

Antifungal and Anti-allergenic Oral Medications in Eyecare

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Fungal Ocular Disease

Higher incidence in warmer climates – places like India way more common than bacterial infections.

Rare in North America: 6.8/100,000 people
-Jeng 2010

Will global warming change the game for us in the USA?

Ocular manifestations:

- **Keratitis, scleritis, orbital disease**
- **Endophthalmitis: (indwelling catheters) , immunocompromised, IV drug users**

Pathogens

- Yeasts

Candida

albicans, parapsilosis,
tropicalis, krusei

- Filamentous

Non-pigmented

Fusarium

- solani, oxysporum,
moniliforme, episphaesia

Aspergillus

- fumigatus, flavus

Acremonium
(Cephalosporium)

Paecilomyces

Pigmented

Curvularia

Lasiodiplodia

Cladosporium

Collectotrichum

Source: Alfonso et. al., 2005

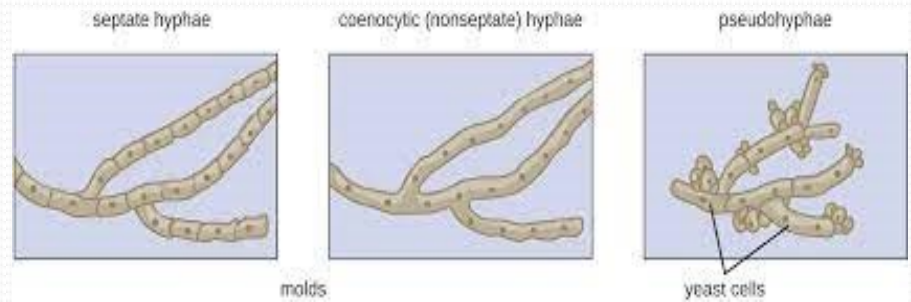
Important Fungal Organisms

Most are caused by filamentous organisms

Septae : Fusarium, Aspergillus, Cephalosporium, Curvularia, Penicillium

Non Septae: mucor infection of the orbit, sinus in diabetes, immunosuppressed

Candida most common yeast infection



Risk Factors

1. **Most common reason: trauma involving organic or vegetative matter, such as leaves, branches, etc.**
2. **Contact lens: especially extended wear**
3. **Contact lens solutions: failure or contamination (ReNu MoistureLoc (B & L, 2005)**
4. **Chronic ocular surface disease – blepharitis, vernal/atopic keratoconjunctivitis**
5. **Prior ocular surgery**
6. **Existing ocular surface defects**
7. **Systemic diseases – diabetes, rheumatoid arthritis**
8. **Immunosuppression**

Source: Thomas, Geraldine, et. al., 2007

Cornea. 2018 Apr; 37(4): 515–518.

Candida Endophthalmitis after Descemet Stripping Automated Endothelial Keratoplasty with Grafts from Both Eyes of a Donor with Possible Systemic Candidiasis

Sotiria Palioura, MD, PhD,¹ Kavitha Sivaraman, MD,¹ Madhura Joag, MD,¹ Adam Sise, MD,¹ Juan F. Batlle, Jr., MD,¹ Darlene Miller, DHSc,¹ Edgar M. Espana, MD,² Guillermo Amescua, MD,¹ Sonia H. Yoo, MD,¹ Anat Galor, MD, and Carol L. Karp, MD¹

- “The higher risk for postop fungal infections seems to relate to donor contamination, lack of anti-fungal prophylaxis in donor storage media, and repeated warming cycles during DSAEK donor tissue processing in eye banks,” said Dr. Tan, Singapore National Eye Centre.

Case history is important: Trauma

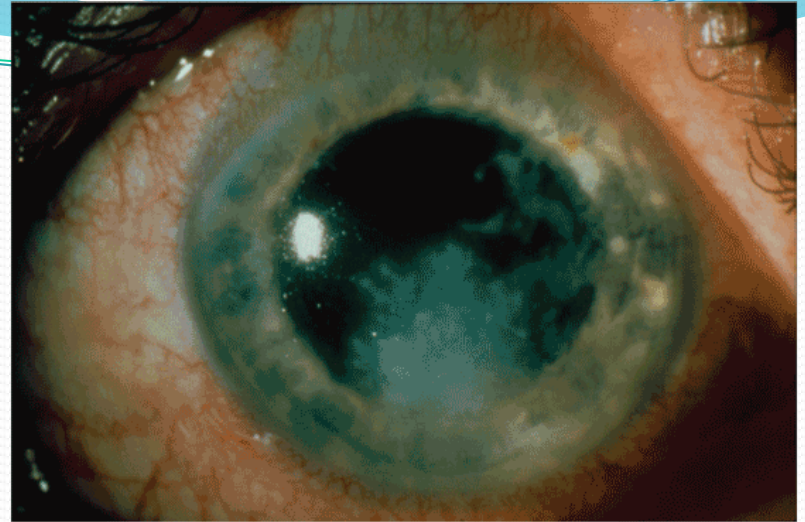
- Symptoms tend to begin 10-21 days after the event
- Blurred vision, photophobia, hyperemia, exudate
- May have been given antibiotic treatment with no response*



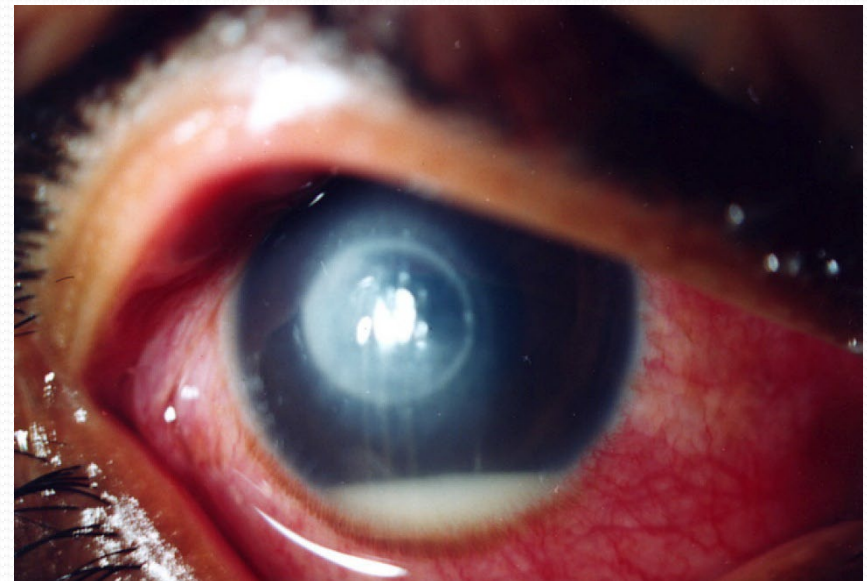
Filamentous fungal keratitis often consists of a grayish infiltrate with a filamentous or feathery edge.

Fungal keratitis

- Severe edema, Descemet's folds
Anterior uveitis, hypopyon common
Mucopurulent discharge
- Filamentary:
 - Irregular, gray-white feathery margins
 - Dry, rough texture
 - Satellite lesions
 - Epithelium may be elevated or ulcerated
- Non-filamentary
 - Central or paracentral stromal infiltrate with dense, white endothelial plaque
 - Candida



Filamentous fungal keratitis often consists of a grayish infiltrate with a filamentous or feathery edge.



Fungal Keratitis



An ulcer exhibiting serrated ('hyphae') margins, with central positioning



An ulcer with raised necrotic slough

Source: Thomas et. al, 2003

Fungal Keratitis



**Dry, rough
Texture**

Hypopyon

Fungal Keratitis

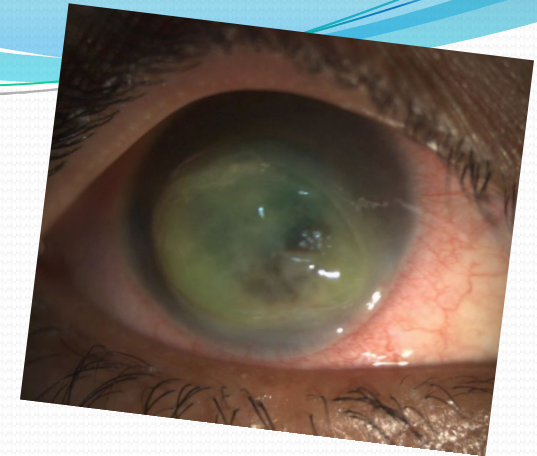


Feathery Margins

Conjunctival Injection

Mimickers

Infectious Keratitis



- **Bacterial**

- Staphylococcus
- Streptococci
- Corynebacterium sp.
- Pseudomonas
- Enterobacteriaceae

- **Fungal**

- Candida
- Aspergillus
- Fusarium

- **Viral**

- Herpes Simplex Virus
- Herpes Zoster Virus
- Epstein-Barr Virus

- **Parasitic**

- Acanthamoeba
- Onchocerciasis
- Trypanosomiasis

Pearls

- Fungi can cause severe stromal necrosis and enter the anterior chamber by penetrating an intact Descemet's membrane.
- Once in the A/C the infection is very difficult to control in part due to poor penetration of antimycotic agents.
- Empirical treatment is something I would not generally advise unless the history (trauma) is clear.

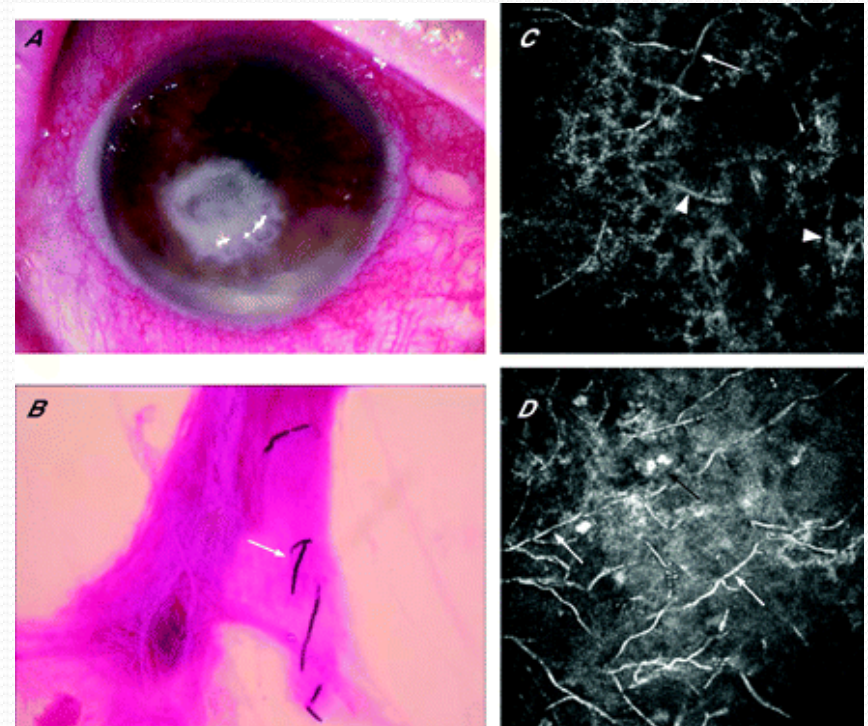
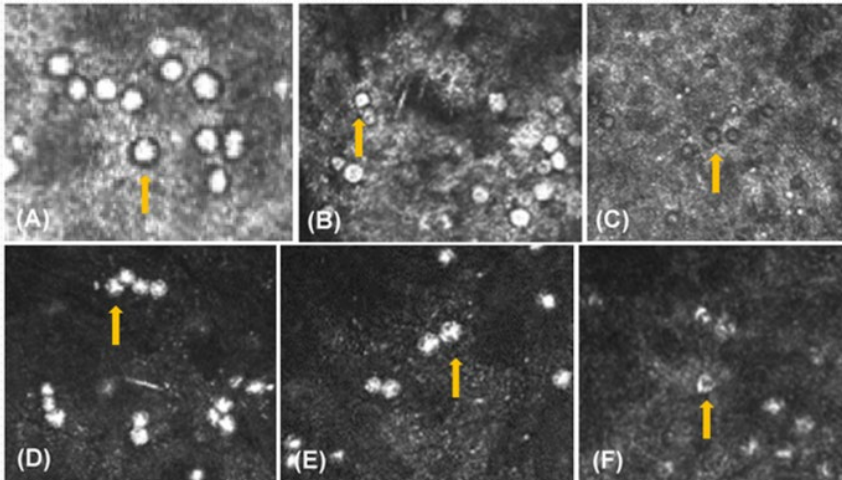
Making the proper diagnosis: Cultures and Smears

- Most of these keratitis will require corneal scraping and culture.
- Bacteria culture for differential
- Smears - stain with Giemsa dye, calcofluor white (Candida Gram +)
- Cultures - Sabouraud's agar or thioglycolate broth

Confocal microscopy

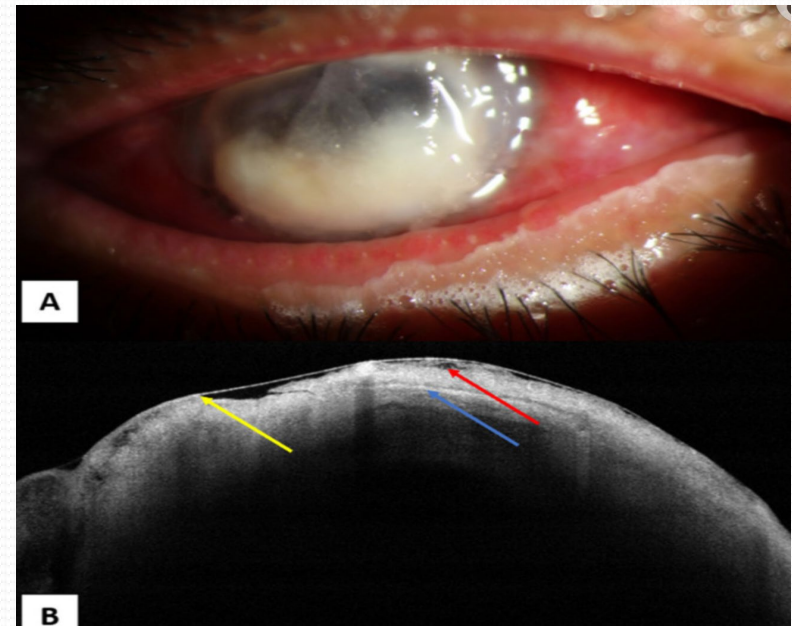
Acanthamoeba keratitis

Fusarium keratitis



AS-OCT

- Shows irregular thickness of the epithelium with areas of epithelial loss (yellow arrow), irregular cystic spaces (red arrow), hyperreflective lesion with different densities affecting the whole corneal thickness (blue arrow).



Werkmeister, René M., et al. "Ultrahigh-resolution OCT imaging of the human cornea." *Biomedical optics express* 8.2 (2017): 1221-1239

Treatment- topical

5% Natamycin drops – One gtt q1-2h for 72 hours, continue q2h after bedtime

Taper to QID over several weeks

- only commercially available medicine- rest are compounded
 - wide spectrum especially filamentous organisms.

-limited drug penetration

Consider epithelial debridement to improve penetration

- 0.15% Amphotericin B – (effective against candida)
- Topical fortified voriconazole 1%
- Q1- 2hrs around the clock

Then taper over 4-6 weeks.

Cycloplegics for AC rxn/hypopyon

No steroids!



Treatment with oral agents: deep corneal ulcers or suspected fungal endophthalmitis

- Fluconazole (esp. yeast) or Itraconazole (aspergillus, yeast)
- Itraconazole has the highest corneal penetration of all the oral antifungal agents
- 200-400 mg PO loading dose 100 -200 mg po daily
- Posaconazole 300 mg po BID 1 days then 300 mg PO BID x 1 day then 300 mg PO daily
- OR
- VORICONAZOLE (aspergillus, candida, +/- fusarium)
- 200mg po BID

Oral antifungals: Adverse Effects

- **Adverse Effects:**

- GI distress
- Rash, itch
- Peripheral edema
- Hepatotoxicity
- Mouth Sores
- Headache

- **Contraindications:** Heart disease (CHF), Liver disease ,
Taking statin medications or ergot type medications

Management

- Follow up: Daily
- Weeks to months of treatment
- No topical steroids !
- Corneal debridement beneficial for drug penetration
Maintenance dosage for 6-8 weeks to prevent recurrence
- Biopsy may be needed for diagnosis if cultures negative
- Intrastromal injection of Amphotericin B or Voriconazole
- PK may be needed for progressive infections or perforation
- Organisms can penetrate intact Descemet's membrane

Mycotic Ulcer Treatment Trial 1 & 2

- Outcomes- 2010 and 2017

MUTT-1 : In fungal corneal ulcer cases with filamentous fungal keratitis, particularly the *Fusarium* species, patients treated with natamycin had a better outcome than those treated with voriconazole. The difference in outcome in other species were not significant. Voriconazole should not be used as mono- therapy in the treatment of *Fusarium* keratitis.

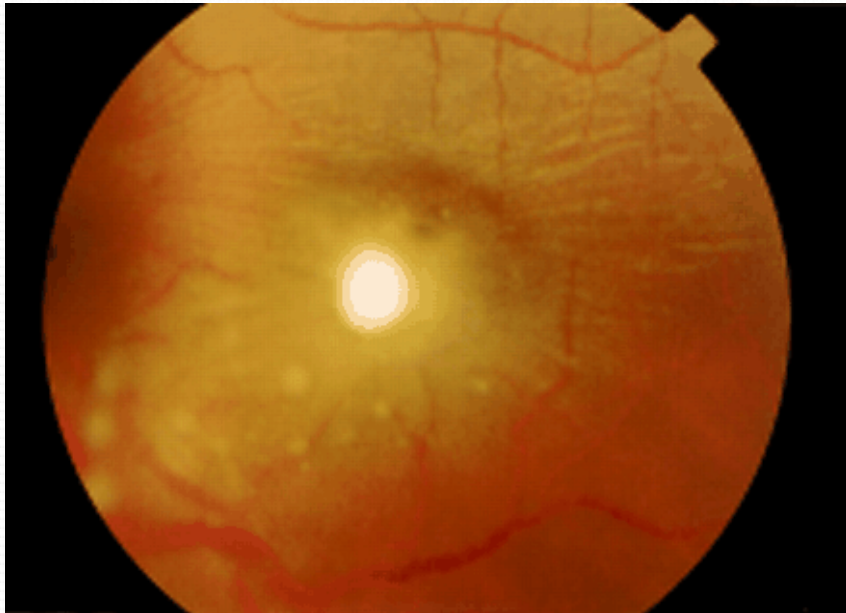
MUTT-2 -the addition of oral voriconazole to topical antifungals does not provide any therapeutic benefit for advanced filamentous fungal ulcer cases.

Fungal Scleritis

- Pterygium surgery
- Spread from corneal infection



Candida endophthalmitis



- Immunocompromised patients
- Patients with long term indwelling catheters
- IV drug addicts
- Spread from anterior segment infections

Hot off the presses.... 1/20/2023

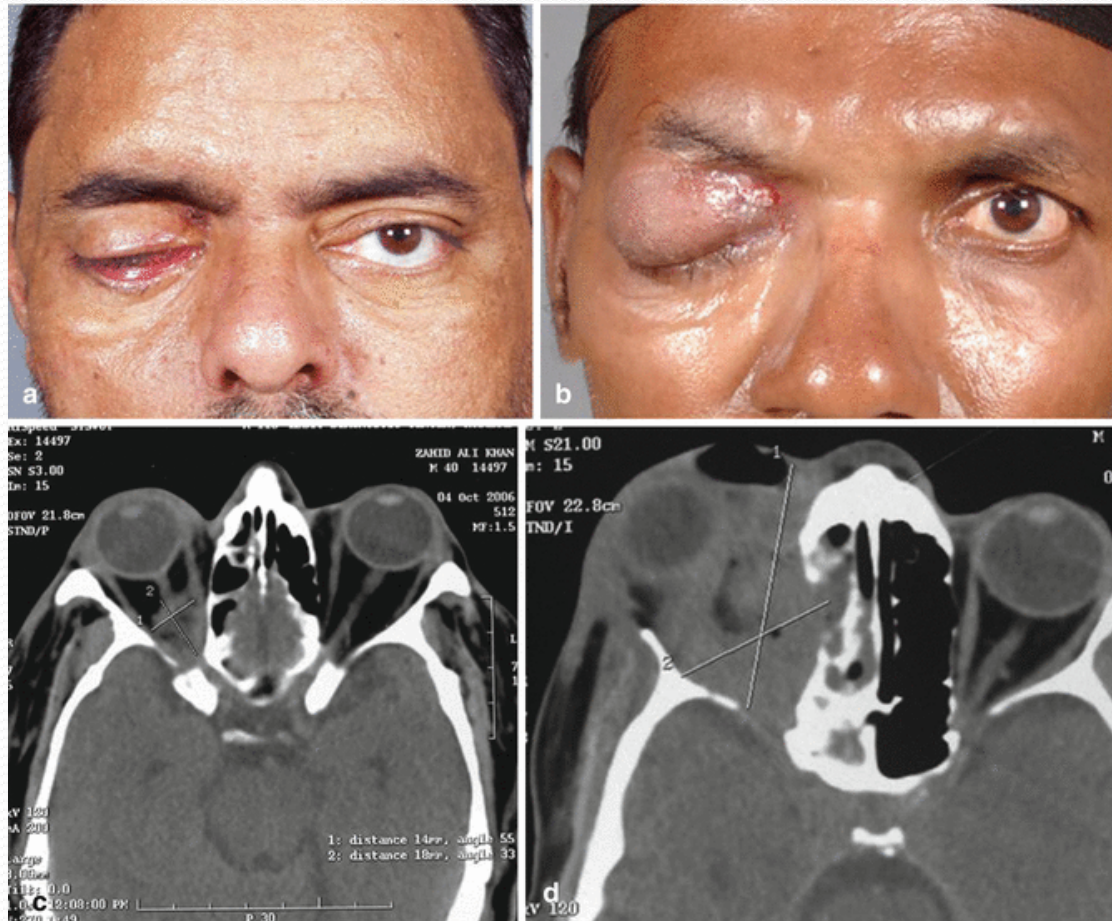
JAMA Ophthalmology

- **An Outbreak of Fungal Endophthalmitis After Cataract Surgery in South Korea.**

Seong Woo Kim, Jae Hui Kim, Mihyun Choi, Sang Joon Lee, Jae Pil Shin, June Goe Kim, Se Woong Kang, Kyu Hyung Park
JAMA Ophthalmology 2023 January 20

- The fungal endophthalmitis outbreak between September 1, 2020, and June 30, 2021. Patients were diagnosed with fungal endophthalmitis resulting from the use of the viscoelastic material sodium hyaluronate.
- **Treatment:** Vitrectomy, accompanied by IOL and lens capsule removal and antifungal injection.

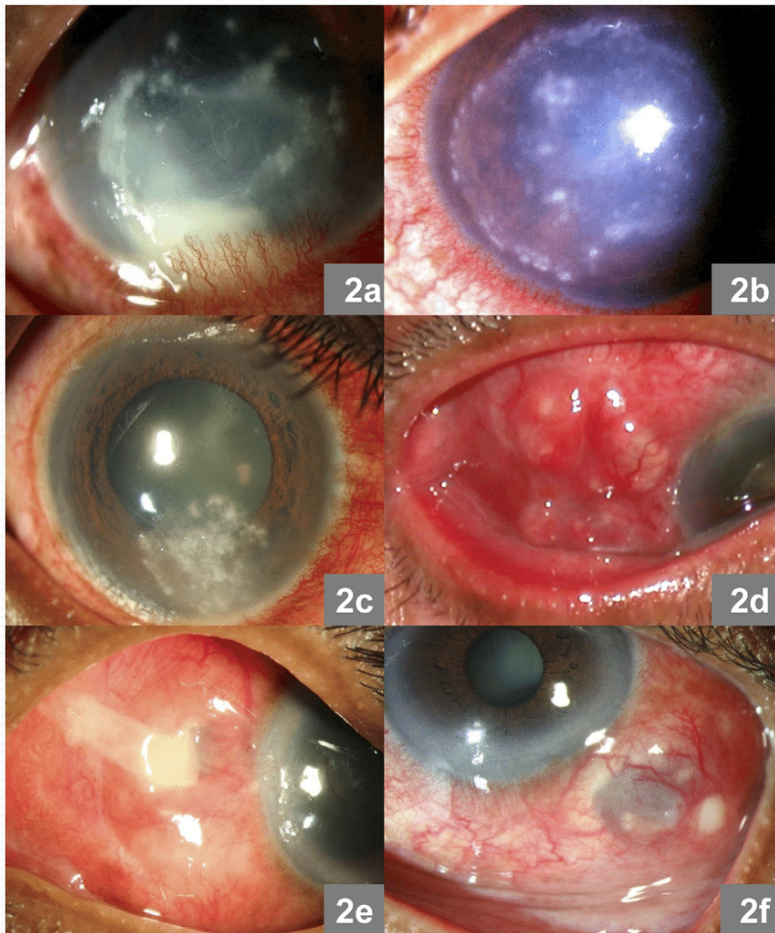
Mucormycosis/Aspergillosis



Mucormycosis

- Rare opportunistic infection
- Typically affects patients with diabetic ketoacidosis or immunosuppression
- Aggressive and fatal infection
- Acquired by inhalation of spores which gives rise to upper respiratory infection that spreads to sinuses and then orbit and brain
- Invasion of blood vessels by hyphae results in occlusive vasculitis with ischemic infarct of orbital tissue

Nocardia Keratitis Mimics Fungal



- Characteristic clinical findings from **Nocardia keratitis and scleritis infections.**
- A, " Wreath " -like ulcerative corneal lesion.
- B, Corneal infiltrate with multiple " pinhead " -shaped lesions.
- C, Dry " cotton wool " corneal infiltrate mimicking fungal infection.
- D, Scleral infection presenting with multiple nodular lesions.
- E, Ulcerative lesion on sclera.
- F, Inferotemporal scleral nodule with pointing abscess and adjacent ulcerative lesion.

What's news? JAMA April 7, 2022

- **Outcome of COVID-19–Associated Rhino-Orbital Mucormycosis**

Purva S. Date, DNB¹; Twinkle Choksi, MD¹; Avinash B. Ingole, MS¹

- Study conducted during the peak of the second wave of the COVID-19 pandemic in India, from March to May 2021.
- Among diabetic patients with COVID infection who went on to develop Mucormycosis.
- The overall mortality rate of mucormycosis in India is in the range of **28% to 52%**

Case

- 25 yo female with history of contact lens wear being treated for non-resolving corneal ulcer OD.
- Initially treated with Vigamox without improvement and started on fortified tobramycin 15 mg/ ml drops without improvement. The patient reported that she felt her vision was worsening.
- OHX : No previous trauma, surgery. Wears contact lenses 2 week disposables. Uses multipurpose solution: OPTI-FREE® Puremoist®
- Changes lenses every 2 weeks. Showers with lenses on. Occasionally will sleep in lens.
- No recent trips or swimming with lenses.
- MHx: Denies any medical issues or medications.

Slit lamp exam

- On exam (photos)...
- Acuity OD 20/60
- Endothelial plaque underlying a central multi-focal infiltrate of 2.5 x 2.5 mm with overlying epi defect
- Hypopyon



What is your next best step?

- A. Wait a few days to see if the ulcer responds?
- B. Add Pred Forte QID
- C. Empirically treat with Natamycin 5% every hour
- D. Refer for culture / scraping/ culture the contact lens case ?

Differentials?

- Bacterial- ? Not responding
- Fungal- possible. Atypical presentation
- Acanthamoeba- possible
- Mycobacterial
- Herpetic

What was done?

- Fungal hyphae identified on smear (Giemsa stain)
- Natamycin 5% begun q 1 hr
- Advised to return in 2 days but no showed for 8 days.

8 days later

- Vision OD reduced to Hand Motion.
- Culture identifies Acremonium – Mold in the same family as Fusarium and Aspergillus

“Deep plaque,
necrotic center,
feathery edges,
persistent hypopyon”

What happened?

Added 0.15% Amphotericin B Q 1h
Oral Ketoconazole 400 mg daily
Continued Natamycin 5% QID

Eventually patient had to have a PK which ultimately failed.

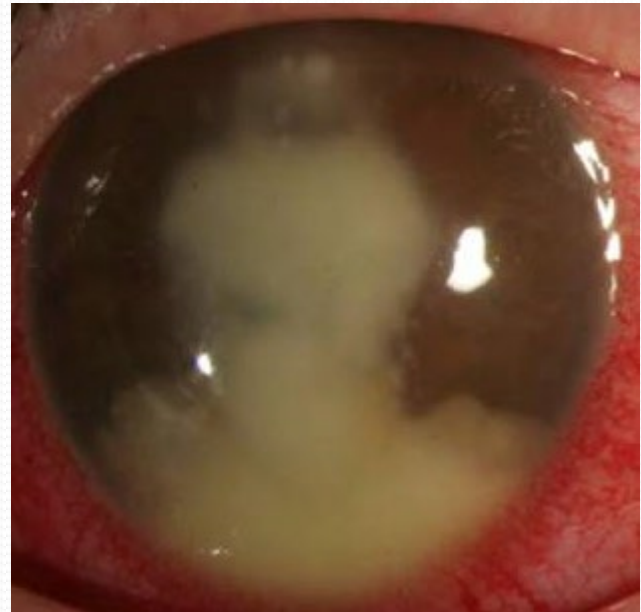
Hand motion vision.

This is how quickly things can go bad?

Day 1



Day 18



Moral

- Fungal disease must be on our differential even with atypical presentations with non-responsive corneal ulcers.
- Time is critical and culturing is the appropriate referral.
- Even with best suggested therapy things can go south.
- Keep in mind fungus can spread to the sclera, penetrate into the anterior chamber and colonize the lens, lens capsule, and turn into an endophthalmitis.

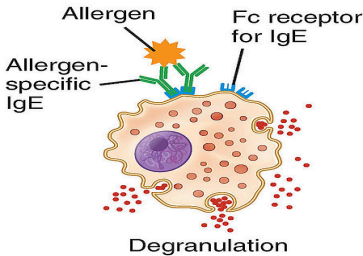
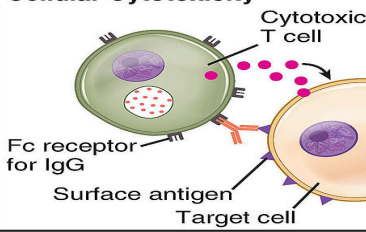
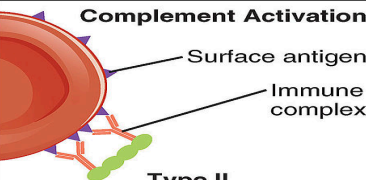
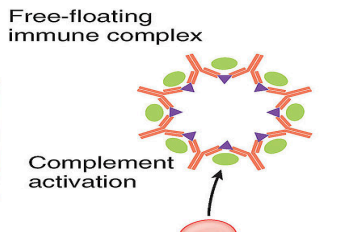
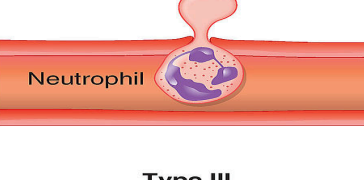
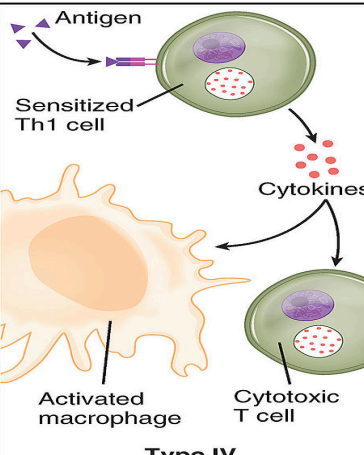
Summary: Fungal

- Fungal keratitis is an important consideration with any infectious keratitis
- Rare but serious
- Immunosuppression is a typical risk factor for Candida keratitis
- Be wary of atypical presentations of fungal keratitis, especially those that are bilateral
- High medical legal risk in this situation if things go bad
- Fungal orbital disease and posterior segment infections are possible in the immunocompromised, IV drug users and those with indwelling catheters (dialysis, chemo therapeutics)

Now on to: Allergies

- 30 % of adult Americans suffer from various types of allergies
- 40 % of children suffer from allergies in US
- Factors: genetics, environmental, immunology
- Allergic conjunctivitis: common reason for visit to the OD!

Hypersensitivity Types

 Type I	Antibody-Dependent Cellular Cytotoxicity  Complement Activation  Type II	Free-floating immune complex  Neutrophil  Type III	Antigen  Sensitized Th1 cell Cytokines Activated macrophage Cytotoxic T cell Type IV
IgE-Mediated Hypersensitivity	IgG-Mediated Cytotoxic Hypersensitivity	Immune Complex-Mediated Hypersensitivity	Cell-Mediated Hypersensitivity
IgE is bound to mast cells via its Fc portion. When an allergen binds to these antibodies, crosslinking of IgE induces degranulation.	Cells are destroyed by bound antibody, either by activation of complement or by a cytotoxic T cell with an Fc receptor for the antibody (ADCC)	Antigen-antibody complexes are deposited in tissues, causing activation of complement, which attracts neutrophils to the site	Th1 cells secrete cytokines, which activate macrophages and cytotoxic T cells and can cause macrophage accumulation at the site
Causes localized and systemic anaphylaxis, seasonal allergies including hay fever, food allergies such as those to shellfish and peanuts, hives, and eczema	Red blood cells destroyed by complement and antibody during a transfusion of mismatched blood type or during erythroblastosis fetalis	Most common forms of immune complex disease are seen in glomerulonephritis, rheumatoid arthritis, and systemic lupus erythematosus	Most common forms are contact dermatitis, tuberculin reaction, autoimmune diseases such as diabetes mellitus type I, multiple sclerosis, and rheumatoid arthritis

Summary Type I and Type IV Hypersensitivity

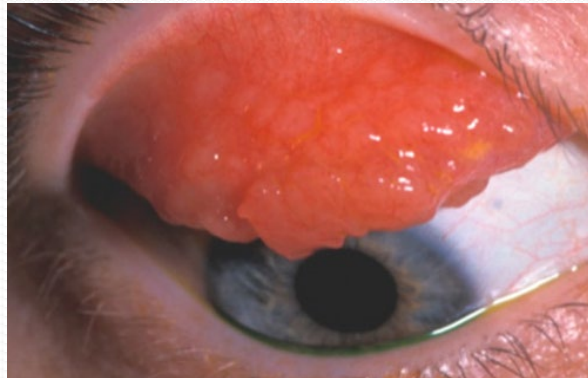
- **Type I hypersensitivity**
 - An immediate reaction and involves immunoglobulin E (IgE) mediated release of antibodies against the antigen.
 - This results in mast cell degranulation and release of histamine and other inflammatory mediators.
- **Type IV hypersensitivity**
 - Often called delayed-type hypersensitivity
 - Can take a day or more to develop.
 - Unlike the other types, it is not antibody-mediated but rather is a type of cell-mediated response.

Systemic Signs & Symptoms

- Sneezing
- Coughing
- Itchy, runny nose
- Itchy ears, throat, soft palate
- Erythema, edema
- Popping sound secondary to ear fluid
- Congestion
- Discharge
- Eczema, dermatitis
- Wheezing
- Asthma
- Sinusitis
- GI issues

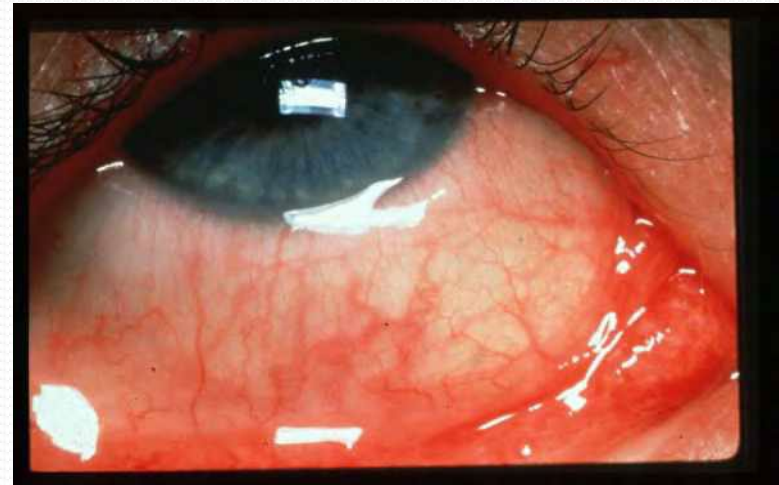
Allergic Conjunctivitis: General Signs/Symptoms

Itch, periorbital, lid, conj edema + injection,
Mild watery, mucus discharge



Allergies and the Eye

- Seasonal allergic conjunctivitis
- Perennial allergic conjunctivitis
- Vernal keratoconjunctivitis
- Atopic keratoconjunctivitis
- Giant Papillary Conjunctivitis
- Contact Dermatitis
- Medicomentosa



Seasonal and Perennial Conjunctivitis

- Seasonal allergens (grass, tree, pollen), with worse symptoms in the spring and summer
- Perennial: occur in all seasons (dust mites, animal dander)
- Typically present with itching, redness, and a watery or stringy mucus discharge
- Other symptoms: intermittent blurry vision, burning, photophobia
- Must evert eyelids to check for papillae
- Papillae are classic findings, comprised of elevated clusters of eosinophils



External observation: periorbital edema, erythema “ Allergic Shiner”



General Ocular Treatment Guidelines

- **Avoid the offending agent!**
- Preservative-free artificial tears (can place in fridge) and cold compresses
- Avoid eye rubbing! ...Mechanical mast cell degranulation
- D/C, reduce, change or switch to 1- day contact lenses
- Treatment varies depending on mild, acute or chronic
- Do you refer for allergy testing?

Ocular allergies

- OTC topical antihistamines
- **Dual-action drugs (that combine antihistamines with mast-cell stabilizers). Pataday, Lastacraft, Alaway**
- **Topical steroids (loteprednol .2 (Alrex) .25% .38%, .5% (Lotemax), FML .1%, Pred .12% or 1%) can be prescribed for short-term treatment of moderate to severe . Dose: Start q2-4 hours 1st 2 days then QID then BID 2-4 weeks.**
- Topical mast-cell stabilizers (cromolyn sodium) are beneficial long term for patients with chronic symptoms. QID. We are not really using anymore...

Allergy meds: Popular Combo

Topical Meds OTC



- **Lastacraft QD:** Alcaftadine 0.25% - an H₁ histamine receptor antagonist and inhibitor of histamine release from mast cells
- **Pataday Once Day and Extra Strength:** Olopatadine .2% QD .7% QD
- **Alaway PF:** The 1st FDA approved OTC preservative-free eye drop for itchy eyes. BID B & L
 - Ketotifen fumarate ophthalmic solution 0.035% approved to relieve itchy eyes caused by pollen, ragweed, grass, animal hair and dander.



TOPICAL ALLERGY	GENERIC NAME	SIG	QTY'S
Alaway (otc) (Combination)	ketotifen 0.025%	bid	10ml
Alocril (Mast Cell Stabilizer)	nedocromil sodium 2.0%	bid	5ml
Alomide (Mast Cell Stabilizer)	lodoxamide tromethamine 0.1%	qid	10ml
Alrex (Steroid)	loteprednol etabonate 0.2%	qid	5, 10ml
Bepreve (Combination)	bepotastine besilate 1.5%	bid	5, 10ml
Crolom (Mast Cell Stabilizer)	cromolyn sodium 4.0%	qid	10, 15ml
Elestat (Combination)	epinastine HCL 0.05%	bid	5ml
Lastacft (Combination)	alcaftadine 0.25%	qd	3ml
Lotemax (ointment) & (gel) (steroid)	loteprednol etabonate 0.5%	qid ¹	3.5gm ung / 5ml gel
Optivar (Combination)	azelastine HCL 0.05%	bid	6ml
Pataday Once Daily Relief (otc) (Combination)	olopatadine HCL 0.2%	qd	2.5ml
Pataday Twice Daily Relief (otc) (Combination)	olopatadine HCL 0.1%	bid	5ml
Pazeo (Combination)	olopatadine HCL 0.7%	qd	2.5ml
Zaditor (otc) (Combination)	ketotifen 0.025%	bid	5ml
Zerviate (Antihistamine)	cetirizine 0.24%	bid	5ml, 7.5ml, 30 0.2 mL units
Opcon-A (otc) Naphcon-A (otc) Antihistamine/Decongestant Visine-A (otc)	naphazoline 0.025% pheniramine 0.3%	qid	0.5 fl. oz.

What about oral OTC?

- Do we recommend orals for allergic conjunctivitis alone?
- Oral antihistamines (Claritin, Zyrtec) can be added for systemic symptoms and nasal corticosteroids have also been effective for patients experiencing concomitant allergic rhinitis.



Common OTC Antihistamines for seasonal allergies

- **Benadryl:** Diphenhydramine 25 -50 mg q4-6 hours, don't under age 6, age 6-12 25 mg q4-6 hrs, drowsy
- **Claritin:** Loratadine 10mg QD, ages 2-6 5mg QD, non drowsy
- **Claritin D** (also contains pseudoephedrine-decongestion)
- **Zyrtec:** Cetirizine 10 mg QD (over age 6), ages 2-6 2.5 ml BID), “non” drowsy but more than Claritin
- **Allegra** (fexofenadine) age 12 and older 60mg BID or 180 QD, children 6-11 30mg BID, non drowsy
- **Allerga D** (also contains pseudoephedrine-decongestion)
Caution with pseudoephedrine with patients HBP*

Possible adverse effects

- Dry eye
- Dry mouth
- Nervousness
- Dizziness
- Headache
- Insomnia
- GI upset



- Just because it is an over the counter, we still need to be aware of the potential concerns.
- **Contraindications:** severe HTN, coronary artery disease, drug interaction with certain antidepressants (monoamine oxidase inhibitors - MAOIs)
- **Precautions:** HTN, cardiovascular disease, narrow angle glaucoma, elderly, hyperthyroid

Vernal Keratoconjunctivitis (VKC)

- Typically bilateral
- Significant itch **
- Ropy discharge
- Photophobia, FB sensation
- Conj & cornea affected
- Commonly affects boys aged 4 to 12 years.
 - Often resolves after puberty. May have hormonal component.
- Presents during the warm weather months and in dry, arid climates.
 - Prevalent in areas such as Mediterranean and West African
 - Seasonal flare ups
- Eczema, asthma, rhinitis associated



Superior Tarsus

Classic signs of VKC include giant cobblestone papillae on upper tarsal plate

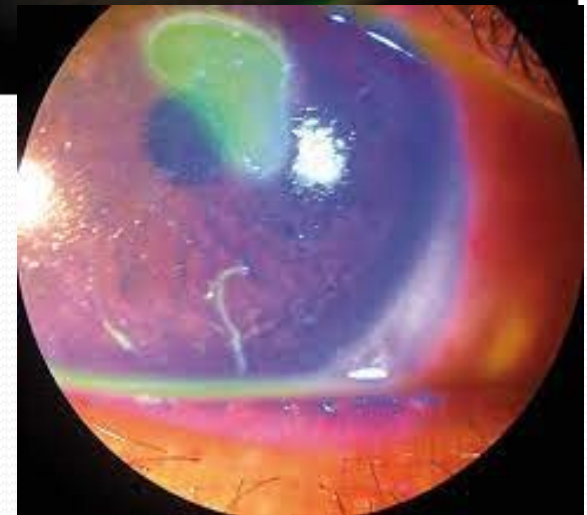
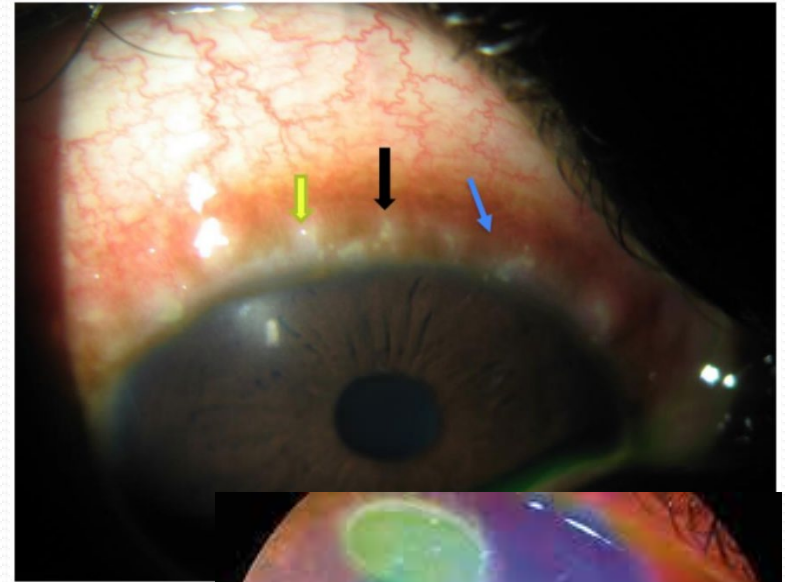


VKC ocular signs



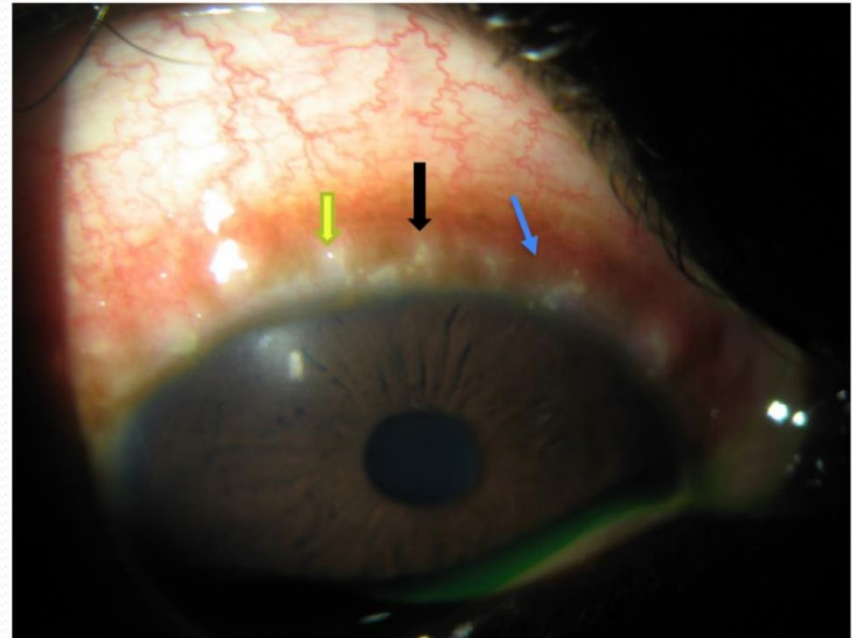
Cornea:

- Corneal involvement ranges from mild: punctate epithelial erosions, to severe: macro-erosions and shield ulcers
- Shield ulcers: typically superior
Oval, grayish
- Horner-Trantas dots
(eosinophils & epithelial cells)



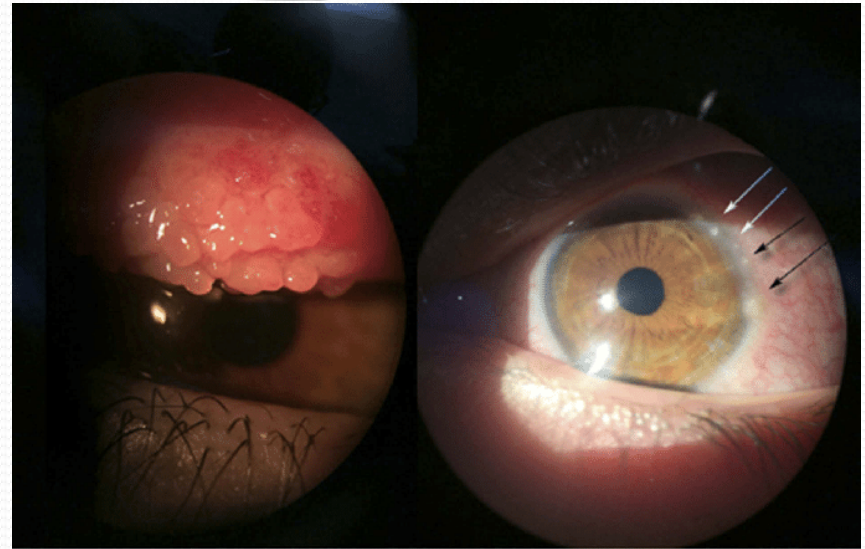
Treatment: depends on presentation

- PF artificial tears
- Cool compresses
- Combo antihistamine/mast cell
- Topical corticosteroids
- Antibiotic cover for shield ulcer drops and/or ointment
- Newly approved Verkazia: .1% cyclosporine, QID
- Oral antihistamines Claritin, Zyrtec



Quality of life

- VKC negatively affects the patients' quality of life.
- Symptoms include intense itching, pain, and photophobia.



Verkazia

- Cyclosporine ophthalmic emulsion 0.1% (Verkazia; Santen Pharmaceutical) for the treatment of VKC, QID
- Works by inhibiting T-cell activation and reduces the level of immune cells and mediators that cause the chronic, severe, allergic inflammation in VKC.

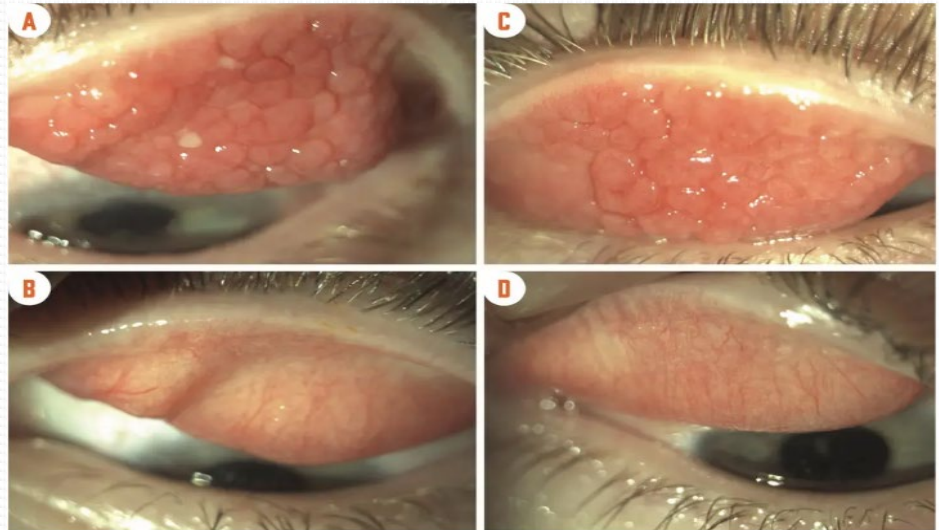
- Leonardi A, Doan S, Amrane M, et al; VEKTIS Study Group. A randomized, controlled trial of cyclosporine A cationic emulsion in pediatric vernal keratoconjunctivitis: the VEKTIS Study. *Ophthalmology* 2019;126(5):671-681. doi:10.1016/j.optha.2018.12.027
- Andrea Leonardi, MD, PhD, of the Department of Neuroscience, Ophthalmology Unit, University of Padua, Italy, and the senior author of both studies

VEKTIS study

- Multicenter, double-masked, randomized controlled trial, assessed the safety and efficacy of cyclosporine A cationic emulsion 0.1% eye drops over a 12-month period in pediatric patients with severe active VKC.
- 169 patients aged 4 to 17 years were randomized to the 4-month VEKTIS trial, and of those, 142 entered the 8-month follow-up period during which the patients randomly assigned to the cyclosporine A cationic emulsion stayed on their original treatment regimen, QID (high dose) or BID (low-dose plus the vehicle twice daily).

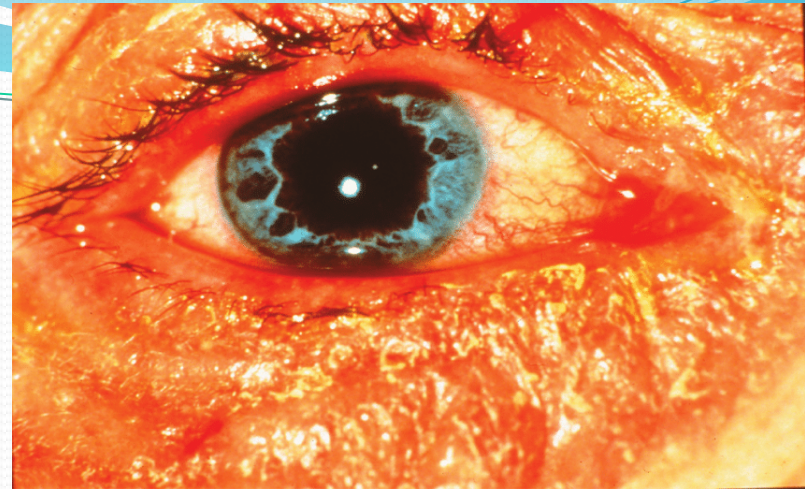
VEKTIS study

- Compared with the patients assigned to vehicle, the patients on active treatment had improvements in signs and symptoms of photophobia, tearing, itching, and mucous discharge (within 1 month).
- The quality of life also improved, as assessed by questionnaire responses during the 4-month
- Good safety profile



Left eye before CsA (A) and after (B). Right eye before CsA (C) and after (D).
(Images courtesy of Andrea Leonardi, MD)

Atopic keratoconjunctivitis



- **Ages 20-50**
- **Atopic dermatitis: chronic inflammatory skin disease: elevated IgE**
- **AKC considered an ocular manifestation of atopic dermatitis.**
 - **Ocular involvement up to 40% in atopic pts**
- **Thought to be a combination of immediate (type 1) and delayed (type 4) hypersensitivity to an ocular allergen exposure.**
- **Inflammatory cells infiltrate the ocular tissues that cause changes including lid and conjunctival thickening, neovascularization, and scarring.**

Pathophysiology AKC



- Bilateral but may be asymmetric.
- Symptoms: chronic irritation, ocular itching, and mucoid discharge
- Symptoms typically persist throughout life, and no specific seasonal correlation.
 - May have flare-ups may occur in winter months
- Classic triad: allergy, asthma, eczema
- Male-to-female (2:1 to 3:1)

AKC

- **Hallmark: eyelid dermatitis, eczematous, thickened lids, can be associated with staph aureus and MGD**
- **Conjunctival hyperemia, corneal neovascularization, and papillae typically located inferiorly**
- **May also have Trantas dots**
- **Atopic cataracts**

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Management



Co-management with an allergist and dermatologist

- Acute treatment same as VKC: topical corticosteroids

Loteprednol .5% or FML.1% ointment to lids.

Watch IOP!

- Long-term management often includes cyclosporine and tacrolimus (allergy, KCS)
 - Tacrolimus: macrolide derivative with anti-inflammatory and immunomodulatory activity. Can suppress the T cell activation and interleukin-2 production by binding to an immunophilin and inhibiting the enzymatic activity of calcineurin.
- Can I use Verkazia?
- Oral antihistamines



Dupixent



- Dupilumab: is a monoclonal antibody blocking interleukin 4 and interleukin 13, used for allergic diseases such as:
 - Eczema, asthma, rhinosinusitis, eosinophilic esophagitis and prurigo nodularis.
- Sub cutaneous injection

Only DUPIXENT specifically targets IL-4 and IL-13 signaling and is approved for 5 indications.^{1,a}

To continue to a site, select a condition:

Moderate-to-Severe ATOPIC DERMATITIS > For Patients Ages 6+ Months	Moderate-to-Severe ASTHMA > For Patients Ages 6+ Years with an Eosinophilic Phenotype or OCS-dependent	CHRONIC RHINOSINUSITIS WITH NASAL POLYPOSIS > For Patients Ages 18+ Years	EOSINOPHILIC ESOPHAGITIS > For Patients Ages 12+ Years, Weighing at Least 40 kg	Now Approved PRURIGO NODULARIS > For Patients Ages 18+ Years
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DUPIXENT is indicated in:

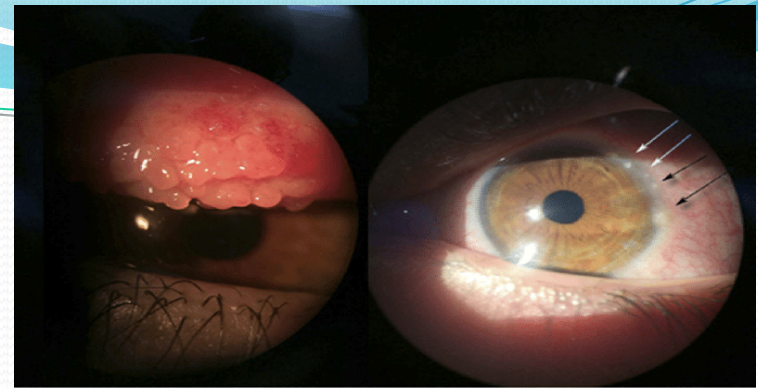
Atopic Dermatitis: for the treatment of adult and pediatric patients aged 6 months and older with moderate-to-severe atopic dermatitis whose disease is not adequately controlled with topical prescription therapies or when those therapies are not advisable. DUPIXENT can be used with or without topical corticosteroids.

Asthma: as an add-on maintenance treatment of adult and pediatric patients aged 6 years and older with

Common side effects of Dupixent include:

- injection site reactions,
- pink eye (conjunctivitis),
- swollen or puffy eyelids,
- oral herpes,
- inflammation of the cornea (keratitis),
- eye itching,
- other herpes simplex virus infection, and.
- dry eye.

VKC vs. AKC



- VKC young under 12, AKC 2nd -5th decade
- VKC upper papillae, AKC mostly lower
- AKC more chronic, VKC more self limiting
- AKC lid involvement

Vernal

Environmental allergens may incite an acute exacerbation. Most commonly present during the springtime with the associated increase in pollen. Increased presence in hot and dry environments with a decrease in inflammation and symptoms during the winter months.

Atopic

Genetic predisposition to atopic reactions with comorbid asthma and atopic dermatitis commonly present. Increased risk with positive family history. Environmental allergens may cause an acute exacerbation as well. No changes with seasons.

Contact Dermatitis

- Periorbital rash, dry, scaly skin, possible lid edema
- Itch, may have mild watery discharge
 - Ask about recent lifestyle changes (usually skin reaction to topical irritants, eye drops, cosmetics, moisturizing lotion, etc.)
 - Ask about skin allergies
 - H/O eczema ?



Treatment Options



- Topical steroids: Lotemax, FML ointment for lids
- 1 % OTC Hydrocortisone cream **outside** eyelids and periorbital area
 - Careful with long term use: possible derm thinning and depigmentation)
- Oral antihistamines
- Consider oral steroids for significant allergic reactions



Case

68 year old female c/o constant itch OU x 6 months

No medical history

No known allergies

Vision 20/20 OD, OS

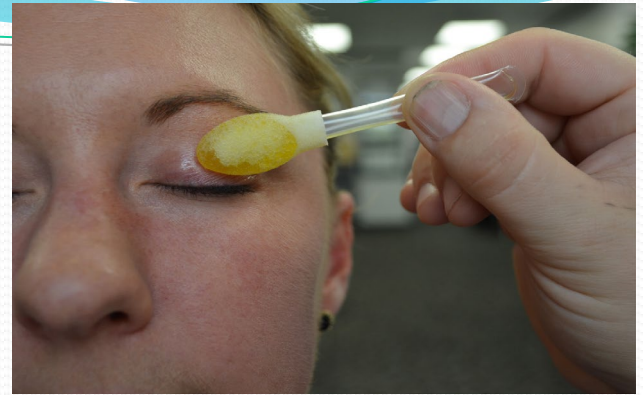
Pupils, EOMS normal

Slit lamp exam...

Lids/Lashes



Treatment: Tea tree oil



Anesthetic drops

Cleanse eyelids and eyelashes with lid scrub

Apply tea tree oil to outside closed upper eyelid margins
x 3 minutes

Remove collarettes from the eyelid and eyelashes with
BlephBrush

Remove oil with lid wipe and saline irrigation

She calls me the next day...



How would you treat?

- A. Cool compresses
- B. Oral antihistamine
- C. Topical 1% hydrocortisone cream
- D. All of the above

Summary Allergies

- The eye can be involved in many different types of allergies (local and systemic).
- There are many treatment options available- both topical and oral.
- Co-management with pediatrician, allergist, dermatologist is important. Communication is important- write letters with your findings!

Thank you

Questions?

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