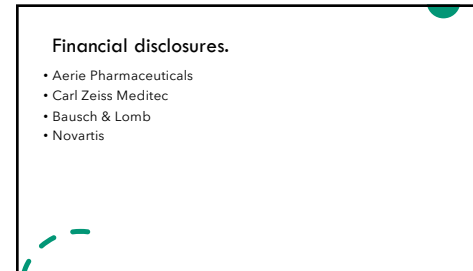




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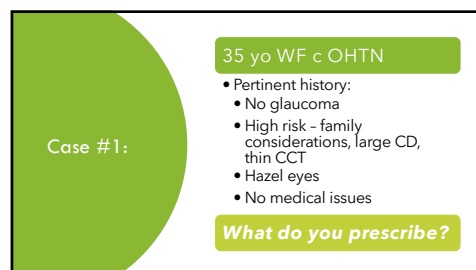
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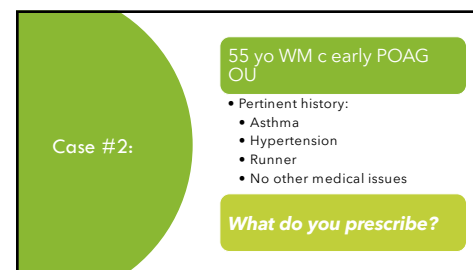
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5



6

Case #3

92 yo AAF c moderate CACG OU

- Pertinent history:
  - Low blood pressure
  - Pace maker
  - Allergic to shellfish
  - No other medical issues

*What do you prescribe?*

7

Case #4:

47 yo HF c unilateral uveitic glaucoma

- Monitored off drops since last flare up
- Pertinent history:
  - BW all unremarkable
  - Unclear why uveitis
  - No glaucoma suspicion OD, glaucoma defect with progression OS
  - No other medical issues

*What do you prescribe?*

8

Technical jargon

- Contraindication** = pre-existing condition in which a drug is not safe or effective
- Side effects**: Undesirable effects of a drug that are predictable by the drug's MOA
- Adverse events**: Undesirable effects of a drug that are not predictable by the drug's MOA.
  - Dose dependent - (toxic drug effects)
  - Non-dose dependent (allergic reaction)

9

Clinical benefit vs Potential harm

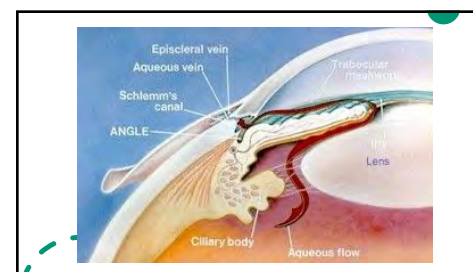
- Treatment goal:**
  - Choose the hypotensive agent(s) that has the highest likelihood to reach the target IOP, with the lowest risk profile for each patient.
- Do no harm.....weigh the risk/benefit ratio for each patient.**

10

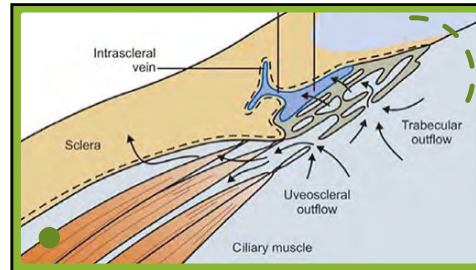
Review on mechanism of action:

- Aqueous is produced by non-pigmented epithelium of the ciliary body
  - Controlled by several factors including carbonic anhydrase and blood flow (EVP)

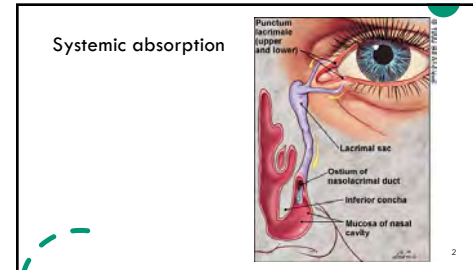
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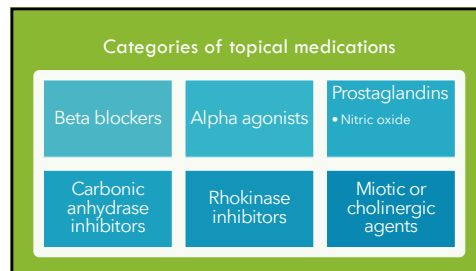
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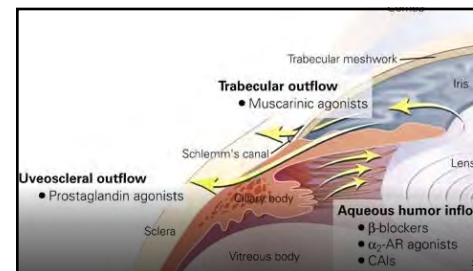
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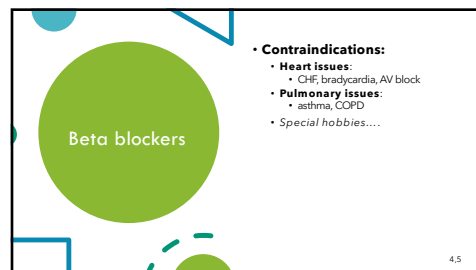
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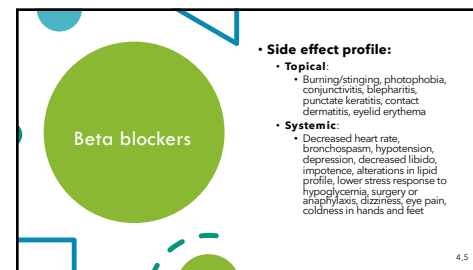
15



16



17



18

### Beta-blockers

Generic	Brand	Concentration	Dosing
Nonselective			
Timolol	Timoptic®	0.25%, 0.5%	
Levobunolol	Betagan®	0.25%, 0.5%	
Cardiolol	Ocupress®	1.0%	QD-BID
$\beta$ 1-selective			
Betaxolol	Betoptic®	0.25%, 0.5%	

19

### 66 yo F c PDR+ POAG OU

- BCVA 20/80-2 OD, 20/50 OS
- IOP 20 OU on GAT
  - Current medications: Cosopt BID OU + Brimonidine TID OU + Rhopressa QHS OU
  - Medical history: Asthma, DM II, HTN, h/o stroke, High cholesterol
- Reports cough at night after gtts

20

### Issues to consider:

- Is there respiratory or heart disease in this patient?
- Is the patient high risk for hypoglycemia?
- Is there depression, anxiety, fatigue, or impotence?
- Does the patient have thyroid disease or myasthenia gravis?
- Other considerations...

21

### Alpha Agonists

#### • Contraindications:

- Orthostatic hypotension, Depression, Raynaud's phenomenon
- Also concurrent with medications:
  - Digoxin
  - Anti-depressants
  - Oral beta blockers

4-6

22

### Alpha agonists

- Side effects:
  - Topical:
    - **Conjunctival blanching**, ocular allergy
  - Systemic:
    - Headache, drowsiness, fatigue, low or high blood pressure, slowing of heart rate, dry mouth
- Interactions:
  - May interact with blood pressure medications, digoxin, beta-blockers, or antidepressants.

4-6

23

### $\alpha$ -2 Adrenergic agonists

Generic	Brand	Concentration	Dosing
Selective			
Apraclonidine	Iopidine®	0.5%, 1.0%	BID-TID
Brimonidine	Alphagan®	0.1%, 0.2%	

4

24

### 57 yo WM with POAG OU

- BCVA 20/25 OU
- IOP 15 OU
- Current medications: Brimonidine BID OU + Latanoprost QHS OU
- Fainted while taking the visual field

25



26

Issues to consider:

Is this a child under 3-4 years old?

Is the patient hypersensitive?

Does the patient have low blood pressure?

Other considerations...

27

PGA

- Contraindications:
  - Hypersensitivity, NAC, ocular infection or inflammation
  - No systemic contraindications

4,5

28

Don't use PGAs in...



UVEITIS



CME POST APHAKIA OR OCULAR SURGERY

29

PGA

- Side effects:
  - Topical:
    - Iris pigmentation changes, eyelid darkening, periorbital fat atrophy, punctate keratitis, burning or stinging
  - Systemic:
    - Headache
    - Hypertension
    - \*\*Nitric oxide considerations?

4,5

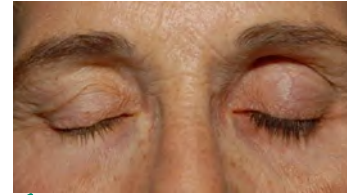
30

### Prostaglandin analogues

Generic	Brand	Concentration	Dosing
Latanoprost	Xalatan®	0.005%	QHS
Travaprost	Travatan®	0.004%	
Bimatoprost	Lumigan®	0.01%, 0.03%	
Tafuprost	Zioptan®	0.0015%	
Latanoprostene	Vyzulta®	0.024%	
Bunod	Iyuzeh®	0.005%	

4, 6

31



4

32

### 43 yo F with unilateral uveitic glaucoma OS

- BCVA 20/20 OU
- IOP 14/15
- Current medications: monitored off gtts
- Today's exam: Progression OS, no glaucoma OD

33

### Issues to consider:

Does the patient have active inflammation or prone to inflammation?

Is this for unilateral use?

Does the patient have hazel or light colored eyes?

Other considerations...

34

CAI

### Contraindications:

- Hypersensitivity to sulfonamides

4, 5

35

CAI

### Side effects:

- Topical:
  - **Burning**, punctate keratitis, ocular allergies
- Systemic:
  - Bitter taste, headache, nausea, asthenia, kidney stones, depression, fatigue

4, 5

36

Issues to consider:

- Is the cornea healthy, specifically endothelial function (eg Fuchs)?
- Does the patient have hepatic or renal issues? (systemic use)
- Other considerations...

37

### Carbonic anhydrase inhibitors

Generic	Brand	Concentration	Dosing
Topical Dorzolamide Brinzolamide	Trusopt® Azopt®	2.0% 1.0%	BID-TID
Systemic Acetazolamide Methazolamide	Diamox® Neptazane®	250, 500mg 25, 50, 100mg	BID-QID BID-TID

38

### Rhokinase Inhibitors

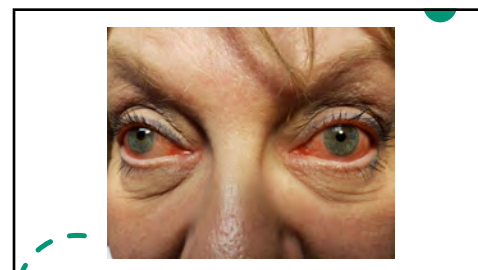
- Contraindications:
  - No systemic contraindications

39

### Rhokinase inhibitors

- Side effects:
  - Topical:
    - conjunctival hyperemia (53%)
    - Others (20%) corneal verticillata, instillation site pain, conjunctival hemorrhage
  - Systemic: NONE!

40



41

52 yo WM artist with hazel eyes GS OD>OS

- BCVA 20/20 OU
- IOP 17/19
- Low blood pressure

42

Issues to consider:

Can the patient tolerate the hyperemia?

Is this for unilateral treatment?

Other considerations...

43

Contraindications:

- Asthma, acute iritis

Miotic or Cholinergic agents

44

Miotic or cholinergic agents

Side effects:

- Topical:
  - burning, blurred vision, night vision issues, miosis, accommodative spasm, lens opacity, RD, angle closure glaucoma
- Systemic:
  - Sweating, salivation, urinary frequency, nausea, diarrhea, bronchospasm, biliary colic, mental status change, variable cardiovascular response

45

Cholinergic stimulators

Generic	Brand	Concentration	Dosing
Direct Pilocarpine HCl	IsoptoCarpine	1%, 2%, 4%	QID QD-BID
Indirect Echothiophate iodide	Phospholine iodide	1.25%	

46

78 yo M c severe POAG post-trab + BGI OU

- BCVA 20/60 OD, 20/100 OS
- IOP 20, 19
- Medical issues: HTN, h/o lymphoma
- Current medications: Timolol BID OU + Rocklatan QHS OU + Simbrinza BID OU + Pilocarpine 1% TID OU

47

Issues to consider:

Is this patient myopic?

Does this patient have lattice degeneration?

Is there a history of an RD?

How high is this patient's accommodation?

How will a small pupil effect this patient?

48





49



50

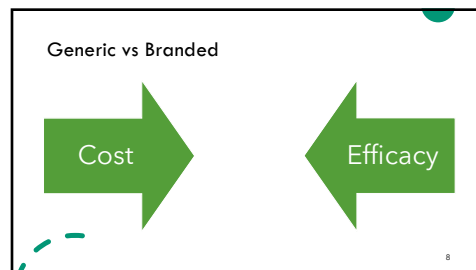


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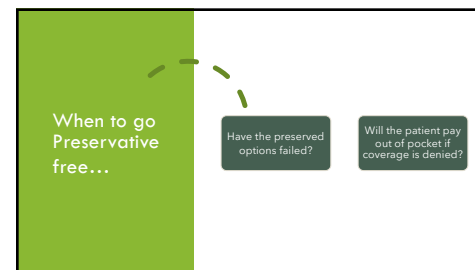
**Combination medications**

Generic	Brand	Concentration	Dosing	Cost generic	Cost brand	Example Cap Color
Dorzolamide/ Timolol	Cosopt®	2.0%/0.5%	BID	\$25/10ml	\$150/10ml	Dorzolamide/timolol
Brimonidine/ Timolol	Combigan®	0.2%/0.5%		N/A	\$135/5ml	Brimonidine/timolol
Brimonidine/ Timolol	Simbrinza®	1.0%/0.2%		N/A	\$135/8ml	Brimonidine/brimonidine

52



53



54


**BAK preservative-free options**

Medication	Brand	Concentration	Preservative	Cost/brand
Alpha agonists Brimonidine	Alphagan-P®	0.1%, 0.15%, 0.2%	Purite®	\$30/5ml (0.2%)
Prostaglandins Travoprost, Tafluprost	Travatan-Z® Zovator® Iluveth®	0.004%, 0.0015%, 0.005%	scZse® None	\$160/2.5ml \$130mo
Beta blockers Timolol maleate Gel Timolol in Ocusose	Timoptic-XE® Timoptic®	0.25%, 0.5% 0.25%, 0.5%	Benzododecinium None	\$200/5ml (0.5%) \$450mo (0.5%)
Cholinergics Echothiophate	Phospholine Iodide	1.25%	Chlorbutanol	\$100/5ml
Combination Timolol/Dorzolamide	Cocept PFB®	0.2%/0.5%	None	\$110mo


4

55


Let's talk about age for a moment?




How does age factor into the treatment plan?



Which drops might you avoid in a young person?



Which drops might you avoid in an elderly person?



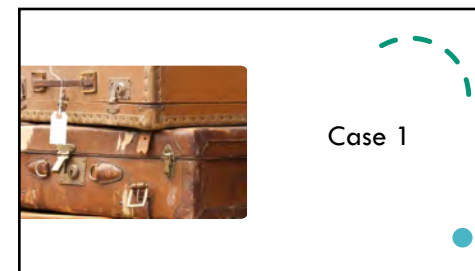
What do we know about adherence?

9,10,11

56



57

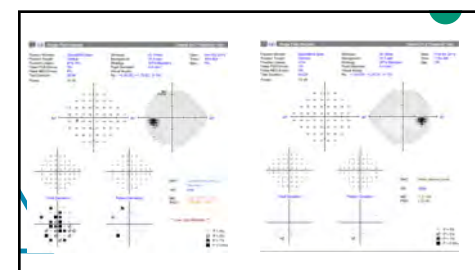


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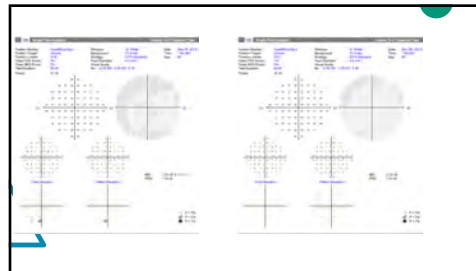
**64 yo M OHTN vs early OAG**

- Medical conditions: HTN, Sulfa allergy, brown eyes
- BCVA: 20/20 OD, OS
- MRC: OD: -0.75-1.25X086, OS: -1.25-1.75X076
- Ant seg: Unremarkable (-) PXE, TIDs, KS OU
- PERRL-APD
- IOP: 22/22 @ 9:25am (TMAX: 27/26)
- CCT: 551/550
- Gonio: Gr 4, CB 360 OU
- Grade 1 NS OU
- ONH: See photos
- Retina: Flat 360 OU

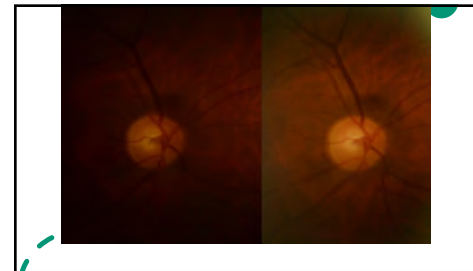
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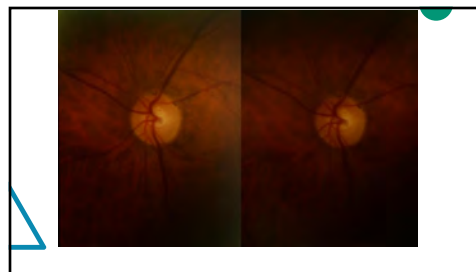
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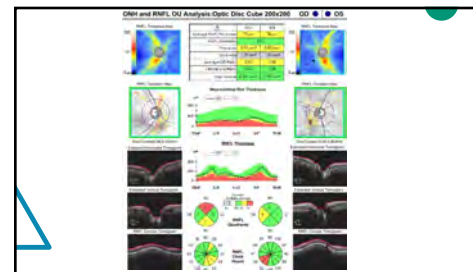
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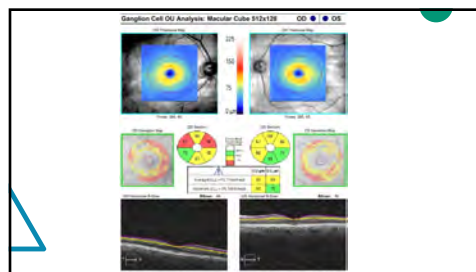
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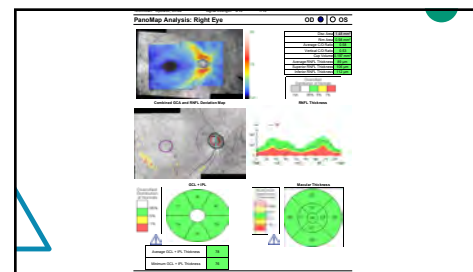
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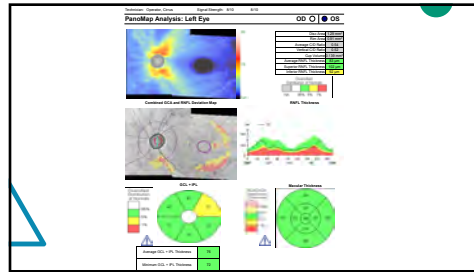
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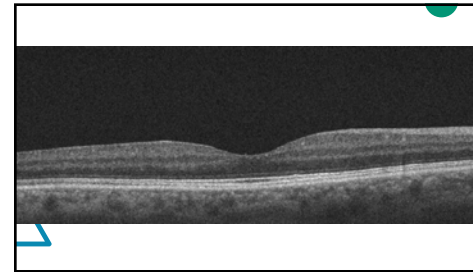
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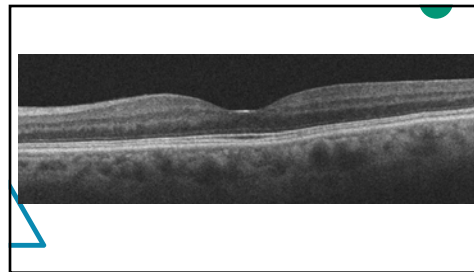
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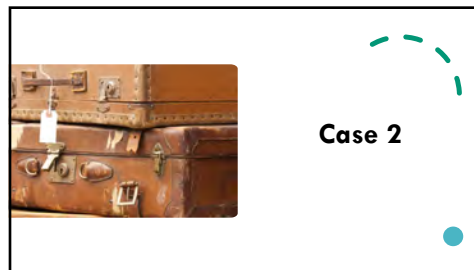


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### Discussion

- 1. Diagnosis:
  - POAG
- 2. Risk Assessment:
  - OHTS Risk Calculator
    - Risk = 28%
    - Treated with Lx at 2<sup>nd</sup> visit
- 4. Frequency of follow-up for the treated vs non-treated pt:
  - Followed q6-9 months

70

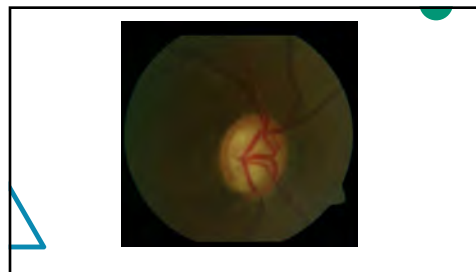


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**68 yo WM POAG OD>OS s/p ALT OD**

- NS OU
- CCT: 553/557
- Cosopt 2/2
- Trav HS/HS
- Medical conditions: Borderline Diabetes, HTN

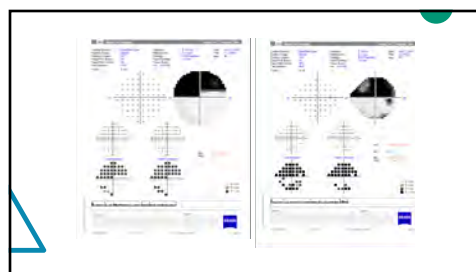
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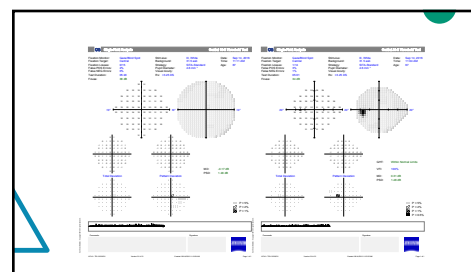
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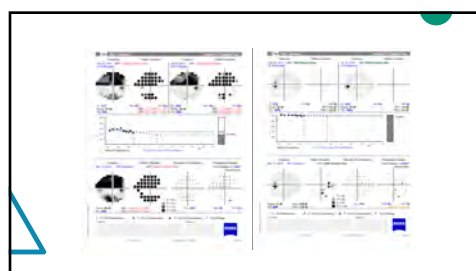
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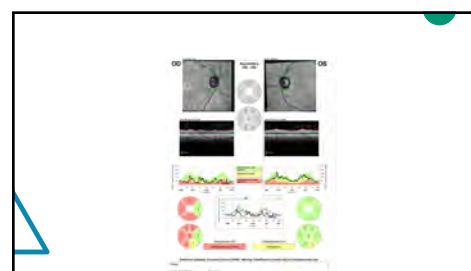
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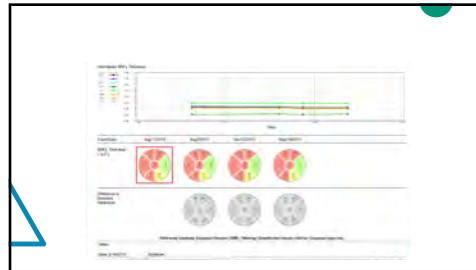
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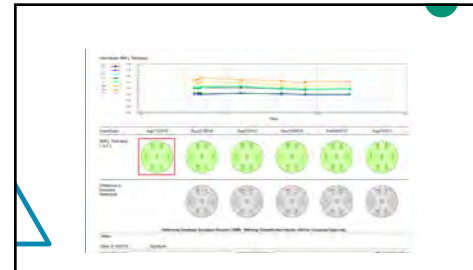
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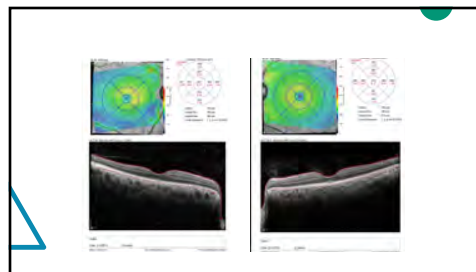
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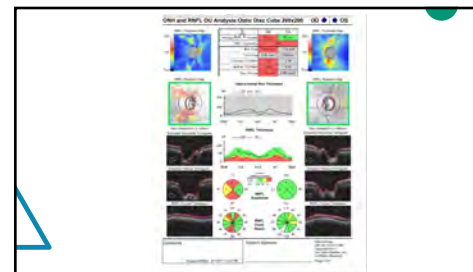
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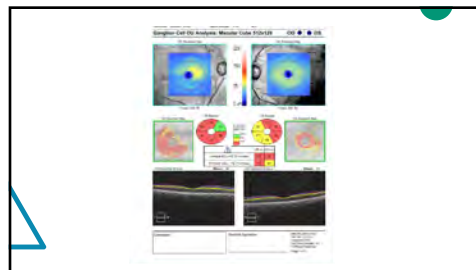
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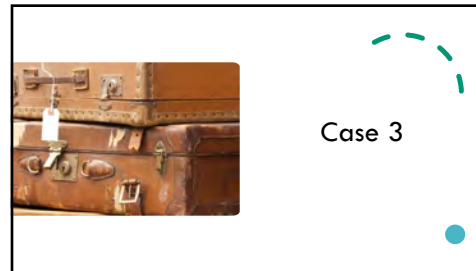


83

**What would you do?**

- Escalate treatment? Monitor?
- What if his IOP is 10?
- What if his IOP is 20?

84



85

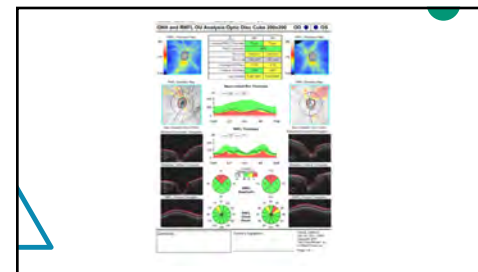
64 yo M presents for blurred reading vision in new glasses

- **Ocular and family history:** unremarkable
- **Medical history:** cholesterol, arrhythmia
- **Relevant exam findings:**
  - **BCVA:** 20/20 OD, OS c mild mixed regular astigmatism OU
  - **PERRL-APD**
  - **IOP c GAT:** 14/14 @10:04am; CCT: 550/553
  - **Slit lamp:**
    - Mild PPA
    - (-) PDS/PXE
  - **Gonioscopy:**
    - Open, gr 2+ OU

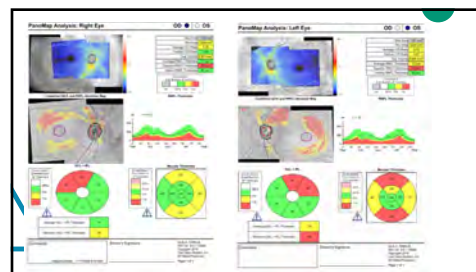
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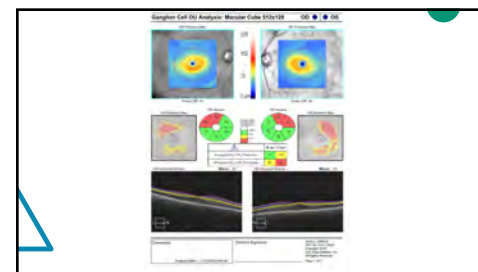
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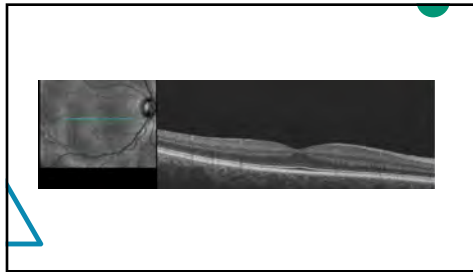
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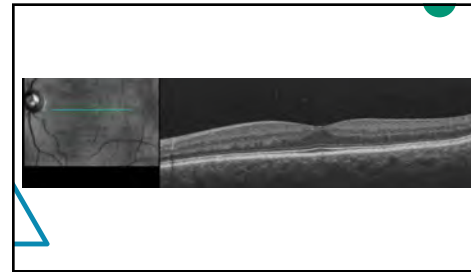
89



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91



92

### Assessment and Plan

- Likely low tension glaucoma OU
  - Discussed findings with patient.
  - No PDS/PXE evident on slit lamp exam
  - No family history reported
  - No history ocular trauma or chronic inflammation. Denies h/o chronic steroids.
  - Return 2 weeks for IOP + HVF 24-2 and initiate treatment. Also recheck for APD

93

### Thoughts so far...

1. Definitely glaucoma, start treatment
2. Definitely glaucoma, wait until follow up to start treatment
3. Unsure if glaucoma, start treatment
4. Unsure if glaucoma, wait for follow up or refer to glaucoma specialist

94

### 01/30/2020

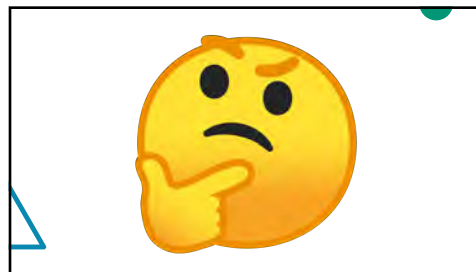
- 64 yo M returns for HVF 24-2 + IOP
  - IOP: 14/12
  - No APD
  - No disc heme

95

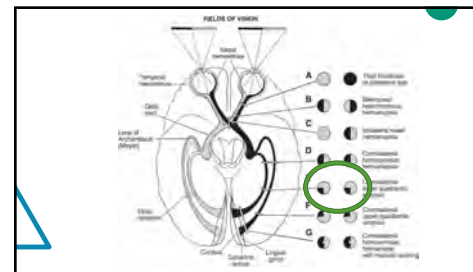


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Does this change your management?

- ☒ Yes, send to ER
- ☐ Yes, refer to neuro-ophthalmologist
- ☐ No, treat as glaucoma with unreliable VF
- ☐ No, treat as glaucoma suspect with unreliable VF

99

Assessment and Plan

- Likely LTG +/- other contributing neuropathy OU
  - Atypical VF defect not consistent with glaucoma in the setting of RNFL arcuate damage and possible GON
  - Suggest Tx to mitigate risk
  - Due to arrhythmia, prefer to avoid beta blocker and alpha agonist
  - Blue/hazel eyes - prefer to avoid Lx as first agent
  - Initiate RhoPressa QHS OU
  - Refer to neuro-ophthalmology for consultation.
  - Return 1 month IOP check

100

03/03/2020

Pt presents for IOP check

- c/o redness OU but tolerable
- IOP: 13/15
- Pending evaluation with neuro-oph
- CSM and RTO 3 months VF/OCT

101

CLINIC SHUTDOWN

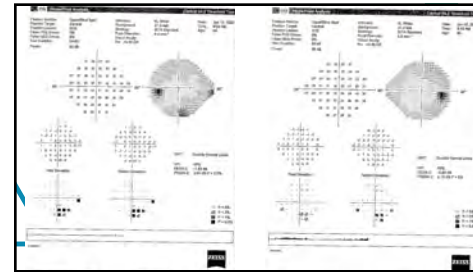
102

06/12/2020

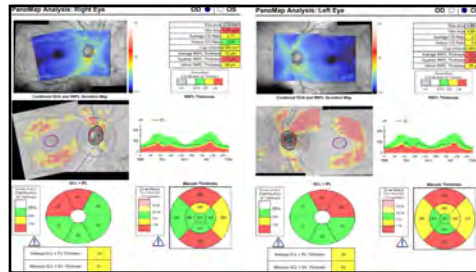
**Presents for VF +OCT follow up**

- Had televisit with neuro-oph 05/22/2020, pending MRI
- Reports compliance with Rho-pressa.
- Denies other visual changes or complaints.

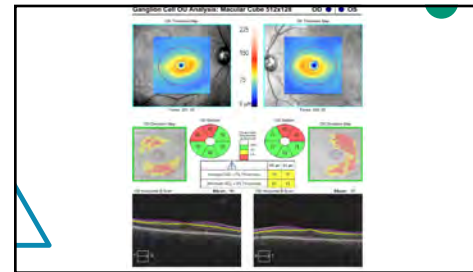
103



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**Assessment and Plan**

- Likely Low Tension OAG +/- other contributing etiology OU
  - Pt tolerating Rho-P well despite injection
  - IOP not adequately lowered in setting of apparent RNFL progression OU
  - Change Rho-P to Rocklatan QHS OU.
- Keep appointment with neuro-oph next week and return in 2 months

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**Neuro-ophthalmic sequelae**

05/22/2020

- Televisit
- Agreed inconsistency btw OCT RNFL defects and VF temporal defects
- Order MRI orbits
- Return for DP + repeat VF

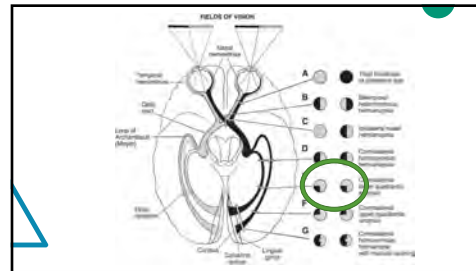
06/10/2020

- DP reveal more pallor than cupping.
- Ordered MRI of orbits and brain with and without contrast to R/O lesion of tract or geniculocalcarine pathway

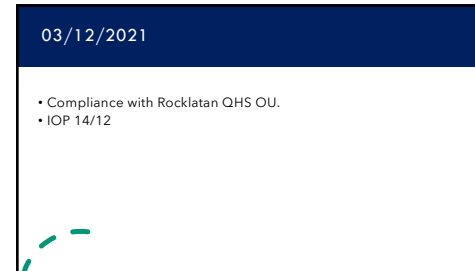
08/17/2020

- Left parieto-occipital visual radiation infarction confirmed

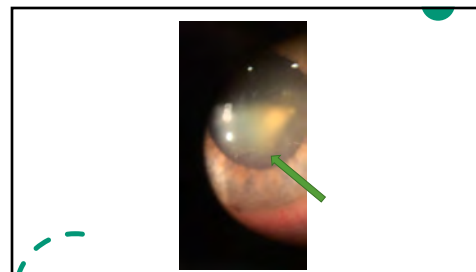
108



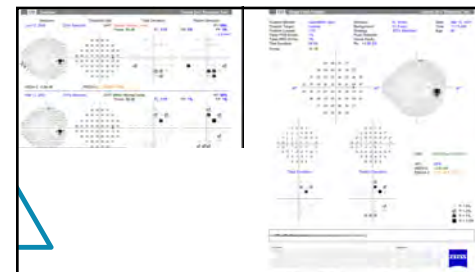
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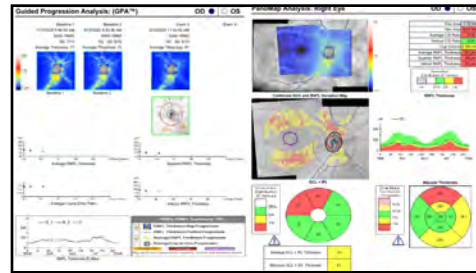
112



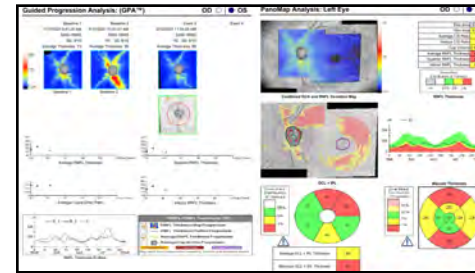
113



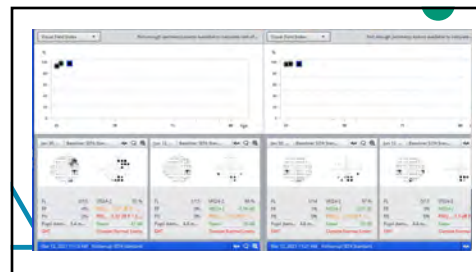
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Does this change your management?

- ☒ Yes, stop therapy
- ☐ Yes, change or alter therapy
- ☐ No, continue same therapy
- ☐ I am not sure what to do, I would refer out

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**Plan:**

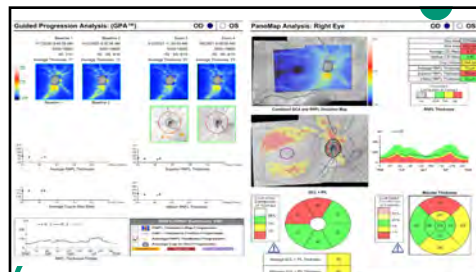
- Consult with Dr. Donald Hood
  - Likely contributory retrograde transneural atrophy of GCL following parieto-occipital visual radiation infarction
  - Difficult to say why there is discrepancy between fields and OCT
  - Uncertain whether glaucoma is present
- Are the side effects of Rhopressa worth it for this patient?
  - Change to Latanoprost QHS OU

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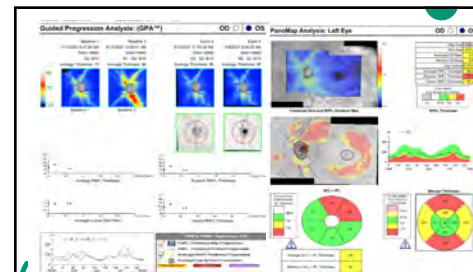
**05/06/2021**

- Much improved redness. No complaints with Lx HS OU
- IOP 15 OU

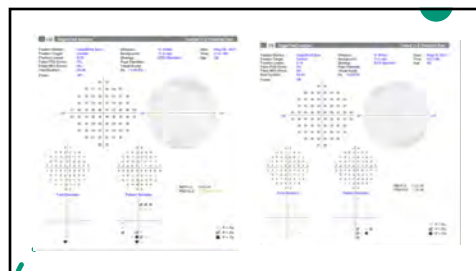
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### Assessment and Plan

- IOP too high
- Progression on RNFL?
- Add Dorzolamide BID OU
- Refer to glaucoma specialist.

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### In cases where there is concern of non-glaucomatous etiology....

1. When to include neuro-ophthalmology? When to send to ER?
2. How should ODs approach treatment and management of these patients?
3. Other comments?

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### Summary

- Know your meds
- Medication categories
- Absolute NO's
- Other considerations

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Thank you for listening!!

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