

Anterior Segment Disease Interactive Grand Rounds

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Case History

- **58 y.o. female**
- **CC: “red painful eye”**
- **Tearing**
- **F.B. Sensation**

Diagnosis?

- A. Herpes Simplex keratitis
- B. Infectious keratitis
- C. Recurrent erosion
- D. Sterile Infiltrate

87% of all recurrent erosion occurs
in what region of the cornea?

- Superior Cornea
- Central cornea
- Inferior Cornea
- Exposure areas of 3:00 and 9:00

**87% of all RCE occurs in
what part of the cornea?**

- _____

- Reidy JJ, Pauli MP et al. *Cornea* 2000 Nov.

Additional testing:

- Weck cell sponge test (Merocil spear)

Diagnosis:

- ***Recurrent Erosion Syndrome***

For how long should hyperosmotic ointments be maintained?

- 1 week
- 6 weeks
- 2-4 weeks
- Until resolution of RCE symptoms

Treatment:

- **Daytime meds?**
- **What about hyperosmotic drops?**
- **Artificial tears PRN**

Which of the following should be avoided in the treatment of RCE?

- Hyperosmotic ointments
- Steroid Drops
- Tetracyclines
- Lubricating ointments

Treatment:

- **What medications should be avoided?**
- **Bland Artificial Tear Ointments**
- *Eke T et al Recurrent symptoms following traumatic corneal abrasion Eye 1999 June*

Alternative Treatments:

- Steroids such as Lotemax T.I.D.
- P.O. Tetracycline
 - *Doxycycline 100 mg bid x 2 months*
 - *Dursun D. et al. Treatment of recalcitrant recurrent corneal erosions with inhibitors of matrix metalloproteinase-9 doxycycline and corticosteroids Ophthal 2001 July*

Cause of Sliding Epithelium?

- **Metalloproteinases which cleave Bowman's layer below the anchoring system (Hemidesmosomes)**
- **Develop through the production of Leukotrienes**

Options for Recalcitrant Cases:

- Bandage contact lens (non-ionic)
- Stromal Puncture
- Phototherapeutic Keratectomy (PTK)

What condition should we be highly suspicious for in cases of RCE without previous trauma?

- Age related macular degeneration
- Fuch's Dystrophy
- Blepharitis or other inflammatory lid disease
- Anterior membrane dystrophy or epithelial basement membrane dystrophy (EBMD)

46% of all patients in this study had EBMD

- James Reidy et al. Recurrent erosions of the cornea: epidemiology and treatment. *Cornea* 2000 Nov; 19(6):767-71
- The remainder had trauma induced causes
 - *Fingernail*
 - *Paper cut etc.*

Case 2

- 34 y.o. male - professional golf instructor
- CC: Burning and can't go outside because cannot keep eyes open
- "burns, stings and itches"
- People think I have pink-eye and stay away
- Has been going on for "years" just much worse this winter

SLEx

- 2+ conjunctival injection and edema
- Periorbital redness, dry skin and crusting
- Corneal neovascularization superiorly approx. 3-4mm of encroachment
- AC: D&Q
- Lens clear
- Retina: NAP

Allergic Eye Disease

Incidence

- Up to 30% of the US population suffer from some form of allergy!
- Allergies are the 6th leading cause of chronic disease in the US
- 3.5 Million lost work days each year
- Over \$6 Billion spent on prescription medications

Allergies

- A systemic condition
- An immune response to naturally occurring substances
- Can be severe and life threatening
 - e.g. anaphylaxis

Allergic Eye Disease

- _____
 - _____
 - _____
 - _____
- _____
- All Type I hypersensitivity reactions

Atopic keratoconjunctivitis (AKC)

- Chronic and potentially severe
- Can be sight threatening

AKC - Clinical Diagnosis

- Conjunctivitis may be cicatrizing (scarring, hypertrophy)
- Swollen eczematous periorbital skin
- Superficial punctate keratitis
- Superficial corneal infiltrates
- Keratoconus
- Anterior polar cataracts

Atopic keratoconjunctivitis

- Strong family history of Atopic disease (eczema etc.)

AKC immunology

- Persistent state of mast cells
- High concentration of eosinophils
- Lymphocyte activation

AKC Treatment

- Mast cell stabilizers (Alocril, Alamast)
- New site-specific steroids (Loteprednol 0.5%)

AKC- Treatment

- Chronic Redness, Itching and irritation
- Multiple problems
 - Blepharitis
 - Keratoconjunctivitis Sicca
 - Atopic dermatitis
 - Eczema of eyelids and periorbital tissue
 - Ocular allergic response

AKC Treatment: Blepharitis

- Hot compresses
- Lid hygiene (avoid lid scrubs*)
 - Hot compresses
- P.O. Doxycycline 100mg bid x 2-4 weeks

AKC Treatment: KCS

- Preservative-Free Artificial Tears
- Ointments HS
- Punctal Occlusion?
 - Perhaps after inflammation is under control

AKC Treatment: Atopic Dermatitis & Eczema

- 1% hydrocortisone cream after a non-drying soap (Dove)
- Unscented lubricant creams (Eucerin)
- Best option?
- Elidel bid (pimecrolimus 1%)

AKC Treatment: Allergic Component

- Known to have an abnormality of the T-lymphocytes (Anti-inflammatory Meds)
- Mast cells play a significant role in multiple sensitivities (Mast cell stabilizers)
- P.O. Antihistamines (Claritin, Allegra, Clarinex)

AKC Treatment: Allergic Component

- Corneal Integrity Damage?
- Protect with topical antibiotics (Quixin, Ocuflax, or Polytrim)
 - Avoid highly preserved antibiotics (BAK, EDTA)
- Vascularization present?
- Pulsed Steroid Drops (Alrex or Lotemax)

Vernal keratoconjunctivitis

- Most commonly affects?
 - _____
 - _____
 - Another visually threatening type of the allergic eye disease

Vernal keratoconjunctivitis

- Two Sub-types:
 - Palpebral
 - Limbal

VKC - Clinical Diagnosis

- Presents in early spring - lasts until fall
- Seen in children, predominately boys
 - 4-18 years old
- Increased levels of superficial Mast Cells, Eosinophils and Lymphocytes
- Intense itching
- Tearing
- Hot, tight, sensitive feeling to eyes
- Photophobia*

VKC - Clinical Diagnosis

- Pseudo-ptosis
- Change in curvature
- Conjunctival injection
- Neovascularization
- Large, non-uniform cobblestone papillae
- Shield ulcers
- Limbal bumps
- Trantas dots

Vernal keratoconjunctivitis

- Common presenting signs:
 - Cobblestone-like papillae
 - Thick, ropy, mucous discharge
 - Horner-Trantas dots

Eosinophils

Eosinophil levels are not increased in patients with seasonal allergic conjunctivitis^{1,2}

VKC: Immunology

- Th2 cells
- H1 and H2 activation (extreme itching - H1)
- Chronic in nature

VKC: Treatment

- Severe itching in young patients leads to severe mechanical trauma (eye rubbing)
- Patanol, Optivar, or Zaditor
- NSAID's: P.O. Aspirin

VKC: Treatment

- Chronic condition:
- Mast cell stabilizers
- Alocril, Alamast (bid)
- Alomide (qid)

VKC: Treatment

- Steroid drops - pulsed to control inflammation
- Lotemax (or Pred Forte in severe cases)
 - qid
 - 2 weeks
- Restasis bid - very effective for shield ulcers

GPC - Clinical Diagnosis

- Associated with contact lenses, ocular prosthetics, exposed sutures, cyanoacrylate adhesive, extruded scleral buckles and ocular FBs
- Decreased contact lens tolerance
- Foreign body sensation
- Lid discomfort upon lens removal
- Increased lens movement

GPC - Clinical Diagnosis

- Mild lid hyperemia
- Thick mucus build-up
- Uniform, flat, papillae/follicles, on upper tarsal plate
- Increased chronic inflammatory cells
- Increase in mast cells and eosinophils
- Histamine levels not elevated

GPC - Immunology

- Increased mast cells
- Increased lymphocytes and inflammatory components (cytokines, leukotrienes, prostaglandins)
- Increased eosinophils

GPC - Treatment

- Early Diagnosis is critical to rapid treatment
- Discontinue offending agent (contact lens) for 1-3 weeks
- Treatment choice:
 - _____

GPC - Treatment

- Severe upper tarsal pathology: Add?
 - _____
- When returning to CL wear consider a different edge design and/or different material

Acute Allergic Conjunctivitis

- Ragweed, pollen, mold
- Higher incidence at certain times of the year
- Perennial allergic conjunctivitis (PAC)
 - All year
 - e.g. animal dander, dust,
 - Indoor allergies

Acute Allergic Conjunctivitis

Signs

- _____
- _____
- _____

SAC: Symptoms

- Itching !!
- Location:
 - Canthal region
 - Limbal region
 - Lid margin
- Also burning & tearing
- Bilateral

SAC Treatment

- All patients should be on:

- _____
- _____

SAC Treatment

- Mild will self treat
- OTC antihistamines
- 20% of patients have SAC
- 50% will try OTC antihistamines
 - e.g. Opcon A or Naphcon A
- Rebound hyperemia

SAC Treatment

- Seasonal Allergic Conjunctivitis every year, same time of year
- Newer mast stabilizers may only require 4-7 days
- Patients are not accustomed to seeing a physician without symptoms

SAC Treatment

- Best medication for anticipating seasonal allergic conjunctivitis?
- Mast-cell stabilizers b.i.d. 1-2 weeks and throughout allergy season
 - Alocril (bid), Alamast (bid)

SAC Treatment

- ACUTE Seasonal Allergic Conjunctivitis
 - Most common presenting patient
 - Treatment decision depends on signs & symptoms

SAC Treatment

- SIGNS
- mild to moderate hyperemia and edema
- _____

Histamine Release

- Stimulation of the H1 receptor - _____
- Stimulation of the H2 receptor - _____

SAC Treatment

- SIGNS
- moderate to severe erythema and edema
- Steroid drops t.i.d. x 2 weeks
 - Alrex 0.2% (perhaps Lotemax 0.5% in moderate/severe cases)

Arachidonic Acid's Role

- Crosslinking of membrane bound IgE molecules
- Activation of A2
- Release and metabolism of arachidonic acid

Arachidonic Acid's Role

- Release of:
 - prostaglandins (cyclooxygenase)
 - Leukotrienes (lipoxygenase)
 - Platelet activating factor (PAF)

Treatment Categories

- SYMPTOMS
- “Affecting daily activities or lifestyle”
 - I.e can't work
- Steroid drops t.i.d. x 2 weeks
 - Alrex 0.2% (perhaps Lotemax 0.5% in severe cases)

Loteprednol

- M. Abelson
- 66 patients on Loteprednol 0.5% for 35 days for allergic conjunctivitis
- Percentage of patients with an increase in IOP?
- 0%

Potential Ocular Steroid Risks

- Increased IOP
- Posterior Subcapsular Cataracts
- Increased Susceptibility to Infections

Loteprednol 0.2% Safety Study

- Loteprednol Etabone 0.2% used for Seasonal & Perennial Allergic Conjunctivitis
- Administered under a University of South Florida College of Medicine IRB
- 3 Study Locations
 - 1 study site in Mississippi
 - 2 study sites in New Jersey
- 397 pts reviewed
- 159 pts had used loteprednol etabonate 0.2% for more than 1 year (QD to QID); 106 pts 2-3 years
- Ages 8 to 92 (mean age 58)

Loteprednol 0.2% Safety Study

- RESULTS
 - No patients developed PSCs
 - No patient had worsening of all-ready existing cataracts
 - No reported secondary infectious disease
 - No patient developed a clinically significant increase in IOP

Loteprednol Etabonate 0.2% Safety Related to Chemical Structure

- Loteprednol etabonate 0.2% similar to prednisolone
- Molecular difference:
 - *Ketone* steroids remain in anterior chamber and can influence IOP & cataract formation
 - *Post breakdown, ketone metabolites are still active*
 - *Ketone* group in prednisolone is replaced by an *Ester* group in loteprednol
 - *Ester* group causes the molecule to be hydrolyzed by tissue esterases to become an inactive metabolite.

Ester vs. Ketone Steroids

- *Ester Steroids* are inactivated by naturally occurring esterases
 - less side effects
- *Ketone Steroids* are not inactivated and have propensity to remain in anterior chamber post breakdown as active metabolites

Ester vs. Ketone Steroids

Loteprednol	→	ester steroid
Prednisolone	→	ketone steroid
Fluorometholone		
Dexamethasone		
Medrysone		
Rimexolone		

SAC Treatment

- Category III - Significant Systemic Involvement
- Rhinitis, itchy throat, cough, sinus congestion
- Add Oral medications to topical regimen
- Consider consult with allergist depending on severity, duration and recurrence rates

SAC Systemic Treatment

- P.O. Claritin, Allegra or Clarinex qd
- If sinus congestion is present:
 - P.O. Claritin-D 24-hr or Allegra-D 24 hr - qd
- Contains Pseudoephedrine

Non-sedating does not mean non-drying!

- Not recommended with ocular signs/symptoms present only or significant dry eye
- Maintain or increase preservative-free artificial tears
- Can exacerbate the condition

SAC Treatment

- Consider nala inhalers
 - Antihistamine
 - Astelin bid
 - Steroid
 - Beconase, Flonase, Vancenase
 - bid
 - Crolool sodium OTC
 - Poor systemic absorption - few side effects

Systemic Treatment

- Potentially the most effective treatment for chronic disease:

- _____

Allergic Pearls

- Avoid eye rubbing
 - Mechanical mast cell degranulation
- Refrigerate drops
 - Soothing and effective

Allergic Pearls

- Contact lens use?
- Depends on:
 - severity and contributing factors
 - Evert lid:
 - papillae
 - hyperemia

Case History: 63.y.o. caucasian female presenting with blurred vision

BCVA: 20/40+

What else would you ask?

What other tests would you perform?

Fuch's Dystrophy

- Female > Male
- Loss of endothelial cells
- May be secondary to other factors:
 - Cataract Surgery stain on compromised endothelium
 - AC IOL's (Pseudophakic Bullous Keratopathy)

Fuch's Dystrophy: Testing

- Vision affected at what time of the day?

- Slit lamp exam to note:
 - Guttata grading
 - Discoloration of cornea ("Beaten Bronze")

Fuch's Dystrophy: Testing

- Pachymetry: > _____
- Specular microscopy

Fuch's Dystrophy: Treatment

- Hyperosmotic Ung and Drops:
 - Muro 128- 5% ung
 - Muro 128- 2% sol
- Avoid? _____

New Surgical Options

Deep Lamellar Endothelial Keratoplasty

- Eliminate corneal sutures
- Eliminate corneal surface incisions
 - Faster wound healing
 - Smoother topography
 - Stronger and more stable eye.

Deep Lamellar Endothelial keratoplasty Indications

- Fuch's
- PBK - better to do a double
- Other endothelial dystrophies
 - ICE syndromes

Deep Lamellar Endothelial Keratoplasty (DLEK)

- Remove only diseased endothelium vs. removing entire cornea (PKP)
- 9mm limbal incision - scleral tunnel
- Creates a deep lamellar corneal pocket
- No surface incisions or sutures!

Deep Lamellar Endothelial Keratoplasty (DLEK)

- Excise 7.5 - 8.0 mm of diseased tissue
- Replace with healthy donor endothelium
- Temporary air bubble to maintain placement
- Pump function maintains as does natural adherence properties of cornea

Deep Lamellar Endothelial Keratoplasty (DLEK)

- Rapid recovery
- No induced cylinder
- No incisions or sutures
- Only complication noted in any clinical studies was a microperforation and the patient had a PKP

Cataract Patient with Fuch's

- Consider a triple when:
 - Patient has symptoms of blurred vision in the morning with:
 - Pachs over 600 or
 - Failed cornea after phaco in first eye

Thank You

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