WHEN GLAUCOMA ISN'T GLAUCOMA

GWCO
2022

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DISCLOSURES

Leo Semes, OD, FAAO, FACMO

Consultant - Maculogix

Speaker Bureau - Regeneron

Scientific Advisory Board - EyePromise, Apellis

Stock options - Eye Promise (< 0.01% ownership), HPO (< 0.01% ownership)

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COURSE OBJECTIVES

- The attendee will be challenged with cases without clear-cut diagnoses
- The attendee will be presented with alternative diagnoses to optic nerve head disorders
- The attendee will gain a perspective on the use of complementary testing in glaucoma diagnoses
- The attendee will be presented with a template for optic disc and RNFL evaluation using clinical observations
- The attendee will appreciate that few cases are straightforward
- The attendee will be offered discussion and input on the conflict that occurs among clinical findings

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CONTEMPORARY GLAUCOMA DEFINITION

POAG is a progressive, chronic optic neuropathy in adults in which intraocular pressure (IOP) *and other currently unknown factors* contribute to damage and in which there is a characteristic acquired atrophy of the optic nerve and loss of retinal ganglion cells and their axons. This condition is associated with an anterior chamber angle that is open by gonioscopic appearance.

-ala AAO PPP

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CONTEMPORARY GLAUCOMA DEFINITION…

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-ala AAO PPP

"Can glaucomatous optic neuropathy be induced by a primary non-IOP-related insult . . . alone??" -Claude Burgoyne

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A CASE ILLUSTRATING POTENTIAL CONTAMINATION OF GCC RESULTS

- 40s AA Male
- Longstanding diagnosis of MS with systemic treatment
- BSCVA 20/40, 20/40
- Normal IOP and anterior segment

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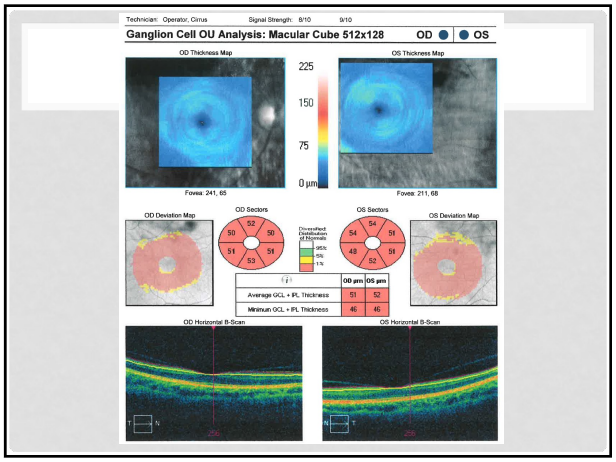

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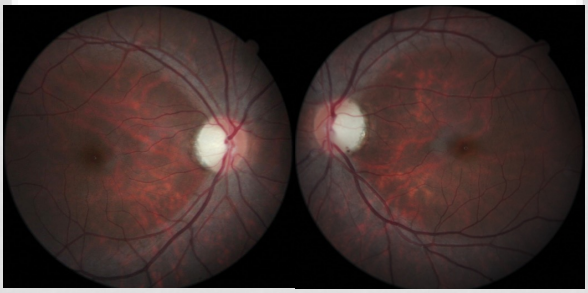
FUNDUS



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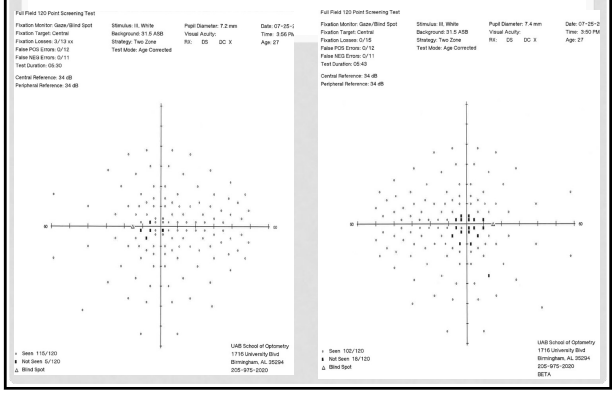
SUPRATHERSHOLD VF



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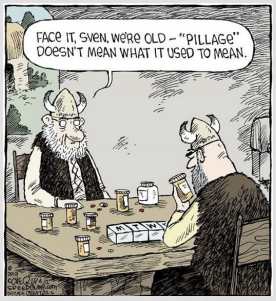

- Comments
- Questions

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FLD? GLAUCOMA? ???

- A 24 year-old was referred to the Ocular Disease Service at UAB Eye Care for a glaucoma evaluation.
- Spectacle lens correction for myopic refractive error, personal ophthalmic history is otherwise negative.
- Maternal grandfather with glaucoma (unconfirmed).
- He has never smoked and drinks alcohol socially.
- He takes no Rx medications

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FLD? GLAUCOMA? ???

- Visual acuity is correctable to 20/20 in each eye.
- Pupils are round and equally reactive without RAPD.
- Goldmann applanation tonometry: 16 mm Hg in each eye at 9:55 AM.
- Pachymetry: 619 and 622 um OD, OS, respectively.
- The anterior segments were unremarkable in each eye.

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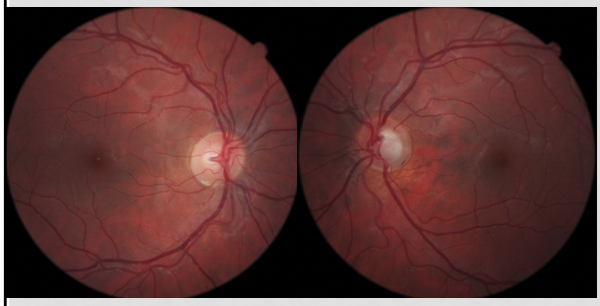
FIGURE 1
(FROM *OPTOMETRY TIMES*, RETINA DEPARTMENT)



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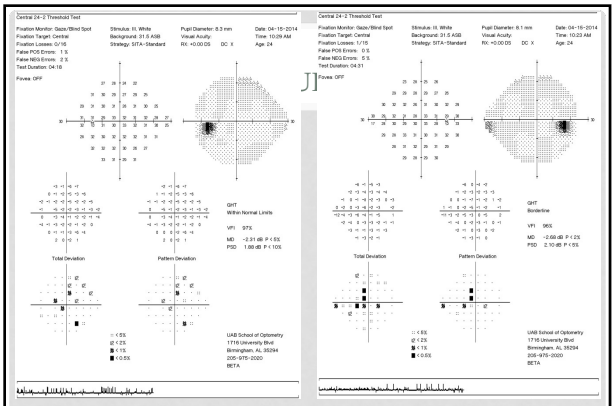

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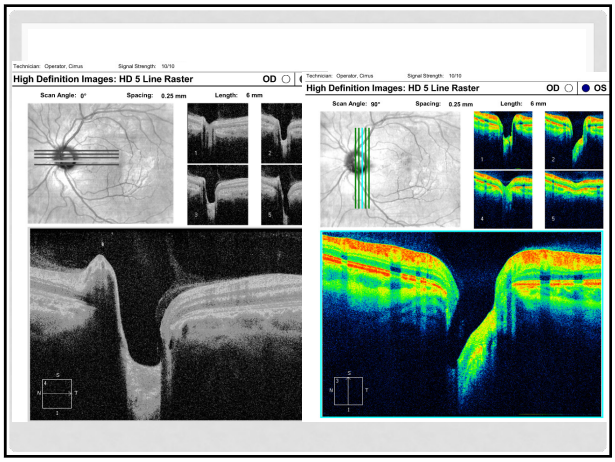

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WHAT'S YOUR DIAGNOSIS?

- Congenital/developmental optic pit.

Distinguish from APON

Javitt JC, Spaeth GL, Katz LJ, Poryzees E, Addiego R. Acquired pits of the optic nerve. Increased prevalence in patients with low-tension glaucoma. Ophthalmology. 1990 Aug;97(8):1038-43; discussion 1043-4.

- Careful stereoscopic observation may lead to the diagnosis but additional testing, such as the OCT images are helpful.
- Stereoscopically, the pit is evident.

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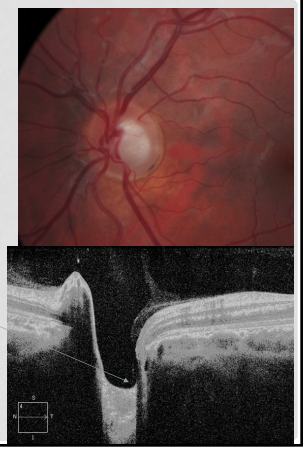
- What would not be clear at clinical examination is the extent of any communication between the pit and the sub-sensory retina space.
- The potential conduit can be seen in the cross-sectional images from the OCT.
- (Optic-pit maculopathy)



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OPTIC PIT

- Questions
- Comments

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62 WM

- Complained of vision loss superiorly in the left eye.
- VA 20/20 OD, OS; (L)RAPD 2+; IOP 11,9 mmHg.
- Seen by primary-care OD – Dx = NTG, initiated on latanoprost qhs.

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62 WM

- Complained of vision loss superiorly in the left eye VA 20/20 OD, OS; (L)RAPD 2+; IOP 11,9 mmHg.
- Seen by primary-care OD – Dx = NTG, initiated on latanoprost qhs.

- Sent for consultation/SLT due to significant VF depressions.

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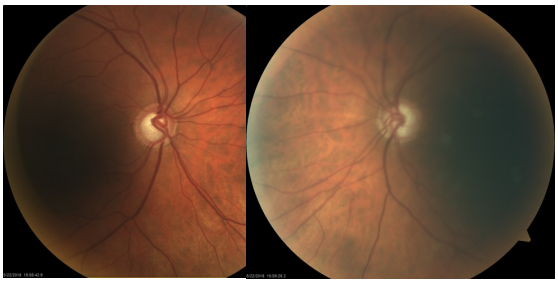

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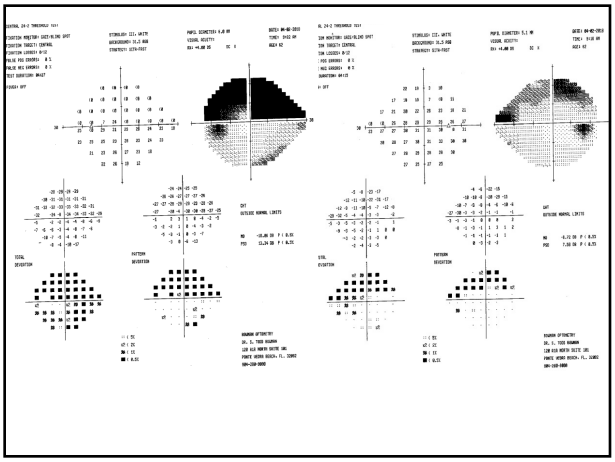

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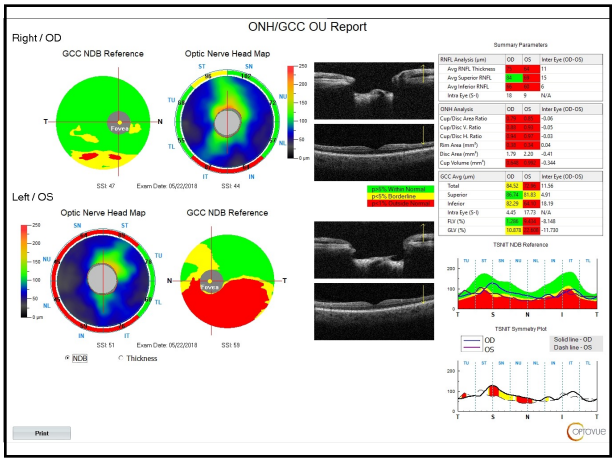

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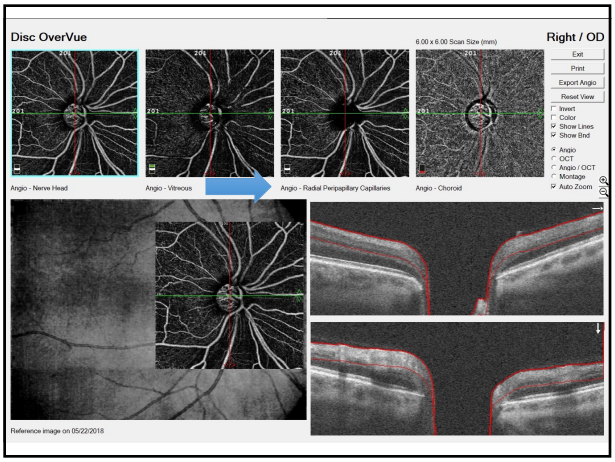

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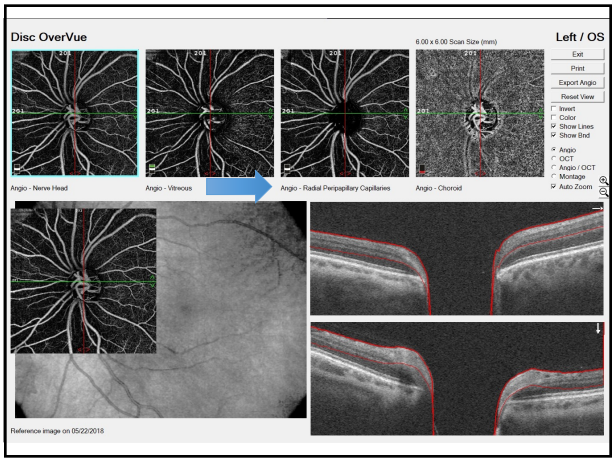

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Additional information

- Patient reveals in social conversation the he suffers from Reynauds syndrome

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Additional information

- Patient reveals in social conversation the he suffers from Reynauds syndrome
- Patient further reveals in casual conversation that he takes a prescription medication for ED, and that it makes his vision blurry!

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SCIENCE ADVANCES | RESEARCH ARTICLE

BIOCHEMISTRY

Cryo-EM structure of phosphodiesterase 6 reveals insights into the allosteric regulation of type I phosphodiesterases

Sahil Gulati[1,2,3], Krzysztof Palczewski[1,2,3]*, Andreas Engel[4], Henning Stahlberg[4]*, Lubomir Kovacik[4]

Cyclic nucleotide phosphodiesterases (PDEs) work in conjunction with adenylate/guanylate cyclases to regulate the key second messengers of G protein–coupled receptor signaling. Previous attempts to determine the full-length structure of PDE family members at high-resolution have been hindered by structural flexibility, especially in their linker regions and N- and C-terminal ends. Therefore, most structure-activity relationship studies have so far focused on truncated and conserved catalytic domains rather than the regulatory domains that allosterically govern the activity of most PDEs. Here, we used single-particle cryo–electron microscopy to determine the structure of the full-length PDE6αβ2γ complex. The final density map resolved at 3.4 Å reveals several previously unseen structural features, including a coiled N-terminal domain and the interface of PDE6γ subunits with the PDE6αβ heterodimer. Comparison of the PDE6αβ2γ complex with the closed state of PDE2A sheds light on the conformational changes associated with the allosteric activation of type I PDEs.

Gulati et al., Sci. Adv. 2019; 5 : eaav4322 27 February 2019

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SCIENCE ADVANCES | RESEARCH ARTICLE

BIOCHEMISTRY

the PDE family (*4*, *5*) and other related enzymes (*6*). In particular, inhibitors of PDE5, including sildenafil and vardenafil, are widely used for the treatment of erectile dysfunction and pulmonary hypertension (*7*). However, PDE5 inhibitors have been associated with several ocular side effects, including blurred vision, changes in color vision, transient alterations in the electroretinogram, conjunctival hyperemia, ocular pain, photophobia, and, in extreme cases, damage to the optic nerve (*8*). These secondary effects are mediated

Gulati et al., Sci. Adv. 2019; 5 : eaav4322 27 February 2019

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But not all data support the risk for AION

- Analysis included reports from MEDLINE, EMBASE, Toxline and VigiBase for NAION and PDE-5 inhibitors
  - Four observational studies, [3 had good methodological protocols]
  - 50 case reports, 12 of which did not have risk factors for NAION, but regular administration was observed in 24/50 (48%) & 39 (78%) were treated for ED

    and
  - 608 spontaneous reports

Conclusion: According to the available evidence, the treatment with phosphodiesterase - 5 inhibitors was not found to be associated with NAION.

Penedones A, Alves C, Batel Marques F. Risk of nonarteritic ischaemic optic neuropathy with phosphodiesterase type 5 inhibitors: a systematic review and meta-analysis. Acta Ophthalmol. 2020 Feb;98(1):22-31. doi: 10.1111/aos.14253. Epub 2019 Sep 27.

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AION ?=? NTG

- Questions
- Comments

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27 YO ASIAN MALE

- Presents for periodic ophthalmic evaluation
- Unremarkable ocular [ex. myopia] and family history
- Noncontributory medical history
- BSCVA 20/20 (OD, OS)
- Anterior segment – unremarkable (OD, OS)
- IOP 16, 17 mmHg, (OD, OS); (Pachymetry not obtained)

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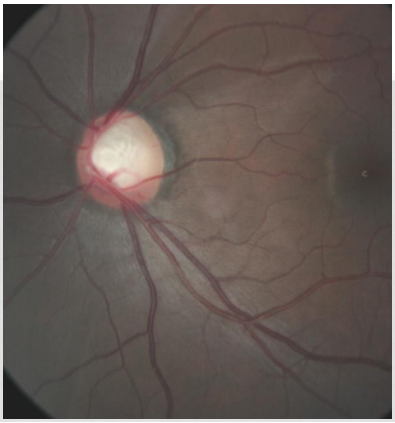

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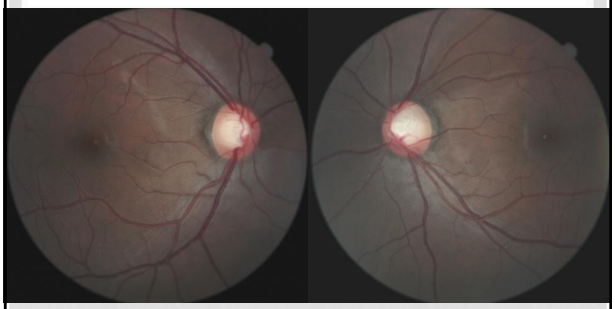
29 A/M 20/20 (-7.50 OD, OS) VS



What do you expect for the VF? 43

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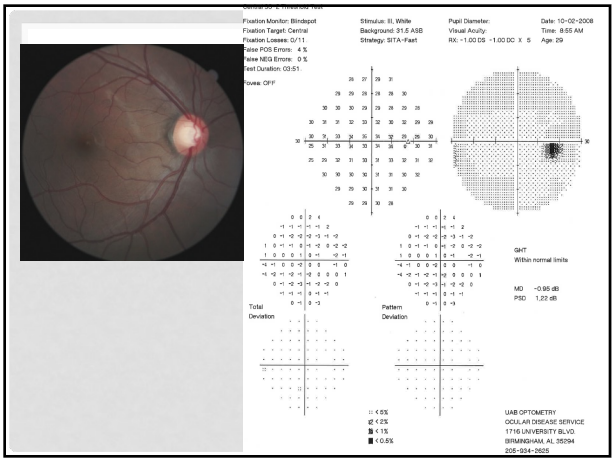

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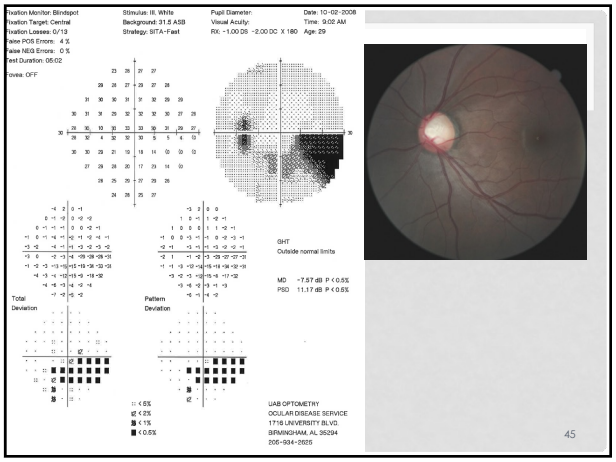

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CLINICAL GUIDANCE FOR THE PRESENT CASE

Doshi A, Kreidl KO, Lombardi L, Sakamoto DK, Singh K. *Nonprogressive* glaucomatous cupping and visual field abnormalities in young Chinese males. Ophthalmology. 2007 Mar;114(3):472-9.

http://www.ncbi.nlm.nih.gov/pubmed/17123617

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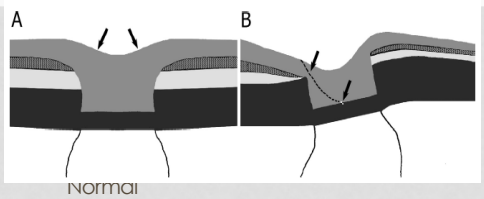
PROPOSED MECHANISM TO EXPLAIN CLINICAL FINDINGS



A. Normal

B. Deformed ONH (now obliquely inserted with stable RNFL thickness, ONH appearance and VF.

Doshi A, Kreidl KO, Lombardi L, Sakamoto DK, Singh K. *Nonprogressive glaucomatous cupping and visual field abnormalities in young Chinese males.* Ophthalmology. 2007 Mar;114(3):472-9.

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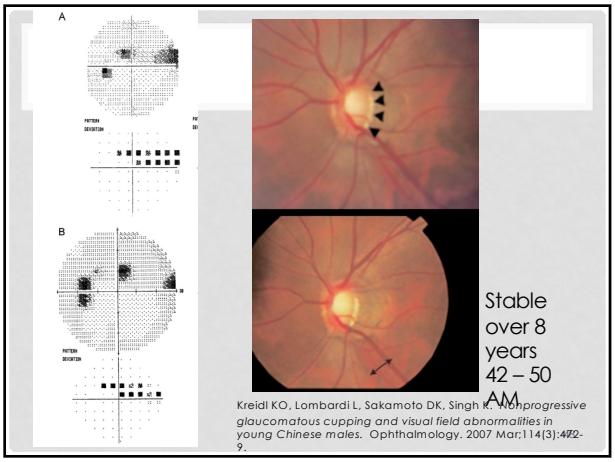

Kreidl KO, Lombardi L, Sakamoto DK, Singh K. *Nonprogressive glaucomatous cupping and visual field abnormalities in young Chinese males.* Ophthalmology. 2007 Mar;114(3):472-9.

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FOLLOW-UP DATA AND GUIDANCE (2011)

- Treated and untreated patients suspected of having glaucoma should be followed for several years to determine progression regardless of whether their condition is related to myopia.
- Among young Chinese myopes, the best course may be to initiate treatment "gently" [1 or 2 meds] unless or until there is demonstration of rapid progression.

http://www.ncbi.nlm.nih.gov/pubmed/21623224

Kumar RS, Baskaran M, Singh K, Aung T. Clinical Characterization of Young Chinese Myopes With Optic Nerve and Visual Field Changes Resembling Glaucoma. J Glaucoma. 2011 May 26.

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FURTHER REPORT

Key conclusions

- Optic disc rotation-VF defect correspondence may be an important prognostic factor for patients with myopic NTG *for predicting progression.*

(ONH hemorrhage and IOP reduction may contribute as well)

Sung MS, Kang YS, Heo H, Park SW. Optic Disc Rotation as a Clue for Predicting Visual Field Progression in Myopic Normal-Tension Glaucoma. Ophthalmology. 2016 May 5. pii: S0161-6420(16)30086-0. doi: 10.1016/j.ophtha.2016.03.040. [Epub ahead of print] http://www.ncbi.nlm.nih.gov/pubmed/27157844

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FURTHER REPORT

Clinical guidance

- Distinguishing between the direction of ONH rotation and *corresponding or non-corresponding* VF depressions may allow us to distinguish those myopic patients who are likely to progress.

Sung MS, Kang YS, Heo H, Park SW. Optic Disc Rotation as a Clue for Predicting Visual Field Progression in Myopic Normal-Tension Glaucoma. Ophthalmology. 2016 May 5. pii: S0161-6420(16)30086-0. doi: 10.1016/j.ophtha.2016.03.040. [Epub ahead of print] http://www.ncbi.nlm.nih.gov/pubmed/27157844

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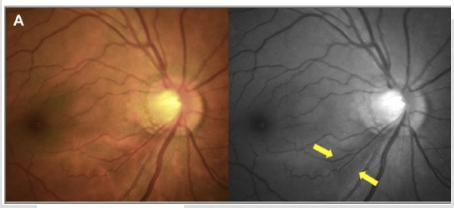
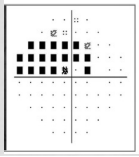
CONNECTING THE DOTS





Inferior optic disc rotation with inferior RNFL defect - and Corresponding VF depressions

www.ncbi.nlm.nih.gov/pubmed/27157844

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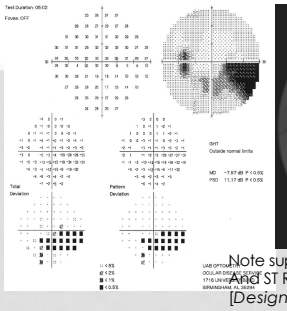

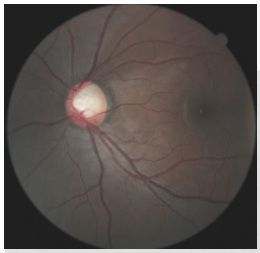

* Cranial imaging was unremarkable for mass.

Note superior optic disc rotation AND ST RNFL defect [*Designated as ONH-VF correspondence*].

This configuration places this patient is at risk for progression.

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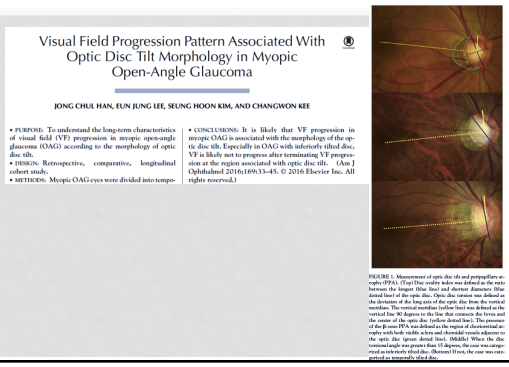
AFFIRMATION OF OPTIC DISC TILT AND VISUAL FIELD PROGRESSION IN MYOPIC GLAUCOMA



Visual Field Progression Pattern Associated With Optic Disc Tilt Morphology in Myopic Open-Angle Glaucoma

JONG CHUL HAN, EUN JUNG LEE, SEUNG HOON KIM, AND CHANGWON KEE

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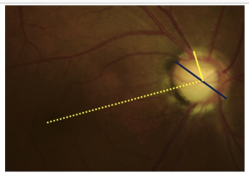
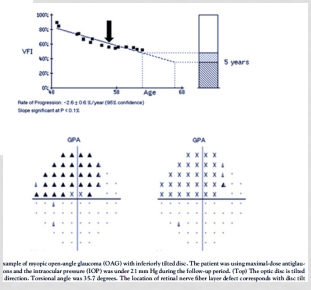
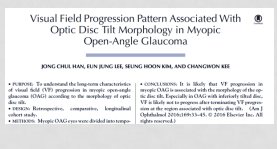
INFERIOR TILT CORRESPONDING WITH SUPERIOR VF DEPRESSIONS







Visual Field Progression Pattern Associated With Optic Disc Tilt Morphology in Myopic Open-Angle Glaucoma

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HERE'S ONE CLOSE TO HOME

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FROM A FORMER STUDENT LAST MONTH

- 59 year old white female.
- H/o high myopia.
- Post-LASIK CCT 482/472.
- Dad and PGF have glaucoma.
- T_{app} at 1:44 pm: 10/11, Tmax 17/16.

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COLOR FUNDUS PHOTORAPHY

- Discs are large and oval shaped with symmetric, moderate cup depth OU. So generalized rim thinning not really surprising.

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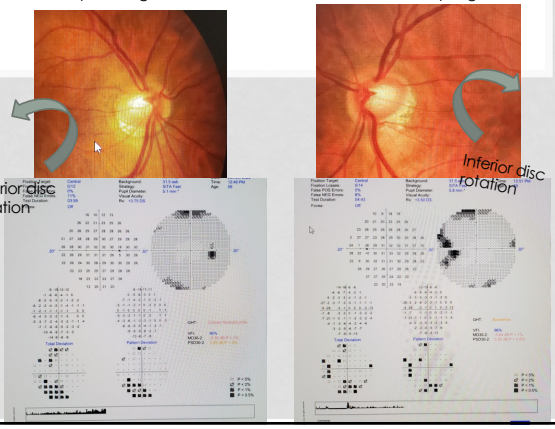
Noncorresponding VF/Disc rotation = low likelihood of progression



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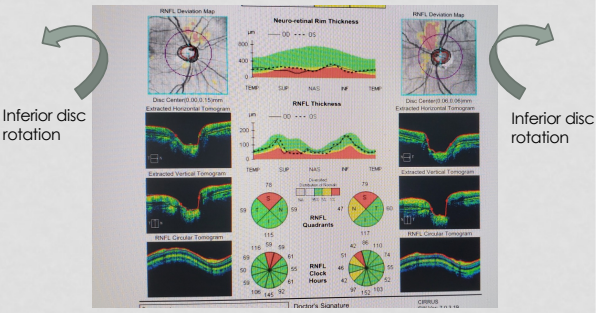
OCT 9/10 signal strength OD/OS.
Inferior VF defects correspond to OCT thinning but *opposite* to disc appearance/direction of tilt by observation.



Noncorresponding VF/Disc rotation = low likelihood of progression

60

WORLDWIDE SUPPORT FOR THE RELATIONSHIP OF MYOPIA & GLAUCOMA

- Grødum K, Heijl A, Bengtsson B. Refractive error and glaucoma. Acta Ophthalmol Scand 2001;79:560–6. [Sweden]
- Mitchell P, Hourihan F, Sandbach J, Wang JJ. The relationship between glaucoma and myopia: the Blue Mountains Eye Study. Ophthalmology 1999;106:2010–5. [Australia]
- Suzuki Y, Iwase A, Araie M, et al. Risk factors for open-angle glaucoma in a Japanese population: the Tajimi Study. Ophthalmology 2006;113:1613–7. [Japan]
- Yoshida M, Okada E, Mizuki N, et al. Age-specific prevalence of open-angle glaucoma and its relationship to refraction among more than 60,000 asymptomatic Japanese subjects. J Clin Epidemiol 2001;54:1151–8. [Japan]

61

WORLDWIDE SUPPORT FOR THE RELATIONSHIP OF MYOPIA & GLAUCOMA

- Mastropasqua L, Lobefalo L, Mancini A, et al. Prevalence of myopia in open angle glaucoma. Eur J Ophthalmol 1992;2: 33–5. [Italy]
- Leske MC, Connell AM, Wu SY, et al. Risk factors for openangle glaucoma. The Barbados Eye Study. Arch Ophthalmol 1995;113:918–24. [Barbados]
- Perera SA, Wong TY, Tay WT, et al. Refractive error, axial dimensions, and primary open-angle glaucoma: the Singapore Malay Eye Study. Arch Ophthalmol 2010;128: 900–5. [Singapore]
- Xu L, Wang Y, Wang S, et al. High myopia and glaucoma susceptibility the Beijing Eye Study. Ophthalmology2007;114:216–20. {China]
- Jiang X, Varma R, Wu S, et al. Baseline risk factors that predict the development of open-angle glaucoma in a population: the Los Angeles Latino Eye Study. Ophthalmology 2012;119:2245–53. [USA]

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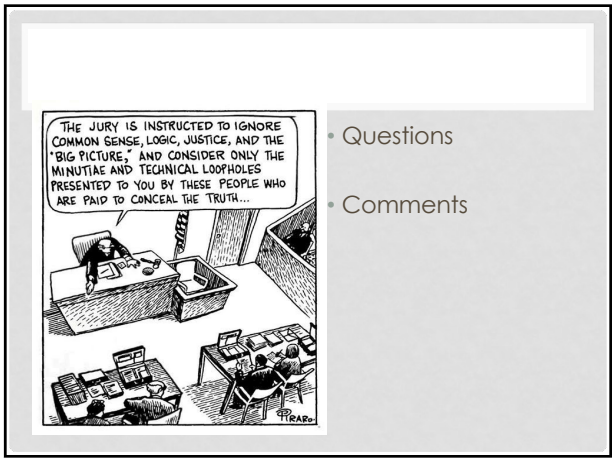

- Questions
- Comments

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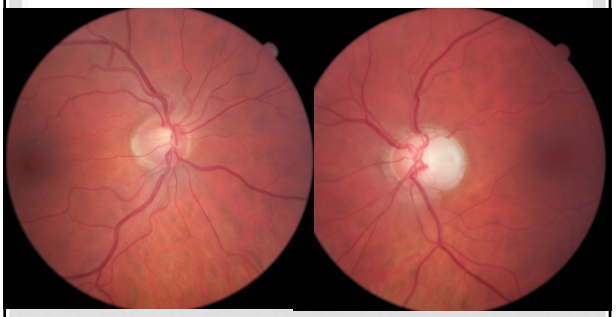
57 W/M -5.50 (20/20) -9.50 (5/350)



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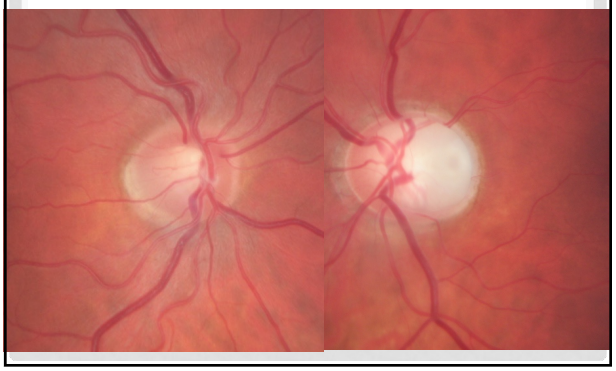

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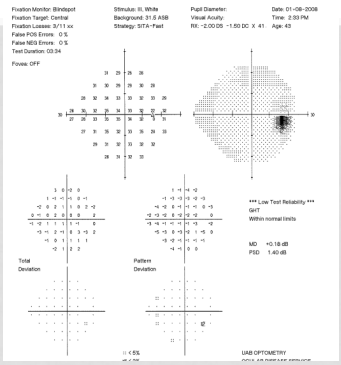
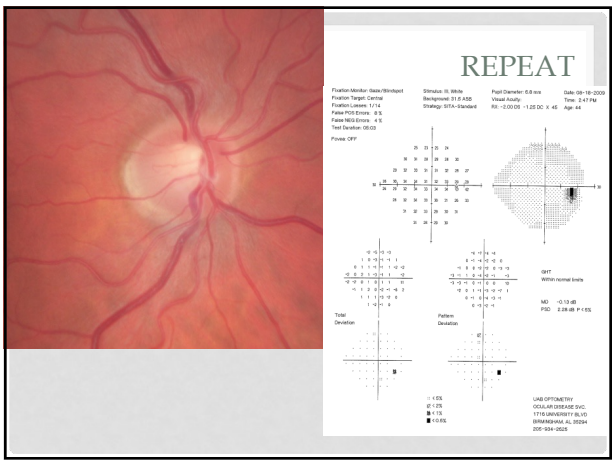
VF – OD



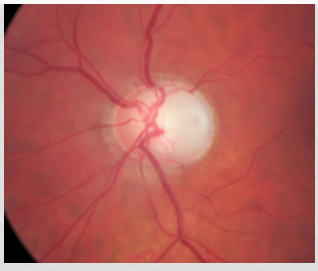
66



67

FINAL EXAM QUESTION 64
(POSTERIOR SEGMENT OPT-225)

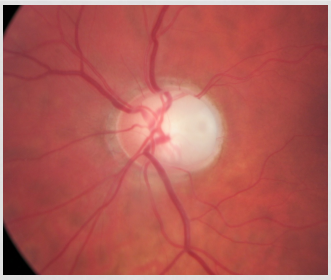
A. Glaucoma
B. Coloboma
C. Staphyloma
D. Melanoma



68

FINAL EXAM QUESTION 31 (GLAUCOMA OPT-314)

A. Glaucoma
B. Coloboma
C. Staphyloma
D. Melanoma



69

WHAT IS THE RELATIONSHIP BETWEEN MYOPIA AND GLAUCOMA (2011)

Myopia as a Risk Factor for Open-Angle Glaucoma: A Systematic Review and Meta-Analysis

Michael W. Marcus, MSc,[1] Margriet M. de Vries, MD,[1] Francisco G. Junoy Montolio, MD,[1] Nomdo M. Jansonius, MD, PhD[1,2]

Objective: To determine the association between myopia and open-angle glaucoma.
Design: Systematic review and meta-analysis of observational studies.
Participants: Thirteen studies involving 48 161 individuals.
Methods: Articles published between 1994 and 2010 were identified in PubMed, Embase, and reference lists. Study-specific odds ratios (ORs) were pooled using a random effects model.
Main Outcome Measures: Odds ratios with 95% confidence intervals (CIs) of myopia as a risk factor for open-angle glaucoma.
Results: Data from 11 population-based cross-sectional studies were included in the main analyses. The pooled OR of the association between myopia and glaucoma based on 11 risk estimates was 1.92 (95% CI, 1.54–2.38). On the basis of 7 risk estimates, the pooled ORs of the associations between low myopia (myopia up to −3 D) and glaucoma and between high myopia (≤ −3 D myopic) and glaucoma were 1.65 (1.26–2.17) and 2.46 (1.93–3.15), respectively. There was considerable heterogeneity among studies that reported an association between any myopia and glaucoma (I^2=53%) and low myopia and glaucoma (I^2=29%), but not for high myopia and glaucoma (I^2=0%). After omitting studies that contributed significantly to the heterogeneity, the pooled ORs were 1.88 (1.60–2.20) for any myopia and glaucoma and 1.77 (1.41–2.23) for low myopia and glaucoma.
Conclusions: Individuals with myopia have an increased risk of developing open-angle glaucoma.

Conclusion: Individuals with myopia have an increased risk of developing open-angle glaucoma.

70

- Questions
- Comments

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GLAUCOMA SUSPECT

THIS CASE APPEARED IN PCON FEBRUARY 2-14

CBLS

72

33 F (NURSE)

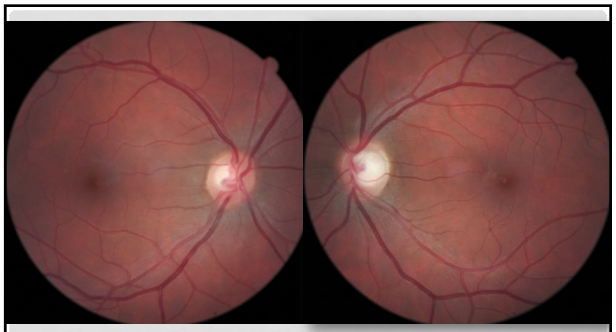
- Referred to UAB Eye Care as a glaucoma suspect
- Medical history non-contributory
- Family history positive for "glaucoma"
- Ocular history: refractive correction and mention of amblyopia.
-

73

33 F (NURSE)

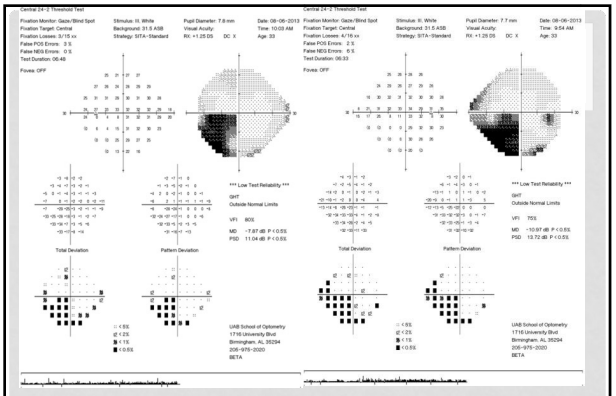
- BSCVA 20/20 OD, OS. Minimal hyperopic refraction
- IOP: 16 mm Hg OD and 18 mm Hg OS
- Pachymetry:m567 microns OD and 562 microns OS
- Angles open with visible CB 360 OS, OS
- Anterior segment unremarkable

74

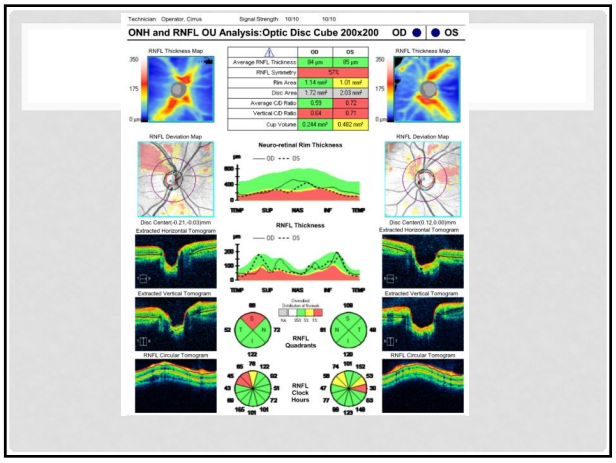


Which ONH looks more suspicious?

75



76



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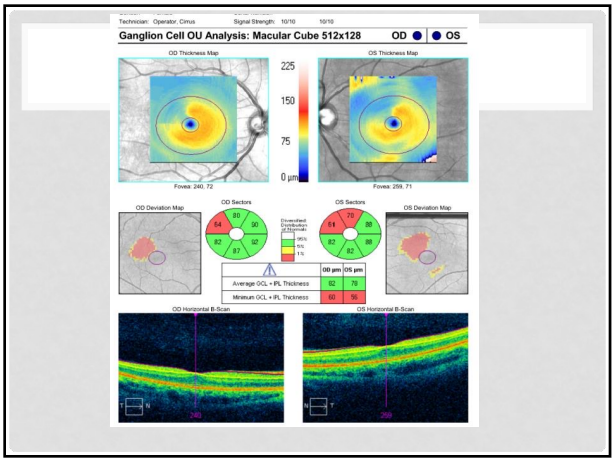

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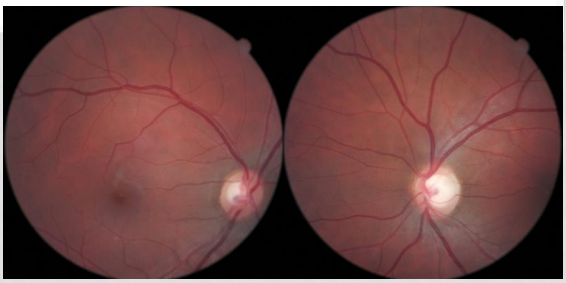

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RADIOLOGY INTERPRETATION

"Right peritrigonal luecomalacia which is most likely developmental causing a left homonyous inferior quanrantic defect. She is completely stable."

-MSV

80

Past / Present Ocular History		Date Diagnosed
Glaucoma	Negative (mid-50s WM)	
Cataracts	Negative	
Age-Related Macular Degeneration	Negative	
Eye Injury	Negative	
Retinal Disease	Lattice Degeneration OU	
Other Disease	Negative	
Blindness	Negative	
Strabismus	Negative	
Amblyopia	Negative	
Diabetes	Negative	
Dry Eye	Negative	
Refractive	Glasses Full-time	
Other	H/o transient dipl/intermittant dipl, resolved (spectacle adjustment)	

82

Social History	
Drugs	None
Alcohol	None
Occupation	Engineer (currently unemployed)
Hobbies	Writer, Musician, Woodworker
Tobacco	Quit smoking 3 yrs ago, uses Nicotine lozenges
Smoking Status	Former smoker

83

Family History	
Glaucoma	Negative
Cataracts	Mother, Father
ARMD	Negative
Eye Injury	Negative
Retinal Disease	Negative
Other Disease	Negative
Blindness	Negative
Strabismus	Sister - DV, wears prism in glasses
Amblyopia	Negative
Diabetes	Negative
Cancer	MGM - skin
Heart Disease	Negative
Hypertension	Negative
High Cholesterol	Negative
Kidney Disease	Negative
Stroke	Negative

84

OPHTHALMIC FINDINGS (MID-50S WM)

- BSCVA 20/20 20/20
-2.25 – 0.50 X 090 -2.50-0.75X 090
- Pupils – normally reactive w/o RAPD
- IOP history (Goldmann)
  - 13/14 (4/24/2014)
  - 16/15 (7/22/2014)
- Pachymetry: 587u, 586u
- Anterior segment – unremarkable
- ACA – open; AC - D&Q

85

Medications				
Date	Name	Strength	Form	S I C
4/21/2014	Advil			
6/9/2010	Ibruprofen			
4/24/2014	Zyrtec	10 mg	Add'l Sig	

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OPHTHALMIC FINDINGS

- Lens (LOCSIII) : NO 1 / NC2 CS 0 PSC 0 (OD = OS)
- Optic disc
- VF
- OCT
- What do you expect?

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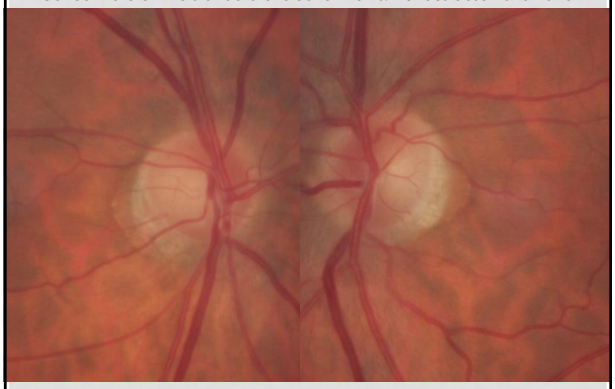
Concentrate on the standard evaluation items. Fundus observation and VF



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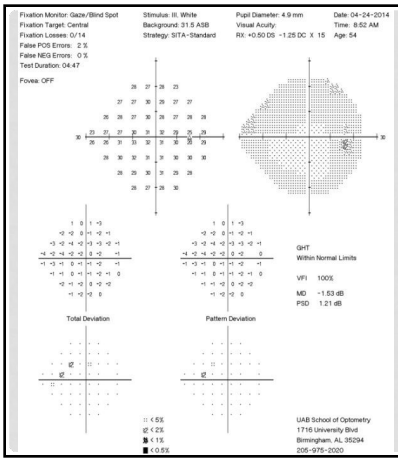
WHAT ARE YOUR OBSERVATIONS OF THE ONHS

89

WHAT ARE YOUR OBSERVATIONS OF THE ONHS

- Small
- Temporal crescent consistent with RE
- OBL insertion OS > OD
- Inferior notch OD > OS
- β-zone PPA (OD where rim tissue is thinnest; OS greater temporally than inferiorly)

90



Reliable data?

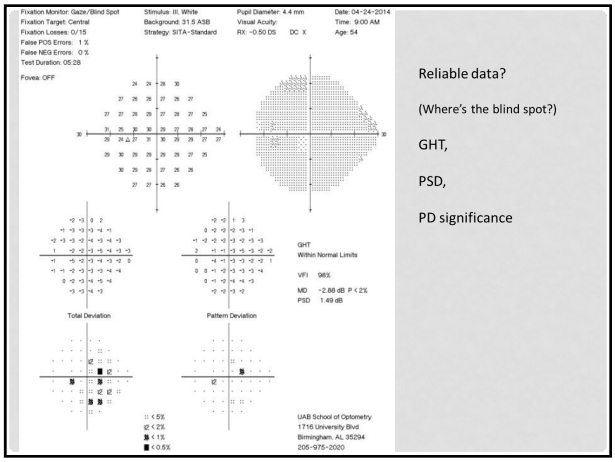
(Where's the blind spot?)

GHT,

PSD,

PD significance

91



Reliable data?

(Where's the blind spot?)

GHT,

PSD,

PD significance

92

WHAT IS YOUR INTERPRETATION OF THE VF

Right	Left
• Correct test • Correct eye • Appropriate correction	• Correct test • Correct eye • Appropriate correction
• Reliable data • GHT – WNL	• Reliable data • GHT – WNL
• PSD – not flagged	• PSD – not flagged
• PD significance – no clusters in areas suspicious for glaucoma	• PD significance – ? clusters in areas suspicious for glaucoma

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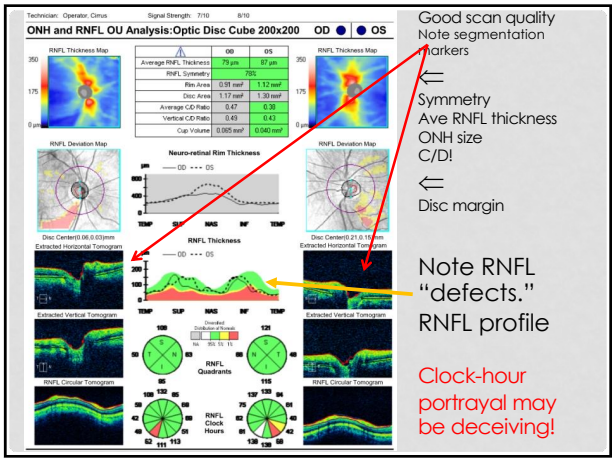

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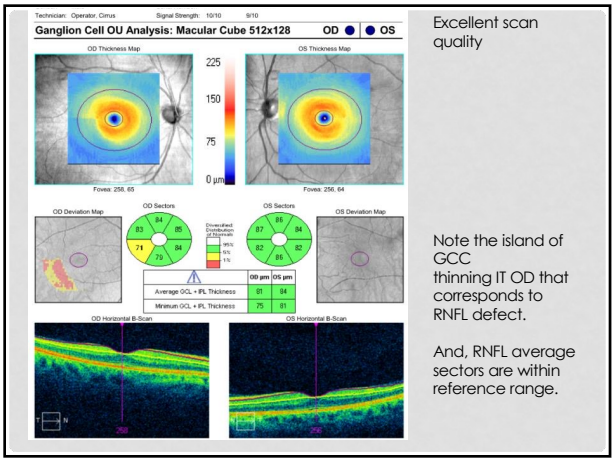

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OCT AND GLAUCOMA

- Utility
  - Confirming or ruling out he diagnosis of glaucoma
  - Monitoring progression
- Capabilities
  - RNFL thickness*
  - ONH profile
  - ONH "topography"
  - Macular RNFL**

96

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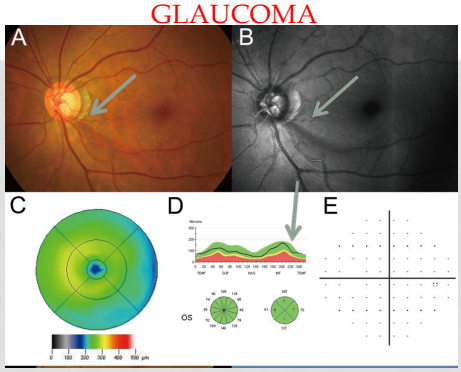
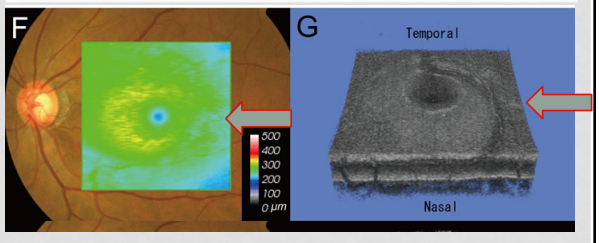
EMERGING TRENDS IN GCC FOR GLAUCOMA



Sakamoto A, et al. 3-D Imaging of the Macular RNFL in Glaucoma with SD OCT. (*Invest Ophthalmol Vis Sci.* 2010;51:5062–5070.

97

EMERGING TRENDS IN GCC FOR GLAUCOMA



Sakamoto A, et al. 3-D Imaging of the Macular RNFL in Glaucoma with SD OCT. (*Invest Ophthalmol Vis Sci.* 2010;51:5062–5070.

98

Support of horizontal raphe sign for progression

- Bak E, et al. Preperimetric Open Angle Glaucoma with Young Age of Onset: Natural Clinical Course and Risk Factors for Progression. Am J Ophthalmol. **2020 Mar 25**;S0002-9394(20)30126-4.
- Shin JW, et al. Ganglion Cell-Inner Plexiform Layer Change Detected by Optical Coherence Tomography Indicates Progression in Advanced Glaucoma. Ophthalmology. 2017 Oct;124(10):1466-1474.
- Kim KE, et al. Long-term follow-up in preperimetric open-angle glaucoma: progression rates and associated factors. Am J Ophthalmol. 2015 Jan;159(1):160-8.e1-2.
- Yu M, et al. Risk of Visual Field Progression in Glaucoma Patients with Progressive Retinal Nerve Fiber Layer Thinning: A 5-Year Prospective Study.Ophthalmology. 2016 Jun;123(6):1201-10.

99

WHAT ARE OUR NEXT STEPS?

100

WHAT ARE OUR NEXT STEPS?

- Reviewing the data
  - Good VA
  - (-) family history of glaucoma
  - ? SAS / (+) heart murmur // no beta-blocker meds.
  - Normal IOP
- Apparently clean VF
- Evidence of ONH / RNFL damage

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DIAGNOSTIC LABELING

- Glaucoma suspect
- Glaucoma
- Pre-perimetric glaucoma
- OHT

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PRE-PERIMETRIC GLAUCOMA EXPLANATION

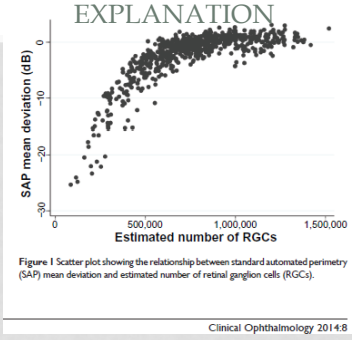

Figure 1 Scatter plot showing the relationship between standard automated perimetry (SAP) mean deviation and estimated number of retinal ganglion cells (RGCs).

Clinical Ophthalmology 2014:8

http://dx.doi.org/10.2147/OPTH.S44586

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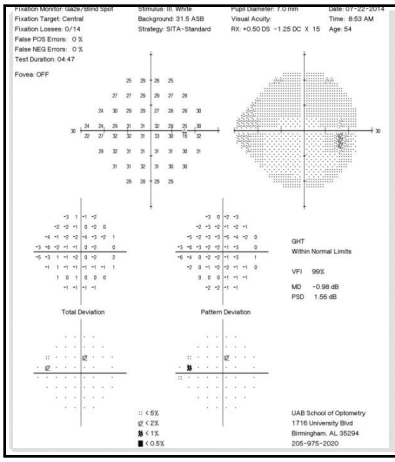
REPEAT THE VISUAL FIELD !!!

104



Reliable data?

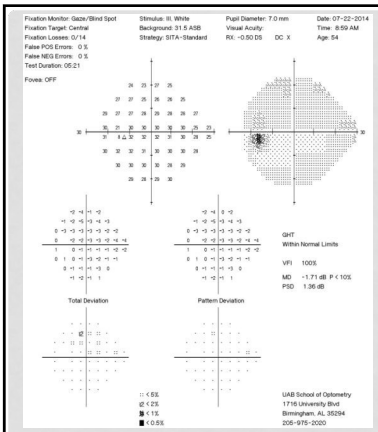
(Where's the blind spot?)

GHT,

PSD,

PD significance

105



Reliable data?

(Where's the blind spot?)

GHT,

PSD,

PD significance

106

WHAT IS YOUR INTERPRETATION OF THE VF

- Right
  - Correct test
  - Correct eye
  - Appropriate correction
- Reliable data
- GHT – WNL
- PSD – not flagged
- PD significance –? cluster in nasal step region

- Left
  - Correct test
  - Correct eye
  - Appropriate correction
- Reliable data
- GHT – WNL
- PSD – not flagged
- PD significance – no clusters in areas suspicious for glaucoma

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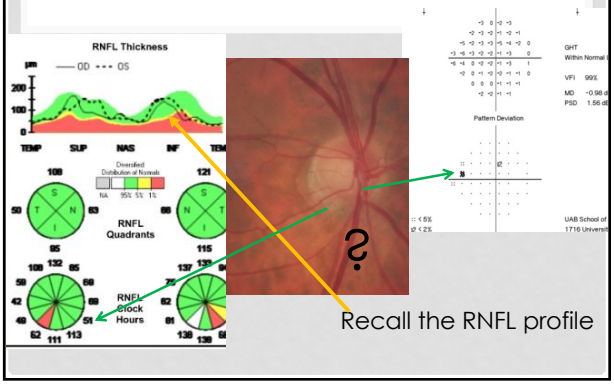
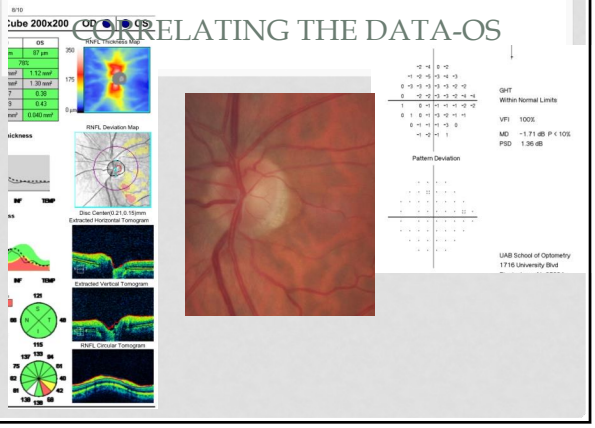
RECONCILING THE DATA-OD



108

CORRELATING THE DATA-OS



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MANAGEMENT

- Critical questions
  - Degree of damage
  - Burden of treatment
  - Life span

110

MANAGEMENT

- Critical questions
  - Degree of damage
  - Burden of treatment
  - Life span
- No treatment at this time
- Follow, repeating all tests X 6 mo
- ? Alternatives?

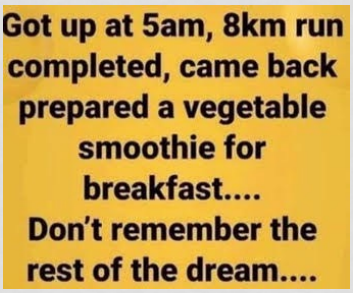
111

MOST RECENT VISIT

- IOP = 19/20
- Updated disrupted sleep status – diagnosed with SAS and using CPAP device. Reportedly, "…feeling much better."
- Does this change our thinking?

112

- Questions
- Comments



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RS 70S W F

FOLLOWED AS GLAUCOMA SUSPECT X 7 YEARS

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RS – FOLLOWED X 7 YRS

- Non-contributory medical and family histories
- IOP averages 23 (narrow range: 2-3 mm fluctuation)
- DDX?
  - Glaucoma suspect
  - Ocular hypertensive

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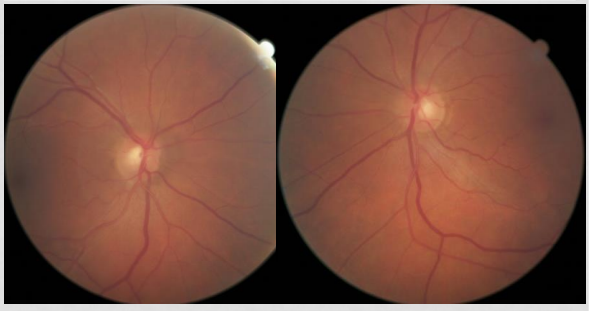
BASELINE PHOTOS



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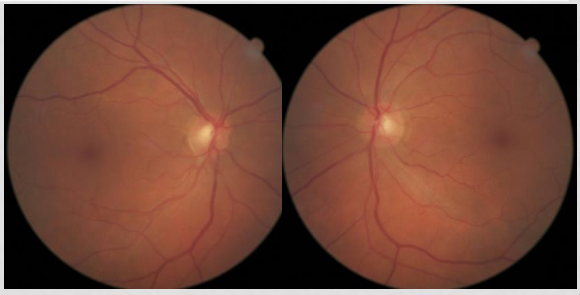
BASELINE X 1 YR.



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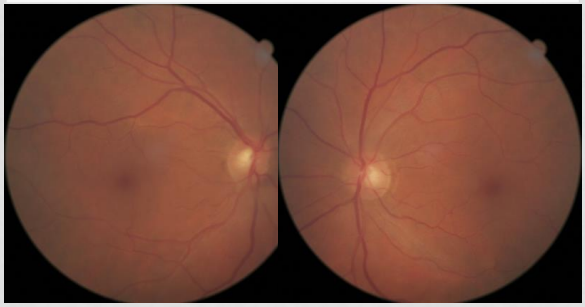
BASELINE X 2 YRS.



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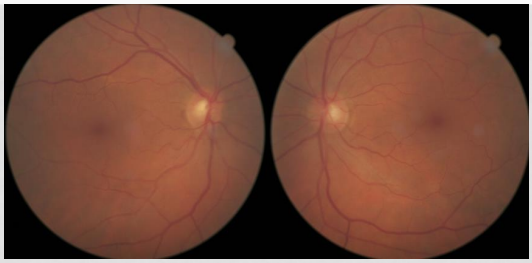
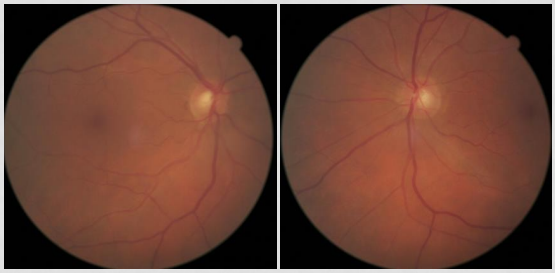
BASELINE X 3 YRS.



126

BASELINE X 4 YRS.



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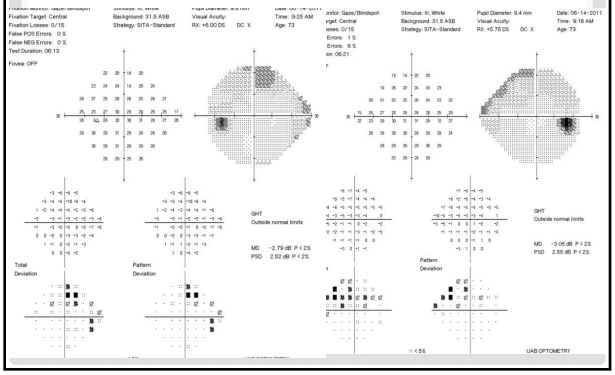
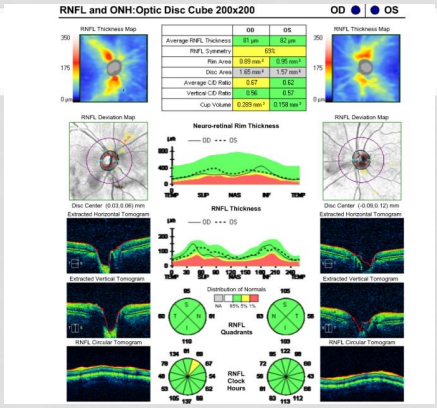
VF @ 5 YEAR FOLLOW-UP



130



Any red flags?

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And this just in . . .

Journal Pre-proof
The Weiss ring, a major confounding factor for measurements of peripapillary retinal nerve fiber layer thickness
PII: S0002-9394(22)00003-4
DOI: https://doi.org/10.1016/j.ajo.2022.01.001

To appear in: *American Journal of Ophthalmology*

Accepted date: January 1, 2022

Highlights

Eyes with a Weiss ring showed thinner mean and inferior pRNFL thicknesses than normal controls, which could be a major confounding factor for analyses of pRNFL changes, especially in glaucoma patients.

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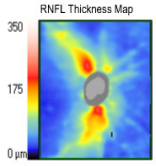
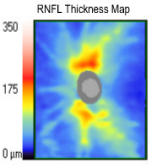
RNFL and ONH:Optic Disc Cube 200x200 OD ● | ● OS

RNFL Thickness Map



	OD	OS
Average RNFL Thickness	81 µm	82 µm
RNFL Symmetry	63%	
Rim Area	0.89 mm²	0.95 mm²
Disc Area	1.65 mm²	1.57 mm²
Average C/D Ratio	0.67	0.62
Vertical C/D Ratio	0.56	0.57
Cup Volume	0.289 mm³	0.158 mm³

RNFL Thickness Map



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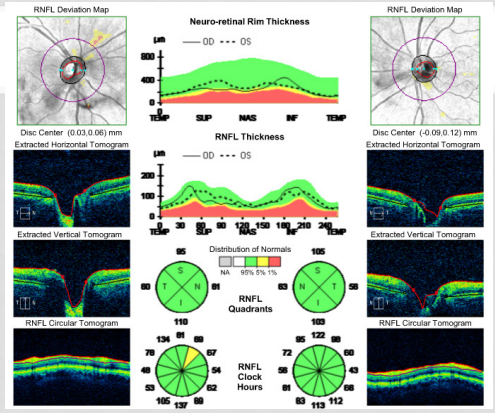

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OHT RISK CALCULATIONS
(FROM OHTS DATA MINING)

Glaucoma Risk Calculation Results

Patient Age - - - 74

Has Diabetes? - - - N/A

Risk of developing glaucoma within the next five years

Risk without treatment - - - 17.75 %

Risk with treatment - - - 7.10 %

Vertical Cup / Disk Ratio - - - 0.4

136

Glaucoma Risk Calculation Results

Patient Age - - - 74

Has Diabetes? - - - N/A

Corneal Thickness - - - 560 microns

IOP - - - 23

PSD - - - 2.30

Vertical Cup / Disk Ratio - - - 0.4

Risk of developing glaucoma within the next five years

Risk without treatment - - - 17.75 %

Risk with treatment - - - 7.10 %

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Glaucoma Risk Calculation Results

Patient Age - - - 74

Has Diabetes? - - - N/A

Risk of developing glaucoma within the next five years

Risk without treatment - - - 19.21 %

Risk with treatment - - - 7.69 %

Vertical Cup / Disk Ratio - - - 0.4

Using just the latest PSD [mean OD + OS] and IOP, note the difference

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http://ohts.wustl.edu/risk/calculator.html

"Glaucoma risk estimator"

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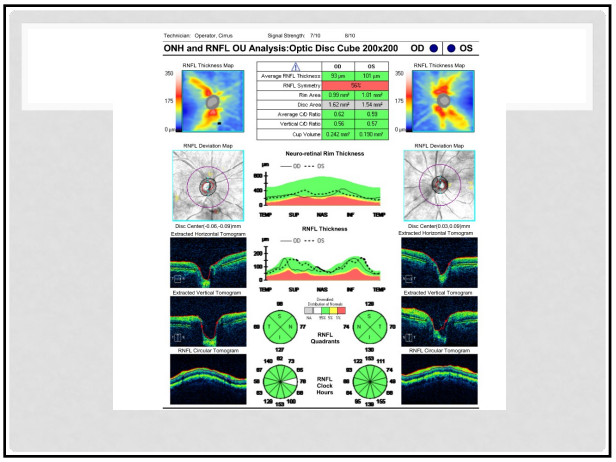

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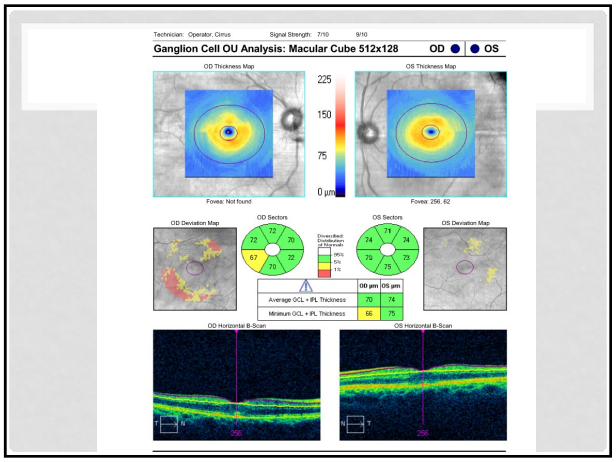

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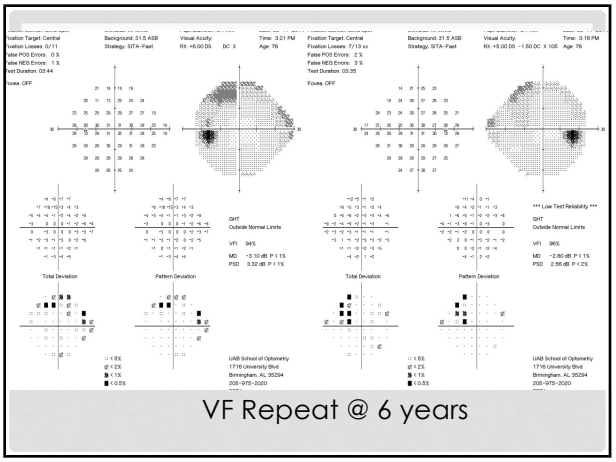

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OHT FOLLOW-UP - MOST RECENT

- Treatment option offered and pt started on PGA ghs
- F/U @ 2 weeks IOP = 16mm Hg in each eye.
- Continued on treatment with low teens IOP

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OHT 20-YEAR FOLLOW

Assessment of Cumulative Incidence and Severity of Primary Open-Angle Glaucoma Among Participants in the Ocular Hypertension Treatment Study After 20 Years of Follow-up The Ocular Hypertension Study Group

JAMA Ophthalmol. 2021;139(5):558-566. doi:10.1001/jamaophthalmol.2021.0341
Published online April 15, 2021. Corrected on July 22, 2021.

Twenty-year cumulative incidence and severity of POAG in 1 or both eyes after adjustment for exposure time.

CONCLUSIONS AND RELEVANCE In this study, only one-fourth of participants in the OHTS developed visual field loss in either eye over long-term follow-up. This information, together with a prediction model, may help clinicians and patients make informed personalized decisions about the management of ocular hypertension.

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THANK YOU

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