Ophthalmology Grand Rounds

Cindy Calderon, M.D.
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Case Presentation I

CC: " My right eye is blurry."

- Patient is a 56 yo AA female with c/o acute on chronic blurred vision OD that began to worsen over the past 3 weeks. Patient denies any ocular pain or trauma. Requests new Rx for glasses.

Patient Care and Interpersonal Skills

Case Presentation II

- PMHx : denies

- PSHx: denies

- POHx: refractive error (last Rx 4 years ago)

- Meds/gtts: None

- NKDA

Patient Care and Interpersonal Skills

Physical Exam I

Externals

- DVa sc:
  - OD 20/60 PHNI /MRx NI
  - OS 20/25
- P: no APD
- EOM: full OU
- CVF: full OU
- Tapp: 18, 18 @ 1600

Patient Care and Interpersonal Skills

Physical Exam II

SLE

- LLA: wnl OU
- C/S: w/q OU
- K: clear OU
- AC: d/q OU
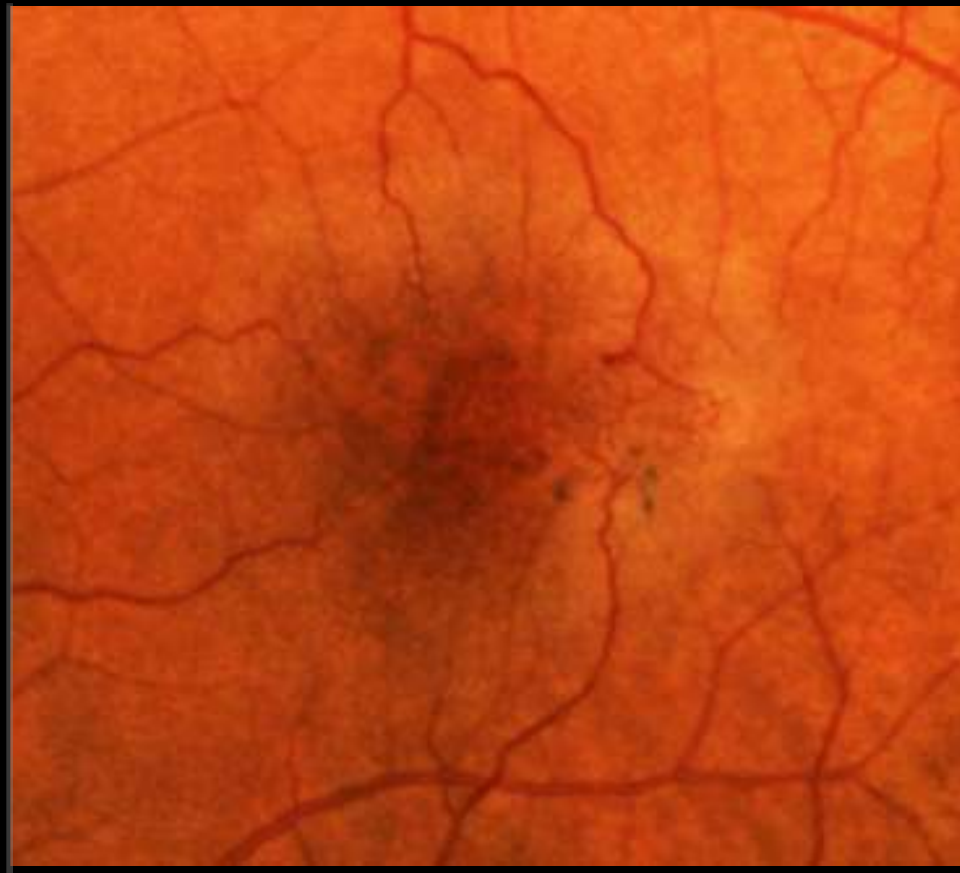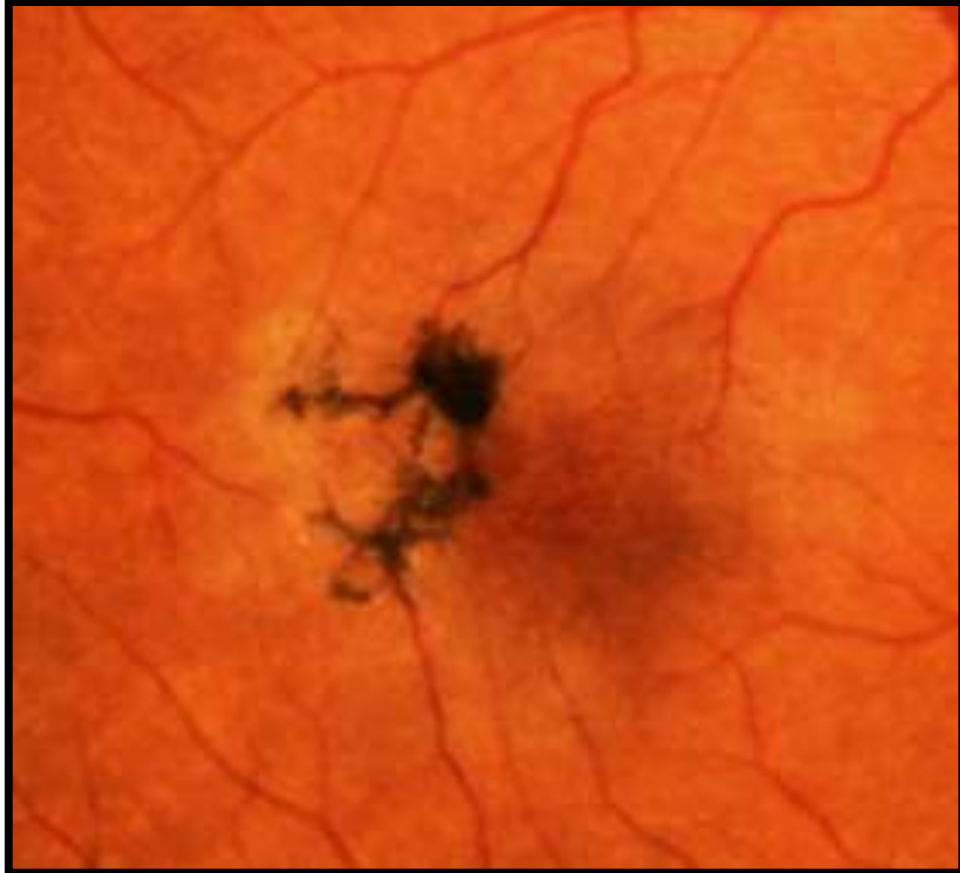- I/P: BRR OU
- Lens: 1+ NS OU

DFE

- See photos

Patient Care and Interpersonal Skills

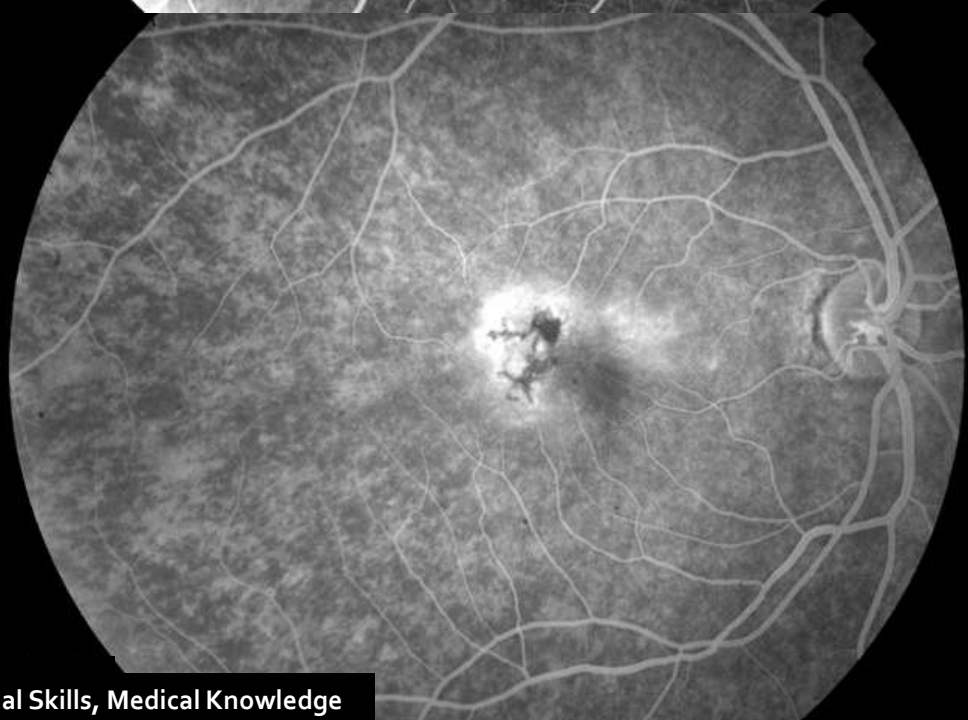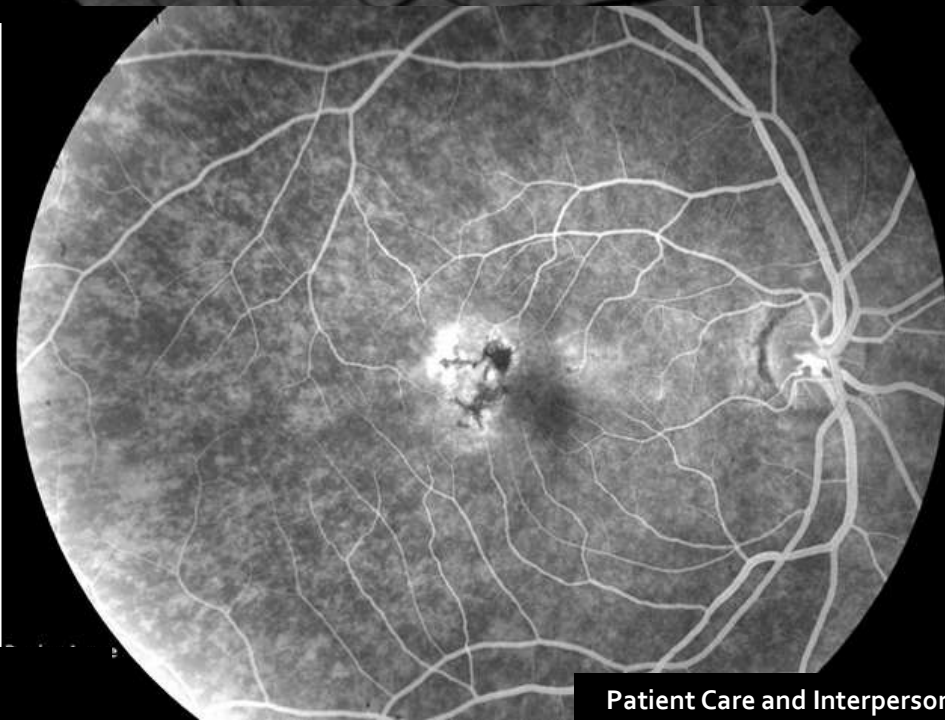# Physical Examination

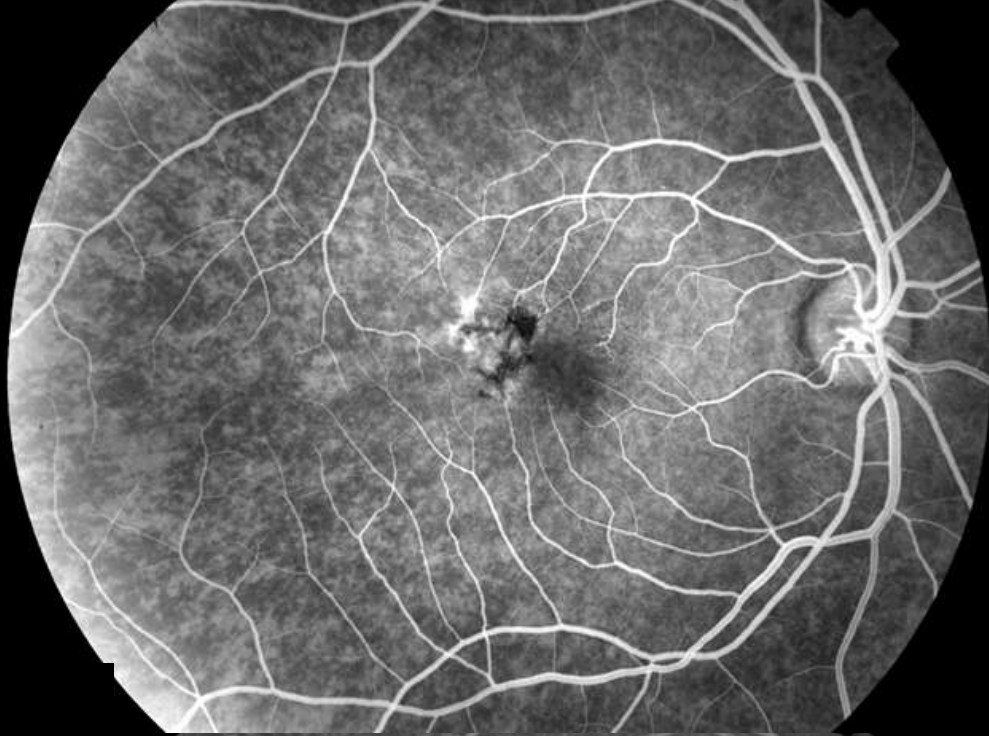# Physical Exam

Patient Care, Medical Knowledge
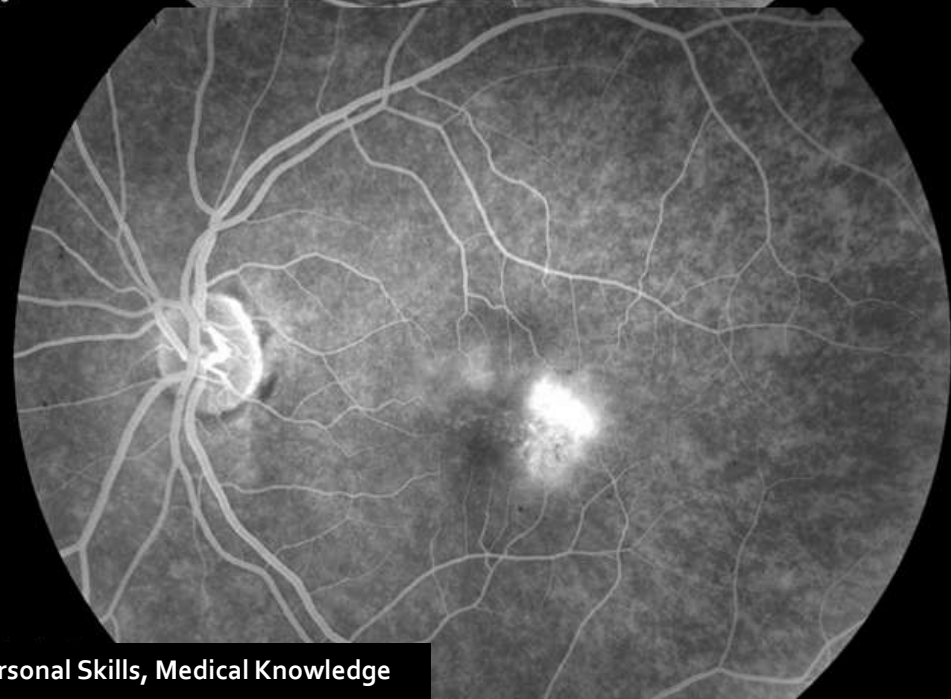
Further work-up?

- Fluorescein angiography
- OCT macula

Patient Care and Interpersonal Skills, Medical Knowledge
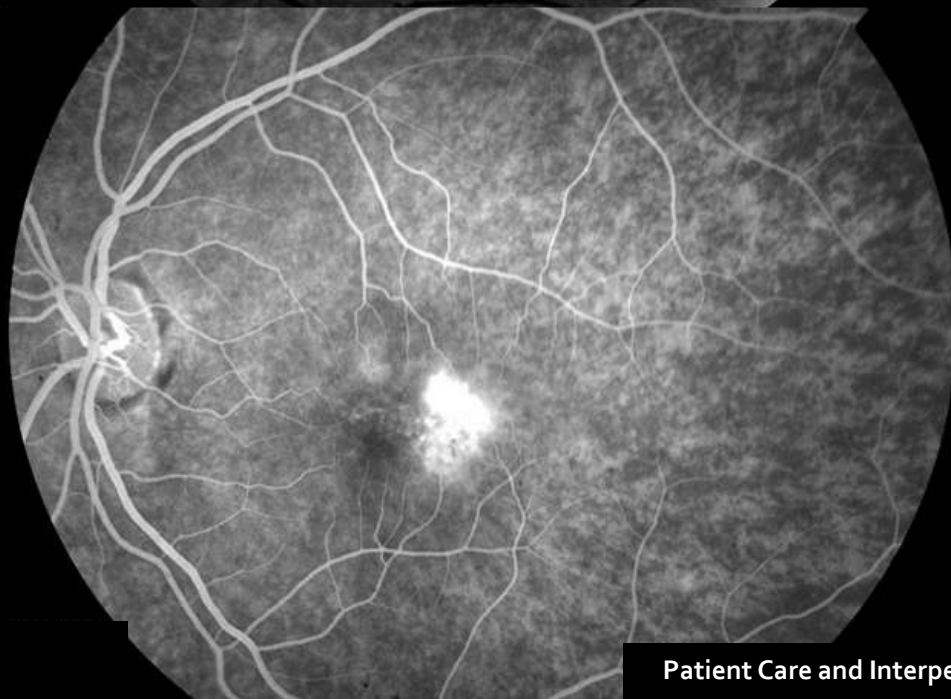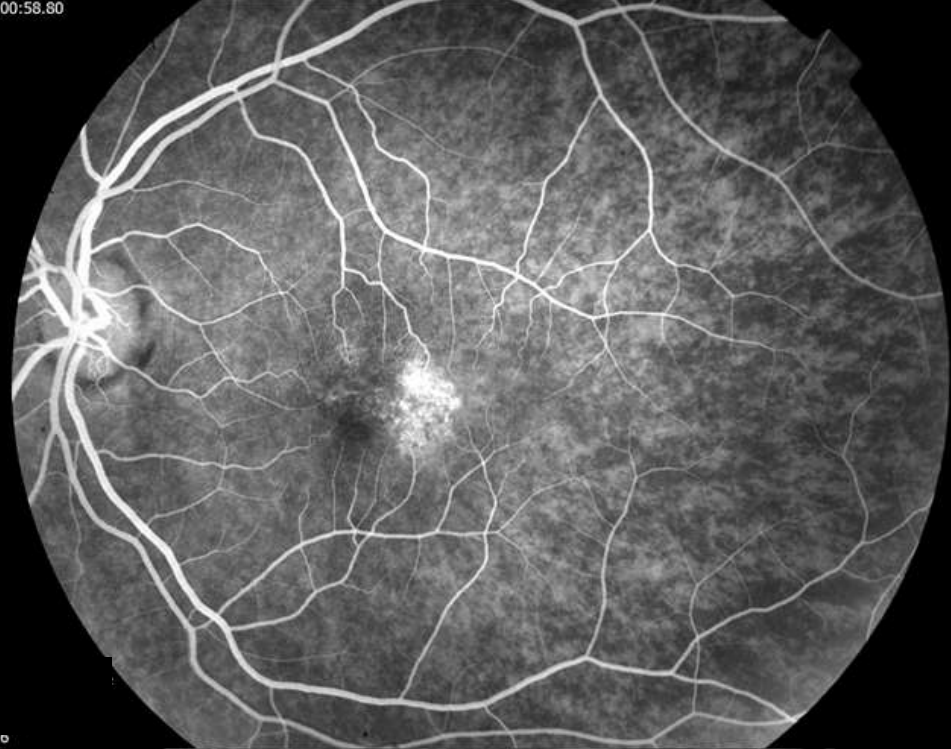
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OCT
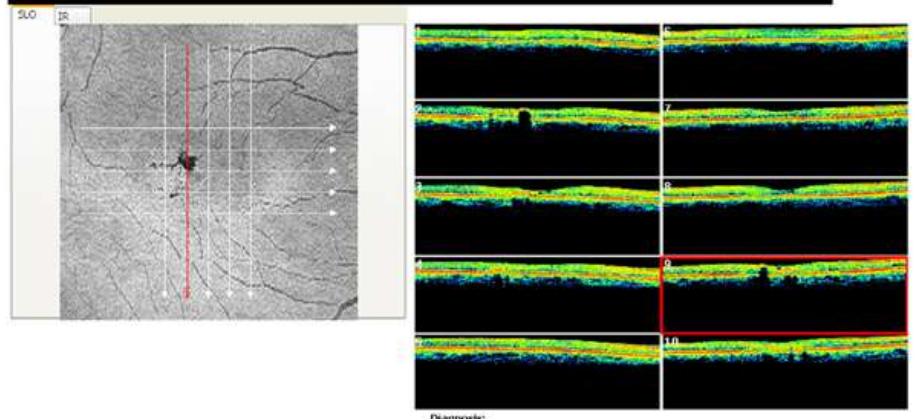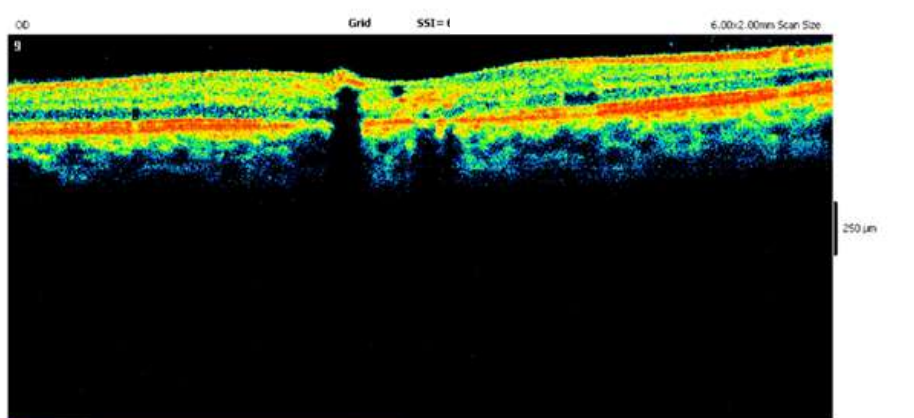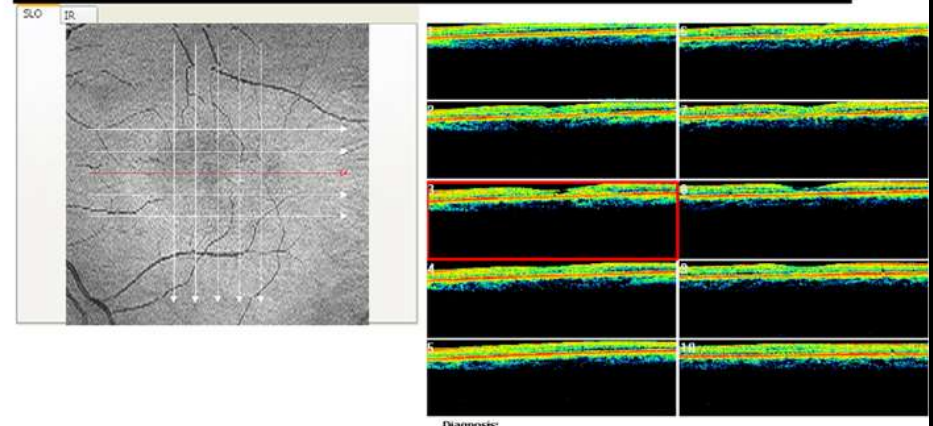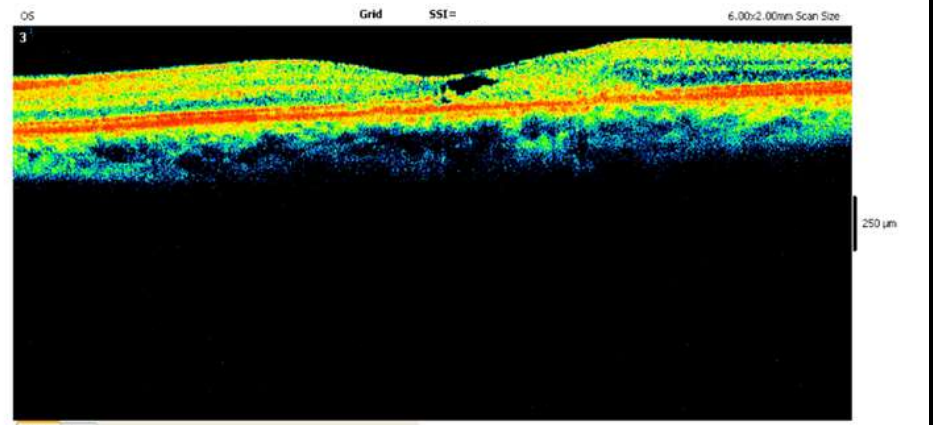
Differential Diagnosis

- Diabetic retinopathy
- Hypertensive retinopathy
- Age-related macular degeneration
- Idiopathic juxtafoveal telangiectasia
- Coats disease
- Retinal venous occlusions
- Radiation retinopathy
- Sickle cell maculopathy

- Inflammatory retinopathy/Irvine–Gass syndrome
- Eales' disease
- Ocular ischemic syndrome/carotid artery obstruction
- Polycythemia vera retinopathy
- Localized retinal capillary hemangioma

Medical Knowledge

Idiopathic Juxtafoveal Retinal Telangiectasia

History

- A group of retinal disorders first described by Gass and Oyakawa in 1982

- Characterized by incompetence, ectasia and microaneurysmal and saccular dilation of capillaries in the juxtafoveal area in one or both eyes

- AKA idiopathic perifoveal retinal telangiectasia, idiopathic parafoveal retinal telangiectasia, idiopathic macular telangiectasia

- Age of onset: adulthood

- Three general categories: Groups 1, 2 and 3

Medical Knowledge

Idiopathic Juxtafoveal Retinal Telangiectasia

Group 1A – "1 is unilateral"

- Unilateral

- Congenital

- Typically occurs in men (M:F ratio 10:1)

- Mean age of onset of symptoms ~40 years with visual loss in the 20/40 range

- Vascular abnormalities present in a small area, one to two disc areas in diameter, in the temporal half of the macula – mild variant of Coat's disease

- Lipid deposition common; circinate-type exudates formed at the outer margin of the area of telangiectasia

Medical Knowledge

Idiopathic Juxtafoveal Retinal Telangiectasia

Group 1B

- Unilateral

- Middle-aged men

- Blurred vision in the 20/25 range or better

- Acquired vs. a small focus of congenital telangiectasia

- Caused by a tiny area of capillary telangiectasia confined to one clock hour at the edge of the foveal avascular zone

- Minimal exudate and edema

Medical Knowledge

Group 1B

IJRT
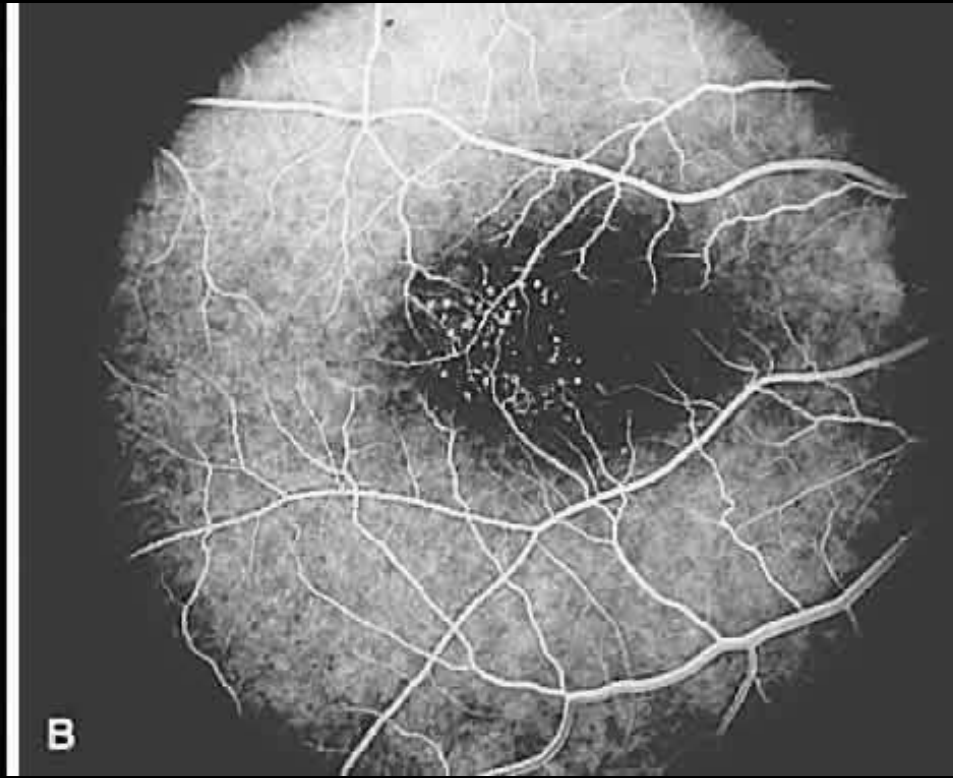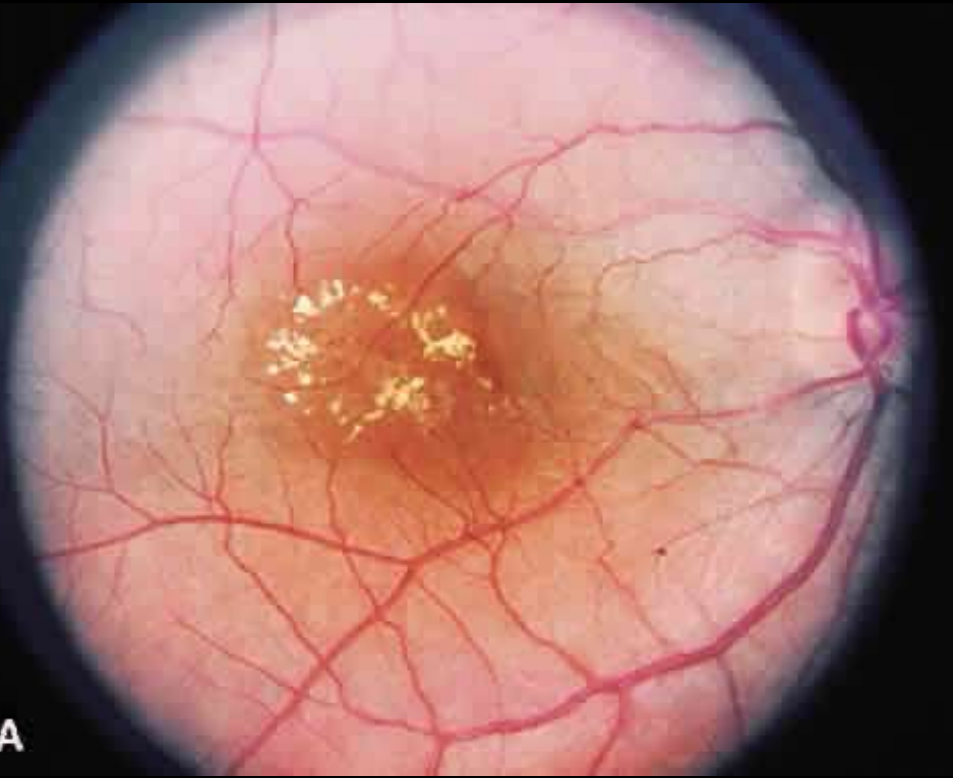
Group 2 – "2 is bilateral"

- Bilateral

- Acquired

- Idiopathic – occurs in males <u>and</u> females (1:1 ratio)

- Age of onset in the fifth and sixth decades with symptoms of blurred vision in one or both eyes.

- Small, symmetrical areas of capillary dilatation , usually the size of one disc area or less, in both eyes

- Gass classification: Group 2A (adult onset) and 2B (juvenile onset - rare)

Medical Knowledge

IJRT

Characteristics of Group 2A – most common

- Minimal → no lipid deposition
- Minimal serous exudation
- Grey appearance of lesions with yellow-white, refractile crystals in the superficial retina in the parafoveal region
- Common finding: right-angled retinal venules that drain the capillary abnormalities
- Slow loss of visual acuity occurs over many years due to the atrophy of the central fovea and parafoveal region. Visual complaints may include metamorphopsia.
- Other risks: CNV (often subfoveal), hemorrhagic macular detachment, retinochoroidal anastomosis

Medical Knowledge

Five Stages of Group 2A IJRT

Stage 1

- Staining of capillary vessel walls due to thickening – asymptomatic

Stage 2

- Loss of endothelial cells and pericytes leading to decreased function – may present as mild visual disturbances

Stage 3

- Right-angled venules form within the inner retina to drain the capillary bed

Stage 4

- Loss of photoreceptor cells due to further metabolic derangement; RPE hyperplasia, further visual decline and formation of lamellar macular hole may occur

Stage 5

- Neovascularization, SRNV, exudation, hemorrhage, pigment plaques leading to foveal atrophy, rapid and severe vision loss

Medical Knowledge

IJRT

Group 3

- Bilateral

- **A rare variant**: telangiectasia with capillary occlusion

- Loss of vision due to progressive obliteration of the capillary network , beginning with telangiectasia

- Associated with a variety of systemic diseases including polycythemia, hypoglycemia, ulcerative colitis, multiple myeloma and chronic lymphatic leukemia

- Gass Classification: 3A and 3B
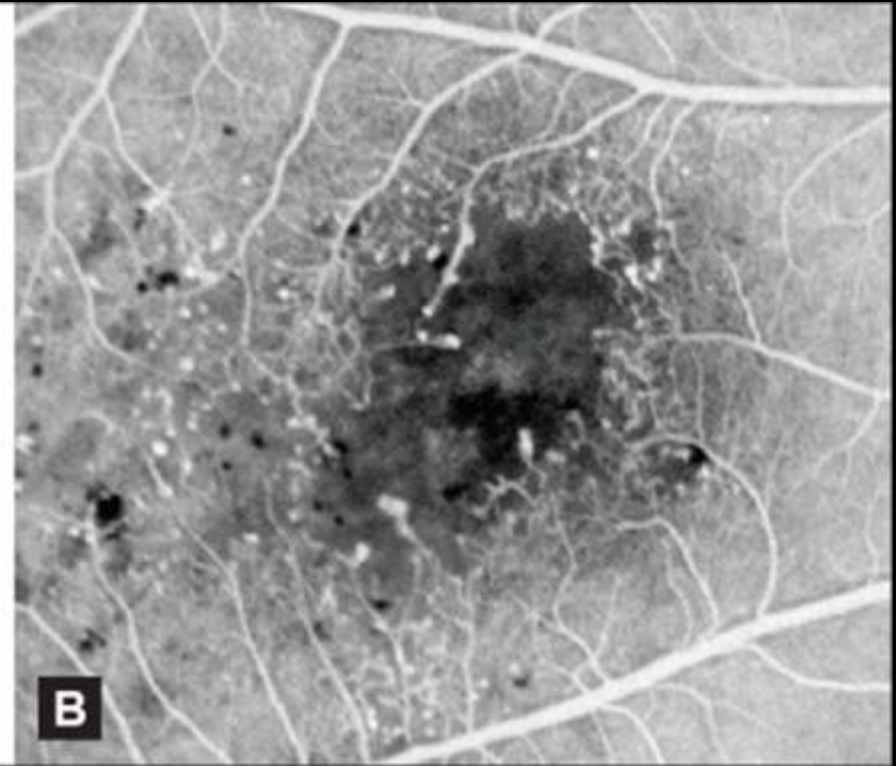
Medical Knowledge

IJRT Group 3

IJRT

- **Gass and Blodi revised classification, 1993**

	Group 1A	Group 1B	Group 2A	Group 2B	Group 3A	Group 3B
Usual age at onset	Third decade	Fourth decade	Fifth decade	First decade	Fourth to fifth decade	Third to fourth decade
Gender predilection	Male (90%)	Male (88%)	None	Male (100%)	Female	Male
Area of involvement	2 DD or more	Small	1 DD around fovea	Small	Enlargement of FAZ to more than 1500 <gm>m	Enlargement of FAZ
Laterality	Unilateral (90%)	Unilateral (88%)	Bilateral (98%)	Bilateral (100%)	Bilateral	Bilateral
Treatment	Consider photocoagulation early	Consider photocoagulation early	Consider foro neovascularization	Consider for neovascularization	None	Neurologic evaluation
Associated findings	Exudates, retinal edema	Exudates	Foveal atrophy, right-angled venules, crystalline deposits, SRNV	SRNV, telangiectasis	Capillary occlusion, minimal exudates	Capillary occlusion, minimal exudates
Familial involvement	No	No	Yes, in 2%	Yes, in 100%	Yes	Yes
Extent of visual loss	20/40 but may be HM	Up to 20/40	20/200 or less	20/70	20/50	20/50
Comments	A mild form of Coats syndrome	Limited form of 1A with better prognosis	Most common form; some develop diabetes	Only two cases reported	Polycythemia, arthritis, and hypoglycemia are associated	Associated with fibrinoid necrosis of the brain

DD, disc diameter; FAZ, foveal avascular zone; HM, hand motion; SRNV, subretinal neovascularization.
(Based on Gass JDM, Blodi BA: Idiopathic juxtafoveolar retinal telangiectasis. Ophthalmology 100:1536---1546, 1993)

Medical Knowledge

OCT

Characteristics

- Retinal thickness is variable and does not correlate with degree of leakage on FA
- No foveolar thickening
- Thinning and disruption of photoreceptor layer is common (retinal atrophy)
- Cyst-like structures in foveola and adjacent tissues are common
- "cystoids" – not visible on exam. Due to atrophic changes, not edema/exudation.
- Can enlarge as disease progresses
- Blunting of foveal pit is common

Project Objectives - Clinical Research

- Characterize the clinical features and natural history of MacTel from the earliest to the vision-threatening stages
- Collect genetic samples of affected individuals and their families to establish whether there is a genetic basis for the disease.
- Promote and publicize the disease amongst their colleagues in the ophthalmic community as an important subject for research
- Gather evidence on the results of any treatments that have already been employed for patients with MacTel
- Conduct pilot clinical trials for MacTel of therapies that are emerging for the treatment of other retinal vascular diseases
- Develop and support a Web site to provide information for the benefit of patients with MacTel

Research Objectives - Laboratory Research

- Produce a more detailed understanding of the pathogenetic mechanisms of MacTel emphasizing both early and critical stages
- Identify a mouse model(s) for MacTel
- Clarify the genetic basis for MacTel in mouse models and humans
- Identify potential novel treatments
  - drugs
  - cytokines
  - human progenitor cells

Systems-Based Practice, Professionalism

Retinal Crystals in Type 2 Idiopathic Macular Telangiectasia

Ferenc B. Sallo, MD, PhD,[1,2] Irene Leung, BA,[1] Mina Chung, MD,[3,4] Ute E. K. Wolf-Schnurrbusch, MD,[5] Alfredo Dubra, PhD,[4,6] David R. Williams, PhD,[4] Traci Clemons, PhD,[7] Daniel Pauleikhoff, MD, PhD,[8] Alan C. Bird, MD,[1] Tunde Peto, MD, PhD,[9] on behalf of the MacTel Study Group

Purpose: To characterize the phenotype and investigate the associations of intraretinal crystalline deposits in a large cohort with type 2 idiopathic macular telangiectasia (MacTel).

Design: Case-control study.

Participants: Patients with and without retinal crystals from the Macular Telangiectasia Project, an international multicenter prospective study of type 2 MacTel.

- Total participants: 403, of which 232 (46%) = no crystals, 203 ++crystals
- 60% were bilateral, 40% were unilateral
- Crystals are arranged along the ganglion cell axons of the nerve fiber layers – at any given time, there are more crystals present than visible on exam.
- Significant association between the amount of crystals and a disruption in the IS/OS junction line, fluorescein leakage, and macular pigment loss
- Although the origin and chemical composition of the crystals are unknown, their distribution and reflective properties support the hypothesis that crystals may be composed of retinoids within Muller cell footplates.

Medical Knowledge

TYPE 2 IDIOPATHIC MACULAR TELANGIECTASIA: Long-Term Visual Prognosis and Incidence of Subretinal Neovascularization

Shukla D, Gupta SR, Neelakantan N, Tiwari S, Gupta S, Patwardhan AR, Soubhya TB. Retina. 2011 Sep; 30.

Retina-Vitreous Service, Aravind Eye Hospital & Postgraduate Institute of Ophthalmology, Madurai, Tamil Nadu, India; and †Lions Aravind Institute of Community Ophthalmology, Madurai, Tamil Nadu, India

- Retrospective observational case series of 104 patients (203 eyes; 66 women, 38 men) with Mac Tel type 2.

- RESULTS: Mean age: 57 years. Over the course of 3 years: 19 eyes presented with SRNV →29 eyes total at end (14%). **Diabetes** was common (59%) though retinopathy was initially absent or mild to moderate in 99% patients. BCVA declined overall; mean vision 20/80 in the eyes with SRNV and 20/50 in eyes without SRNV.

- Of 128 eyes (including SRNV) with BCVA ≥20/40 at baseline, 77% retained stable visual status; 74 (71%) patients retained best-corrected visual acuity of 20/40 or better at least in 1 eye.

- **CONCLUSION**: Over 3 years, most eyes with Type 2 idiopathic macular telangiectasia starting with good vision were found to retain status quo; sight-threatening complications developed in a minority of eyes; most patients retained good vision at least in 1 eye.

Medical Knowledge, Practice-based Learning

Treatment

Group 1

- Mainstay of treatment is laser photocoagulation therapy for retinal edema/exudates

- Other treatment considerations: intravitreal injection with triamcinolone and anti-VEGF (bevacizumab)

Group 2

- Without CNV (Stages 1-4):
  - Laser has not shown to be effective.
  - Photodynamic therapy has also shown to be not effective.
  - Case reports have shown conflicting results with intravitreal triamcinolone and anti-VEGF

- With CNV (Stage 5)
  - Classic options include laser photocoagulation, PDT, IV triamcinolone, surgical removal of SRNV

Medical Knowledge, Practice-Based Learning

Findings in Fluorescein Angiography and Optical Coherence Tomography after Intravitreal Bevacizumab in Type 2 Idiopathic Macular Telangiectasia

Peter Charbel Issa, MD, Frank G. Holz, MD, Hendrik P. N. Scholl, MD, MA

Purpose: To report the short-term effects of intravitreal bevacizumab in patients with type 2 idiopathic macular telangiectasia (IMT).

- Report of short-term effect of IV bevacizumab in MacTel type 2
- Retrospective case series of seven eyes (six patients) with MacTel type 2
- Patients received 2 doses of IV bevacizumab (1.5 mg) at 4-week intervals. Serial exams conducted using ETDRS VA, FA and OCT at baseline, 4 –wk and 8-wks.
- Mean increase in VA was found at 8 weeks in 2 patients. All patients showed a reduction of extension and intensity of late-stage parafoveal hyperfluorescence on FA. OCT findings showed reduction in mean retinal thickness in foveal and parafoveal temporal zone.
- CONCLUSION: Short-term results indicate that intravitreal bevacizumab is associated with decreased retinal thickness and reduction in angiographic leakage in MacTel type 2 and it may improve visual acuity in affected patients.

Practice-Based Learning, Medical Knowledge

Intravitreal bevacizumab for treatment of proliferative and nonproliferative type 2 idiopathic macular telangiectasia

Roller AB, Folk JC, Patel NM, Boldt HC, Russell SR, Abramoff MD, Mahajan VB. Retina. 2011 Oct;31(9):1848-55. University of Iowa. Dept of Ophthalmology and Visual Sciences.

- Retrospective chart review of clinic patients treated with bevacizumab for macular telangiectasia Type 2.

- Fourteen eyes of 10 patients were studied. In 5 eyes with nonproliferative MacTel Type 2, average follow-up was 17 months (± 7 months), and no eye demonstrated improvement in visual acuity or decrease in central macular thickness at final follow-up compared with baseline.

- In 9 eyes with proliferative disease, follow-up averaged 17 months (± 9 months). At 6 weeks, central macular thickness decreased 63 μm (± 58 μm), and acuity improved 1.7 lines (± 2 lines). At final follow-up, central macular thickness decreased 48 μm (± 89 μm) and acuity improved 1.1 lines (± 3 lines). Subretinal neovascularization resolved in eight of nine eyes with proliferative disease after treatment.

- **CONCLUSION**: Bevacizumab did not improve acuity or reduce retinal thickness in non-proliferative macular telangiectasia Type 2 at final follow-up. In proliferative macular telangiectasia Type 2, bevacizumab caused involution of neovascularization and improved visual acuity.

Medical Knowledge

Patient Update

- The patient was diagnosed with IJRT Type 2A, Stage 4 and seen for follow up at KCHC in mid- October 2011.

- Upon return, the patient reported stabilization of vision OU. Clinical exam and repeat OCT confirmed stable edema, no evidence of neovascularization. After a lengthy discussion with the patient regarding possible laser therapy versus observation, and review of the current literature, the patient elected to continue with observation.

Patient Care and Interpersonal Skills, Professionalism

Reflective Practice

- I believe this patient was treated in a compassionate and timely manner. Appropriate ancillary testing was performed to allow for diagnosis and further discussion of treatment options with the patient.

Patient Care and Interpersonal Skills, Professionalism

References

- Yanoff M, Duker J. Ophthalmology, 3rd edition. 2009.

- Gass JDM, Blodi BA. Idiopathic juxtafoveolar retinal telangiectasis: update of classification and follow-up study. Ophthalmology. 1993;100:1536-1546.

- Nowilaty, S et al. Idiopathic Juxtafoveolar Retinal Telangiectasis: A Current Review. Middle East Afr J Ophthalmol. 17(3): 224–241, 2010.

- Sallo F, Leung I, Chung M, Wolf-Schnurrbusch U.K. , Dubra A, Williams D, Clemons D, et al. Retinal Crystals in Type 2 Idiopathic Macular Telangiectasia. Ophthalmology 2011;118:2461–2467

- Shukla D, Gupta SR, Neelakantan N, Tiwari S, Gupta S, Patwardhan AR, Soubhya TB. Type 2 Idiopathic Macular Telangiectasia: Long-Term Visual Prognosis and Incidence of Subretinal NeovascularizationRetina. 2011 Sep; 30.

- Charbel Issa P, Holz FG, Scholl HP. Findings in fluorescein angiography and optical coherence tomography after intravitreal bevacizumab in type 2 idiopathic macular telangiectasia. Ophthalmology. 2007 Sep;114(9):1736-42.

- Roller AB, Folk JC, Patel NM, Boldt HC, Russell SR, Abramoff MD, Mahajan VB. Intravitreal bevacizumab for treatment of proliferative and nonproliferative type 2 idiopathic macular telangiectasia. Retina. 2011 Oct;31(9):1848-55.

- Gamulescu MA, Walter A, Sachs H, Helbig H. Bevacizumab in the treatment of idiopathic macular telangiectasia. Graefes Arch Clin Exp Ophthalmol 2008;246:1189 –93

- Duane's Ophthalmology. 2006

Core Competencies

- Patient Care: This patient was appropriately evaluated for her symptoms and ocular findings.

- Medical Knowledge: This presentation provides an overview of the classification of IJRT, disease course and current treatment options.

- Practice-Based Learning and Improvement: The current literature was reviewed by staff in order to implement a treatment plan for the patient.

- Interpersonal & Communication Skills: The patient was informed about the course of her disease, and explanation of possible treatment options based upon severity of disease were discussed with the patient.

- Professionalism: Pt was treated with compassion and respect at all times.

- Systems-Based Practice: Appropriate and timely services were extended to the patient with regard to ancillary testing (OCT, FA) and treatment given to the patient within the context of a larger healthcare system.

Thank You

- Patient A.D.
- Dr. Kenneth Olumba