- Managing Patients With Multiple Conditions
  - COPE
  - COPE

No financial disclosures

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At 10 years old, what is the normal IOP range?

8-19

IOP in kids

- Under 12 between 6 to 9 months
- Then increase 1 mm/year
- Reaches “normal range” around age 12

What is normal C/D ratio?

- .30
- 90% of the normal population falls between 0.2 to 0.5 with a greater variability than the adult population

Central corneal thickness

- Very few studies
- One small study of 150 infants found CCT of 600 at birth. Comes to down to 550 within a week. Why the rapid change?

Ocular Hypertension vs glaucoma suspect

- OHTN: Elevated IOP and everything else is normal

Ocular Hypertension vs glaucoma suspect

- Glaucoma Suspect – patient is at higher risk for developing glaucoma than the average person based on a variety of factors

Physiological cupping

- First: rule out glaucoma before you jump to the conclusion of physiological cupping
- Second: physio cupping is only confirmed after years and years of a stable ONH
- Lastly: In terms of liability, there is no such thing as physiological cupping!

If this patient has a normal OCT, do we still do a VF?

If follow

- How often do we follow?
- Is this person a glaucoma suspect for life or can we stop the work up at some point?

If treat…

- What do we treat with?
- Beta blockers have shown to be best in children. Alphagan and CAI an option also
- PG don't work as well in children. No studies with PG as monotherapy, only adjunctive

People Get Worse. . .

People Get Worse. . .

Why do People Get Worse?

- Some doctors are not aggressive enough
- Monotherapy is nice but not realistic for most patients with glaucoma

"Targets"

- 25% IOP reduction for OHTN or mild glaucoma
- 30% for moderate glaucoma
- 35% or more for severe glaucoma

For most patients with glaucoma . . .

The question is not IF they will get worse

The question is WHEN they will get worse

Now what do we do?

Very little consensus on what to do for glaucomatous progression

Beta Blockers

- Beta blocker in AM, PG in PM
- Beta blockers have a proven record

Problem with Beta Blockers

- No effect on diurnal variation
- Does not help IOP at night

Alphagan P **(Brimonidine)**

- **Original concentration was 0.2% and then revised 0.15% solution.**
- **Most recent formula is 0.1% with Purite**

Brimondine

- Most prescribe as BID dosing
- No effect on diurnal variation
- Does not help IOP at night

Combining the Prostaglandins

"The combination of bimatoprost and latanoprost in POAG increases the IOP and should not be considered as a therapeutic option."

Doi LM et al. *Effects of the combination of bimatoprost and latanoprost on intraocular pressure in primary open angle glaucoma: a randomized clinical trial.* Br J Ophthalmol 2005;89(5):

CAIs as adjunctive therapy

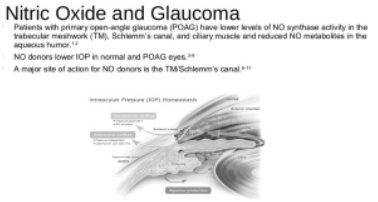
- Sulfa based drug
- Most prescribe BID

Vyzulta

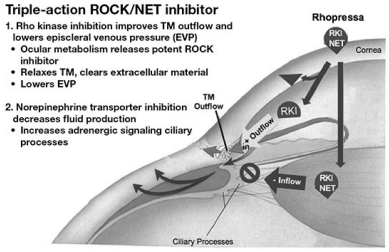
- Nitroglycin – a key component of dynamite – was found to relieve angina pectoris
- This effect is mediated by nitroglycerin's well known vasodilatory effects, which occur through the relaxation of smooth muscle in the walls of both arteries and veins

Nitric oxide

- Lowers IOP by directly improving trabecular outflow via direct effects on TM cells



Rhopressa



Rhopressa

- Additive to Prostaglandins
- Will likely come out as combination product with PG in spring

Problem with Rhopressa

- $$$$
- Hyperemia
- Use discount cards
- Hopefully price will come down soon

Combination Products

- Simbrinza – brinzolamide/brimonidine
- Combigan – brimonidine/timolol
- Cosopt – dorzolamide/timolol

Advantage of Combination Products

- Adds another medication to medical regimen without adding another bottle
- Keeps costs down since only one copay
- Less preservatives since 2 drugs in one bottle

Disadvantage of Combination Products

- Mismatch of dosing in many cases
- Is third drug helping all that much?

What to Choose as Second Agent?

- Depends on the doctor
- No right answer
- Istalol, Alphagan, Cosopt,Combigan

My plan for a patient who demonstrates progression

Rule # 1

- Find out why a patient's glaucoma is worse
  - i.e. is it due to noncompliance
- If so consider surgery – really one of the few times I consider surgery as an option for glaucoma patients

Rule # 2

- If the patient is hypertensive, find out if they are on an oral beta blocker
- If so, no value in adding a beta blocker, which also means the combination beta blocker products

If patient is hypertensive

- See if they can take their meds in AM instead of at bedtime
- Will help increase perfusion pressure at bedtime
- Will help lower IOP in AM

Rule # 3

- If rule # 1 and #2 not violated, then perform serial tonometry to estimate when the patients IOP is the highest
- Realize that each medication you add follows the law of diminishing returns

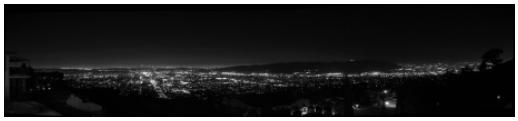
My ideal plan for progressive glaucoma

- Switch Prostaglandin to Vyzulta
- Will lower IOP an additional 10-15% than PG alone and patient still only takes once a day

My preference for 2nd line therapy if IOP highest in AM

- Beta-blockers in AM
- Prostaglandins at night time

My preference for 2nd line therapy if IOP highest other time of day



- Azopt or Simbrinza BID
- Prostaglandins at night time

What is vasovagal?

- Occurs when you faint because your body overreacts to certain triggers, such as the sight of blood or extreme emotional distress. It may also be called neurocardiogenic syncope.
- What happens: heart rate and blood pressure drop suddenly. That leads to reduced blood flow to your brain, causing you to briefly lose consciousness.

Vasovagal?

Short term: What is your role? Make sure patient doesn't get hurt.

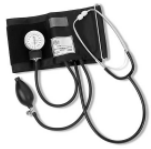
Long term: Do you send this patient for work-up with PMD?

What is normal BP?

- Systolic = 120 mm Hg
- Diastolic = 80 mm Hg

Diagnosis of Hypertension

- Repeated abnormal elevation of BP on 3 separate occasions over at least 6 weeks
- A single blood pressure > 200/120



Cause of Hypertension

- Primary ("essential") 95% of cases
- Secondary 5% of cases, most common of which is kidney disease

Treatment of Hypertension

- Diet – low salt
- Exercise – reduce weight
- Medications

How does sodium inc BP?

- Causes water retention which increases peripheral resistance which makes the heart work harder to pump blood

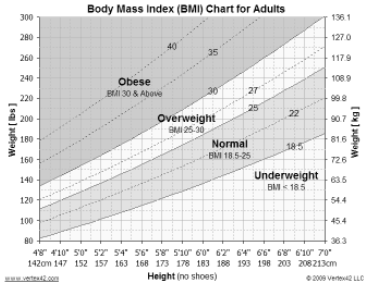
What is normal sodium intake?

- 2300 mg per day for normal, healthy person
- 1500 for patient with high blood pressure or person in high-risk category

How much sodium does the average person take in per day?

- 3400 mg
- Why so high? So many products use sodium as a preservative

Lose Weight



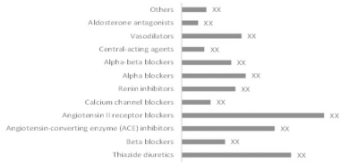
Calculate Body Mass Index

$$BMI = \frac{\text{weightInPounds x 703}}{\text{heightInInches x heightInInches}}$$

Or

$$BMI = \frac{\text{weightInKilograms}}{\text{heightInMeters x heightInMeters}}$$

Drug classes to manage HTN



Ocular Manifestions of HTN

- Vessel changes/AV nicking
- Retinal hemorrhages
- Papilledema

How do you show meaningful use?

Patient educated to work with PMD on maintaining proper bp

Why does it matter to ODs?

- We are a part of a patient's healthcare team so we should have a working knowledge of conditions beyond the eye
- Many ODs are checking blood pressure in the office
- HTN is #2 leading cause of preventable death

When do we send a patient for surgery?

- When a patient wants it and we can't talk him/her out of it
- When they NEED it
- When there is no other choice

Treatment Options

- Prevention
- Patient deals with it
- Surgery

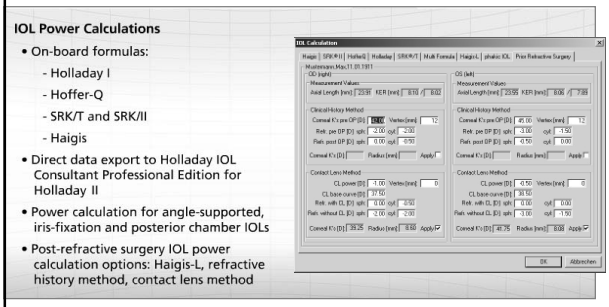
Prevention

- UV glasses may delay onset
- Nutrition – diet high in antioxidants plus multivitamins
- Ultimately, it is a losing battle

The procedure

- The trend is smaller incisions
- Stitch-less
- Blade-less
- The entire procedure takes 10-12 minutes

The Surgeon will also do…



IOLs: What are the options?

- Traditional distance only IOLs
- Toric IOL
- Multifocal IOL

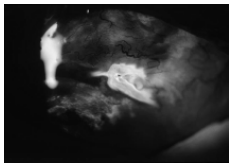
Monofocal Toric Bifocal

Who has the discussion about IOLS options and post ορrefraction?

- **They are still YOUR patient – you understand their visual needs and past history better than anyone else**
- **If you have this discussion, the patient will have time to process the information when the MD discusses with them again**

Elevated IOP

Wound leak: What are the signs?



CME

- Order OCT, if available
- Share the liability with surgeon and/or retinal specialist
- Most common treatment is topical steroids and topical NSAIDs

#4: PC Haze

Why does it happen?

- It is caused by residual lens epithelial cells that remain in the **capsular** bag **after** surgery and undergo proliferation, migration, and fibrous metaplasia.

Management of RCE

- ST: Treat corneal abrasion again
- LT: What are your options?

Muro 128

Bandage CL

Other options for RCE

Superficial keratectomy

PTK

Anterior Stromal Puncture

Amniotic membrane

Amniotic membrane is an avascular fetal membrane that lies deep to the chorion and is harvested in a sterile environment from placental tissue obtained during elective cesarean sections.

Donors are screened for transmissible diseases, and the AM is further treated with broad-spectrum antibiotics immediately after collection.

Types of AM on the market

- **Cryopreserved AM.**
- Involves slow freezing at –80°C using DMEM/glycerol preservation media to allow for slow-rate freezing without ice formation. The tissue is stored in a –80°C freezer and brought to room temperature when needed for use.
- ProKera (BioTissue) is a cryopreserved form of AM in which the membrane is secured around a polycarbonate ring or an elastomeric band. This form of AM has been cleared by the FDA as a class II medical device, and product claims approved by the FDA include protective, wound healing, and antiinflammatory effects.

Types of AM on the market

- **Dehydrated AM.** Dehydrated AM is preserved using vacuum with low temperature heat to retain devitalized cellular components. FDA-approved claims for this type of AM are limited to wound coverage. Unlike cryopreserved tissue, dehydrated AM is kept at room temperature, but it must be rehydrated for clinical use.
- AmbioDisk (IOP Ophthalmics) is a dehydrated AM commercially available for in-office use; it is applied directly to the ocular surface and covered with an overlying bandage contact lens.

After insertion

- Usually follow up in 4-6 days for removal
- Can still Rx antibiotics and/or topical steroids if needed

Billing: Amniotic membrane

- CPT 65778 (Placement of amniotic membrane on ocular surface without sutures)
- Cost: $500 to $900
- Reimbursement: $870 to $1400

Other options for RCE

- Oral tetracyclines (Doxycycline)

Risk Factors for Dry Eyes

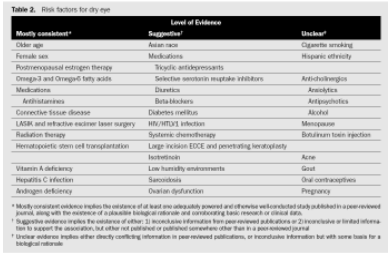


Table 2. Risk factors for dry eye

Level of Evidence		
Mostly consistent*	Suggestive†	Unclear‡
Older age	Asian race	Cigarette smoking
Female sex	Medications	Hispanic ethnicity
Postmenopausal estrogen therapy	Tricyclic antidepressants	
Omega-3 and Omega-6 fatty acids	Selective serotonin reuptake inhibitors	Anticholinergics
Medications	Diuretics	Anxiolytics
Antihistamines	Beta-blockers	Antipsychotics
Connective tissue disease	Diabetes mellitus	Alcohol
LASIK and refractive excimer laser surgery	HIV/HTLV1 infection	Menopause
Radiation therapy	Systemic chemotherapy	Botulinum toxin injection
Hematopoietic stem cell transplantation	Large-incision ECCE and penetrating keratoplasty	
	Isotretinoin	Acne
Vitamin A deficiency	Low humidity environments	Gout
Hepatitis C infection	Sarcoidosis	Oral contraceptives
Androgen deficiency	Ovarian dysfunction	Pregnancy

* Mostly consistent evidence implies the existence of at least one adequately powered and otherwise well-conducted study published in a peer-reviewed journal, along with the existence of a plausible biological rationale and corroborating basic research or clinical data.

† Suggestive evidence implies the existence of either: 1) inconclusive information from peer-reviewed publications or 2) inconclusive or limited information to support the association, but either not published or published somewhere other than in a peer-reviewed journal

‡ Unclear evidence implies either directly conflicting information in peer-reviewed publications, or inconclusive information but with some basis for a biological rationale

You give a patient some samples of Systane and tell her to buy more OTC.

Punctal Plugs: How to bill

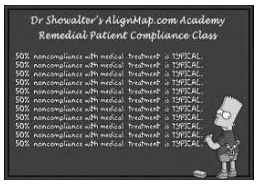
- CPT Code 68761
- Document: Patient is not getting sufficient relief with prior treatments

Restasis(Cyclosporin)
Mechanism of Action

- **Activated T cells produce cytokines that result in**
- **Increased cytokine production**
- **Neural signal to lacrimal gland that disrupts production of natural tears**

Xiidra

Most common reason for failure



Most common mistake

Once you put a patient on either medication, you MUST see them more than once a year.

You should see them every 6 months or even every 4 months

Lotemax (Loteprednol) and Dry Eyes

- **Diagnostic for Restasis**
- **Short-term pulse therapy**
- **Concurrent therapy with Restasis**

Lacrisert

More Options

- **Omega 3's**
- **Humidifiers**
- **Warm Compresses**

Why is it so important for you to help her DES?

1. She is your patient
2. She is a contact lens wearer

What is AWT for a patient who is happy in their CL?

- 15.5 hours a day
- If your patient wears their CL less than this, you should ask why

Rubbing is still needed for many patients

A Peroxide cleaning system can help as well

How much of the market share is by ECP?

Is that % going up or down?

- Market share of CL materials was nearly 100 % 40 years ago
- Fell to 70% in late 1990's to early 2000's
- After FCLA, went to 39%

Why it changed…

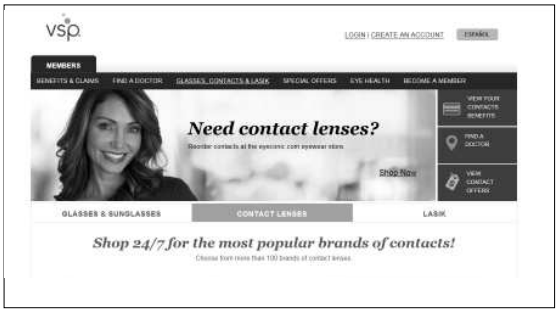
1st step: Self-Awarenes

Find out about the competition

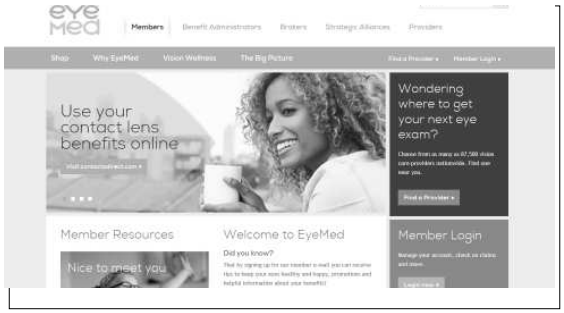
Now…

- Your competition is the OMD who is giving away CL services
- Your competition is a website or app
- Or it is a vision plan

VSP



EyeMed



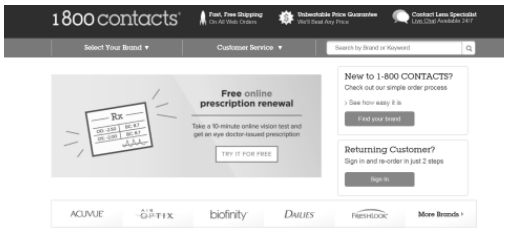
Other things you can do…

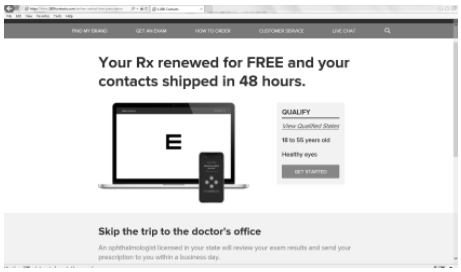
- Superior customer service
- "Extra" trials and starter kits

Why Should I lower myself and do this?

- **For those of you who are against it, remember that you get ZERO dollars for writing a Rx for CL**

1800contacts





The struggle is ongoing

- **About** one year ago, Annette Hanian, OD, testified before the Arizona House of Representatives against a bill that, if successful, would have extended contact lens prescription expiration limits to three years.
- According to Dr. Hanian, Arizona Optometric Association's Legislation Chair: "All it takes is one state. I felt that from the very beginning of all of this. I just knew that if Arizona lost, it wasn't just Arizona patients losing—it was patients across the whole country. All you need is one state to establish a precedent. It would have been a disaster. A rolling stone."

The Hill 4/27/17

- the contact-lens industry is rife with protectionism. Despite a Federal Trade Commission regulation promulgated more than a decade ago requiring prescribers to give consumers copies of their prescriptions, there is evidence of widespread flouting of the rule. In April 2016, the FTC issued 45 warning letters to prescribers and 10 more to retailers about alleged violations of the rule's verification clause. The obvious motivation for such violations is to force consumers to buy from outlets owned by or affiliated with their prescriber, shutting down other sources of competition.

The Hill 4/27/17

What is the most significant factors in injury from CL wear?

Research clearly shows these case overwhelmingly are attributable to user error – to bad hygiene decisions like wearing lenses overnight, exposing them to tap water or reusing lens solution. A study by the FTC found such harms were not correlated with the type of contacts a user bought, whether they were issued pursuant to a prescription or the manner in which they were sold.

The Coalition for Contact Lens Consumer Choice

Consists of 1-800 Contacts, Costco Wholesale and Lens.com

Ultimate goal is deregulation of CL

What questions should we ask?

- Describe headaches
- Frequency
- Any contributing factors?

How do we check for it?

- Dilated fundus exam
- Manifest refraction
- NRA/PRA?
- Cycloplegic exam?

Types of headaches

- Tension
- Sinus
- Migraines
- Cluster

Tension headaches

- Tension headaches are the most common type of headache among adults and teens.
- They cause mild to moderate pain and come and go over time.
- They usually have no other symptoms.

Treatment

- OTC pain killers
- Ultimately: Reduce stress – how?

Sinus headaches

- Air-filled spaces inside your forehead, cheekbones, and behind the bridge of your nose.
- When they get inflamed -- usually because of an allergic rxn or an infection -- they swell, make more mucus, and the channels that drain them can get blocked.
- The build-up of pressure in the sinuses causes pain that feels like a headache.

Sinus headaches

- Treatment:
- Antibiotics if sinus infection.
- Otherwise, antihistamines and/or decongestants

Migraine headaches

- Often happens with nausea, vomiting, and sensitivity to light. They can last from 4 hours to 3 days, and sometimes longer.
- Unknown cause but typically have triggers such as stress, caffeine, chocolate, not enough sleep, hormones

Migraine headaches

- Can happen with or without aura
- Typically no cure but meds to manage include OTC painkillers, nausea medications, prescription medications

Cluster headaches

- A series of relatively short but extremely painful headache every day for weeks or months at a time. You tend to get them at the same time each year, such as the spring or fall.
- Management includes Rx medications, steroids, inhaled oxygen

What to do with headache patient after your exam shows no link to headaches

"No obvious ocular cause of headaches"

"Refer back to PMD for continued headache work up"

Before Prescribing Anything…

- **Take a thorough medical history**
- **HPI and ROS**
- **Current Medications**
- **Allergies**
- **Pregnancy/Nursing**

Ask every female patient

- Are you pregnant?
- If has infant, are you nursing?

FDA Pregnancy Categories

A - Controlled studies demonstrate no risk

B - No evidence in risk in humans. Either animal studies show risk and humans do not OR if no human studies, animal studies negative

C - Risk cannot be ruled out. Human studies lacking but animal studies are positive for fetal risk or lacking

D - Positive Evidence of risk
Investigational or post-marketing data show risk to fetus. If needed in life-threatening situation or serious situation or serious disease, drug may be acceptable

X –Contraindicated in pregnancy
Fetal risk clearly outweighs any benefit to patient

Commonly Prescribed Drugs

- Zymar – C
- Zylet – C
- Alrex – C
- Lotemax – C
- Tobradex -C
- Restasis – C
- Patanol – C
- Elestat – C
- Vigamox - C

- Erythromycin – B
- Tobramycin – B
- Doxycycline – D
- Tetracycline – D
- Neomycin -- D

Doxycycline

- **Effective member of tetracycline family**
- **Typical Dosing 50 mg BID**

Common Uses

- Eyelid and skin disease
- Ocular Rosacea
- Chalazion and hordeolum
- Meibomian gland disease
- Recurrent Corneal Erosion

Doxycycline

- Side Effects
  - Photosensitivity
  - Pseudotumor Cerebri, Blood Dyscrasias
  - Decreased bone growth, teeth discoloration in children under 8 year old

Doxycycline

- Warn female patients that BCP may not work
- Suggest patient take with food to minimize GI upset

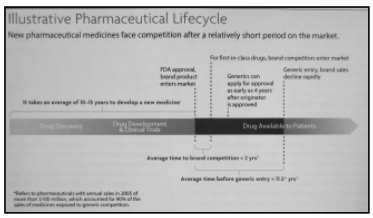
Zithromax (azithromycin)

- Macrolide antibiotic (erythromycin)
- Safe for children and pregnant women
- Similar uses as Doxycycline

Zithromax (azithromycin)

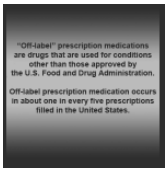
- Available as Z-pak (six 250 mg pills taken over five day period)
- Available as Tri-Pak (three 500 mg pills taken over three day period)
- Available as oral suspension

The approval process for branded drugs



For generic drugs . . .

Define off label



Commonly Used Off-Label Drugs in Optometry

- Allergy drops for GPC
- Antibiotic drops for corneal abrasions
- 4th generation fluoroquinolones for corneal ulcers
- Lotemax for Allergies
- Alrex for Dry Eyes
- Travatan Z for 1st line Glaucoma therapy

Rx vs OTC
How to stay in control

Diagnosing Iritis

» Deep

» No Cells

» No Flare

ACG

- Pt complaint of dull ache
- Steamy Cornea
- Mid fixed dilated pupil
- Elevated IOP

What about the risk of HSK?

- Do a careful history
- Document negative findings
  - i.e. (no dendrites, no corneal staining)
- You can never be 100% sure. You must see patient for follow up

Corneal FB/Penetrating Injury

How many eye infections a year?

What is the most important risk factor for eye infections?

If we do nothing… Most of them get better anyway

- **Moxeza: 75 % treated vs 56% placebo**
- **Zymaxid: 90% treated vs 70% placebo**
- **Conclusion for both package inserts: "Microbial eradication does not always correlate with clinical outcome in anti-infective trials"**

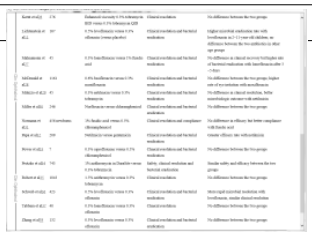
If that is the case, why do we prescribe?

- Because patients expect us to
- Because it is the best way to stay in control of your patients

What do we treat with?

- Antibiotics alone?
- Combination products?
- Steroids?

How important is our choice of Antibiotic?

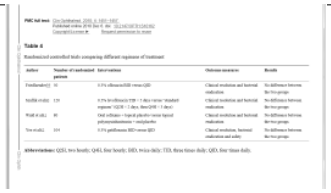


Clinical Ophthalmology 2010; 4:1451-1457

What is the proper dosing?

- QD
- BID
- TID
- QID

What is the proper dosing for antibiotics?



Clinical Ophthalmology 2010; 4:1451-1457

The Truth

- The steroid is doing 95% of the work
- The antibiotic is not needed
- Yet, many of us still prescribe both

Clinical Pearl

- Writing the Rx for a Steroid:

Always limit use – be specific

– Rx Drug of choice OU BID for 7 days, then discontinue. Discard unused portion

When does a keratoconus patient need surgery

- Risk of perforating
- Scarring preventing adequate vision
- Progression of disease
- GP Intolerance
- Poorly fitting CL

What are risk factors for cornea perforating in keratoconus?

- Acute hydrops
- Eye rubbing
- Topical steroid use
- Raised IOP

Scarring of cornea

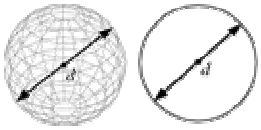
- Mostly due to CL abuse and/or improperly fit lens
- Is this avoidable?

Scarring of cornea

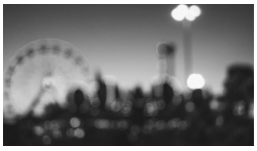
- As scarring progresses, CL refit can often stop the process. Patients only need surgery if you wait too long to refit them
- Most keratoconus patients are compliant therefore it is your job to fix this

Ways to avoid GP intolerance

Ways to avoid GP intolerance



Ways to avoid GP intolerance



What is the overall success rate of PKP?

What happens after 90 days? How many grafts still viable at 10 years?

60 to 70%

Post Op

- Eyedrops for months, years, and sometimes forever
- Fluctuating, hazy vision for months

Astigmatism after PKP

- The vast majority of patients are left with residual astigmatism
- Refraction may be difficult or imprecise in these patients
- Glasses may not work to correct this astigmatism. GP are often needed to fully restore vision

When can you fit a post op patient with a CL?

The earliest is 3 months

Things to Help

- Hyper Dk material : Dk/t > 100
- Small diameter lens
- Dec AWT
- More frequent follow ups

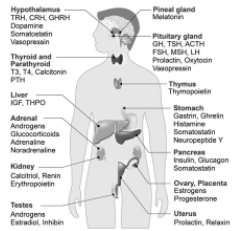
What signs should you warn a patient about post PK?

- R – redness
- S – sensitivity to light
- V – vision changes
- P - pain

CXL

- FDA approved for 14 years and older
- Min corneal thickness 400 after removing epithelium
- Demonstrate progression or suspect progression will occur

Progression of Kconus



Postoperative treatment:

- 0,1% prednisolone 3 times/day
- Ciprofloxacin 4 times/day
- Artificial tears hourly

Removing of the contact lens:

- 3rd postoperative day

Efficacy of Procedure

Complications

- Delayed corneal reepithelization
- Infection
- Corneal endothelium cell damage – in thin corneas
- Keratouveitis
- Severe corneal haze

Factors to consider before sending a patient out for CXL

Which is less risky?

Progression is usually a finite time period

Working in healthcare means making a commitment to “first do no harm”

In any given year, 99.9 percent of us are practicing good optometry….

Lifetime Risk for Getting Sued

6%

How do reduce the risk from 6% to even lower?

You are a doctor

- Quite worrying if your patient is here on vision plan or medical
- Your recommendation on how to manage a patient should not change based on insurance plans

Do your due diligence

- Make the appointment while the patient is still there
- Follow up on all missed appointments, etc

Diagnosing Disease

- Work up those with a higher risk than average not those who you think have the disease

Diagnosing Disease

- Just because you don't have the instruments for it doesn't mean that it doesn't need to be done

Explain R & B

- You should discuss and document the risks and benefits of nearly every assessment/plan you have for your patient

Special Populations

- Always try to have a family member for children and the elderly. Document who was there
- If patient doesn't speak English, have them bring a translator
- Always prescribe with caution in pregnant women and/or women who are nursing

Take Care of Yourself

A.K.A. How to make more money

Increase Patient Flow

- You have a choice:
- 1. See more patients per day for the cheap vision exams
- 2. See less patients per day for the higher reimbursing medical plans

Medical Optomery

- Medical reimbursements are higher than vision plans
- You can see patients for follow ups as often as needed
- This should be in addition to glasses, contacts, and the “yearly” eye exam

What if your patient is here due to a vision plan but you need to do additional testing

Option 1

- Tell your patients about findings and convert exam into medical
- Patient can still use vision plan for materials but ALL exam procedures are billed to medical

Option 2

- Keep today as vision plan. Do no ancillary procedures and have patient return for comprehensive medical work up

Practical Tip

If your patient is here under vision plan, do you write a script for an allergy medication or Restasis?

Answer…

- Ideally no
- But if you must, give no refills and have patient return in 2-3 weeks for a follow up which will be billed to medical and write another Rx with refills.

My 3 Suggestions

- Work hard, but more importantly work smart
- Make all the money you can – we all have a limited time to make sure we get a good return of our investment in optometry school
- Make sure to enjoy the journey == don't keep chasing numbers in a bank account.