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Two Truths & a Lie

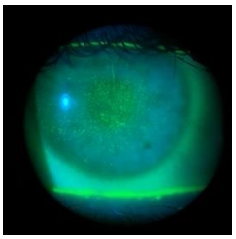
Rapid Fire Format of cases that contain truths and a "lie".

Join us in these fun discussions on our journey from the front of the eye to the back. Case reports will be presented with traditional thinking and then a lie will be revealed based on evidence-based medicine that makes us all think differently. These new approaches will challenge us in diagnosis and treatment of patients that are seen every day in clinical practice.

Key Objectives:

- Discuss and review evidence-based cases of the anterior segment
- Discuss and review evidence-based cases of the posterior segment
- Review diagnostic corneal sensitivity testing
- Review diagnosis and treatment of keratoconus
- Review diagnosis and treatment of geographic atrophy
- Review diagnosis and treatment of diabetic macular edema

The Myth: A Cornea that looks like this is "severe dry eye."

- 

1. Symptoms
2. Tear Composition
3. Ocular Surface
4. Lid structure and function
5. Treat Inflammation and Obstruction

Symptoms of the patient

Options for a Validated Questionnaire

- OSDI (Ocular Surface Disease Index-*Allergan*)
- SPEED (Standardarized Patient Evaluation of Eye Dryness and Ocular Surface Disease Index-*TearScience*
- DEQ-5 (The Dry Eye Questionnaire-*Chalmers et al*)

Tear Composition

- Tear Osmolarity-This diagnostic tool measures the saltiness of tears, or osmolarity. In reviewed literature Osmolarity readings above 308 mOsms/L or an inter-eye difference of >8 mOsm/L are an indication of mild osmolarity and loss of homeostasis[3,4].
- MMP-9 (Metalloproteinase-9) is a nonspecific inflammatory marker that can be present in patients who have dry eye disease[5].

Ocular Surface Integrity

- Tear Meniscus Height-This information tells us how much tear volume is present. The normal average is 0.2mm[6].
- Lissamine Green-This vital dye stains devitalized cells of the conjunctiva. Symptoms and conjunctival staining characterize Level 1 dry eye disease[1]. No corneal signs will be present. This dye is a must have otherwise you will miss Level 1 severity and may put off treatment until the patient progresses to Level 2 or 3.
- NaFl (Sodium Fluoroscein)-This vital dye stains corneal breaks and devitalized cells of the cornea. Certainly an important indicator in establishing the health of the cornea. Must have!
- Measuring TBUT or Tear Break Up Time gives important information about how long the tear film stays in place or the stability of the tears.
- Phenol Red is a patient preferred Shirmer's test. It measures tear volume in 15 seconds with much less reflex tearing than Shirmer's. Nice to have when an objective measure of tear volume is needed for those truly aqueous deficient patients.

Lid structure and function

- Lid morphology with the slit-lamp is the basic diagnostic test here.
- Expression of meibomian glands is important to know the quality of meibum and quantity that are functioning. Diagnostic tools: cotton swab, fingertip, or meibomian gland evaluator[7].
- Blink rate-Identifying patients that have a partial blink, full blink, and how many times they blink is important to evaluate. Proper blinking facilitates meibomian gland functionanaility[8].
- Meibography

Serology

- Sjogren's syndrome test –SS-A(RO), SS-B (La) and proprietary biomarkers (Quest Diagnostics)(SP-1, IgA, IgC, IgM,)

The Ocular Surface Exam

- Case History
- Validated Symptom Questionnaire
- Tear Lab Osmolarity
- Blink rate and thorough evaluation of lids at slit lamp
- Tear meniscus height
- Corneal and Conjunctival staining with NaFL and Lissamine
- TBUT with fluorescein

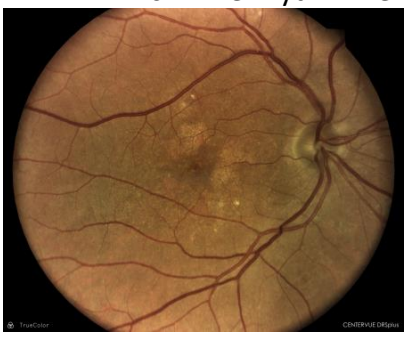
Diagnostic Tools

- Meibography
- Digital photography
- Videography
- CWT

Neurotrophic Keratitis-

  - Signs/Symptoms
  - Differential Diagnosis
  - Diagnostic Testing
  - Mackie Classification
  - Treatment Options
  - Discussion

- Retina Case #1: Time is of the essence
  - The Myth: There is nothing that can be done for Geographic Atrophy



I. Geographic Atrophy
   a. Clinical presentation

i. Characterized by the presence of retinal atrophy that arises as a result of progressive and irreversible loss of the photoreceptors, retinal pigment epithelium (RPE) and choriocapillaris

b. Pathophysiology
    i. Complement factor pathway
        1. C3, C5, Membrane Attack Complex
c. Status of the fellow eye in risk assessment
d. Risk factors for progression
    i. GA size- GA lesions that are large at baseline, have a higher rate of progression
    ii. Number of GA lesions- multifocal lesions have increased rates of GA growth
    iii. Shape- Irregularly shaped lesions grow more rapidly than circular lesions
    iv. Location of the atrophy (foveal versus extrafoveal)- GA can present with or without foveal involvement. Foveal involvement is believed to be a strong predictor of growth rate and progression. Extrafoveal lesions progress more rapidly than foveal lesions
    v. OCT and FAF findings
    vi. Type of drusen- Reticular pseudodrusen or subretinal drusenoid deposits reside in the subretinal space (versus regular drusen that exist between the RPE and Bruch's membrane). These drusen have a "saw-tooth" appearance and resemble small triangular projections on OCT. Reticular pseudodrusen are highly linked to GA progression.
    vii. Hyper-reflective foci- Hyper-reflective dots or round lesions within retinal layers on OCT. These foci are biomarkers for disease progression and prognosis including macular atrophy.
e. Multi-modal imaging
    i. Color fundus photography
    ii. OCT (CAM Classification Criteria)
        1. Complete RPE and outer retinal atrophy (cRORA)
            - Loss of outer retinal layers
            - RPE loss
            - Choroidal hypertransmission of at least 250 um: Choroidal hypertransmission (increased signal penetration into the choroid) occurs as a result of the atrophy or attenuation of the overlying sensory retina and RPE.
        2. Incomplete RPE and outer retinal atrophy (iRORA)
            - Earlier stage of atrophy
            - Patchy loss of the RPE (less than 250 um)
            - Choroidal hypertransmission (less than 250 um)
        3. Complete outer retinal atrophy (cORA)
            - Continuous non-visibility of the ellipsoid zone and interdigitation zone
            - Severe thinning of the outer retina
            - Intact RPE band
            - Choroidal hypertransmission is intermittent
        4. Incomplete outer retinal atrophy (iORA)
            - Continuous external limiting membrane (ELM)
            - Detectable ellipsoid zone disruption
            - Thinning of outer retina
            - Intact RPE band
            - No hypertransmission defects

iii. Fundus Autofluorescence (FAF)
    1. Patterns (seen in the junctional zone of GA)
        a. None
        b. Focal- Evidence of one or more small spots of elevated FAF at the edge of the lesion
        c. Patchy-Lesions show some FAF spots outside the GA lesion area, with spread toward the posterior pole
        d. *Banded - increased autofluorescence is characterized by a continuous stippled band of increased FAF surrounding the entire atrophic area
        e. Diffuse: (Reticular, branching, fine-granular with peripheral punctate spots, or *diffuse trickling); Diffuse trickling- lesions demonstrate gray (rather than black) hypoautofluorescence and lobular atrophic patches with high intensity at the margins

iv. Near Infrared Reflectance Imaging

II. Treatment?
- a. Syfovre: pegcetacoplan injection
    - i. First FDA approved intravitreal injection to halt progression of GA
    - ii. Targeted C3 therapy
    - iii. Up to 36% reduction rate when used monthly
- b. Izervay: avacincaptad pegol (ACP)
    - i. Complement 5 inhibitor
    - ii. observed efficacy rates of up to 35%

- Retina Case #2: Don't mind the swelling
    - The Myth: All Diabetic Macular Edema is created equal

I. Diabetic Macular Edema
- a. A retinal complication that is assessed in addition to the level of retinopathy
- b. DME is the collection of intraretinal fluid in the macula with or without exudate or cystoid changes
- c. VA is usually compromised when DME affects the fovea

II. Clinically significant macular edema
- a. The term clinically significant macular edema (CSME) was introduced in the Early Treatment Diabetic Retinopathy Study to signify an increased risk for moderate visual loss, defined as doubling of the visual angle (e.g., from 20/40 to 20/80)

To be classified as CSME, one or more of the following criteria must be present:
- i. • Thickening of the retina ≤500 microns (1/3 DD) from the center of the macula

ii. • Hard exudates ≤500 microns (1/3 DD) from the center of the macula with thickening of the adjacent retina
iii. • A zone or zones of retinal thickening ≥1 disc area (DA) in size, any portion of which is ≤1 DD from the center of the macula.

III. Diabetic macular edema
a. Diabetic macular edema can be further classified as:
i. • Non-central-involved – retinal thickening in the macula that does not involve the center subfield zone that is 1mm in diameter
ii. • Central-involved – retinal thickening in the macula that does involve the central subfield zone.
b. Why does it matter?
i. Eyes with central-involved DME had nearly a ten-fold greater risk for developing moderate visual loss compared to eyes without center involvement, stressing the importance of determining central involvement in eyes with macular edema.
c. Case examples
i. Role of OCT
1. Raster
2. Retinal thickness map
d. Treatments
i. Steroids
ii. Laser
iii. Anti-VEGF
1. A review of the new agents