

## EYE CARE UPDATE – Part I

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## Financial Disclosure

Drs Ron Melton and Randall Thomas are consultants to, on the speakers bureau of, on the advisory committee of, or involved in research for the following companies: ICARE and Valeant.

## Refractionist or Doctor

- A new world of vision testing and eye wear sales is dawning now that refractions and prescription fulfillment are being offered online.
- These developments may not be a negative for ophthalmology practices and patients.
- Websites:
  - [Opternative](#)
  - [EyeNetra](#)
  - [MyVisionPod](#)
  - [Smart Vision Labs](#)
  - [Vmax Vision](#)
  - [WarbyParker](#)
- Optometrists: Expand your scope of patient care services to protect your future!
- The AOA is aggressively fighting for optometry: Join the AOA!!

EyeNet , Aug 2017.

## Eye Glasses From 3-D Printing Technology

- The (unintended) assault on traditional optometric practice continues
- 3-D printing technology can make a lightweight (7 grams), customized pair of eye glasses in 14 hours at a cost of about \$160.00
- We believe that a variety of technologies will steadily replace the need for traditional optometric care.
- Embrace medical eye care, or you might devolve into a dinosaur!

*Clin Exp Optom, May, 2018*

## Eye Drops for Presbyopia

- EVO6 (Novartis) – new agent designed to restore crystalline lens flexibility
- Prodrug with lipoic acid choline ester 1.5% - converts to dihydrolipoic acid – to dihydrolipoic acid – breaks down disulphide bonds in lens – improved flexibility
- Goal is to maintain reverse lens hardening and allow lens to maintain or regain accommodation
- Liquid Vision drops – temporary presbyopia-correcting therapy lasting five hours or longer
- In Phase I trials – combines aceclidine (miotic) with tropicamide (cycloplegic) to create super pinhole effect and moderate accommodation
- Developed by Presbyopia Therapies

*Review of Optometry, June 15, 2017*

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## What Makes a Happy Patient

“Time spent with the physician and ease of scheduling an appointment are the 2 most important factors in determining whether or not a patient will recommend a particular practice to others. Even practices that provide the highest-quality care will not be successful if patients have trouble making appointments and do not get what is perceived to be adequate time with the practitioner”

*Long C, et al. Ophthalmology 2016;123:242-7*

## Dress For Success

- True optometric physicians need to dress like the doctors we are.
- “Patients preferred to see their physicians dressed formally with white coats. They saw these physicians as more knowledgeable, trustworthy, caring and approachable than physicians dressed in other ways.”

*Br Med J, May, 2018*

## Oxervate (cenegermin) 0.002% solution for Neurotrophic Keratitis

- FDA-approved in August 2018
- Eye drop delivery of human nerve growth factor
- Dosage: 6 x D (2 hour intervals) for 8 weeks
- Do Not Shake – Very complex administration protocol
- 70% “complete healing” in 8 weeks
- “Orphan Drug” – marketed by Dompe U.S., Boston

## Inveltys (loteprednol 1%) suspension

- “Treatment of post-operative inflammation and pain following ocular surgery”
- FDA-approved in August 2018
- Approved for BID administration
- Uses nano-particles to extend duration of efficacy
- Marketed by Kala Pharmaceuticals

## Solar and Laser Retinopathy

- Similar pathophysiology: DDx- good Hx
- Central scotoma with mild to moderate reduction in BVA
- Small, focal yellowish macular lesion
- OCT: Compromise to RPE and outer layers
  - Inner layer involvement in severe damage
- Light energy is absorbed by RPE resulting in heat damage to the tissue
- Some recovery of vision may occur over several months

## Hand-Held Laser Retinal Injury

- Delay in diagnosis is a common feature.
- Average age of exposure 9-16 years, mostly males. 50% admit to laser exposure.
- Vision decrease highly variable; modest recovery over time.
- Symptoms: Central scotoma, variable blurred vision.
- OCT is critical to the diagnosis; Focal RPE and outer retinal tissues are preferentially damaged.
- “The lack of awareness of such injuries among ophthalmologists is likely to contribute toward a delay in making the diagnosis, as evidenced by the fact that almost a third of children in this study were referred as retinal dystrophies.” This is likely true for most eye doctors.

*Raouf N, et al. Am J Ophthalmol. 2016;171:88-94*

## Antibacterial Medications

- Sulfa Preparations
- Erythromycin
- Bacitracin
- Bacitracin / Polymyxin B
- Bacitracin / Polymyxin B / Neomycin
- Chloramphenicol
- Gentamicin
- Tobramycin
- Trimethoprim / Polymyxin B
- Fluoroquinolones
- Azithromycin
- Oral antibiotics

## Off label

- “An estimated 50 percent of medications used routinely in ophthalmic practice are used off-label.”
- “Clinical practice should be guided by the best interest of the patient.”
- “In many instances, off-label treatments may be the best, or the only, available treatment, and withholding treatment would be unethical.”

*Reference: EyeNet. April 2011*

## Treating During Pregnancy

- 6.3 million pregnancies reported in US each year
- Pregnancy creates a natural reduction in IOP (19.6% reduction is normal; 24.4% decrease in OH)
- Past FDA Pregnancy Categories no longer apply for drugs approved after June 30, 2015; Doctor must now read the package inserts and analyze the safety data to make an informed decision.
- Until new drugs are approved, use the more familiar pregnancy category labeling
- In glaucoma, brimonidine only category B (avoid during lactation- linked to CNS depression)
- Consult patient's OB/GYN or PCP prior to treatment

## Herpes Gladiatorum

- Occurs most commonly among young wrestlers, or in other sports where there is very close skin contact.
- First described in the 1960's – NEJM
- It is an expression of HSV-I
- Lymph nodes (preauricular and/or submandibular) are commonly present on one or both sides
- Treated with oral antiviral for a week
- Like all HSV infections, can become recurrent in nature.
- Temporary isolation from sports while being treated is key to breaking cycle of perpetuation

## Eczema Herpeticum

- Opportunistic non-unilateral expression usually of the face and neck
- These patients have atopy, of which eczema is the typical association - - get a good history
- Seen mostly in people in their teens and 20's
- Primary expression of HSV
  - Globe is rarely involved
- Because of potential for a more virulent expression, use Zoster dosage of 800 mg of ACV 5XD, or 1,000 mg of VCV TID X 7-10 days
- Usually seen primarily by dermatology, but if periocular involvement, eye doctor consultation is common practice.

*www.healthguideinfo.com/skin-allergies/p63286*

## Primary HSV Infection

- Vesicular eruptions on the eyelid skin and/or eyelid margin
- Can be limited to the skin or can also result in follicular conjunctivitis and/or corneal epithelial disease
- Treatment: PO ACV 400 mg 5 x D x 1W  
PO Valtrex 500 mg tid x 1W
- Vesicles resolve without scarring

## Non-ophthalmic steroid: ointment/cream/lotion

- Triamcinolone - moderate potency steroid
- Available in cream, ointment and lotion (0.5%, 0.1%, 0.025%)
- Our favorite: the 0.1% cream

*Reference: Drug Facts and Comparisons*

## Systemic Prednisone

- Most common Rx'd systemic corticosteroid
- Common initial dosage 40-60 mg
- Available generically in both tablets and DosePaks (5 or 10 mg at 6 or 12 day course)
- Questions to ask before prescribing?
  - > Diabetic?
  - > Peptic Ulcer Disease?
  - > Tuberculosis?
  - > Pregnant?

## Perspective on Oral Prednisolone

- Using oral prednisolone at 1,250 mg/day is equivalent to 1,000 mg of I.V. methylprednisolone sodium succinate (Solu-Medrol®) for 3 days in treating acute optic neuritis.
- "There was no significant difference in adverse events between the groups."
- And,... we are concerned about using 40 – 60 mg/day!?!

*JAMA Neurology, June, 2018*

## Bilateral Periorbital Impetigo - Dermatitis

- Impetigo is a *Staph aureus* infection, often seen in patients with eczema
- Usually seen in children and young adults
- Can cause a secondary inflammatory dermatitis
- Can create cicatricial ectropion
- Tx with oral antibiotic and topical antibiotic/steroid or steroid ointment

*Ophthalmology, June, 2018*

## Perspective on Posterior Vitreous Detachment

- Occurs mostly between ages 50 and 70 (peak incidence 62)
- No association with refractive error, except patients with -3.00D or more go to P.V.D. 5-10 years earlier
- 80-90% of breaks associated with P.V.D. are in the superior quadrants
- Within 2 years, 10% of patients will develop a P.V.D. in the fellow eye

## Acute PVD and Retinal Tears

- The rate of an acute retinal tear associated with an acute symptomatic PVD is about 8% at the initial visit, and 1.5% of eyes without a tear on the initial visit are found to have a tear on follow-up examination.

*Ophthalmology, January 2018*

## Treatment of Vitreous Floaters

- Treatment options:
  - > Live with them
  - > Vitrectomy
  - > Vitreolysis
- YAG laser – angle of focus can be changed to reach floaters; special vitreous lenses allow the laser beam to focus on floater
- Advantages: simple, noninvasive, no pain or discomfort
- Disadvantages: healthy eyes getting elective surgery, risk of retinal detachment, possibly worsening of symptoms
- Clear visualization of floaters key to successful treatment
- Treatment may require more than one laser session; symptomatic vitreous opacifications (SVO); only SVO's > 4mm from retina treated
- Patient decision on benefits vs risks

*CRST, May 2016 (Stonecipher)*

### Timing and RD Repair: Is there a hurry?

- Preoperative VA is the strongest predictor of postoperative VA
- When control vision is affected, about 30% of patients ultimately achieve 20/40 or better
- “There is no difference in VA outcomes among patients who underwent within the first week of onset.”
- VA can improve for months to years after surgical repair
- There was no association between duration of macular detachment and postoperative VA
- “Clinical evidence suggests that the duration of macular detachment has a minor, if any, effect on visual outcome when repair is performed within about one week. Similarly, many fovea-sparing RD’s can likely be deferred for a short period without affecting visual outcomes.”

*JAMA Oph. November 2013*

### Visual Recovery After Retinal Detachment with Macula-Off

- After 10 days, no rush for up to 30 days
- Enhanced result if surgery is done within the first 3 days

*BJO, 2016; 100 (11)*

### Risk of Progression in Macula-On Retinal Detachment

- A “bullous configuration” of a macula-on rhegmatogenous RD portends a higher risk of macular detachment. This study suggests “prompt surgery in patients diagnosed with bullous macula-on rhegmatogenous RD.”

*Clinical and Experimental ophthalmology, August, 2017*

### Acute and Chronic Conjunctivitis Due to Over-the-Counter Ophthalmic Decongestants

“*Conclusion:* Nonprescription decongestant eyedrops can produce acute and chronic forms of conjunctivitis by pharmacological, toxic, and allergic mechanisms. Once recognized, conjunctival inflammation often takes several weeks to resolve.”

*Reference: C Soparkar et al. Arch of Ophthalmol. January 1997*

### Brimonidine Dermatologic Gel

- Used to address the erythema and flushing commonly expressed in facial and eyelid rosacea
- Causes microvascular vasoconstriction
- Comes in a 30 gram tube – applied once daily
- Provides a “somewhat effective” clinical response
- Available as a .33% gel by Gladerma

*Reference: The Medical Letter, October 2013*

### Lumify (brimonidine 0.025%) Ophthalmic Solution

- FDA approved in December 2017 – OTC product
- Major upgrade to help the chronic red eye
- Superior to early generation vasoconstrictors
- No rebound hyperemia
- Used once or twice a day PRN
- Marketed as Lumify OTC by Bausch & Lomb

### **Perspective on Central Corneal Thickness (CCT)**

- CCT has become “standard-of-care” in the POAG (or suspect) work-up
- Thinner corneas are a strong risk factor for POAG because true IOP is actually higher than the measured IOP.
- Some patients with measured ocular hypertension may simply have a thicker CCT, thus reducing POAG risk because the true IOP is actually less than the measured IOP
- “CCT is the most heritable aspect of ocular structure (more than refraction, axial length, or optic disc size), suggesting that it is under exquisite genetic control.” (Ophthalmology, Nov. 2007)
- “Stop adjusting IOP measurements” JAMA, May 2017

### **Role of Self-IOP Measurements in Glaucoma Management**

- Home tonometry – logical step in understanding and management of glaucoma
- Recent FDA approvals of devices
  - Triggerfish (Sensimed) – contact lens
  - ICARE Home (ICARE USA) – rebound tonometry requiring no anesthetic
- Home tonometry helpful in better understanding the IOP changes and to support future glaucoma management

### **Literature on “HOME” Tonometry**

- “Up to 75% of individuals have peak IOP outside of office hours.”
- “Most patients (73%) were able to accurately measure their own IOP after a short training session. Self-tonometry was deemed comfortable and relatively easy to perform and has the potential to improve patient engagement in their own care.”
- “Patients with glaucoma may not only find self-monitoring of IOP acceptable, but also soon demand it.”

*JAMA Ophthalmol, October, 2017*

### **Glaucoma Treatment Options**

- Prostaglandin Analogs
- Beta-Adrenergic Blockers
- Prostaglandin / Beta-Blocker combinations
- Adrenergic Agonists
- Adrenergic Agonist / Beta-Blocker combination
- Carbonic Anhydrase Inhibitors (CAI’s)
- Pilocarpine derivatives
- Epinephrine derivatives
- Laser Trabeculoplasty
- MIGS
- Surgical Trabeculectomy
- Nitric Oxide donating PGA
- Rho-kinase Inhibitor

### **Prostaglandin Receptor Agonists**

- Latanoprost (Xalatan and generic) 0.005%
- Travoprost (Travatan Z) 0.004%
- Bimatoprost (Lumigan) 0.01%
- Tafluprost (Zioptan) 0.0015%

### **Latanoprostene Bunod 0.024%**

- FDA approved in November 2017
- First nitric oxide – donating prostaglandin
- One molecule – two mechanisms of action
  - Enhances uveoscleral outflow
  - Enhances trabecular meshwork outflow
- Reduces IOP by 7.5 – 9.1 mm Hg
- Preserved with 0.2% BAK
- Used once daily in the evening (6% red eyes)
- Comes in a 2.5 and 5 ml opaque bottle
- Refrigerate until opened
- Marketed as Vyzulta by Bausch & Lomb

### **“Glaucoma Treatment: by the Highest Level of Evidence”**

- “Our current understanding of the relationship between IOP lowering and glaucoma onset or progression translates to the effect of each mm Hg IOP reduction on the development of progression of visual field loss.”  
*de Moraes CG, et al. Survey Ophthalmol 2016;61(5):597-615*
- The risk reduction could be about 19% per mm Hg, confirming results from the Early Manifest Glaucoma Trial and Canadian Glaucoma Study, and showing that IOP reduction is highly effective, and that every mm of pressure counts.
- These results should serve as a stimulus to the pharmaceutical industry to continue development of new and even more potent drugs.  
*Heijl, A. The Lancet, April 5, 2015*

### **Perspective on IOP and Progression on Glaucomatous Optic Neuropathy**

- “Progression was closely linked to the magnitude of the initial IOP reduction with treatment. The initial change in IOP (from baseline to the initial follow-up visit) was strongly associated with progression, with about a 10% lowering of the risk with each mm Hg of IOP reduction.”  
*Leske M, et al. Arch Ophthalmol, Jan 2003*
- “Elevated IOP is a strong risk factor for glaucoma progression, with hazard ratio increasing by 11% for every 1 mm Hg of higher IOP”  
*Bengtsson B, et al. Ophthalmology, Feb 2007*

### **Rhopressa (netarsudil 0.02%)**

- FDA approved in December 2017
- First rhokinase inhibitor
- MOA purported to be enhancement of conventional trabecular outflow
- Use once daily in the evening
- Reduces IOP about 4-5 mm Hg
- Preserved with 0.015% BAK
- Comes in a 2.5 ml bottle
- Potential Side Effects:
  - > In phase III, 53% experienced red eyes;
  - > Can cause subconjunctival hemorrhages
  - > Can cause an amiodarone-like vortex keratopathy
- Marketed by Aerie Pharmaceuticals

### **How important is “Preservative Free”?**

- “Published studies have not demonstrated any clear benefits of the BAK-Free formulations.”
- “There is a lack of evidence of clinically significant harm from a small number of BAK preserved drops in patients without OSD. This means that generally more expensive PF glaucoma medications should only be recommended for those on poly pharmacy or those with OSD but are not necessarily required for all patients.”  
*Br J Ophthalmol, July, 2018*