Learning Objectives

- Emphasize clinical diagnosis of ocular pathology and disease.
- Strengthen clinical treatment of ocular pathology and disease.
- Heighten the clinician’s comfort level when treating ocular pathology or disease with topical and/or oral medications.
- Heighten the clinician’s comfort level in new techniques, technologies, procedures, and treatments in ocular pathology and disease.
- Gain confidence in ordering and interpreting diagnostic and laboratory tests.
- Gain confidence in making a sub-specialty referral.

Course Description

- The interactive Grand Rounds format, where cases are presented and audience participation drives the discussion, has been a staple of continuing education for over 5 decades.
- We take advantage of 21st century technology to poll the attendees on their thoughts.
- Answer text questions in real time. Raise your hand and be heard or just use your phone...as we work through selected cases in the chosen topic areas.
- Topic areas run the gamut, but all are relevant to primary care optometrists.
- This course is committed to lifelong learning.
Grand Rounds Improving Eye Care and Outcomes for Patients 2019

Drs. Caldwell, Kislan, and O'Dell

814-931-2030

Greg Caldwell
Text your question or comment

814-931-2030

Metabolic Disease

- Pre-Diabetes
- Metabolic Syndrome
  - R73.03
  - E88.81
- Diabetes
  - E10
  - E11
- Dyslipidemia
- Hypertension

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How Many Times Have You Seen and Heard

- A patient on metformin and lisinopril
- Patient claims he/she is not diabetic
- Patient claims he/she does not have hypertension

OD on Facebook

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Metabolic Syndrome

- A cluster of conditions that increase the risk of:
  - Heart disease
  - Stroke
  - Diabetes
  - Dementia
  - Cancer
  - Insulin resistance
  - Polygenic obesity syndrome
  - Non-alcoholic fatty liver disease

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The Cluster of Conditions

- Elevated glucose
  - Insulin resistance
  - HbA1c >6.5
- High blood pressure
  - Systolic >130
- Obese/overweight
  - BMI >25
- Abdominal obesity
- Non-alcoholic fatty liver disease
- Proinflammatory and prothrombotic states

3 of these 5 leads to:
- Heart disease, stroke, DM, dementia, cancer...

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Pre-Diabetes

- Type 2 Diabetes (R73.03)
- Insulin Resistance
  - Diminished ability of cells to respond to insulin
  - Transport of blood glucose into target tissues is impaired
- Obesity
  - BMI >25
  - Abdominal obesity

Metabolic “Syndrome”

What is Optometry’s Role Now and in the Future?

Diabetes Mellitus

- Prediabetes and Diabetes Diagnosis: Classification and Risk Factors
- Diabetic Retinopathy Progression
- Diabetic Macular Edema Management
Diabetes Mellitus

- 29 million Americans diagnosed with diabetes
  - Type 2 diabetes 95% of cases
  - Type 1 diabetes 5% of cases
- Seventh leading cause of death in the US in 2013
- Leading cause of kidney failure, lower-limb amputations, and adult-onset blindness.
- Accounts for more than 20% of health care spending

Type 2 DM: Risk Factors

- Overweight
- 45 years or older
- Family history of type 2 diabetes
- Being physically active less than 3x / week
- Gestational diabetes or baby > 9 pounds

Number and Percentage of U.S. Population with Diagnosed Diabetes 1958-2014

Percentage of Processed Foods is “SAD” (2017)

Where Americans Eat, 1889-2009

Obesity Continues to Rise

Prevalence of overweight and obese U.S. adults aged 20-74
Prediabetes

- 86 million diagnosed with prediabetes
- 90% with prediabetes are not aware
- About 1 in 3 US adults could have diabetes by 2050
- Living without knowledge or in Denial

What is Prediabetes?

Risk Factors for Diabetes/Prediabetes

Non-modifiable
- Age
- Race/Ethnicity
- Gender
- Family history

Modifiable
- Physical inactivity
- Overweight/Obesity
- Hypertension
- Smoking
- High plasma glucose levels
- Abnormal lipid metabolism

Lipid Metabolism is Compromised in Diabetic Patients


Prediabetes

- An important risk factor for future diabetes and CV disease
- Risk for prediabetes is a continuum
- Important to identify early and begin intervention immediately
- Interventions can reduce the rate of progression from prediabetes to diabetes:
  - Healthy diet
  - Physical activity
  - Weight loss
Lipid Metabolism is Compromised in Diabetic Patients

Omega-3s for Patients at risk for Diabetes Mellitus

Evidence that Omega-3s may Delay the Onset and Slow the Progression of Diabetic Retinopathy

The Evidence for Omega-3s for Diabetic Patients at risk for Diabetic Retinopathy

Diabetic Retinopathy Risk Factors

- Duration of diabetes (over 50% of Type 2 at 20y)
- Poor control of blood sugar level (HbA1c >7%)
- Hypertension
- Hypercholesterolemia and hypertriglyceridemia
- Pregnancy
- Tobacco use

Source: "Serum Omega-3 Polyunsaturated Fatty Acids and Risk of Incident Type 2 Diabetes in Men: The Kuopio Ischemic Heart Disease Risk Factor Study," ADA Diabetes Care, 2014;37(1):189-96. doi: 10.2337/dc13-1504. Epub 2013 Sep 11
For Diagnosed Patients, Diabetic Retinopathy is a Major Complication

- Pre-Diabetes
- Diabetic Diagnosis
- Mild DR
- Severe DR or Macular Edema

Diabetic Retinopathy Risk Factors
- Presence of diabetes (over 25% of Type 2 at 60y)
- Poor control of blood sugar level (HbA1c >7%)
- Hypertension
- Hypertriglyceridemia
- Hypercholesterolemia
- Pregnancy
- Diabetes

35-40% develop DR within 5 yrs, 60% develop OR within 20 yrs

A protein-enriched low glycemic index diet with omega-3 polyunsaturated fatty acid supplementation exerts beneficial effects on metabolic control in type 2 diabetes

- Prediabetes and Type 2 Diabetes
- Dietary Supplement: 3 g per day omega-3 polyunsaturated fatty acids in a protein-enriched low-GI diet
- HbA1c decreased significantly
- CRP decreased significantly

Managing the Progression of Diabetic Retinopathy

Diabetic Retinopathy Severity

- No Apparent Retinopathy
- Non Proliferative Diabetic Retinopathy (NPDR)
- Proliferative Diabetic Retinopathy (PDR)

Evidence that Omega-3s are Beneficial to Reduce Risk of Diabetic Retinopathy

Source: CDC’s “National Diabetes Statistics Report, 2017”

Matrix of diabetic retinopathy with long-chain omega-3 (DHA, eicosapentaenoic acid), or in overweight or obese patients with type 2 diabetes.
PREDIMED TRIAL

- Multicenter clinical trial in Spain
- 6 year median follow-up
- Compared >500 mg/d fish-derived LCω3PUFA with <500 mg/d
- 48% relative reduction in risk of sight-threatening DR with >500 mg/d (2 weekly servings of oily fish)
- Results concur with findings from experimental models and the current model of DR pathogenesis


Anti-VEGF Treatment Results in Visual Gain for Patients with DME

Can Omega-3s Benefit?

Evidence that Omega-3s are Even Beneficial in Conjunction with Anti-VEGF Treatment

Type 2 diabetes mellitus with center-involved DME
- 2 year study duration
- All subjects (76 eyes) received Lucentis 0.5 mg/0.05ml q month for 4 months then PRN
- Study eyes (n=34): 1050 mg DHA / 127 mg EPA
**Clear Benefits of DHA Supplementation vs. Anti-VEGF Alone**

- **OCT Central Macular Thickness**
  - DHA supplementation + Ranibizumab vs. Control (Ranibizumab)
  - DHA supplementation + Ranibizumab vs. Control (Ranibizumab)

- **ETDRS Visual Acuity**
  - DHA supplementation + Ranibizumab vs. Control (Ranibizumab)
  - DHA supplementation + Ranibizumab vs. Control (Ranibizumab)

**Conclusion**
- Ranibizumab + DHA supplementation reduced central subfield macular thickness compared with ranibizumab alone.
- The anatomical improvement was accompanied by a trend for an improvement in vision (not statistically significant).

**In Summary**
- **Omega-3s are beneficial for Diabetic Patients at risk for Diabetic Retinopathy**
  - Supports retinal cellular metabolism, structure and function.
  - Omega-3s, specifically high DHA, helps to delay the onset and slow the progression of Diabetic Retinopathy.
  - Omega-3s (DHA/EPA) assist in the suppression of retinal inflammation.
  - A minimum of 500mg/day of EPA/DHA provided at 48% decreased risk of sight-threatening DR.

**Diabetes Mellitus**
- Prediabetes and Diabetes Diagnosis: Classification and Risk Factors.
- Diet, exercise and weight loss.
- Omega-3 supplementation.
- Diabetic Retinopathy Progression.
- Risk factor reduction, metabolic control.
- Omega-3 supplementation: PREDIMED Study.
- Diabetic Macular Edema Management.
- Anti-VEGF therapy, intravitreal steroid, macular laser.
- Omega-3 supplementation added to anti-VEGF.
OCT Angiography

A New Approach to Protecting Vision

- Non-invasive visualization of individual layers of retinal vasculature
- Pathology not obscured by fluorescein staining or pooling
- Image acquisition requires less time than a dye-based procedure
- Reduced patient burden allows more frequent imaging to better follow disease progression and treatment response

Enface OCT-A Slabs Based on Retinal Anatomy

Normal Retinal Vasculature

Identify Early Vascular Changes in Diabetic Eyes

Assess Disease Progression with Multiscan View
29 year old man with diabetes

- Yearly diabetic exam, reports no changes to vision
  - Type 1 DM
  - BS: 190 this AM, last HbA1c 8.6
  - Vision 20/20
- Anterior segment: normal
- Posterior segment:
  - Non-proliferative DR
  - Hemorrhages and exudates
  - No DME
- Billed for:
  - Exam, 99214
  - Optomap, OCT-Wellness, and OCT-A (Angiography)
12-19-18 what do you see?

12-19-2018

12-19-18

12-19-2018

12-19-18

12-19-2018

12-19-2018

Aid in Disease Severity Assessment with FAZ Measurements

FAZ size and FAZ vessel density are correlated significantly with disease severity in CNV.

Drs. Caldwell, Kislan, and O'Dell
Predicting Alzheimer's Disease and other Neurological Conditions with Optical Coherence Tomography Angiography

Optical Coherence Tomography Angiography
- Detects red blood cell movement through changes in phase and intensity of the OCT signal
- Degeneration of the optic nerve and retinal ganglion cells can be monitored due to changes in profusion of the central retinal artery
- Verification of OCTA microvascular findings through post-mortem histologic tissue comparison

Alzheimer Disease Research Center at St. Louis case-control study
- 58 eyes from 30 participants (53% female, 97% Caucasian)
- All participants cognitively normal
- 14 participants had biomarkers for Alzheimer's disease (AD) (avg 73.5 years), 16 participants without biomarkers were the control group (avg 75.4 years)
- Foveal avascular zone was increased biomarker-positive group
  - 0.384 vs 0.275 mm²
- Mean inner foveal thickness was decreased in biomarker-positive group
  - 66.0 vs 75.4 µm (O'Byhim, 2018)
Retinal Microvascular Changes in Cognitively Impaired vs Control Participants at Duke

Participants:
- 70 eyes from 39 AD patients
- 72 eyes from 37 participants with mild cognitive impairment
- 254 eyes from 133 control participants

Comparisons:
- Vessel density
- Vessel profusion density
- Fovea avascular zone area
- Central subfield thickness
- Macular ganglion cell/inner plexiform layer thickness
- Peripapillary retinal nerve fiber layer (Yoon, 2019)

Significantly decreased superficial capillary plexus vessel density and profusion density at 3mm comparisons, also significantly decreased profusion density at 6mm

Significantly decreased ganglion cell/inner plexiform layer thickness located inferior/inferior nasally in Alzheimer’s patients vs mildly cognitively impaired with significantly decreased superior nasal/inferior nasal sectors

Mild cognitively impaired participants showed decreased temporal RNFL (Yoon, 2019)

Conclusions from Duke

Alzheimer’s participants were found to have reduced macular vessel density, reduced profusion density, and reduced ganglion cell/inner plexiform layer thickness when compared to mild cognitively impaired and control participants. The microvascular changes may correlate to cerebrovascular changes in Alzheimer’s (Yoon, 2019).

OCTA and Multiple Sclerosis

OCTA and Ischemic Optic Neuropathy

OCTA Conclusions

Limitations: lack of industry standard and anatomical variables
Less invasive than techniques such as fluorescein angiography
Multiple studies have concluded its value in monitoring blood flow and vessel density in multiple sclerosis, Alzheimer’s Disease, and optic nerve disorders.
USING OPTICAL COHERENCE TOMOGRAPHY TO MONITOR PARKINSON’S DISEASE & MULTIPLE SCLEROSIS

- Parkinson’s disease is characterized by a progressive loss of dopamine.
- Dopamine is a neurotransmitter used to provide input to the ganglion cell layer through connections in the inner plexiform layer (Moschos, 2018).

OCT AND PARKINSON’S DISEASE

- 31 Parkinson’s disease patients, 25 control
- OCT measurements:
  - Retinal nerve fiber layer (RNFL)
  - Choroidal thickness
- The results do not reveal a correlation between age, sex, IOP, BCVA, or axial length (Moschos, 2018).

OCT AND PARKINSON’S DISEASE CONCLUSIONS

- Parkinson’s patients showed a statistically significant reduction in ganglion cell layer and average RNFL thickness.
- Superior and temporal RNFL were also reduced.
- Choroidal thickness was also significantly reduced at the subfoveal area (Moschos, 2018).

References

OCT AND MULTIPLE SCLEROSIS

- 50% of patients with multiple sclerosis will experience optic neuritis.
- Post-mortem studies show neuronal retinal ganglion cell loss, optic nerve gliosis, and atrophy.
- 522 participants followed at baseline and 10-year follow-up.
- Analyzed the following structures:
  - Total macular volume
  - Peripapillary retinal nerve fiber layer
- Compared OCT findings with 10-year EDSS score (Rothman, 2019).

OCT AND MULTIPLE SCLEROSIS

- 26% of participants experienced clinically significant worsening of the EDSS score over 10 years.
- A lower baseline total macular thickness was associated with higher 10-year EDSS score.
- History of optic neuritis also increased the 10-year score.
- Patients with low total macular volume had thinner retinal nerve fiber layer subsequently poorer baseline function (Rothman, 2019).

OCT AND MULTIPLE SCLEROSIS CONCLUSIONS

- Total macular volume highly correlates with 10-year disability and predicts worsening of symptoms over that time period.
- The lowest tertile of total macular thickness is associated with higher likelihood for EDSS progression.
- Even after accounting for disability status.
- Multiple studies have revealed that thin RNFL is associated with a higher EDSS score, however this study connects retinal changes to allow for prediction of the disease (Rothman, 2019).

REFERENCES


Case RH

- 68 year old Caucasian male referred for dry eye evaluation.
- CC: redness, watering, burning with morning symptoms of eyelids “stuck together” when awakening.
- Ocular hx: no surgical hx, no Hx of using intraocular shots, currently using Xiidra 1gtt OU for about 1 year and Omega 3 fish oil from the referring OD.
- Systemic hx:
  - Hypertension—controlled with Amlodipine Besylate and Sertraline HCL
  - Factor V—controlled with Coumadin
  - Facial Rosacea
- Social Hx: (+) smoking (+) social drinking.
Key symptoms

- Morning “sticking” of his eyelids
- Things to consider for your exam:
  - EBMD
  - Inadequate nocturnal lid seal
  - Blepharitis
  - Think Demodex
  - Floppy eyelids

EBMD

- Subtle negative staining patterns with FL
- Be sure to evaluate the entire cornea.

Korb-Blackie Light Test

- Korb - ARVO 2017: 79% of patients with symptomatic dry eye disease were found to have compromised lid seal.

Eyelash evaluation

- Start SLE with eyes closed for good view of upper lash margin
- Consider epilation to confirm Demodex
- Other techniques

Floppy lids and lid laxity

- Evaluation of lashes - ptosis?
- Snap Test
- Upper lid evaluation

<table>
<thead>
<tr>
<th>Grade</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Lid retracts immediately on release</td>
</tr>
<tr>
<td>1</td>
<td>2 sec</td>
</tr>
<tr>
<td>2</td>
<td>3.5 sec</td>
</tr>
<tr>
<td>3</td>
<td>5 sec</td>
</tr>
<tr>
<td>4</td>
<td>7 sec or more to central position</td>
</tr>
<tr>
<td>5</td>
<td>Hold for 10 sec or more</td>
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</tbody>
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Drs. Caldwell, Kislan, and O'Dell
Case RH
- Entering Acuity: OD 20/20
- OS: 20/20 OU 20/20
- External exam: (+) inadequate nocturnal lid seal
- (+) Snap test OU - lower lids
- SLE: Eyelashes: Anterior blepharitis OU with collarettes visible
- Conjunctiva: WNL
- Cornea: OD: WNL OS: inferior corneal punctate keratitis
- Lissamine green: (+) LWE OS, no staining OD

• Cut-offs (Sullivan et al., 2010, Keech et al., 2013):

Grading both superior and inferior MG
- Pult Scale - most inter-observer reproducible

Dx:
- 1. Demodex blepharitis
- 2. Floppy lids OU
- 3. Dry Eye Disease OD: level 1, OS: level 2 with MGD obstructive disease and ocular rosacea

TX:
- 1. S/p In office blephex by referring OD and will continue with his Zocular foam cleanser daily
- 2. As gland function improves will make arrangement for surgical consult with ocularoplastics - continue gel or ointment qhs for now
- 3. Continue Xiidra 1 gtt OU BID and recommend gland clearing treatment with Lipiflow thermal pulsation to improve MG function
The sustained effect (12 months) of a single-dose vectored thermal pulsation procedure for meibomian gland dysfunction and evaporative dry eye.


Case RH
Referral to oculoplastics

Day of surgery - bilateral inferior intermittent ectropion

Post-operative period - remember Factor V

Follow up after referral to Oculoplastics

CL: “everything has gotten a lot better”

Patient is using Xiidra 1 gtt OU BID with some cost concerns, he is now s/p bilateral inferior ectropion repair and no longer using drops during the day or ointments to sleep. Symptoms are 90% improved with awakening and mild burning and watering remain

Case RH
Follow up

Acuity: unaided: OD: 20/20 OS 20/20 OU: 20/20

External Exam:

(+) Lid seal
(-) Snap test

SLE:

Eyelashes: Trace debris
 Conjunctival: Normal
 Cornea: normal
**Case RH**

- **Dry eye exam**
  - SPEED: 12/28
  - Osmolarity: OD: 298, OS: 303
- **Inflammadry**: OD: (-) OS: (-)

**Dx:**
1. Demodex blepharitis
2. Floppy lids with inadequate lid seal
3. OBD (level 1 with MGD)

**Tx:**
1. Continue daily lid hygiene
2. S/p surgical repair of lower lid ectropion with lid seal - Start at home nocturnal shield with eye seal 4.0
3. Continue Xiodra 1 gtt OU BID and refer for IPL treatment due to persistent redness from ocular rosacea

**Case PH**

- **Acuity:**
  - CC: OD: +2.25 - 0.75 x 070 20/40
  - OS: +2.75 x 095 20/40
- **External Exam:** NNL
- **SLE:**
  - Eyelashes: normal
  - Conjunctiva: (-) conjunctivochalasis OU
  - Cornea: (-)

- **SPEED:** 11/28
- **Osmolarity:**
  - OD: 308, OS: 307
- **Inflammadry:** OD (-) OS (-)
- **MGE:**
  - Meibography: grade 3 atrophy
  - MGE: MGVL5: OD: 8 OS: 8 glands

**CASE PH**

- **73 YO Caucasian female**
- **CC:** Pre-surgical dry eye evaluation with blurred vision due to cataracts OU as well as mild burning and occasional watering of eyes
- **Ocular Hx:** Seasonal allergies - per patient never formally tested
- **Systemic Hx:**
  - Type 2 DM - Controlled with oral medication
  - HTN - controlled
  - Hysterectomy from uterine cancer
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ASCRS 2019 Preoperative OSD screening

**Signs (Osmolarity/Inflammation):**

- **(-) screen:** OSD unlikely
- **(+) screen:** OSD likely
- Further testing: Meibography, LIT, Vital dyes
- OSD ruled out - proceed with surgery
- OSD "ruled in"
- Non- visually significant OSD
- Visually significant OSD - surgery delayed

**ASCRS PREOPERATIVE OSD ALGORITHM**

**CASE PH**

- **Dx:**
  - Cataract OU - visually significant - mild symptoms dry eye disease without clinical findings
  - Mild CCH OU
- **Tx:**
  - Refer for laser assisted Cataract extraction OU - dropless, recommend monovision for IOL selection.
  - Pre-treatment with daily use of hypocholor to aid in reduction of bacteria prior to upcoming surgery.

Updated SPEED
CASE PH - post surgical

CC: Here for post surgical exam and refraction for updated Rx. Vision is much improved however she is having watering of her eyes with mid day burning. Feels better when her eyes are close. Thought to be worsening of her seasonal allergies.

Ocular Hx: Cataract extraction OU laser assisted with LRI OU. Patient was pleased with her vision.

Ocular medications: Bromsite OU qd - now d/c.

Final rx:
- OD: +0.50 -0.50 x 080 20/20
- OS: +0.25 -0.25 x 055 20/20

External exam: noticed epiphora prior to SLE

SLE:
- Eyelashes: WNL
- Conjunctiva: Significant conjunctivochalasis noted OU and found to be in direct apposition to the punctum.
- Cornea: WNL

Case PH - exam

- Final Rx:
  - OD: +0.50 -0.50 x 080 20/20
  - OS: +0.25 -0.25 x 055 20/20

SLE:
- External exam: noticed epiphora prior to SLE
- Eyelashes: WNL
- Conjuctiva: Significant conjunctivochalasis noted OU and found to be in direct apposition to the punctum.
- Cornea: WNL

Case PH - Dry Eye Testing

SPEED: 18/28

Osmolarity: OD: 297 OS: 313

Inflammadry: OD: (-) OS: (-)

MGE:
- Continue to have clear meibum expressing with MGE

Case PH

DX:
- Conjunctivochalasis OU grade 3-4 with NCCh noted and overlying punctum disrupting normal tear drainage
- Epiphora with mild DED OS

TX:
- Start Pazeo 1 gtt OU qam - due to self-reported symptoms of allergy and CCH OU
- Start Xiidra OU 1 gtt OU BID

Dr. Google to the rescue

Patient PH is my mother-in-law at a family gathering: I googled my symptoms (tearing) and "they" said to use Refresh plus every hour.

ME: "I’m not surprised as it seems a though your symptoms are more dry eye related than allergy."

After the Xiidra sample ran out (10 days) she noticed watering.

She was avoiding outdoor sports activities for her grandchildren.

Closing her eyes gave her most relief.

After another consult to the pharmacist - she RTO for an emergent dry eye follow up.
Case PH

- **Dry eye testing:**
  - Osmolarity OD: 298 OS: 310
  - Inflammadry (OU)

- **External exam:** epiphora noted from the central lower lid OU

**DX:**
- Conjunctivochalasis OU - grade 3-4 with NCCh noted and overlying punctum disrupting normal tear drainage
- Epiphora with mild DED OS

**TX:**
- Start Lotemax 1 gtt OU QID x 1 week then taper to BID until F/U in 3 weeks
- Continue Xiidra OU 1 gtt OU BID

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**Conjunctivochalasis**

- dry eye symptoms, abnormal tear permeability, and ocular surface changes

**Peripheral Exudative Hemorrhagic Chorioretinopathy (PEHCR)**

- **Clinical Features**
  - Most often located within the infero-temporal quadrant, and anterior to the equator
  - Retinal Findings: subretinal hemorrhage (78%), subretinal exudation (21%), serous PED (28%), sub-RPE hemorrhage (24%), and vitreous hemorrhage (24%).
  - Chronic changes include RPE hyperplasia, and atrophy
  - B Scan: dome-shaped mass with hollow acoustic quality
  - FA: patchy blockage of choroidal fluorescence at the site of hemorrhage, and diffuse filling in serous PED
  - Symptoms: Loss of vision, floaters, photopsia, metamorphopsia and pain on rare occasions.
  - Pain secondary to angle closure from a sub RPE hemorrhage
PEHCR vs. Choroidal Melanoma

A Hemorrhagic Pigment epithelial detachment (PED) secondary to PEHCR may present as a dome shaped mass of similar size and location, as a choroidal melanoma.

Management and Prognosis

- Asymptomatic Patients Observed
  - Most lesions stabilize or regress over time (fibrosis, RPE atrophy, RPE hyperplasia)
- Anti-VEGF for subfoveal blood or fluid
- Laser photocoagulation + Anti-VEGF for choroidal neovascularization w/subretinal fluid
- Vitrectomy for vitreous hemorrhage

References

- https://eyewiki.aao.org/Peripheral_exudative_hemorrhagic_chorioretinopathy

Multiple Evanescent White Dot Syndrome (MEWDS)

Clinical Features

- Rare, idiopathic, self limiting disease that most commonly affects young to middle aged females
- Viral prodrome is associated with 50% of cases
- Symptoms include a sudden decrease in vision, paracentral scotoma, enlarged blind spot, and temporal photopsia
- Characterized by flat, multifocal gray-white lesions located in the outer retina and/or RPE, with foveal granularity
- Other exam findings include: (+) APD, mild vitritis, disc edema, and vascular leakage
- ERG may reveal a reduced A wave amplitude
- Disease of the photoreceptors with disruption of the outer segments and ellipsoid zone.
Clinical Features

Management and Prognosis

- Short clinical course of 1-2 months
- Most patients experience complete visual recovery
- White dots resolve spontaneously, although foveal granularity and mild pigmentary changes may remain
- Recurrences are rare

CASE

- 73 YO Caucasian Female
- CC: mild difficulty with her reading vision gradual onset over the past 3 months
- Since her last exam she was diagnosed with pancreatic cancer and has begun IV chemotherapy with combination of Gemzar/Abraxane
- Ocular Hx: cataract OU, dry eye disease OU, glaucoma suspect OU based on cupping OU
- Systemic Hx: metastatic pancreatic cancer - dx 8 months prior to exam

CASE

- https://www.aao.org/focalpointssnippetdetail.aspx?id=c91e58d4-1020-4316-9243-33acf04fa90a
CASE DW - exam

- Acuity:
  - OD: -1.50 - 0.25 x 130 Add: -0.25 20/25
  - OS: -2.25 Add: -3.50 20/25

- Final Rx:
  - OD: -1.50 - 0.25 x 130 20/25
  - OS: -1.50 sph 20/25

- Exam:
  - OF 20 mm OU with Goldmann
  - Confrontation fields full, normal pupils, normal EOM

Case DW

- Glaucoma evaluation that day with 24-2 and OCT exam
  - VF 24-2 site faster
  - OD: MD: -0.16 PSD: 1.95 - scattered nasal points
  - OS: MD: 1.19 PSD: 3.07 - scattered inferior points not previously noted
  - OCT
  - NL NFL noted OU
  - Macular scan however showed abnormality centrally

Posterior Segment Toxicity Following Gemcitabine and Docetaxel Chemotherapy

Ali Kord Valeshabad, MD, MPH, William F. Mieler, MD, Vikram Setlur, MD, Merina Thomas, MD, and Mahnaz Shahidi, PhD

Abstract

To report relevant unusual and late-onset following toxicities in patients with gemcitabine and docetaxel chemotherapy for metastatic uveal melanoma.

Case Report

A 66-year-old woman presented with blurry vision following an episode of gemcitabine and docetaxel chemotherapy for metastatic uveal melanoma. Her medical history included a 25-year history of smoking, controlled glaucoma, and a history of diabetes. She presented with a 30-mm Hg increase in intraocular pressure and a decrease in visual acuity. Ocular examination revealed a 2-disc-diameter choroidal mass with a yellowish appearance. She was treated with topical medications, including a steroid, cycloplegics, and latanoprost. Unfortunately, the tumor continued to grow despite treatment, and the patient was referred to a retinal specialist. The final diagnosis was metastatic uveal melanoma.

Case DW

- Dx:
  - Vortex keratopathy OU
  - Glaucoma suspect OU
  - Cataract OU
  - Macular abnormality OU
  - Newly noted macular pucker OS

- Tx:
  - Monitor - no longer using amiodarone for her recently dx A. fib
  - Glaucoma suspect OU (+) family hx, mother. Thin corneas with normal OCT and VF findings - continue to monitor
  - Becoming visually significant
  - Refer to local retinal specialist to determine if macular change are related to her IV chemotherapy
  - Monitor Macular pucker OS for change over time

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Case: New patient Friday Evening

- 40 YO AA female
- CC: “time for my annual exam”
- MRI/AMD symptoms of dryness that she is using daily AT’s – symptoms seem worse with long hours of driving to and from her job
- Ocular Hx: LASIK OU and PRK enhancement x2 OU
- Systemic hx: Negative

Friday nightmares

Case – Friday nighttime

- Acuity: OD: 20/20 OS: 20/20 OU: 20/20
- Refraction: OD: Pl 20/20 OS: Pl 20/20
- External exam: noted eyelash enhancement with false eyelashes - questioned patient to her beauty habits and she admits to application of false eyelashes monthly.
- SLE:
  - Eyelashes: Blepharitis OU - moderate crusting with false eyelashes and glue noted
  - Conjunctiva: MGD OU
  - Cornea: Faint visible LASIK flap noted OU without keratitis OU
  - Lens: WNL
  - IOP: 10 OU
  - Posterior pole: OD: .3 OS: .3 all normal findings

Case – Friday Night

- Dx: Blepharitis OU
- Tx:
  - Educate patient to risks associated with false eyelashes
  - Photo document blepharitis to educate and follow
  - Recommended starting application of hypochlor in place of her baby shampoo for daily cleaning of her lid margin
  - Recommended RTO for formal dry eye evaluation due to her risk for MGD

False Lashes

- Blepharitis: Patients stop cleaning their lash bases.
- Formaldehyde laden adhesives leach onto the ocular surface, irritating at 0.5 ppm:
  - Clinically observed chemical conjunctivitis
  - Clinically observed allergic reactions to eyelash extension adhesives
  - Synthetic prostaglandins lace the OTC eyelash growth serums: Isopropyl Cloprostenolate
Formaldehyde

- We need better, more Ocular Surface friendly preservatives.
- Formaldehyde.
- Formaldehyde nervous at 0.
- Hidden off.

Lid:Lash Ratio

- Altered eyelash length:lid length ratio results in:
  - altered natural properties:
    - wind deflection
    - debris deflection
    - allergen deflection

Eyelash Enhancement

- False eyelashes
- Cosmetics
- Eyelash growth serums

The Never list

- Never share cosmetics
- Never use products on the eyes intended for lips, paper, etc
- Never alter with heat
- Never moisten with saliva
- Never apply while moving

Wear cosmetics without the risk

- Sharpen eyeliner pencils with each uses
- Replace moist cosmetics monthly
- Remove make up daily
- Clean make up brushes regularly

TOP 10 OCULAR SURFACE-OFFENDING INGREDIENTS

1. Alcohol
2. Argireline (Acetyl Hexapeptide-3, Lipotec)
3. Benzaionium chloride (BAK)
4. Butylene Glycol
5. Ethylene/diaminetetraacetic Acid (EDTA)
6. Formaldehyde & Formaldehyde Donors
7. Isopropyl Cloprostenate
8. Parabens
9. Phenoxyethanol
10. Retinol
TOP 10 OCULAR SURFACE BEAUTY BLUNDERS

1. Botox for Crow’s Feet
2. Botox in a Jar
3. Eyelash Extensions
4. Eyelid Tatooing
5. Eyelash Tinting
6. Eyeshadow Powder or Glitter
7. OTC Eyelash Growth Serums
8. Retin-A
9. Sharing Eye Makeup
10. Waterproof Eye Makeup

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CASE - PS

52 year old Caucasian female with history of dry eyes for several years. History of intolerance to Restasis. Currently using Xiidra OU BID with continued complaints of burning and eye fatigue. This is worse toward the end of the day and with prolonged computer use.

- Symptom Assessment:
  - SPEED survey: 12
- Clinical Evaluation:
  - Corneal OSM: 310 OS: 320
  - TBUT: OD: 5 sec OS: 1 sec
- Normal corneal and conjunctival staining patterns with FL
- Mild Lissamine green staining of the lid wiper epithelium OU
- Subtype Classification testing (TFOS DEWSII)
- Meibomian gland expression
  - (MGE) OD: 7 MGYLS OS: 2 MGYLS

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CASE STUDY: OD Pre and Post (1 month after procedure)

CASE STUDY: OD Pre and Post (1 month after procedure)

CASE STUDY: OD Pre and Post (1 month after procedure)

CASE STUDY: Lipid Layer Thickness OD & OS Post TearCare Procedure
**History**
- 62 yo WF bilateral cat sx w tonic IOL
- OD 9-14-18, OS 10-10-18
- CC: dryness p/o, worse at night, gets up 1-2x per night, blur, dit and near that fluctuates, chronic irritation, burning worse in am since cat sx, uses sooth xp and thera tears 6x a day
- Pt states, “my cataract surgery didn’t work and has made my vision and eyes worse”
- Only pre op instructions were OTC tears PRN and usual pre op meds

**Exam 2/7/19**
- BCVA 20/20- OD and OS
- Present rx: OD -1.25, OS -1.00-0.50x25
- Refraction: OD 1.00 20/20-, OS 1.25 0.75x45 20/20-, pt states vision fluctuating
- SLE: ITF 2, sup and inf Fl stain, conj lissamine stain, TBUT 4
- ID: positive
- Osmolarity: 288, 299

**Follow up 4/5/19**
- CC: compliant w meds, less fluctuating vision
- BCVA: 20/20- OU with less fluctuations
- Refraction: OD 1.25 20/20-, OS 1.00-0.50x35 20/20- fluctuating but less
- SLE: ITF 1, lissamine stain on conj, cornea clear, TBUT 8
- ID: weak positive
- Osmolarity: 298, 294

**Treatments**
- PRN DEO 2po bid (2400mg EPA/DHA)
- Lotemax bid ou
- Restasis bid ou
- MiboMask 10-12 minutes bid
- Had new glasses on order at wal mart-told her to cancel
Treatments
- Cont DEO 2po bid
- Cont Restasis bid ou
- Change to Lotemax SM bid
- Inferior semi permanent plugs inserted
- Continue MiboMask

Follow up 5-8-19
- CC: Pt feels vision much sharper, no fluctuations
- Refraction: same
- SLE: neg stain, TBUT 9
- ID: negative
- Osmolarity: 299, 296

Treatments
- New spectacle rx-pt purchased progressive poly transition w blue block, also second pair polarized progressive w blue block
- Cont DEO 2po bid
- Cont Restasis bid ou
- Decrease Lotemax SM to on condition only until empty then d/c
- Cont MiboMask
- Disc permanent plugs, miboflo, lipiflow, true tear
- RTC: 4 months

Lessons Learned?
- Cataract surgery went fine…pt perception?
- Why didn’t surgeon do a OSD wu pre-op
- ALWAYS OSD wu before specialty IOL
- Cataract surgery can push “mildly sick” corneas over the edge
- New pt with >$1K in practice revenue
Which is More Suspicious?

- Shows early changes in the retina and optic disc
- Adds new information to the diagnosis
- Aids in progression detection

How Does OCTA Change the Way You See Glaucoma?

Review of Normal
25 year old man
Review of Normal 60 year old man

60 Year Old Montage OD

60 Year Old Montage OS

60 Year Old Montage OU

68 year old woman with glaucoma

- Wants second opinion for glaucoma management
- Recently had cataract surgery OS with iStent
  - September 25, 2017
  - Dorzolamide 2% BID OS, Lumigan 0.01% QD OS
- Our practice recently performed cataract surgery and Kahook dual blade (KDB) MIGS
  - July 24, 2018
- IOP: 12 and 16 at 11:27 am

OCT for Pachymetry in Glaucoma
OCT GCC and NFL

Visual Fields

Angiography and AngioAnalytics of Disc

En Face Radial Peripapillary Capillaries (RPC)

Angiography and AngioAnalytics of Retina

Montage OD
Montage OS

Montage OU

74 year old man

- POAG, OS > OD
- Lumigan 0.01% QD OU
- Combigan BID OU

VF OD and OS 1-26-2018

VF OD and OS GPA 1-26-2018

OCT NFL and GCC 9-25-2018

54 year old man

- POAG, OU > OS
- Lumigan 0.01% QD OU
- Combigan BID OU

VF OD and OS GPA 1-26-2018

OCT NFL and GCC 9-25-2018
Change Analysis NFL-GCC

OCT-A 9-25-2018
POAG OS > OD

Montage OD

Montage OS

Montage OU
They do read their EHR communication

49 year old man

- Ocular Hypertension since 2014
  - No treatment
- Pigment Dispersion
  - Baseline IOP at Tmax 26/26 2014—March 2018
  - Today 30/32, new Tmax 9-25-18

49 year old man

VF 24-2 Sita-Faster 9-25-2018

OCT NFL and GCC 3-22-18

OCT-A 9-25-2018

OCT-A 9-25-2018
Montage OD

Montage OS

Montage OU

Questions

Thank You!