MYSTERY RETINA 2016: INTERACTIVE DISCUSSION OF CHALLENGING CASES

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WAEPS
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Objectives

- Describe several diagnostically challenging retina cases
- Understand the signs and symptoms that lead to the correct diagnosis
Evaluation of the retina can provide information regarding the presence and severity of many systemic diseases.
Normal Retina
**Layer Abbreviations**

- **ILM**: Inner limiting membrane
- **IPL**: Inner plexiform layer
- **INL**: Inner nuclear layer
- **OPL**: Outer plexiform layer
- **ONL**: Outer nuclear layer
- **ELM**: External limiting membrane
- **IS/OS**: Junction of inner and outer photoreceptor segments
- **OPR**: Outer segment PR/RPE complex
- **GCL**: Ganglion cell layer
- **NFL**: Nerve fiber layer
- **GCL**: Ganglion cell layer
- **NFL**: Nerve fiber layer
- **RPE**: Retinal pigment epithelium
- **+ Bruch’s Membrane**
Common Retinal Disorders

Central Retinal Artery Occlusion

Central Retinal Vein Occlusion
Diabetic Retinopathy
Case 1

- HPI: 59 year old African American male complaining of decreased vision in the right eye x 5 days
- Meds: None
- POHx: None
- Vision: OD: CF, OS: 20/25
- IOP: OD: 8, OS: 9
- Anterior chamber:
  OD: 2+ cell, OS: 1+ cell
Further testing?

- Fluorescein angiogram
- OCT
2/25/2015, OD
IR&OCT 30° ART [HS] ART(11) Q: 24
So what do we know?

- Inflammation
- Chorioretinal process

UVEITIS

- Idiopathic
- Autoimmune
- Infectious
- Cancer
Additional history

- Not on any medications but....

- Patient admits that he is HIV+, but not seeking medical care

- Uveitis lab work-up done:
  - positive for syphilis
After treatment with IV penicillin:

Vision returned to 20/30 OD and 20/25 OS
After IV penicillin treatment:

At initial presentation:
Ocular Syphilis

- The majority of cases have been among HIV-infected patients

- Ocular syphilis can involve almost any eye structure (posterior uveitis, panuveitis, anterior uveitis, optic neuropathy, retinal vasculitis and interstitial keratitis)

- All patients with syphilis should receive an HIV test if status is unknown or previously HIV-negative

- Ocular syphilis should be managed according to treatment recommendations for neurosyphilis
Case 2

- 30 year old female with no visual complaints
- PMHx: Type 1 DM since age 4, dyslipidemia, anemia
- Vision: 20/20 OU
- IOP normal OU
- Investigations?
- Diagnosis?
- Cholesterol (total): 313 mg/dL
- Triglycerides: 1046.3 mg/dL (normal triglycerides <150 mg/dL)
- No family history
Lipaemia Retinalis

- Manifestation of excess triglycerides in the bloodstream
- It is directly related to the levels of plasma triglycerides exceeding 1000 mg/dl
- Associated with types I, II, IV and V hyperlipoproteinemia
# Classification

<table>
<thead>
<tr>
<th>Grade</th>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>Grade I</td>
<td>Early</td>
<td>Peripheral vessels have a creamy tint</td>
</tr>
<tr>
<td>Grade II</td>
<td>Moderate</td>
<td>Extension of cream-coloured vessels towards the disc</td>
</tr>
<tr>
<td>Grade III</td>
<td>Marked</td>
<td>All vessels are cream-coloured, arteries and veins indistinguishable. Fundus appears a salmon colour</td>
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*Table I. Grading system to describe the stages of lipoaemia retinalis*

[^2]: Source or note for grading system.
At presentation

1 month later after cholesterol treatment
Complete recovery of fundus after treatment of hyperlipidemia
Case 3

- 56 year old male referred for scars in both eyes. He is otherwise asymptomatic

- PMHx: None
- Meds: None

- Vision 20/20 OU

- IOP: OD: 10  OS: 9

- Anterior chamber: WNL OU, quiet OU
Thoughts?

- Angioid streaks
- Vasculitis
- Pigmented paravenous retinochoroidal atrophy
Pigmented paravenous retinochoroidal atrophy

- Characterized by:
  - perivenous pigment clumps
  - peripapillary and radial zones of retinochoroidal atrophy distributed along the retinal veins

- Patients are usually asymptomatic and the disease process is non-progressive or slow and subtly progressive

- Commonly bilateral and symmetric

- The cause of the condition is unknown

- No treatment indicated
Case 4

- 60 year old female with poor vision for 10+ years.

- PMHx: Lupus, Rheumatoid Arthritis, Hypertension, Sjögren's Syndrome

- POHx: Amblyopia OS, high myopia -18 D

- Vision: OD: 20/60 OS: 20/400

- IOP: OD: 13 OS: 12
7/10/2015, OD
IR&OCT 30° [HS] ART(10) Q: 25
Bull’s Eye Maculopathy

- **Differential diagnosis:**
  - Age-related macular degeneration
  - Bardet-Biedl syndrome
  - Benign concentric annular macular dystrophy
  - Chloroquine/hydroxychloroquine maculopathy
  - Cone dystrophy
  - Cone-rod dystrophy
  - Idiopathic central serous retinopathy
  - Leber congenital amaurosis
  - Lipofuscinosis
  - Sorsby central areolar choroidal dystrophy
  - Stargardt disease
What’s the most likely cause in our patient?

- Hydroxychloroquine (Plaquinil) Maculopathy
  - Our patient has history of Plaquinil use from 1982-2002) and ALSO chloroquine use (2002-2005).
Hydroxychloroquine Retinopathy

- Most influenced by daily dose, length of use, and cumulative dose over time.

- Risk for toxicity is least with less than 6.5 mg/kg/day for hydroxychloroquine and 3 mg/kg/day for chloroquine.

- Patients are at low risk during the first 5 years of treatment. Cumulative use in excess of 250 grams increases the risk for toxic retinopathy.

- Other risk factors:
  - obesity, kidney or liver disease, older age, and other retinal disorders.
Flying Saucer Sign
Treatment

- No treatment

- Medication cessation **DOES NOT** reverse retinopathy (in fact, the drug can still be detected in the blood and urine of patients 5 years after cessation of therapy)

- Goal is prevention with early screening
Case 5

- 67 yo male with sudden blurry vision x 2 days

- Vision 20/200 OU

- IOP wnl OU

- Anterior segment: wnl OU, quiet OU
Autofluorescence
Diagnosis?

- Serous Retinal Detachments
  - Central serous retinopathy
  - Age related macular degeneration
  - Lupus erythematosus
  - Choroidal ischemic disorders (such as accelerated hypertension and pre-eclampsia)
  - Choroidal tumors
  - Inflammatory disorders
More history...

- Patient was diagnosed with CMML (chronic myelomonocytic leukemia)
- Lumbar puncture showed evidence of CNS involvement with leukemic cells
- Patient started treatment with chemotherapy
Treatment is aimed at treating his underlying malignancy
Case 6

- HPI: 31 year old male complaining of blurry vision in the right eye

- POHx: Advanced glaucoma (on Cosopt, Lumigan, Iopidine)

- Vision: OD: 20/40  OS: 20/20
- IOP: OD: 14  OS: 15
Dilated episcleral vessels
Fluorescein Angiogram
Fluorescein angiography: early hyperfluorescence with persistence of hyperfluorescence through the late phases of the angiogram. The hyperfluorescent pattern is diffuse and corresponds with the tumor margins.
ICG: rapid diffuse filling in early phases of the angiogram with intense persistence of hyperfluorescence into the late phases
Thoughts?

- Sturge Weber Syndrome
  - Port wine stain (facial angioma)
  - Choroidal Hemangioma
  - Glaucoma
Sturge-Weber Syndrome

- Classic signs:
  - Port-wine stain
  - Diffuse Choroidal hemangioma
  - Dilated and tortuous episcleral vessels
  - Seizures
  - Glaucoma

- Neuroimaging should be performed to evaluate for CNS angiomas (not malignant, but will cause local problems)

- 50% of patients will develop glaucoma, and 80% of patients may develop seizures

- Glaucoma pathophysiology: Resistance to aqueous outflow due to elevated episcleral venous pressure vs. underlying angle anomaly
Treatment of choroidal hemangioma

- Diffuse choroidal hemangioma may be asymptomatic.

- Visual loss can occur secondary to refractive error, foveal distortion, and exudative retinal detachment.

- Observation may be appropriate for asymptomatic cases that lack subretinal fluid exudation.

- When visual loss occurs, therapy is aimed at inducing tumor atrophy, resolving exudative retinal detachment, and minimizing foveal distortion:
  - Radiotherapy
  - Photodynamic therapy
Case 7

- 40 year old Caucasian male complaining of sudden onset blurry vision in the right eye. Describes constant circular blurred area, "like after image of bright light"

- PMHx: None, but getting over the flu
- Meds: None

- Vision: 20/20 OU

- IOP: OD: 14  OS: 12

- Anterior chamber: WNL OU, quiet OU
11/6/2014, OD
IR&OCT 30° ART [HS] ART(11) Q: 35
Additional history

- Patient recovering from recent “flu”
  - Described having a rash on his hands and feet, and blisters in his mouth

- Thoughts?
Unilateral Acute Idiopathic Maculopathy

- Young healthy adults who developed sudden, severe, unilateral central visual loss after a flu-like illness

- Exudative detachment of the macula overlying a grayish thickening of the RPE

- Resolved spontaneously over a period of 3 to 6 weeks with near complete recovery of vision in all patients.

- A residual RPE change is characteristic.
Unilateral Acute Idiopathic Maculopathy

- Possible relationship between coxackievirus (hand-foot-mouth disease) and UAIM has been hypothesized
4 months later
2/25/2015, OD
IR&OCT 30° [HS] ART(9) Q: 25
Case 8

- 22 year old female complaining of sudden decreased vision in the right eye

- PMHx: None

- Meds: None

- Vision: OD: 20/40    OS: 20/30

- IOP wnl OU
Autofluorescence imaging
- Thoughts?
On presentation

1 month later
Thoughts?
MEWDS (Multiple Evanescent White Dot Syndrome)

- Classic findings:
  - Sudden drop in visual acuity
  - Mostly young females
  - Small discrete white dots at RPE level
  - ‘Grainy’ macula
  - ERG changes that reverse after episode
  - Condition rarely recurs
  - Vision returns without treatment
• Exact pathogenesis is unknown, but thought to be associated with a viral prodrome

• Self-limited disease, with almost all patients regaining good visual acuity within 3-9 weeks

• No treatment is recommended
Fluorescein angiogram findings

- Early punctate hyperfluorescence in a wreath-like pattern and late staining, in areas corresponding to the white dots

- Retinal vascular sheathing and optic nerve staining may be seen in some patients with MEWDS
Fundus Autofluorescence

- Hyperautofluorescent dots correlate with white dots seen on fundoscopy.
- Even in the absence of white dots on examination, FAF can show characteristic hyperautofluorescent lesions.
- Recent reports suggest that FAF may be the most sensitive and practical ancillary test to detect MEWDS.
Case 9

- 22 year old male previously followed for disc drusen. No visual complaints

- PMHx: history of febrile seizure at age 2

- POHx: low myopia, disc drusen diagnosed at age 5

- Vision: 20/20 OU
Thoughts?

- Are these disc drusen?
- Further testing?
Any other tests?

- Neuroimaging
Diagnosis?

- Tuberous Sclerosis

- Our patient was found to have mutation in TSC2 gene

- Renal scan was normal
Tuberous Sclerosis

- Rare genetic disease that causes noncancerous tumors to grow in many parts of the body

- Often detected during infancy or childhood. Some people have such mild signs and symptoms that the condition isn't diagnosed until adulthood, or it goes undiagnosed.
Tuberous Sclerosis

- CNS
  - Seizures, development delay

- Cutaneous
  - Ash leaf spots, adenoma sebaceum, shagreen patches

- Other: cardiac rhabdomyoma, renal angiomyolipomas, periungual fibromas
Conclusions

- Recognizing normal from abnormal

- We now have a multitude of imaging modalities to assist with diagnosis and treatment

- Many retinal findings are nonspecific, but early recognition of these signs can help prevent ophthalmologic complications and vision loss
Questions?