Meet the Choroid

Carlo J. Pelino, OD, FAAO
Joseph J. Pizzimenti, OD, FAAO
pizzimen@nova.edu

Goals for This Course
- Functional anatomy review
- Choroid examination and evaluation
- Case examples
- Interactive

The Choroid: Structure, Function, and Evaluation

The Choroid
- Located between the sclera and the RPE
  - Extends from ora serrata to optic nerve
- Pigmented/vascular tissue .75mm thick
- Nourishes the RPE
  - Choriocapillaris designed to leak
- Absorbs light that passes through retina

Choroidal thickness
- Loose connective tissue
- Melanocytes
- Choriocapillaris
  - Fenestrated endothelium allows diffusion of proteins
  - S_________ regulation
  - High blood flow
  - Very little O-2 extracted, so high venous O-2
Bruch’s Membrane
- Basal lamina of RPE
- Anterior collagenous layer
- Elastic layer
- Posterior collagenous layer
- Basal lamina of CC endothelium
- Contamination of Bruch’s can result in d______, CNVM

Common Causes of CNV
- Exudative AMD
- Ocular Histoplasmosis
- High Myopia
- Angioid Streaks

48 y/o WM
-12.00D
Concave fundus, CNV, schisis

CNV Variants
Polypoidal Choroidal Vasculopathy (PCV)
Retinal Angiomatous Proliferation (RAP)

Choroidal Vasculature
- SPCAs provide blood flow to choroid posterior to equator
- ACA and LPCA supply anterior choroid
- Vortex veins drain the choroidal veins
- V.V. drain into sup, inf ophthalmic vein

Choroid Anatomy
The choroid is a rich vascular network supplying oxygen and nutrition to the retinal pigment epithelium and outer retina. It is arranged in a lobular pattern.
Retinal Vasculature

- 2 sources of blood supply:
  - Choroidal BV
    - Supply outer retinal layers, including PRs
  - CRA
    - 4 branches nourish inner retina
    - Run radially toward fovea

Choroid Microstructure

Vascular Layers of the Choroid

Imaging the Choroid

Fluorescein Angiography (FA)

- *FA answers the question: is the blood-retinal barrier intact?*

The Fluorescein Angiogram

- Stages
  - Choroidal phase
  - Arterial phase
  - Laminar venous phase
  - Venous phase
  - Recirculatory phase
  - Late phase
CSC

Indocyanine Green Angiography (ICGA)
- Uses digital imaging
- Dye properties
- “Sees through” blood
- Delineates choroidal circulation better than fluorescein angiography
- Boundaries of occult membranes imaged

Echography of Choroidal Melanoma

B-Scan Echogram
Assess topographic features, including tumor shape, surface contour and boundaries

A-Scan Echogram
Internal structure, reflectivity, tumor height (elevation)

QUESTIONS AND COMMENTS?

Neoplastic Disease
Most patients with choroidal melanoma have no symptoms. Their tumors are found during a "routine" eye examination.

To Find Small Ocular Melanoma

**T** = thickness  
No risk factors (<4%)

**F** = subretinal fluid  
1 risk factor (36%)

**S** = symptoms  
3 risk factors (50%)

**O** = orange pigment  
5 risk factors (70%)

**M** = margin touches disc

**DOCUMENTED GROWTH - MEANS EVERYTHING**

Using Helpful Hints = Ultrasound hollow, halo
Echography

- Acoustic hollowness on B-scan of small melanoma.

Echography of large melanoma

Primary choroidal melanoma

- Treatment side effects
  - Main side effect of focal ocular treatment is …………
  - Radiation retinopathy!
  - NVD / NVE
  - Exudative changes
  - Macular edema
  - Occurs several weeks to months after therapy

Primary choroidal melanoma

Melanoma
Radiation retinopathy

Choroidal Melanoma

S/P Radiotherapy

Management of RR
- Avastin
- Laser
- ? Silicone oil at time of Brachytherapy

Choroidal Metastasis

Choroidal Metastasis
METS

Multiple cream colored lesions in posterior pole
Large lesion with neurosensory RD

Early IVFA OS

Note blocking of the background hyperfluorescence in multiple areas including large central lesion

Late IVFA

Note late staining of large central lesion

Pearl

Rapid shrinkage of the choroidal tumor with treatment may be bad news ........ indicates substantial malignant (and metastatic) potential!

QUESTIONS AND COMMENTS?

Hypertensive Choroidopathy

Elschnig’s Spots + NAION
Common Etiologies of Panuveitis

- Infections, such as
  - Infantile toxocariasis
  - Post-op bacterial endophthalmitis
  - Toxoplasmosis
- Granulomatous Dx.
- Multifocal Choroiditis and Panuveitis (right)
  - MCP in a 27 y/o Asian Female

Toxocariasis

Multifocal Choroiditis and Panuveitis

- Bilateral, chronic uveitis
  - Punched-out chorioretinal lesions similar to POHS.
- CNV is the most worrisome potential complication.
- Conservative monitoring and timely steroid treatment essential to care.
- Immunosuppressive drug therapy appears to limit the number of recurrences.

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Carlo and Joe
pizzimen@nova.edu