When to Refer: 
A He Said/She Said Approach

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FUCH’S DYSTROPHY

• Endothelial corneal dystrophy
• Autosomal dominant
• Women:Men, 3:1
• Increases with age

PATHOPHYSIOLOGY

• Thickened Descemet’s membrane with abnormal deposition of collagen and basement membrane protuberances
• Formation of guttata
• Starts centrally and moves peripherally
• Decreased endothelial cell density
• Resultant loss of endothelial pumping action

CLINICAL STAGES

• Guttata
• Stromal edema
  – Decreased vision
  – Worse in morning
• Epithelial edema
  – Pain with ruptured bullae
  – Further decrease in vision
• Corneal scarring

TREATMENT

• Observation
• Muro-128 5% solution/ung
  – Generic available, is half the price of brand
  – Can order on-line for better pricing
• Lowering IOP may reduce stromal and epithelial edema
  – Avoid CAI medications, will further impede pumping action
• Bandage contact lens prn
• DSAEK vs DMEK

When to educate Patient/Inform about DSAEK and DMEK

• Morning blur that lasts a significant amount of time (i.e. > 30 min)
• Pachymetry over 600 microns in a patient that previously had normal (~550 micron) corneal thickness
• Specular microscopy signs
• First cataract surgery resulted in endothelial decompensation
Descemet’s Stripping Automated Endothelial Keratoplasty

• Also known as DSAEK
• Partial thickness, endothelial corneal transplant
• Donor endothelial corneal tissue used to replace damaged endothelium
• Candidates—patients w/ endothelial disease
  — Fuch’s Dystrophy, Pseudophakic Bullous Keratopathy, other endothelial trauma

DISADVANTAGES

• Endothelial button can become dislodged in the first days to weeks following surgery
  — May necessitate another surgery
  — If second surgery fails, can do PKP
• No long-term data available
  — First surgeries done in 2004
  — 2008 data suggests more initial cell loss than PK due to manipulation of graft
  — Cell loss tends to stabilize over time when compared to PKP

ADVANTAGES

• Less invasive
  — Less risk of intraoperative sight-threatening complications
• Smaller incision
  • Similar to clear-cornea cataract incision
  • No sutures needed in many cases
  • Little, if any, induced astigmatism
• Less surgical time

ACANTHAMOEBA

• Free-living protozoan found in air, soil, stagnant or fresh water
• Active, motile trophozoites
• Inactive, dormant, durable cystic form
• Dormant form can turn active and aid in the creation of a keratitis from a small abrasion
• More common in soft contact lens wearers
  — 75-90% of cases

ADVANTAGES

• Quicker visual recovery
• Less likely for traumatic rupture in the future
• 90% of patient’s own cornea remains
  — Less chance of rejection

EARLY ACANTHAMOEBA PRESENTATION

• Patient presents early with irregular, disrupted epithelium
  — Punctate erosions
  — Pseudodendrite formation
  — Small infiltrates
  — Often mistaken for herpes simplex
  — Delayed diagnosis is typical, avg. 6 weeks
EARLY ACANTHAMOEBA PRESENTATION

- Pain is disproportionate to clinical presentation
  - Radial perineuritis
  - Subepithelial infiltrates along radial corneal nerves

LATE ACANTHAMOEBA INFECTION

- Ring infiltrate
  - Seen in only 6% of early cases
  - Seen in only 16% of late cases
- Hypopyon
- Progressive corneal thinning
- Risk of perforation

ACANTHAMOEBA DIAGNOSIS PEARLS

- Contact lens wear
- Epithelial dysplasia
- Pain out of proportion to presentation
- Antibacterials/antivirals fail to achieve response
- Consider culture and/or confocal microscopy if available
  - Charcoal yeast agar

PHARMACOLOGICAL TREATMENT

- Biguanides
  - Polyhexamethylene biguanide (PHMB) 0.02%
  - Chlorhexidine (CHX) 0.02%
- Diamidines
  - Propamidine (Brolene) 0.1%
  - Hexamidine 0.1%
- Antifungals
  - Miconazole, ketoconazole, itraconazole
- Aminoglycosides
  - Neomycin

TREATMENT

- Epithelial debridement
- Can use a combination of PHMB, CHX, and Brolene
  - Dosed q1hr initially, then 6-8 times a day, then qid
  - Slow taper, on treatment for several months
- Antibiotic coverage qid until epithelium heals
- Pain management
  - Cycloplegic
  - Opioid pain control
  - Cautious addition of steroid after improvement

PTERYGIUM

- Growth onto cornea of:
  - Conjunctival epithelium
  - Hypertrophied and INFLAMMED Fibrovascular subconjunctival connective tissue
  - Triangular shaped vascular lesion growing from conjunctiva onto cornea
- Etiology: chronic irritation
  - UV exposure
  - Dusty environment
  - Ocular surface inflammation (DES)
WHEN TO RECOMMEND SURGERY

Chronic surface irritation/dryness from focal disruption of the tear film
Decreased vision
  • Irregular Astigmatism into visual axis
  • Obscuration of visual axis
Ocular restriction
Cosmesis
Reurrence

SURGICAL CONSIDERATIONS

• Surgical removal only (bare sclera) has high incidence of recurrence
  — Up to 89% recurrence
• Excision with Mitomycin C preferred over excision only
  — 3% to 43% recurrence rate
  — Can lead to scleral ischemia and melting
• Recommend surgical excision with autograft especially for recurrent or aggressive pterygia
  — Recurrence rate 2% to 12%
• Nasal + temporal removal may require amnionic membrane graft
  — Recurrence rate 6-20%

Successful Treatment MUST Address All Aspects of the Pterygium

• Complete pterygium excision
  — Aggressively remove the sub fibrovascular tissue, not just bulbar conjunctiva
  — Removes the activated myofibroblasts and inflammatory mediators
• Address inflammation
  — Judicious use of MMC at site of activation
  — Steroids
  — Close follow-up
• Minimally induce surgical trauma
  — Minimal cautery
  — Use Tissuel glue instead of sutures when possible

CHALAZION

• Inflammatory, granulomatous lesion
• Follows internal or external hordeolum
• Is not infectious
• Consider steroid injection or excision

PRESEPTAL CELLULITIS

• Often following acute hordeolum
• Spreads from focal, tender area
• Eyelid redness, swelling, tenderness
• Mild fever
• Generally caused by gram + staph/strep
• Treat with oral antibiotic (Amoxicillin, Augmentin, Z-pack, Keflex) and hot compresses

CONCERNS

• H. influenzae can cause preseptal cellulitis in young children with aggressive course
  — Cover for H flu with Augmentin
• Refer if any signs of orbital cellulitis
  — APD
  — Decreased VA
  — Diplopia/restricted EOMs
  — Proptosis
  — Globe involvement
• No improvement/worsening after 2-3 days of antibiotics and hot compresses
**BACTERIAL CORNEAL ULCER**

- Unilateral, acute-onset pain, redness, photophobia, tearing, decreased VA, discharge
- White, fluffy, ulcerated opacity with epithelial defect and often an AC reaction
- Most ulcers associated with CL wear
  - Extended wear/overwear
- Most infections are gram positive
  - Even 50% of CL ulcers are gram positive

**FUNGAL KERATITIS**

- South and southwestern US more common
- Trauma with vegetative matter
- Also see in CL overwear
- Featherly infiltrate
  - May see multiple “satellite” infiltrates
- Deep penetration of infiltrate
- Hypopyon more common in fungal

**BACTERIAL CORNEAL ULCER**

- Fourth-generation fluoroquinolone q1-2h
  - No ciprofloxacin unless known pseudomonas
- Get up every 2 hours through night if severe
  - Less severe can do tobramycin or bacitracin ointment at bedtime
- Put in cycloplegic in office
- See daily until solid improvement
- No contact lens wear
- NO BANDAGE LENS and NO PAIN MEDS!!!
- One day follow-up ulcer often looks the same
  - But patient feels better
- Add steroid when epithelial defect closing?

**ANTIFUNGAL MEDS**

- Natamycin 1%
  - Only commercially available topical ophthalmic antifungal
  - Start q1h
- Fluconazole 0.2% can be compounded prn
- Voriconazole 1% can be compounded prn
- Use topical antibiotic qid to protect against bacterial superinfection
- Also consider oral Fluconazole 200-400mg qd

**SEVERE BACTERIAL KERATITIS**

- Need to culture
- Find a compounding pharmacist BEFORE you need them
  - www.iacprx.org
- Recommend alternating q 30 minutes to start
  - Vancomycin 25 mg/ml (gram + coverage)
    - Can use Ancef instead of Vancomycin if MRSA not suspected
  - Ceftazidime 50mg/ml (gram – coverage)
  - Tobramycin 13.5 mg/ml (gram – coverage)

**SJOGREN’S**

- Autoimmune disease that attacks the exocrine glands
  - Specifically lacrimal and salivary glands
- Dry eye, dry mouth, rheumatoid arthritis
- Women>Men
- Increases with age
- Diagnosis often made with signs/symptoms
- Positive SSA and SSB serum autoantibodies
- Positive lip biopsy
Sjögren’s Syndrome

- Inflammatory disorder often in association with other autoimmune diseases
- Classically consists of a triad of conditions:
  - Rheumatoid arthritis
  - Dry eye syndrome
  - Dry mouth
- Up to 3 million Americans
- Often misdiagnosed or underdiagnosed for an average of 5 years
- Untreated cases can lead to worsening symptoms, lung disease, and even lymphoma

Seven Rules of Highly Effective Iritis Management

1. Rule out keratouveitis
2. Check IOP
3. Rule out previous ocular surgery
4. Gauge severity – need for systemic work-up
5. Treat AGGRESSIVELY
6. Go beyond AC cell and flare (Restore the Blood-Aqueous Barrier)
7. Dilate and examine the posterior segment

Sterile Infiltrates

- Multiple, small limbal infiltrates
  - White, round or even pinpoint
  - Not soupy or fluffy
- May have mild staining over infiltrates
- Treat with topical steroid qid-q2h (combination agents)
- Often seen with staph exotoxin
  - Bacitracin/erythromycin to lids/lashes
  - Sometimes with circumlimbal infiltrates
- Often seen with CL overwear
  - Take out of CL

Iritis

- Women > Men
- Unilateral pain, circumcorneal injection, photophobia, decreased VA
- C/F in AC, KP on corneal endothelium, posterior synechiae, decreased/increased IOP
- Traumatic, postoperative, idiopathic, systemic associations

Inflammatory Labs

- Lupus (ANA)
- Sarcoid (ACE, if + run Chest X-ray)
- Rheumatoid arthritis (RF, anti-CCP)
- Ankylosing spondylitis (HLA-B27, if + run sacroiliac spinal films)
- Reiter’s (HLA-B27, joint x-rays)
- Pars planitis (HLA-B27)
- Psoriatic arthritis (ESR-Sed rate)
- Syphilis (RPR, FTA-ABS)
- CBC
**DIFFUSE LAMELLAR KERATITIS (DLK)**

- aka SOS
- Will usually develop within first 1-4 days
- DOES NOT STAIN
- Treat with high dose topical steroids every hour until controlled then start taper
- Durezol or Brand Pred Forte 1% q 1h
- Follow daily until improving
- May need lift/rinse if dense and in visual axis
  - Rinse with diluted Solu-Medrol®
  - Severe cases may benefit from Medrol® dosepack

**NON-FLAP RELATED CONCERNS**

- Decreased BVA without signs of flap complications/infection/SOS, etc.
  - Orbscan or Pentacam to rule out decentered/irregular ablation
  - Full retinal and optic nerve exam to rule out other ocular pathology

**OTHER FLAP CONCERNS**

- Macrostriae-immediate referral for refloat
- Microstriae
  - If affecting BVA, if central, if causing ghosting or monocular diplopia
  - Refer back to surgeon for refloat
- Debris under flap
  - Leave alone unless in visual axis

**Prokera®**

- Amnionic membrane to corneal surface
- Uses
  - Non-healing corneal ulcers
  - RCE
  - Neurotrophic ulceration
  - VKC, AKC
  - Severe non-healing SPK

**EPITHELIAL INGROWTH**

- Almost exclusive to enhancements
- Usually develops after more than one week
- Starts at flap edge and migrates centrally
- Most often appears white/grey in color
- Refer if growing centrally or causing astigmatism
- In rare cases, epithelial ingrowth can cause melting of the flap

**Cataract surgery**

- Most common operation performed in U.S.
- 3 million performed last year in U.S.
- Increasing need for surgery and options
  - 15% of US population with be >60 yo by 2020
  - 30 million Americans will need cataract surgery by 2020
  - >65 yo population will double by 2030
  - Baby Boomers expect more options
  - 15% premium IOL use in 2015 (2% in 2004)
- Laser cataract surgery
- Number of ophthalmologists declining
- Optometry will be expected to play a larger role in pre and post-operative care
LASER ASSISTED CATARACT SURGERY
- Makes corneal incisions
- Corrects corneal astigmatism
- Makes capsulorhexis
- Fragments the lens
- Not covered by Medicare or commercial plans
- Patients love the idea of laser surgery
- Especially important for premium IOL results

Herpes Simplex Keratitis
- Simplex
  - Pinpoint areas of negative staining which can coalesce into dendrites
  - History of same sided eye infections in past
  - May or may not have history of cold sores/other herpetic lesions
  - May see old corneal scarring
  - May have high IOP

TRAUMATIC HYSEMHA
- What caused the trauma?
- Is the anterior chamber deep?
- What is the IOP?
- What is the vision?
- Dilate the patient to view the retina.

Treatment of epithelial simplex
- Consider debridement
- Consider betadine wash
- Viroptic 9X day or
- Zirgan 5X day
- And/Or Orals

HYPHEMA TREATMENT
- Start steroid q2h
- Homatropine 5% tid
- Refer for B-scan prn or if Seidel's sign found
- Control IOP if elevated
  - Alphagan P, beta-blockers, CAIs
  - Avoid prostaglandins if possible
- Limit activities, keep HOB elevated, no ASA or IB products

Treatment of stromal disease
- Treat stromal disease with Pred Forte® 1% or Durezol
- Cover steroid with Viroptic®/Zirgan® or oral antiviral
- Usually do steroid 2:1 ratio of topical antiviral
**SIMPLEX TREATMENT**

- In place of Viroptic or Zirgan topically
  - Acyclovir 400mg 5x day x 10 days
  - Famvir® 250mg tid x 7 days
  - Valtrex® 500mg tid x 7 days

- For prevention of recurrences or to cover steroid
  - Acyclovir 400mg qd-bid
  - Famvir® 250mg qd
  - Valtrex® 500 qd

**ORAL ANTIVIRALS**

- For Herpes Zoster (shingles) treatment
  - Must start within 72 hrs for best effect; preferably within 24 hrs
  - Acyclovir 800mg 5X day
  - Famvir 500mg tid 3X day
  - Valtrex 1 gram tid 3X day

**ZOSTER**

- Unilateral
- Older patient
- With same-sided, vesicular facial lesions
  - Lesions on tip of nose suggestive of impending or current ocular involvement
- Conjunctivitis/iritis/corneal pseudodendrites
  - May appear before skin lesions

**ZOSTER TREATMENT**

- Viroptic NOT used in Herpes zoster
- Make sure oral antivirals on board
- If severe keratitis or moderate to severe AC reaction
  - Start PF or Durezol q2h to qid
- If mild AC reaction/hyperemia only
  - Consider watching with cycloplegic only
- Watch IOP!! Avoid prostaglandins