than females by a ratio of 3 to 1.

- VKC usually appears seasonally from early spring till autumn.
Ocular symptoms and signs

• Intense ocular symptomatology:
  – foreign body sensation, tearing,
  – severe photophobia,
  – a very disabling itching,
  – mucous secretion

• Bilateral damage often asymmetric.

• Corneal involvement are very common and can compromise visual function.

3 types of VKC

Tarsal  Limbal  Mixed
Tarsal VKC

• Cobblestone-like papillae > 1mm on the upper side of the conjunctiva.
Limbal VKC

- Two forms:
  - Oedematous limbus: thick and opaque
  - Limbal infiltrates (Tranta’s dots)

Corneal involvements
Corneal involvements

- Pseudo gerontoxon
- Limbal infiltrates
- Superficial punctate keratitis
- Ulcers/plaque
- Neovascularization
- Corneal neuropathy
- Limbal stem cells deficiency
- Modifications on corneal topography (astigmatism; keratoconus)

Corneal ulcers in VKC

Eosinophils

- CYTOTOXIC PROTEINS (MBP ECP)
- Eotaxine (fibroblastes)
Steps of genesis of vernal plaque (Cameron)

Vernal plaque after surgical treatment

Before | Immediately after surgery | 2 months later
VKC and visual loss

Stem cells deficiency

DO  M6  1 Year  2Years

Neovascularization and corneal scars

VKC and corneal biomechanics

• Eye rubbing may causes changes in corneal curvature
• Personnal data : 98% of asigmatism in a population of 534 VKC
• 8.7 % have keratoconus
Atopic keratoconjunctivitis

- Very severe disease; characterized by an association of a serious chronic keratoconjunctivitis with an atopic dermatitis

- It is often observed in adults (aged between 30 and 50) with masculine predominance, can be observed in children with atopic dermatitis.

- It can follow a VKC at adult age.
Clinical signs

- A very intense symptomatology: tearing, itching and mucous secretions.

- Frequently the cornea is involved as diffuse superficial epitheliopathy and/or ulcers that result in scarring, irregular astigmatism, or corneal pannus, all of which can compromise visual function;

- 3 types of manifestations:
  - Palpebral
  - Conjunctival
  - Corneal

Eyelids and peri ocular signs

A more or less severe palpebral eczema or of the peri-ocular region;
Lid margin signs

Eyelid eczema lesions cause thickening, induration and keratinization of the free edges, erythema and eyelid cracks.

Periocular signs

- The peri-ocular region is the site of eczematoid changes, combining erythema, desiccation and crust = Dennie Morgan's fold.
- Some elderly patients: absence of the tail of the eyebrows (Hertoghe's sign) due to chronic eye rubbing.
….or far from the eye : hands and legs

Conjunctival signs

• Papillary hypertrophy of the upper and lower palpebral conjunctiva.
• Chronic conjunctival inflammation leads to progressive subepithelial fibrosis, filling of the dead ends of the sacs by this scarring process and the formation of symblepharons
Corneal signs

- Constant, always serious and easily complicated by new vessels, permanently compromising visual function.

Strategy of management
Key actions

• Eviction of the allergen(s)
  Often difficult in case of multiple antigens

• Eye wash
  To physically eliminate the allergen ++++

Major Anti-Allergic Medications

Antihistaminics H1

• Lévocabastine (LEVOPHTA)
  premier antihistaminique H1

• Olopatadine (OPATANOL)
• Epinastine (PURIVIST)
• Azélastine (ALLERGODIL)
• Emédastine (EMADINE)
• Kétotifène (ZADITEN, ZALERG)
Major Anti-Allergic Medications

• Mast cell stabilizers:
  – Cromoglycates
  – Others:
    • Acide N acétyl aspartyl glutamique NAAXIA, NAABAK
    • Lodoxamide : Almide
    • Nédocromyl : Tilade

• Anti-inflammatory drugs
  – Steroids
  – Ciclosporin A

Usual Doses of Anti-Allergic E.D.

• Anti-histaminics
  – 1 drop twice a day

• Mast cell stabilizers
  - 3 to 6 times a day
Anti-inflammatories

- Steroids: short courses and high doses
  - Under observation
  - Intra tarsal injection of triamcinolone
  - Oral: no or very few indications

- Local immunosuppressant:
  - Ciclosporin 1 or 2%
  - Tacrolimus: AKC

Therapeutic approach in the management of ocular allergy

- Avoid Allergen
- Ocular surface wash

If rhinitis or other allergy:
- Oral Anti-H1
- Anti-H1 drops
  - Mast cell stabilizers drops

Not sufficient:
- Local steroids for a short time
Therapeutic strategy for severe allergies

Mild cases
Éviction of allergen
Steroids during acute phases
Mast cell stabilizers
Immunotherapy
Preservative free lubricants

Moderate cases
Same mild +
STEROIDS or ciclosporin during acute phases

Mild cases
Éviction of allergen
Steroids during acute phases
Mast cell stabilizers
Immunotherapy
Preservative free lubricants
Conclusion

- Ocular allergy can be a severe disease