

PACHYCHOROID DISEASE

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COURSE DESCRIPTION

- This course will provide an introduction into pachychoroid disease and what conditions fall under this category
- Pachychoroid conditions was first described in 2013 and is still a relatively new topic
- It is currently a hot topic for research and there is still much to discover about this clinical entity

COURSE OBJECTIVE

- To **define** what pachychoroid means
- To learn about the **conditions** that are considered pachychoroidal diseases
- To learn how to **identify**, **diagnose**, and **manage** pachychoroidal diseases

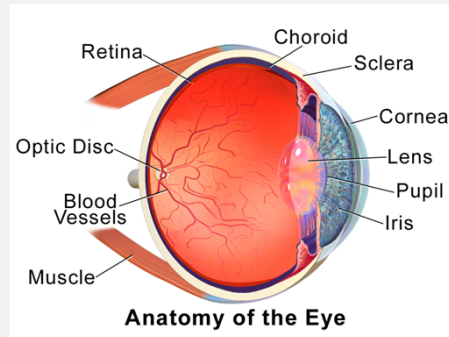
INTRODUCTION

- What does *pachychoroid* mean?
 - Pachy (Greek) – thick

Thickened choroid

INTRODUCTION

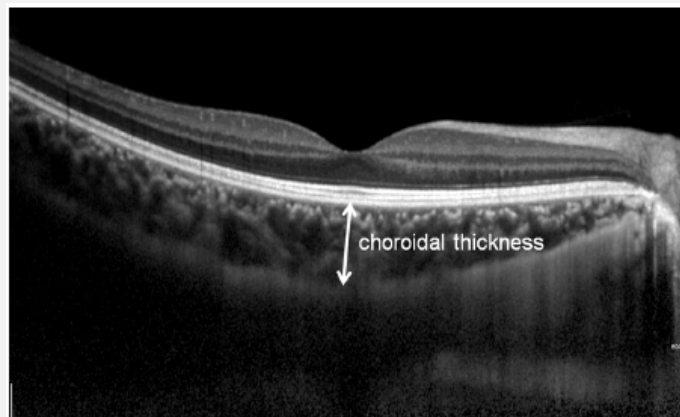
Choroid is very important!



Changes in choroid can indicate disease

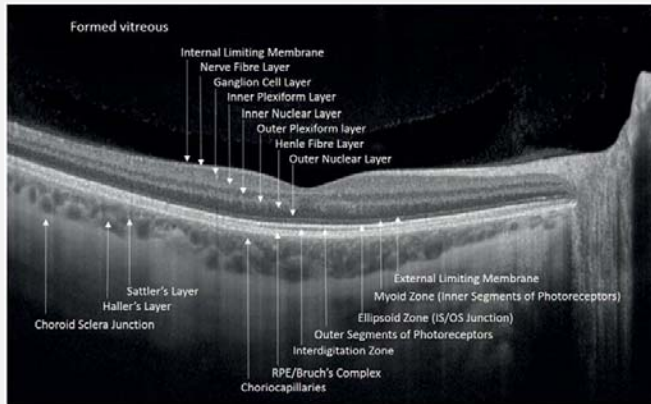
https://commons.wikimedia.org/wiki/File:Blusen_0388_EyeAnatomy_01.png

ENHANCED DEPTH IMAGING OCT



Park, Byoung & Chung, Hye & Kim, Hyung Chan, (2011).3 Effects of Diabetic Retinopathy and Intravitreal Bevacizumab Injection on Choroidal Thickness in Diabetic Patients. Journal of the Korean Ophthalmological Society. 54. 1520. 10.3341/jkos.2013.54.10.1520.

INTRODUCTION



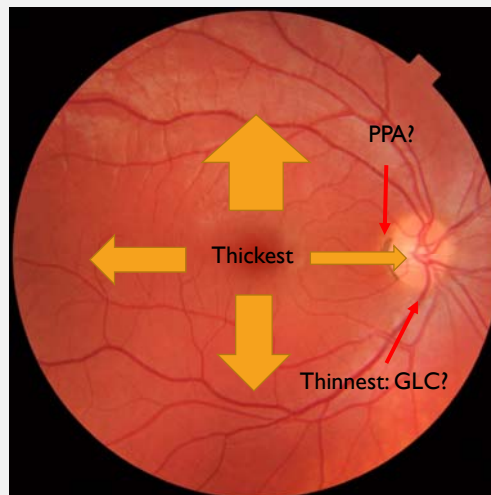
<https://www.opticianonline.net/cet-archives/151>

• Layers of the choroid

- Bruch Membrane
- Choriocapillaris
- Medium blood vessels (Sattler's layer)
- Large blood vessels (Haller's layer)
- Choroid/sclera transition zone (suprachoroid)

INTRODUCTION

• Choroidal thickness



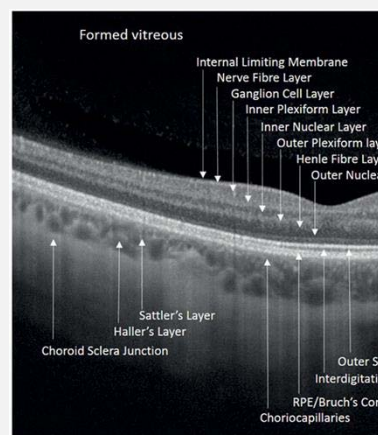
INTRODUCTION

- **Choroidal thickness**
 - Subfoveal thickness range: 191-350 μ m
 - >300 μ m can be pathologic (if other pachychoroid signs are present)
 - Varies based on:
 - Age:
 - ~15micron loss every 10 years
 - >60, 4-5micron loss each year (mean = 197microns)
 - Refractive error/axial length
 - $\downarrow$ 15microns per diopter of myopia
 - $\downarrow$ 32microns for 1mm $\uparrow$ axial length
 - Diurnal variation: thickest between 3am-9am
 - Blood pressure
 - Ethnicity

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2141478/>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2185279/>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2784445/pdf/>
<https://www.researchprotocols.org/2019/1/e14114/>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4071184/>

PACHYCHOROID DISEASES

- Conditions with a thickened choroid...
 - Can cause RPE compromise
 - Can cause vision loss
 - Can cause neovascularization
- Other features:
 - Attenuated small and medium vessel layers
 - Dilated large vessel layer
 - ICGA: hyperpermeable choroidal vessels



<https://www.opticsonline.net/retarchive/153>

CASE

DB 42 Y.O. AFRICAN AMERICAN MALE

- New patient
- CC: black spots in vision OD x 1 week
 - Constant, stable
 - Blurred vision
 - Darker color vision
- Denies headaches, pain, flashes, curtain over vision, floaters

DB 42 Y.O. AFRICAN AMERICAN MALE

- Personal ocular history:
 - Unremarkable
- Personal medical history:
 - Eczema
- Family ocular/medical history:
 - Unremarkable
- BP: 138/96

DB 42 Y.O. AFRICAN AMERICAN MALE

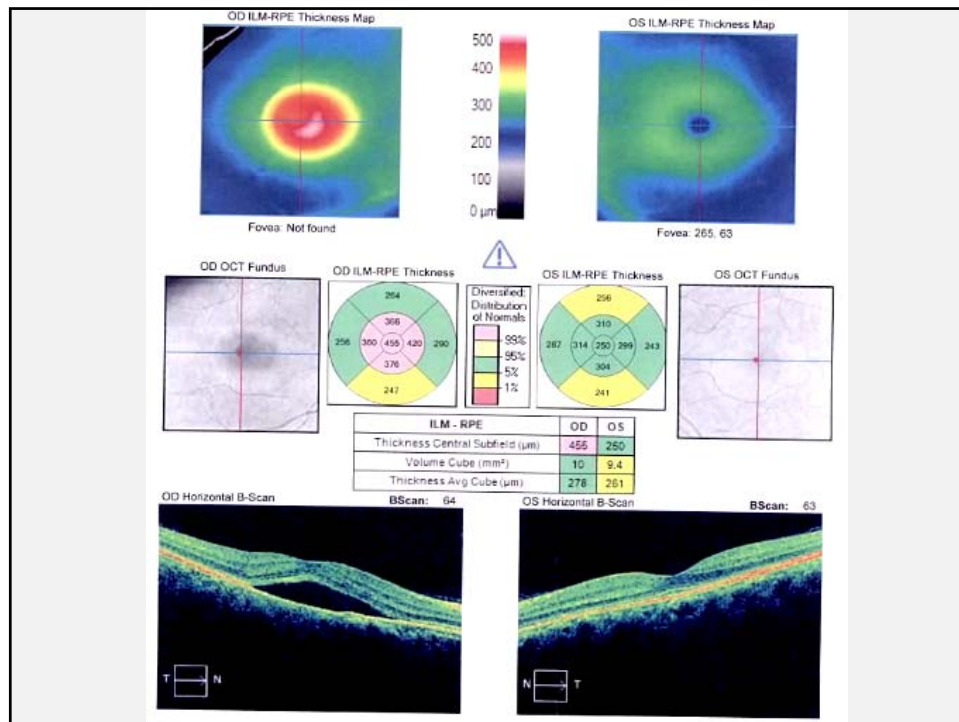
- Medications:
 - Hydrocortisone 1% ointment
- Allergies:
 - NKDA

DB 42 Y.O. AFRICAN AMERICAN MALE

- VA
 - OD: 20/25
 - OS: 20/20+2
- Pupils: PERRL (-)APD OD/OS
- EOMs: SAFE
- CVF: FTFC OD/OS
- CT: Ortho (distance); 2XP (near)
- Red cap: equal between eyes
- Amsler grid: yellow shadow central circle, no metamorphopsia OD

DB 42 Y.O. AFRICAN AMERICAN MALE

- Anterior segment: unremarkable OD/OS
- IOP: 20 OD/ 20 OS GAT
- Posterior segment:
 - OD: 1.0DD central circular edema
 - OS: unremarkable
 - OU: mild arterial attenuation



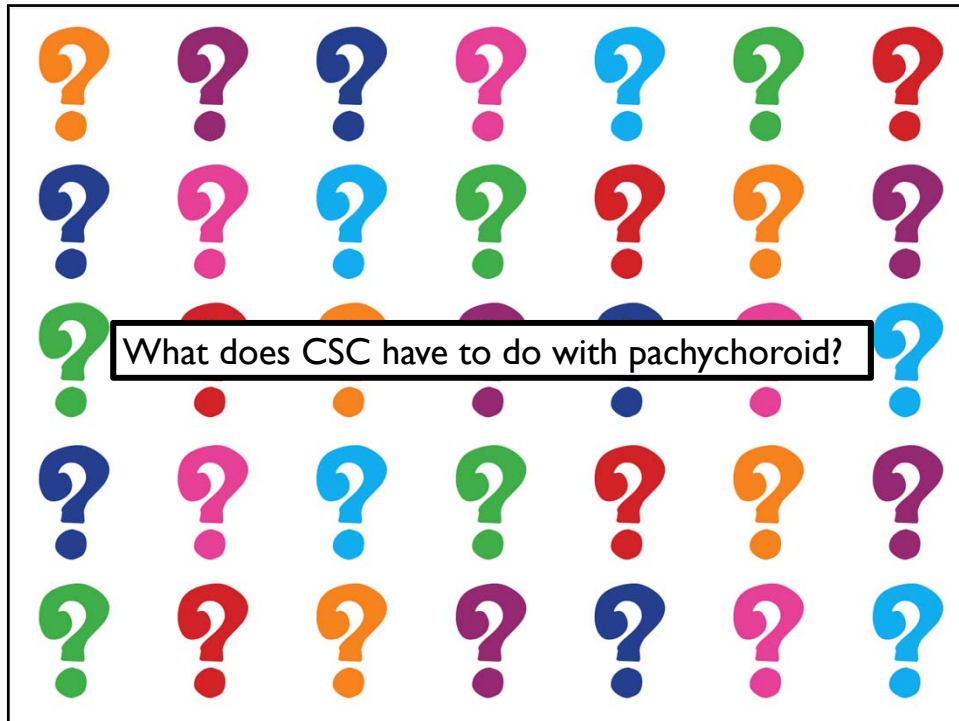
DB 42 Y.O. AFRICAN AMERICAN MALE

- **Assessment:**

- Central serous chorioretinopathy OD
 - Pt reports elevated stress for the last few months
 - Pt reports using hydrocortisone for eczema on eyes and regularly gets it into eyes
 - Elevated BP

- **Plan:**

- Pt edu on findings and relation to stress and cortisol use
- Recommended avoiding use of hydrocortisone, especially getting into eyes
- Exam summary letter written to PCP to encourage f/u for elevated BP
- RTC in 1 month for f/u



CENTRAL SEROUS

- Central serous is a pachychoroid disease!

Choroidal changes:

- Dilated large choroidal vessels (increased vascular permeability)
- Attenuated small/medium choroidal vessels
- Results in **PACHYCHOROID**

PACHYCHOROID DISEASES

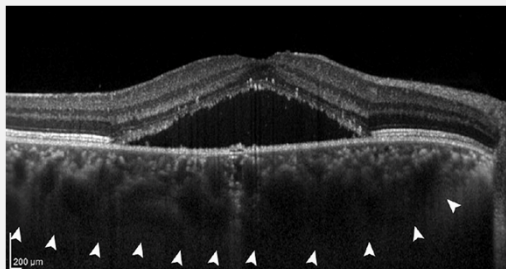
PACHYCHOROID DISEASES

- Central serous chorioretinopathy
- Pachychoroid pigment epitheliopathy
- Pachychoroid neovascularopathy
- Polypoidal choroidal vasculopathy

PACHYCHOROID DISEASES

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CENTRAL SEROUS CHORIORETINOPATHY



https://commons.wikimedia.org/wiki/File:Central_serous_chorioretinopathy_with_increased_choroidal_thickness.png

- M>F
- 30-60 y.o.
- Type A, stress, glucocorticoids
- Subretinal detachment
- Focal PED
- EDI OCT:
 - Dilated outer choroidal vessels
 - Attenuated small/medium vessels
- FA: ink blot or smoke stack

PACHYCHOROID DISEASES

- Central serous chorioretinopathy
- Pachychoroid pigment epitheliopathy
- Pachychoroid neovascularopathy
- Polypoidal choroidal vasculopathy

PACHYCHOROID PIGMENT EPITHELIOPATHY

- “Forme fruste” of central serous chorioretinopathy
- Similar to CSCR but without subretinal fluid
- “Silent disease”
- Maybe bilateral or in fellow eye of CSCR patient

Characteristics:

- EDI OCT – Pachychoroid
- Normal VA (asymptomatic)
- Orange-redish fundus
- Fundus tessellation absent
- Non-specific RPE changes
- Sub-RPE drusen like deposits
- Small PEDs

PACHYCHOROID DISEASES

- Central serous chorioretinopathy
- Pachychoroid pigment epitheliopathy
- **Pachychoroid neovascularopathy**
- Polypoidal choroidal vasculopathy

PACHYCHOROID NEOVASCULOPATHY

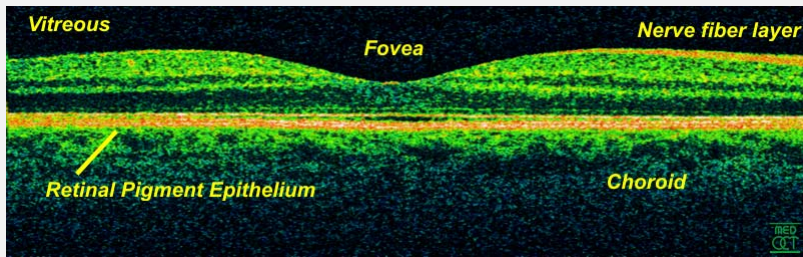
EDI OCT – Pachychoroid

- **Type I CNV**
- Absence of drusen
- Often misdiagnosed as AMD
 - Do not have typical AMD changes (i.e. drusen)
 - Younger vs AMD patients

Symptoms:

- Decreased VAs
- Central scotoma
- Metamorphopsia





<https://commons.wikimedia.org/wiki/File:Retina-OCT800.png>

Type I:

- Vessels originate from the choroid and remain sub-RPE
- Corresponds to hidden CNV

Type II:

- Vessels also originate from the choroid but break through the RPE while remaining sub-retinal
- Corresponds to classic CNV

Type III:

- Vessels originate from the retinal arteries
- Aka: retinal angiomatous proliferation (RAP)

PACHYCHOROID NEOVASCULOPATHY

EDI OCT – Pachychoroid

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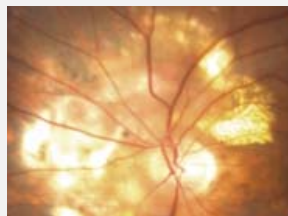
<https://www.flickr.com/photos/nationaljewishmuseum/724370484/>

PACHYCHOROID DISEASES

- Central serous chorioretinopathy
- Pachychoroid pigment epitheliopathy
- Pachychoroid neovascularopathy
- **Polypoidal choroidal vasculopathy**

POLYPOIDAL CHOROIDAL VASCULOPATHY

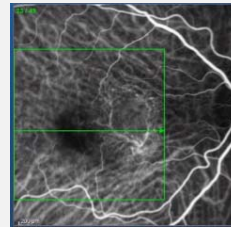
- First described in 1990s
- No universal definition
- Pachychoroid
- Choroidal vascular abnormalities
- Polyps – aneurysmal dilation
- Type I CNV



POLYPOIDAL CHOROIDAL VASCULOPATHY

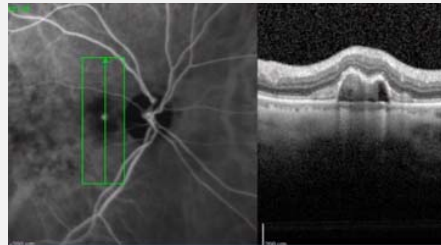
Clinical features:

- Orange-red nodules
- Serous subretinal detachment
- Submacular hemorrhage
- Serous or hemorrhagic PEDs



OCT

- PEDs
- Polyps
- Double layer sign
- Pachychoroid



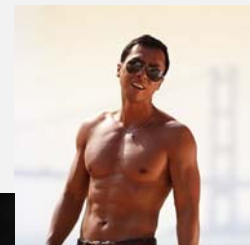
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6114408/>

Yu, Shuen X., and Karan Bhakshi. "Overlooked and Misdiagnosed: Understanding the Polypoidal Spectrum." American Academy of Optometry Conference. American Academy of Optometry Conference. 1 July 2020. Orlando, Florida.

POLYPOIDAL CHOROIDAL VASCULOPATHY

Characteristics:

- Subtype of AMD?
 - Less aggressive vs AMD
 - Better visual prognosis vs AMD
- >Asian & African American
- M>F (Asian); M=F (Caucasian)[#]
- Age: 50-65



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6114408/>

Yu, Shuen X., and Karan Bhakshi. "Overlooked and Misdiagnosed: Understanding the Polypoidal Spectrum." American Academy of Optometry Conference. American Academy of Optometry Conference. 1 July 2020. Orlando, Florida.

POLYPOIDAL CHOROIDAL VASCULOPATHY

AMD vs PCV, why does it matter??

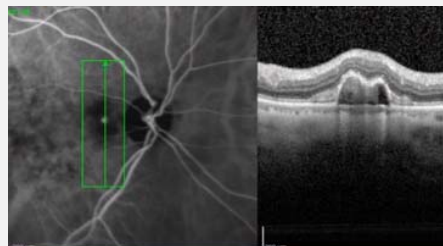
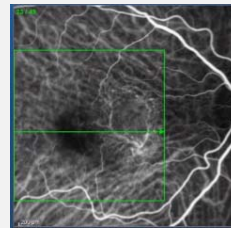
- PCV is more resistant to anti-VEGF therapy
 - Responds better to aflibercept
- PCV responds better to combo therapies: anti-VEGF, PDT, steroids
- Best diagnosed by **indocyanine green (ICG)** angiography

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3011712/>

POLYPOIDAL CHOROIDAL VASCULOPATHY

Diagnosis

- Fundus exam
 - Elevated orange-red nodules
- ICG angiography
 - Polypoidal lesions
- Spectral domain OCT
 - Double-layer hyperreflective lines
 - RPE elevation with moderate reflectivity



PACHYCHOROID DISEASE

	CSCR	Pachychoroid pigment epitheliopathy	Pachychoroid neovascuopathy	Polypoidal choroidal vasculopathy
Enhanced depth imaging OCT	Pachychoroid → attenuated choriocapillaris & Sattler's layer; dilated Haller's layer			
Other features	Subretinal detachment PED	CSCR w/o subretinal fluid Non-specific RPE changes	Type I CNV Absence of drusen	Polyps Type I CNV >Asian & African American
Treatment	Monitor	Monitor	Anti-VEGF	Combo Tx: Anti-VEGF, PDT, steroids

THANK YOU

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