Anterior Segment Grand Rounds

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Eye Care and the Emergency Department

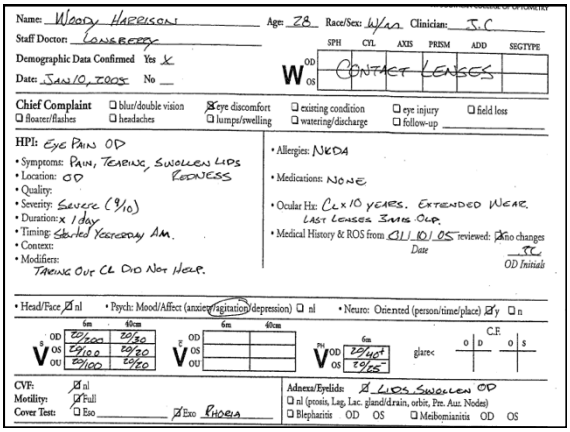
Eye Care and the Emergency Department

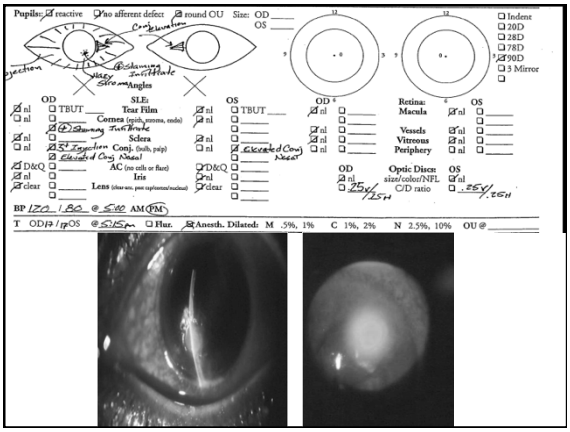
- Non-injury related ocular ER visits comprised 91% of ocular-related visits[7]
- Only 3% of ocular-related ER visits required hospitalization[7]
- **75% of the time**, there was a **clinically significant change in the diagnosis** when care was first delivered at the ED or PCP and then followed up by a visit to an eye care specialist

Distribution of clinical conditions associated with ocular related non-urgent ER visits

Condition	Percent of Non-Urgent Visits (%)
Conjunctivitis, unspecified	46.7
Blepharoconjunctivitis	6.3
Severe Allergic Conjunctivitis	6.2
Atopic Conjunctivitis	4.7
Hemorrhagic Conjunctivitis	4.1
Hordeolum	3
Blepharitis, unspecified	2.7
Disorders of the Optic Nerve	1.8
Myiasis	1.5
Chalazion	1.5

7. Erin A.Nash and Curtis E. Margo, "Patterns of Emergency Department Visits for Disorders of the Eye and Ocular Adnexa," Archives of Ophthalmology, volume 116, September 1998, pp. 1222 - 1226.
8. Hau S, Ioannidis A, Masaoutis P, Verma S. Patterns of ophthalmological complaints presenting to a dedicated ophthalmic Accident & Emergency department: inappropriate use and patients' perspective. Emerg Med J. 2008 Nov;25(11):740-4.





Corneal Ulcers

- Infective bacterial and fungal corneal lesions cause severe pain and loss of vision
- Signs and Symptoms:
  - Pain, photophobia, tearing
  - Mucopurulent discharge with generalized conjunctival injection
  - Decreased VA (esp if on visual axis)
  - Possible AC reaction and hypopyon
  - Dense infiltrate
  - Satellite lesions around main lesion may indicate fungal infection

Associated Factors

- Contact lens wear, especially soft and extended wear lens
- Recent history of corneal trauma
- Topical steroid use
- History of exposure to vegetative matter (fungal etiology)

When to culture?

- 1,2,3 Rule:
  - 1 mm from visual axis
  - 2 infiltrates (or more)
  - 3mm or greater in size
  - Nosocomial infections
  - Immuno-compromised patient
  - Post-surgical

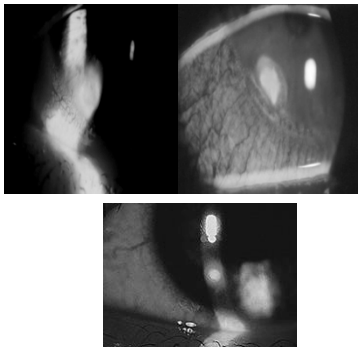
Sterile vs Infectious Infiltrates

Sterile Infiltrates vs. Infectious Infiltrates

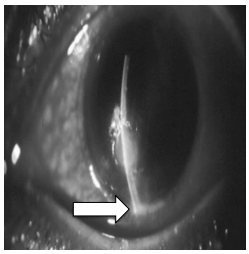
Sterile Infiltrates	Infectious Infiltrates (MK)
Smaller lesion (< 1mm)	Larger lesion (> 1mm)
More peripheral	More central
Minimal epithelial damage (Defect size compared to underlying infiltrate)	Significant epithelial defect (Size of staining defect closely mirrors size of underlying stromal lesion)
No mucous discharge	Mucopurulent discharge
Less pain and photophobia	Pain and photophobia
Little to no anterior chamber reaction	Anterior chamber reaction
No lid involvement	Lid edema

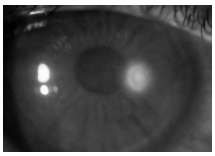
Source: Stein RM, Clinch TE, Cohen EJ, et al. Infected vs. sterile corneal infiltrates in contact lens wearers. Am J Ophthalmol 1988 Jun 15;105(6):632-6.

Peripheral (Sterile) Corneal Ulcer



Infectious Corneal Ulcer





Corneal Ulcers

- The Steroids for Corneal Ulcers Trial (SCUT)
- Conclusions:
  - no overall difference in 3-month BSCVA and no safety concerns with adjunctive corticosteroid therapy for bacterial corneal ulcers
  - researchers did find significant vision improvement for one specific subgroup of the study by using steroid therapy on patients with severe ulcers
- Application to Clinical Practice:
  - Adjunctive topical corticosteroid use does not improve 3-month vision in patients with bacterial corneal ulcers unless in the severe category

Management

- Infective ulcers need to be cultured!
- If contact lens wearer, consider culture of contact lens
- Intensive topical antibiotic regimen, consider fortified preparations, subconjunctival injections.
  - loading dose of Gati/Moxi/Besivance 2gtts q 15 min x 1 hour,
  - 1gt q 30 min x 6 hours,
  - 1 gt q 1 hr until f/u in 24 hours.

Pseudomonas case report

"Doxycycline as an adjunctive therapy…may help to stabilize corneal breakdown and prevent subsequent perforation."

AM. McElvanney

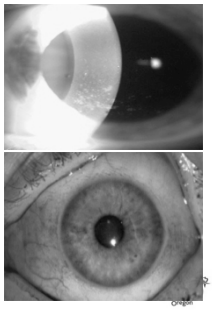
750

Case

- 55 yr white female complains of fluctuating vision
  - Worse at near
  - Spends 8-10 hours/day on the computer
- Medical Hx:
  - Hypertension for 10 years
  - Joint pain
- Medications:
  - HCTZ for HTN
  - Celebrex for her joint pain

Exam Data

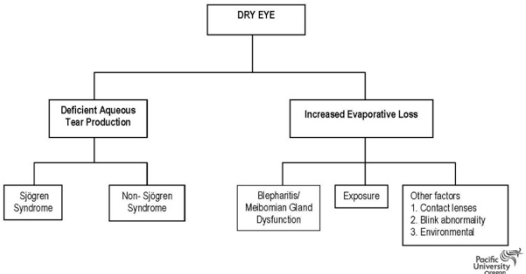
- VA (corrected): OD: 20/25, OS: 20/25
- PERRL
- EOM's: FROM
- CVF: FTFC
- SLE:
  - TBUT 5 sec OD, OS
  - Positive NaFl staining and Lissamine green staining of conj and cornea
  - Decreased tear prism



Additional Testing/Questions

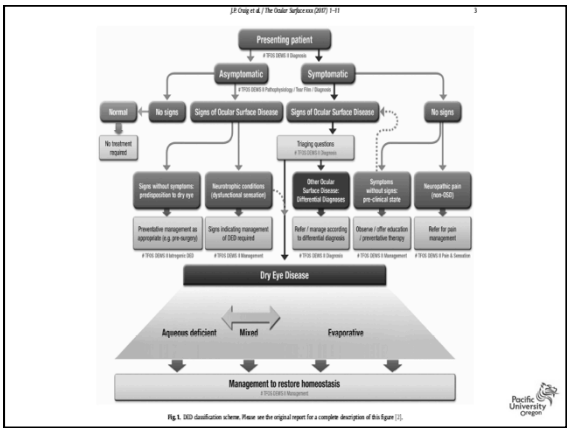
- Schirmer: < 5 mm of wetting in 5 minutes OD, OS
- RF and ANA: normal for patients age
- SS-A: 2.0 (normal < 1.0), SS-B: 1.9 (normal <1.0)
- Additional symptoms reported:
  - Patient experiences dry mouth and taking Salagen
- **Diagnosis: Sjogren's Syndrome**

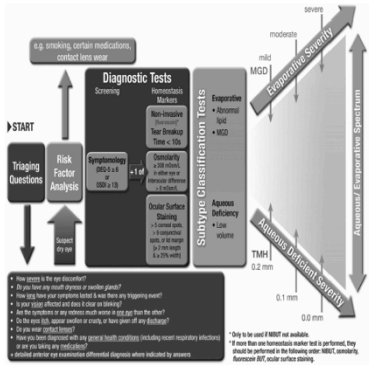
Differential Diagnosis of Dry Eye



DEWS II DED Definition

"Dry eye is a multifactorial disease of the ocular surface characterized by a loss of homeostasis of the tear film, and accompanied by ocular symptoms, in which tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities play etiological roles."





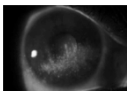
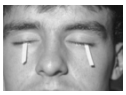
Signs and Symptoms of Dry Eye

Signs:

- Ocular Surface Damage
  - Corneal Staining (Fluorescein and/or Rose Bengal)
  - Conjunctival Staining (Lissamine Green)
- Decreased Tear Quantity
  - Schirmer Score
  - Phenol Red Thread Test
  - Tear Meniscus Height
- Decreased Tear Quality
  - Tear Break Up Time (TBUT)
  - Tear Osmolarity

Symptoms:

- Grittiness
- Burning
- Irritation
- Stringy discharge
- Blurring of vision
- Ocular Surface Disease Index (OSDI)


InflammaDry

- Point of care testing to measure MMP-9 levels
  - MMP-9 is an inflammatory biomarker found to be elevated in patients with dry eye
- Marketed by RPS

Treatment

- We initiated:
  - Omega-3 supplements (2 grams per day)
  - Recommended warm compresses and lid washes qhs
  - Testosterone cream 3% applied to upper lid bid
- Patient had significant improvement in symptoms with the use of the topical testosterone cream.
  - However, she was still symptomatic at the end of the day and she still had significant staining on her cornea and conjunctiva
  - Initiated FML tid for 1 month, Restasis bid after 2 weeks
    - 2 months later patient reported further improvement in her symptoms
    - No conjunctival staining was noted and only slight SPK
    - Schirmer values improved to OD: 9 mm, OS: 10 mm

Role of Androgens?

- Recent studies have suggested that androgen deficiency may be the main cause of the meibomian gland dysfunction, tear-film instability and evaporative dry eye seen in Sjogren patients
- Transdermal testosterone 3% promotes increased tear production and meibomian gland secretion, thereby reducing dry eye symptoms (Dr. Charles Connor).
- Progesterone 0.05%/Testosterone 0.05% Ophthalmic Solution BID (local compounding pharmacy?)
- **Topical Testosterone 0.5% drops BID (compounding pharmacy)**

Sjogrens

- Chronic AI disease that involves diffuse exocrine gland dysfunction and lymphocytic infiltration throughout the body
- Decreased lacrimal gland secretion results in K sicca
- Decreased salivary gland secretion results in sicca complex
- Emotional tearing is not affected

SJOGREN'S SYNDROME: OLD/NEW CLASSIFICATION

- Old:
  - 1º Sjogrens: occurs when sicca complex manifests by itself
    - no systemic disease present
  - 2º Sjogrens: occurs in association with collagen vascular disease such as
    - RA and SLE
    - significant ocular/systemic manifestations
- New:
  - The diagnosis of SS should be given to all who fulfill the new criteria while also diagnosing any concurrent organ-specific or multiorgan autoimmune diseases, without distinguishing as primary or secondary.

Sjogren's Ocular and Systemic

- Recently published article comments:
  - all patients had dry eye symptoms for approximately 10.4 years before presentation
  - 42% of the patients had systemic manifestations resulting from primary SS
  - **SS has been shown to be an independent risk factor for the development of non-Hodgkin' s lymphoma.**

Sjogren's Ocular and Systemic

- Authors recommendation:
  - primary SS is associated with vision- and life-threatening complications
  - presence of SS needs to be explored in patients with clinically significant dry eye because dry eye precedes the occurrence of the systemic manifestations

Dry Eye Summit

- Held in December 2014
  - Combination of optometrists, an ophthalmologist and industry
- Goal:
  - to find a way to encourage optometrists to look for, diagnose and manage dry eye in their patients
  - Come to a consensus on the minimum:
    - 3 questions that should be asked to identify dry eye patients
    - 3 diagnostic tests
    - 3 initial treatments

REV. as of March 13, 2015

Consensus on Screening Questions

1. Do your eyes ever feel dry or uncomfortable?
2. Are you bothered by changes in your vision throughout the day?
3. Are you ever bothered by red eyes?
4. Do you ever use or feel the need to use drops?

Recommendations from the ***Dry Eye Summit 2014***

Consensus on Baseline Diagnostic Options for Entry Level Dry Eye Disease

1. The lid
2. Staining
3. Tear stability

REV. as of March 13, 2015

Recommendations from the ***Dry Eye Summit 2014***

Consensus on Baseline Management

REV. as of March 13, 2015

1. For all patients:
   A. Ocular lubrication
   B. Lid hygiene
   C. Nutrition
2. Topical anti-inflammatories

Recommendations from the ***Dry Eye Summit 2014***

DREAM Study

- In a multicenter, double-blind clinical trial, we randomly assigned patients with moderate-to-severe dry eye disease to receive a daily oral dose of 3000 mg of fish-derived n−3 eicosapentaenoic and docosahexaenoic acids (active supplement group) or an olive oil placebo (placebo group).
- "The results of the DREAM study do not support use of omega-3 supplements for patients with moderate to severe dry eye disease"

DREAM Study

- In DREAM, most dry eye symptoms and signs appear to improve in both arms.
- In each trial group, there was a meaningful statistical change between baseline and 12 months (with time as a continuous variable) in the conjunctival staining score, the corneal staining score and the tear break-up time

Treatment of MGD

At Home Therapy
- Warm compresses
- Eyelid Scrubs
- Self expression

Low Compliance

In-Office Therapy
- Manual Expression
- Off-Label Pharmacotherapy
  - Oral tetracycline/doxycycline ***-systemic side effects***
  - Topical Antibiotics – erythro., tobra. ***-antibiotic resistance, poor gland penetrance***
  - Topical Steroids – dexamethasone ***-risk of cataract, glaucoma, poor gland penetrance***

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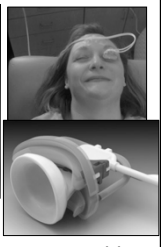
TEARSCIENCE® SOLUTION

LipiView® OSI

LipiFlow® Auto

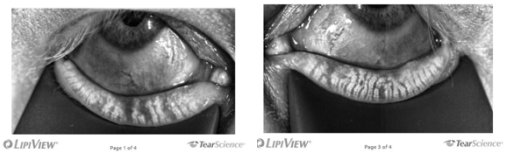


Disposable

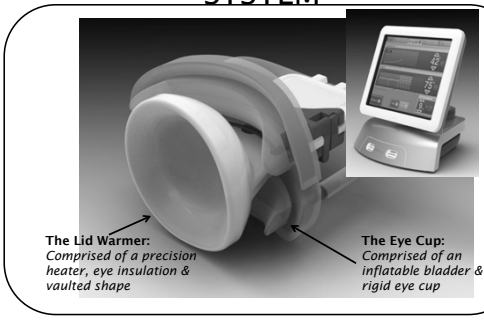
Meibomian Gland Evaluator

Caution: Investigational device. The LipiFlow Auto Console pictured is not approved for use in the U.S. Limited by United States law to investigational use.

LipiView



LIPIFLOW® THERMAL PULSATION SYSTEM



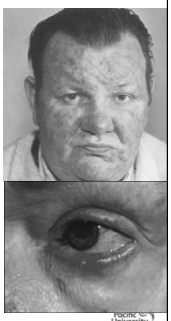
Caution: Investigational device. The LipiFlow Auto Console pictured (inset) is not approved for use in the U.S. Limited by United States law to investigational use.

Lifitegrast (Xiidra)

- Lifitegrast 5% (Xiidra) from Shire Pharmaceuticals approved by the FDA on July 11th, 2016
- indicated for the treatment of both signs and symptoms of dry eye disease
- Lifitegrast inhibits T-cell mediated inflammation associated with dry eye disease at several different points in the inflammatory cascade
- The most common side effects included irritation at the instillation site, dysgeusia and reduced visual acuity, reported in 5% to 25% of patients.

Acne Rosacea

- Acne rosacea:
  - affects females>males after 30 with peak incidence 4-7th decade of Celtic/Northern European descent. Males more disfigured.
- 4 subtypes with classic signs of flushing, papules or pustules usually in crops, telangiectasia.
  - secondary ocular complications (85% of patients) and often precede other skin manifestations include erythema, itching and burning.

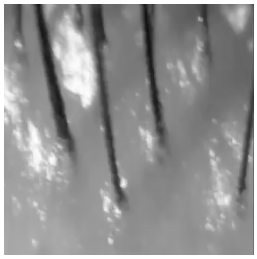


Acne Rosacea and Demodex

- Demodex is a natural part of human microbiome
- *Demodex folliculorum* live in hair follicles, primarily on the face, as well as in the meibomian glands of the eyelids;
- *Demodex brevis* live in the sebaceous glands of the skin.

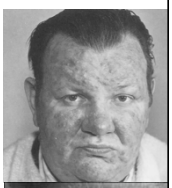
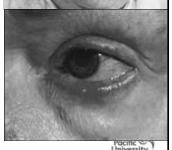
Acne Rosacea and Demodex

- *Demodex folliculorum* frequently occur in greater numbers in those with rosacea and this overabundance is thought to trigger an immune response or possibly certain bacteria associated with the Demodex



Acne Rosacea

- Mainstay oral Tx is **Oracea (40 mg** in morning) or
  - **doxycycline 50 mg po** or minocycline 100 mg po for 4-12 wks.
  - **NOTE: Oracea is subantimicrobial therapy**
  - **May want to consider Tea Tree oil wipes/ foam for the face and lids to try and reduce the role Demodex plays**

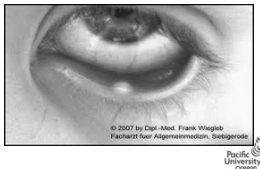
Acne Rosacea Treatments

Oral Antibiotics	Topical Treatments	Non-Prescription
Erythromycin	metronidazole (Metrogel)	Rosacea-Ltd III
Tetracycline	BenzaClin (Clindamycin 1% & benzoyl peroxide 5%)	ZenMed
Doxycycline	BenzaMycin (Erythromycin 3% & benzoyl peroxide 5%)	Neova Therapy
Minocycline	tretinoin (Retin-A)	Kinerase
	Clindamycin 1% lotion/gel	Rosacare
	Plexion Cleanser/Lotion (Sulfa 10% & sulfur 5%)	

www.internationalrosaceafoundation.org

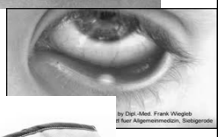
Hordeola

- Acute purulent inflammation
  - Internal occurs due to obstruction of MG
  - External (stye) from infection of the follicle of a cilium and the adjacent glands of Zeiss or Moll
- Painful edema and erythema,

Hordeola

- Typically caused by Staph and often associated with blepharitis
- Treatment includes:
  - hot compresses (e.g. Bruder)
  - topical antibiotics (?)
  - possibly systemic antibiotics
    - Augmentin 500 mg bid-tid
    - Doxycycline 100 mg bid
- Treat concurrent blepharitis

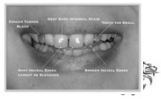




Tetracyclines

- This group includes:
  - Tetracycline (250mg - 500 mg cap BID-QID) needs to be taken 1 hour before or 2 hours after a meal.
  - Minocycline (100 mg cap BID)
  - **Doxycycline (20mg - 100 mg cap or tab BID)**
    - **In Canada: Apprilon (30 mg doxy + 10 mg slow release doxy)**
- **Rules of Thumb with Doxy:**
  - **Do not take before lying down (>2 hours before)**
  - **Do not take with calcium and avoid antacids**
  - **Do not take with dairy**
  - **Do take with food**

Side Effects of Tetracyclines

- Side effects include gastric discomfort, phototoxicity, effects on calcified tissues, vestibular problems, pseudotumor.
- Pregnancy Category D.
  - Tetracyclines are attracted to embryonic and growing bone tissue.
    - Depress growth of long bones in pregnant women/children.
    - Cause changes in both deciduous and permanent teeth during the time of tooth development (Includes discoloration and increased cavities)
- Contraindicated in:
  - Women in the last half of pregnancy
  - Lactating women
  - Children under 8 years of age



30 YR WM

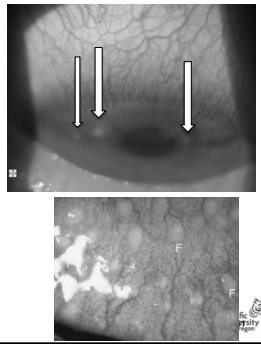
- Patient calls from his PCP office asking if we can see him today because he has had red/painful eyes for over a week and has not resolved
- Medical history:
  - Past week has been experiencing painful urination and discharge
  - New sexual partner apprx 10 days ago, who also had developed a red eye
  - Chlamydia and gonorrhea testing were negative
  - Has tested positive for HSV2 but no current flare up

30 YO WM

- Medications:
  - In the past week patient:
    - 2 courses of azythromycin (1 gram each)
    - Injection of rocephin
    - Injection of penicillin G
    - Currently taking doxycycline 100 mg bid
    - Valtrex 1 gram 3 times per day for 7 days (d/c 1 day ago)
    - Was on Vigamox qid for 7 days (d/c 1 day ago)
- VA: 6/7.5 (20/25) OD, OS
- Entrance skills unremarkable though some pain on eye movement

30 YO WM

- SLE:
  - 2+ injection conjunctival both eyes
  - 1-2+ lid edema
  - Mixed papillary and follicular response
  - 1-2+ diffuse SPK (no staining noted above infiltrates)
  - No cells or flare noted



30 YO WM

- AdenoPlus:
  - Performed on the right eye (patient felt that was the worst eye)
  - Negative

30 YO WM

- Started patient on the miracle drop
  - Tobradex 4 times per day and scheduled patient to come back the next day
- 1 day f/u
  - Patient was feeling better
  - Less redness and much reduced photophobia and discomfort
  - No improvement on painful urination or discharge and is now seeing blood in his urine
  - Continue tobradex 4 times per day and RTC in 4 days for f/u with dilation and told to contact PCP to update on the blood in the urine

30 YO WM

- 4 day f/u:
  - Patient says his eyes are doing great and that all of his urogenital problems abruptly stopped on Saturday
  - Discussion with PCP: Kidney stone
  - What was going on with the eye?
    - Viral conjunctivitis likely EKC

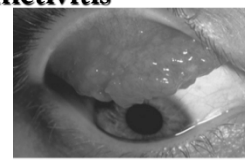
What did we learn from this?

Case

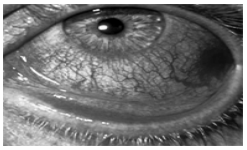
- 27 year old pharmacy student presents to the clinic on emergent basis
  - complains about red/painful eyes for the past 2 days
  - started OD then transferred to OS
  - reports a watery discharge, no itching, and is not a contact lens wearer
  - reports that others in his class have had a similar red eye
  - no seasonal, food or drug allergies
  - has taken Visine 4-5 times/day since eyes became red but hasn't helped much

Conjunctivitis

Bacterial Conjunctivitis



Allergic Conjunctivitis

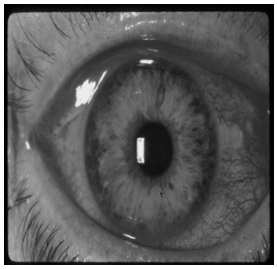


Viral Conjunctivitis

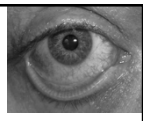
Blepharo-conjunctivitis

Viral Conjunctivitis

- Most common infectious keratitis presenting on emergent basis
- 62% caused by adenovirus
- Two major types:
  - Pharyngoconjunctival fever (PCF)
  - Epidemic keratoconjunctivitis (EKC)

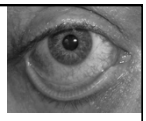


Viral Conjunctivitis



- PCF: history of recent/current upper respiratory infection
  - classic triad of fever, pharyngitis, and acute follicular conjunctivitis.
  - occurs more commonly in children, is caused by serotypes 3 and 7, and is spread by respiratory secretions.
  - tearing and foreign body sensation that is initially unilateral.

Viral Conjunctivitis



- PCF:
- corneal involvement is not a key feature, there is occasionally a punctate keratitis;
- SEIs are rare.
- self-limiting condition that varies in severity and may last from 4 days to 2 weeks
- Treatment if symptomatic though topical steroids are rarely needed.

Viral Conjunctivitis

- EKC: highly contagious with a history of coming in contact with someone having a red eye.
  - Adenovirus 8 common variant leading to "rule of 8's"
    - First 8 days red eye with fine SPK
    - Next 8 days deeper focal epithelial lesions
    - Following 8 potential development of infiltrates
    - Resolution
- AdenoPlus available to use for adenoviral confirmation
  - AdenoPlus is currently being marketed and distributed by RPS (as of August 2014)

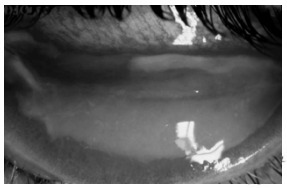
AdenoPlus

- Have you heard about this?

Viral Conjunctivitis: Signs and Symptoms

- Gritty sensation
- Watery discharge
- Sticky in mornings
- *Follicular response*
- Chemosis
- Injection
- SPK
- Infiltrates possible
- Positive lymph nodes

- ***Pseudomembranes in severe cases***
- **Subconjunctival hemes**



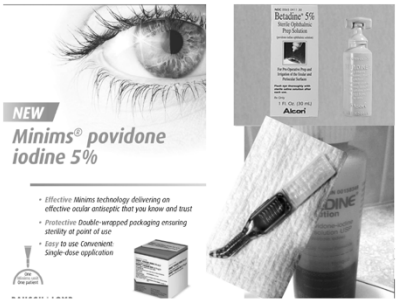
Management

- Consider the use of anti-inflammatory treatment to relieve patient symptoms and improve comfort
  - Alrex QID OU
  - Lotemax QID OU
    - New: Lotemax gel (indicated for post-op cataract but has longer contact time than standard lotemax)
- EKC patients are typically very uncomfortable and would benefit from anti-inflammatory treatment
  - especially if infiltrates or pseudomembrane present

Management

- Betadine (Melton-Thomas Protocol):
  - Proparacaine
  - 4-5 drops of Betadine 5%
    - Get patient to close eye and gently roll them around
  - After one minute, lavage the eye
  - Lotemax 4 times a day for 4 days
- Alternative: Betadine swabsticks.
  - 5% Betadine solution only comes in 30 ml bottles cost $14.00.
  - Case of 200 Betadine swabsticks apprx. 45 dollars.

Available in Canada!



Management

- Antivirals used in HSV keratitis are ineffective in treatment of viral conjunctivitis
  - New Update: in conversation with several colleagues, Zirgan 4-5 times/day has shown significant improvement in patients over a 7-10 time period.
- Important to stress limited contact with others, frequent hand washing, not sharing of towels, etc.

Efficacy of Hospital Germicides against Adenovirus 8, a Common Cause of Epidemic Keratoconjunctivitis in Health Care Facilities. ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, Apr. 2006, p. 1419–1424

An important finding from our study was that of the four disinfectants recommended by the CDC and Association for Professionals in Infection Control and Epidemiology for elimination of adenovirus type 8 from ophthalmic instruments, two **(70% isopropyl alcohol and 3% hydrogen peroxide) were found to be ineffective**. Based on these data, 3% hydrogen peroxide and 70% isopropyl alcohol are not effective against adenovirus that is capable of causing epidemic keratoconjunctivitis and similar viruses and should no longer be used for disinfecting applanation tonometers.

EKC Disinfection

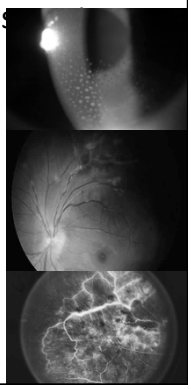
- Commercial grade disinfectants that include compounds such as:
  - peracetic acid,
  - aldehydes [glutaraldehyde and ortho-phthalaldehyde],
  - chlorine-based products [1,900 to 6,000 ppm available free chlorine],
  - ethanol mixed with quaternary ammonium compounds)
- E.g. Cidex, DisCide

Case

- 30 BF presents with eye pain in both eyes for the past several days
  - Severe pain (8/10)
  - Never had eye exam before
- PMHx:
  - Has chronic bronchitis
  - Rash on legs
  - Has recently lost weight and has a fever
  - Taking aspirin for pain

Ocular Health Assess

- VA: 20/30 OD, OS
- Pupils: equally round and reactive
- Visual fields full
- EOM"s: FROM with eye pain in all quadrants
- Anterior segment exam:
  - 3+ injection,
  - 3+ cells and trace flare,
  - deposits on cornea endothelium (see photo)
- Eye pressure: 18, 18 mmHg
- Dilated exam:
  - see attached fundus image and fluorescein angiography.



Classification of Uveitis

- 4 main questions we need answered
  - Where is the inflammation located?
  - Is disease acute or chronic?
  - Granulomatous or non-granulomatous?
  - Unilateral or bilateral?

Classification

- Classification is the key to the proper diagnosis and management of the uveitic patient
- Most common classifications
  - Anterior vs. Intermediate vs. Posterior vs. Panuveitis
  - Acute vs. Chronic/Recurrent
  - Granulomatous vs. Non-granulomatous
  - Infectious vs. Autoimmune

Helpful Mnemonic

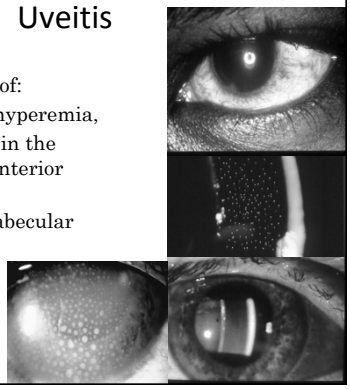
- Mnemonic for acute forms of non-granulomatous uveitis: **BLAIR G**
  - **B**: Behcet's disease
  - **L**: Lyme disease
  - **A**: Ankylosing spondilitis
  - **I**: Inflammatory bowel disease (Crohns)
  - **R**: Reactive arthritis
  - **G**: Glaucomatocyclitic crisis

Uveitis

- The clinical features of anterior uveitis are readily recognizable
  - complaints of:
    - photophobia,
    - pain,
    - blurred or variable vision
- A change in the blood-aqueous barrier results in the liberation of protein and cellular matter into the anterior chamber and the vitreous.

Uveitis

- Clinical findings of:
  - circumlimbal hyperemia,
  - cells and flare in the aqueous and anterior vitreous, and
  - keratic and trabecular precipitates



Uveitis: Treatment

- "Classical treatment":
  - Pred forte: every 1-2 hours, ensure taper
    - Pred forte: prednisolone acetate formulation which allows penetration through cornea to anterior chamber
- Newer treatment option:
  - Durezol

Treatment Options

- Durezol:
  - Difluprednate
    - only difluorinated steroid
  - Steroid emulsion
  - BAK free
  - Increased "potency" so dosing needs to be less than "classical treatment" with Pred Forte
    - rough recommendation is 1/2 dosing of Pred Forte

Cycloplegics

- Common cycloplegic agents include:
  - cyclopentolate 1-2% tid for mild-to-moderate,
  - homatropine 5% BID
  - scopolamine 0.25%
  - atropine 1% bid-tid for moderate-to-severe inflammation
- most common is the use of Homatropine 5% bid
- be careful using atropine as there is potential for severe systemic side effects
  - also makes the iris essentially immobile

Cycloplegics

- Cycloplegia:
  - used for reduction of pain,
  - break/prevent the formation of posterior synechiae
  - also functions in the reduction of inflammation

Treatment

- Topical administration is most common though periocular injections and systemic meds are useful for posterior uveitis and difficult cases
- Dosing is dependent upon severity of the inflammation
  - typically you want to hit the uveitis hard and fast!
    - E.g 1 gtt q 2hrs until the inflammation is gone!
    - If you have a minimal anterior chamber reaction then steroid may not be necessary at all

Treatment

- NOTE: it is crucial to taper your steroid treatment!
  - You will have a rebound inflammation if you simply remove your patient from their steroids…
  - The taper will be dependent upon how long you have had them on the steroid to get rid of the inflammation!
  - Typically, a slow taper is better in order to prevent rebound inflammation
  - If the patient has been on the steroid for less than a week a faster taper can be considered.

Treatment

- NSAIDs:
  - do not play an important role in the treatment of an acute uveitis

Treatment: Additional Therapies

- Immunosuppressive agents (cytotoxic)
  - reserved for sight-threatening uveitis that have not responded to conventional treatment
    - e.g. cyclophosphamide
- Antimetabolites (e.g. methotrexate) have been found useful in JIA related iridocyclitis and scleromalacia
- Cyclosporin has a very specific effect on the immune system and has been found useful in posterior and intermediate uveitis

Follow-up

- Every 1-7 days in acute phase depending upon severity and every 1-6 months when stable.
- On each f/u visit the anterior chamber reaction and IOP should be evaluated
  - DFE should be performed for flare-ups, when VA affected, or every 3-6 months.

Follow Up

- If AC reaction improving, then steroid drops can be slowly tapered.
  - cycloplegia can also be tapered as the AC reaction improves.
  - slow taper recommended for chronic granulomatous uveitis.

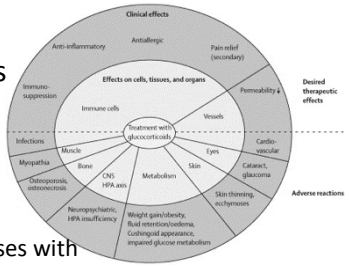
Systemic Corticosteroids

- Often grouped based on duration of action:
  - **Short acting**: Hydrocortisone and Cortisone
  - **Intermediate acting:** Prednisone, Prednisolone, Methylprednisolone, and Triamcinolone
  - **Long acting**: Dexamethasone
- The shorter-acting medications have less effect on the HPA axis.
- Most commonly used oral steroid by Optometrists: **Prednisone**
- Most commonly used IV steroid by Optometrists: **Methylprednisolone**

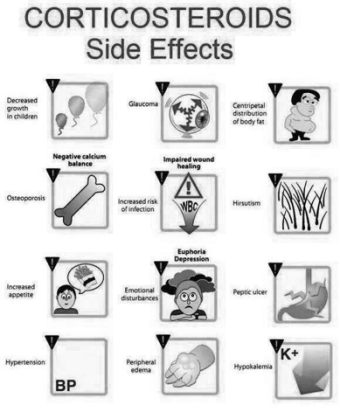
Systemic Corticosteroids

- Prednisone
  - Available as Oral: 1, 2.5, 5, 10, 20, 50 mg tablets and 1 and 5 mg/mL solution and syrup
- Ocular Treatment Guidelines:
  - Mild to Moderate: Initial dose of 20-40 mg
  - Moderate to Severe: 40 – 60 mg
  - Severe: Begin with 60 mg and increase if necessary
  - Specific Conditions: Giant Cell Arteritis
    - 80-100 mg Prednisone
    - Consider IV Methylprednisolone 250 mg IV q6hours for 12 doses

Side Effects of Systemic Corticosteroids



- Incidence increases with long-term high-dose therapy.
- Length of use has greater link to developing side effects than dosage amount.



Side Effects of Systemic Steroids

- Metabolic Effects:
  - HYPERglycemia can occur
  - Increased appetite, Weight Gain, and Redistribution of fat
  - Decreased calcium absorption – leads to Osteoporosis
  - Hyperlipidemia
- Mineralocorticoid Effects:
  - Fluid Retention (Increased Sodium Retention)
  - Hypertension
  - Edema (If liver/kidneys can't keep up)
- CNS Symptoms: Euphoria, Insomnia, Psychoses, Depression, and Restlessness

Side Effects of Systemic Steroids

- Additional Side Effects:
  - Activation of Infections
  - Peptic Ulcers
    - Steroids Inhibit the COX 1 Enzyme that protects the stomach lining.
  - Increased body hair and acne
  - Inhibition of growth in children

Therapy Considerations

- Diabetics
  - Educate all Type 2 Diabetics that their BS will likely become elevated.
  - Educate all Type 1 Diabetics they may need to alter their insulin levels.
- Peptic Ulcers
  - With a history of ulcers should work with PCP if prescribing.
  - Consider prescribing with an H2 Blocker or a Proton Pump Inhibitor (Both suppress gastric acid secretion).
    - PPI's: Omeprazole (Prilosec), Esomeprazole (Nexium), and Lansoprazole (Prevacid)
    - H2 Blockers: Cimetidine (Tagamet), Famotidine (Pepcid), and Ranitidine (Zantac)

Therapy Considerations

- Also use caution in patients with:
  - Any Infectious disease
  - Pregnancy (Orals are Category C)
  - Chronic renal failure
  - Congestive Heart Failure
  - Systemic Hypertension
  - Osteoporosis
  - Psychoses
  - History/Signs of Tuberculosis
    - Ask all patients about travel to areas where TB is endemic?
    - Consider obtaining chest x-ray and PPD.

Medication Interactions

- Increased metabolism of steroids occurs with:
  - Phenytoin (Seizure Medication)
  - Barbituates (CNS Depressants such as Phenobarbital)
- May reduce the effect of:
  - Anticoagulants
- Monitor patients on systemic therapy at regular intervals for hypertension, glaucoma, and cataracts.

Review Info for Systemic Steroids

- Oral Steroid for Optometrists: Prednisone
  - Available as Oral: 1, 2.5, 5, 10, 20, 50 mg tablets and 1 and 5 mg/mL solution and syrup
- Ocular Treatment Guidelines:
  - Mild to Moderate: Initial dose of 20-40 mg
  - Moderate to Severe: 40 – 60 mg
  - Severe: Begin with 60 mg and increase if necessary
- Doses of 40 – 60 mg for less than 1 week often do not need to be tapered depending on why the steroid was needed in the first place.
- Major Concerns: Increased Blood Glucose, Peptic Ulcers, Reactivation of Infection, and Pregnancy