



Grand Rounds Presentation

August 25, 2011

David Mostafavi MD PL2
SUNY Downstate Ophthalmology

Physical Exam

BP: 150/100

nV/Acc: 20/70 od (eccentric viewing); 20/30 os

P: 4 to 2 ou, no apd

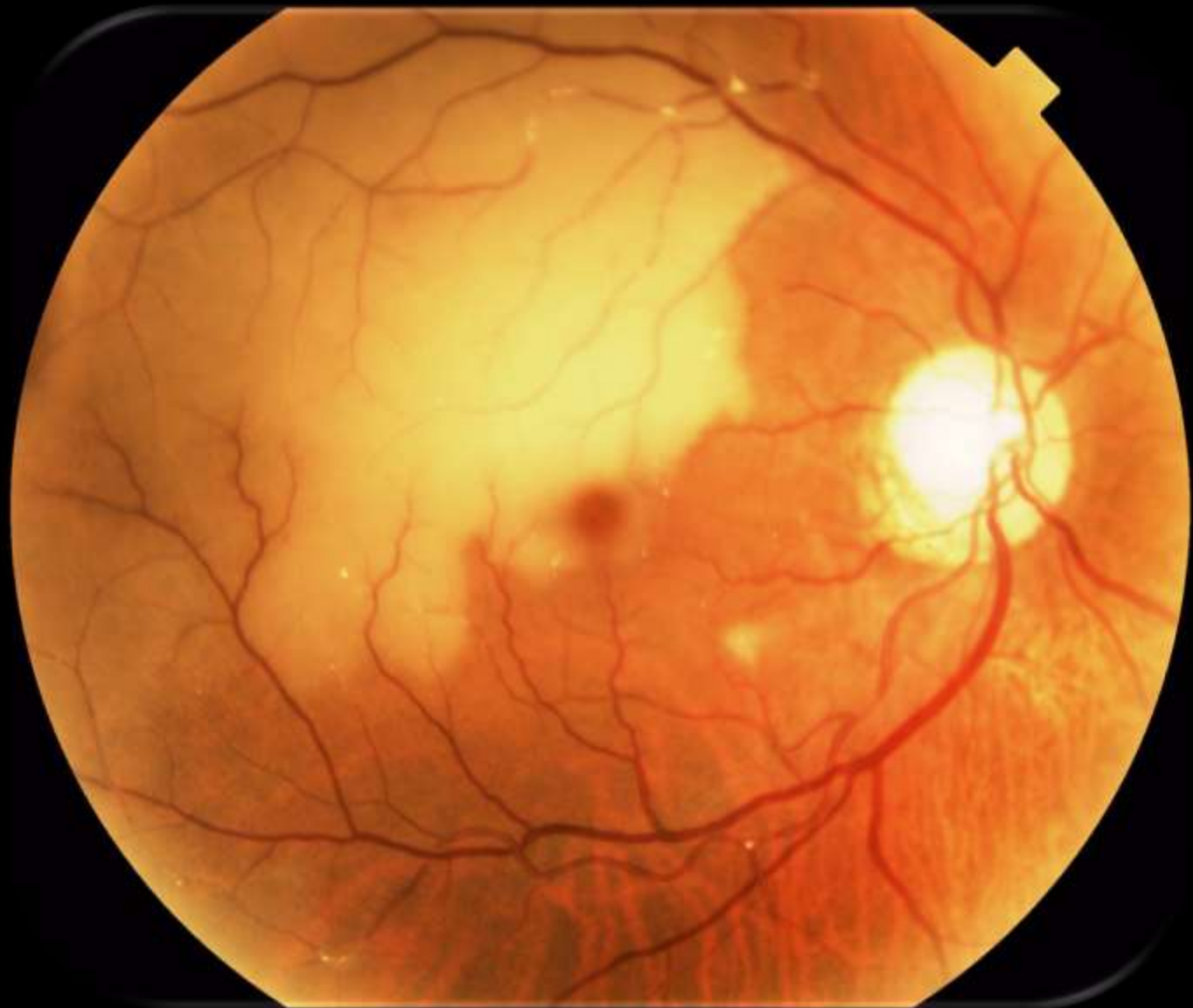
EOM: full ou

CF: superior nasal, inferior nasal and temporal defect OD

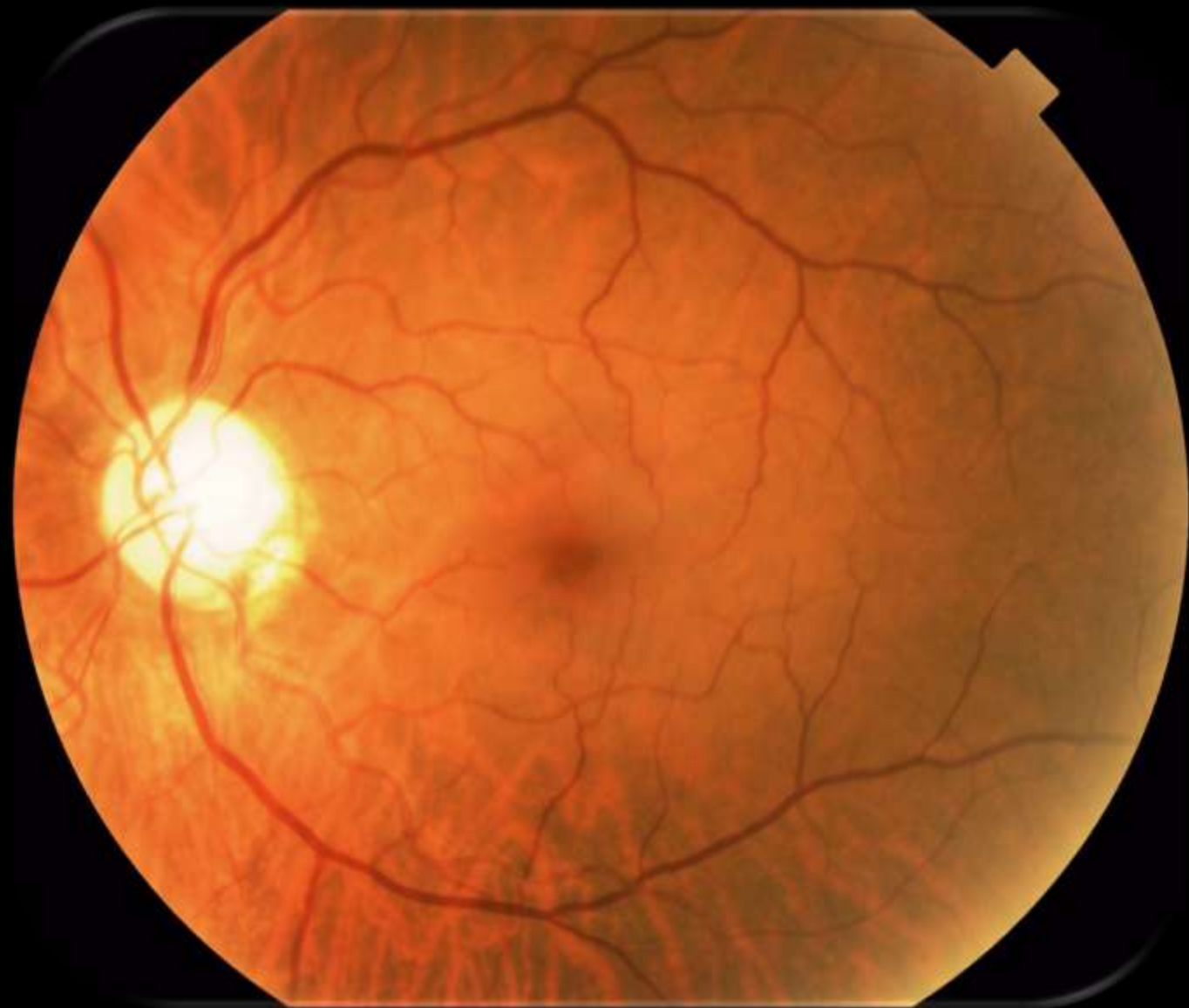
Tap: 14/14

Neuro: CN 2-12 intact. No ext weakness or sensation loss

SLE: +1 cortical cataract





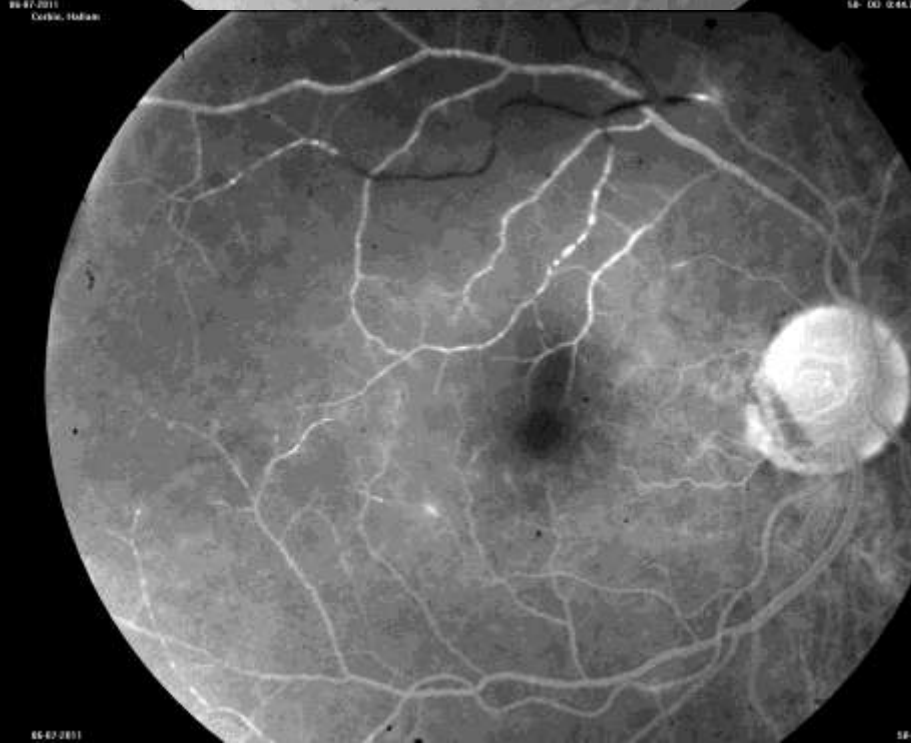
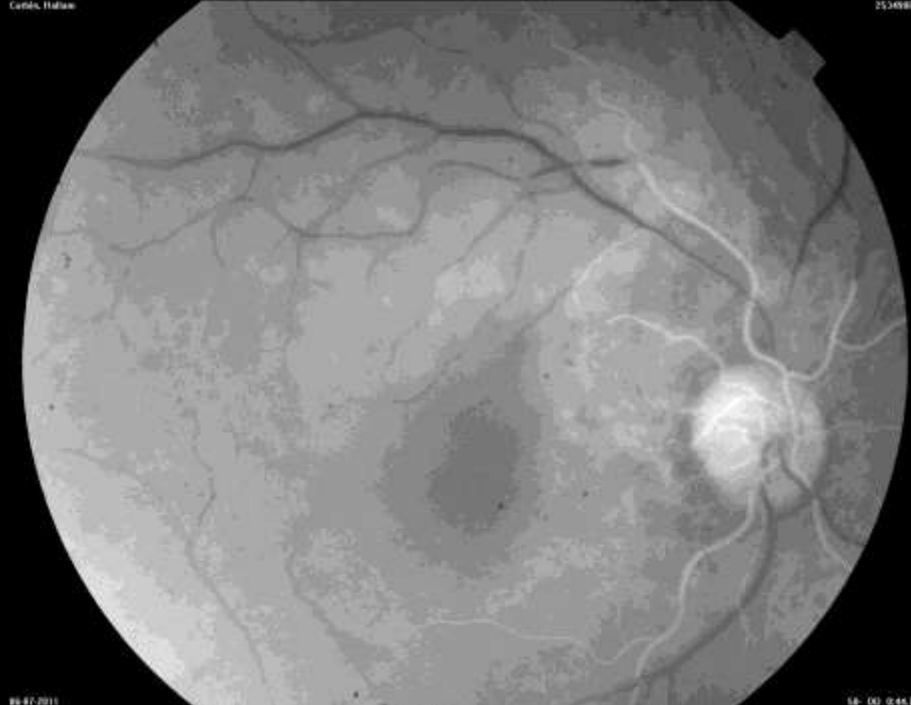
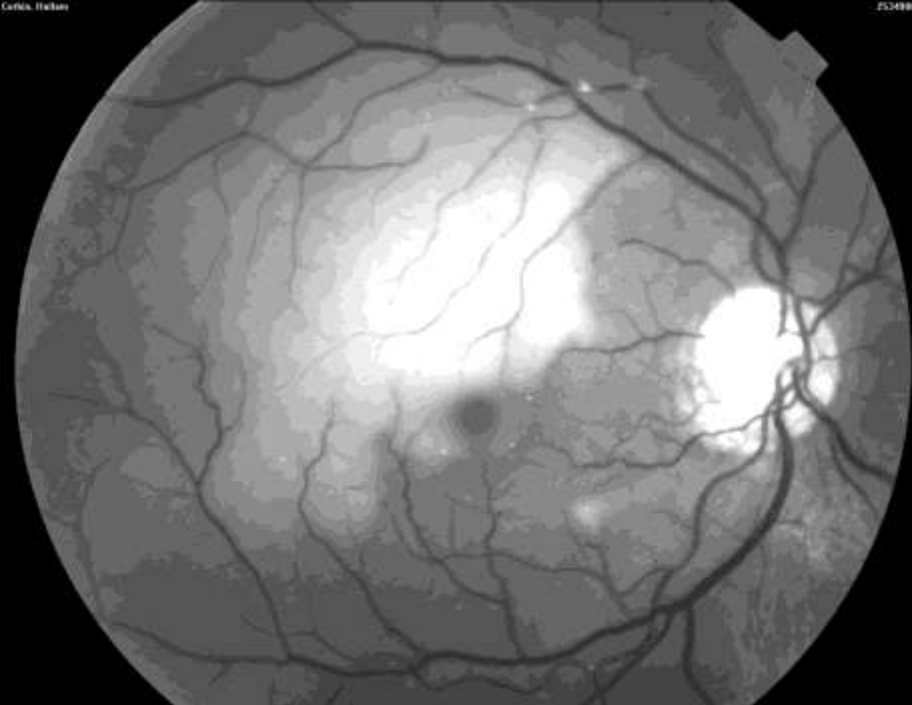


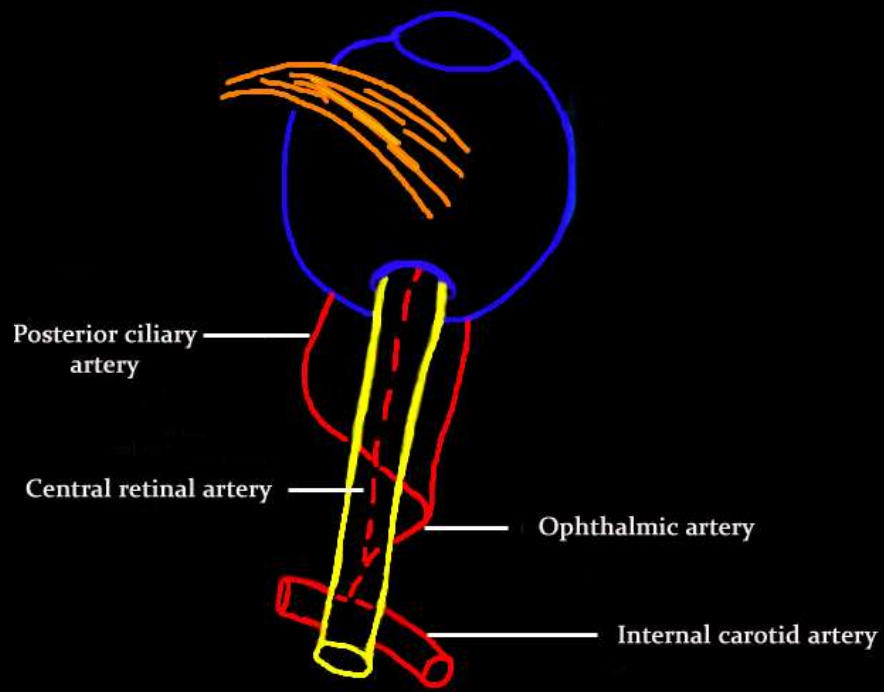
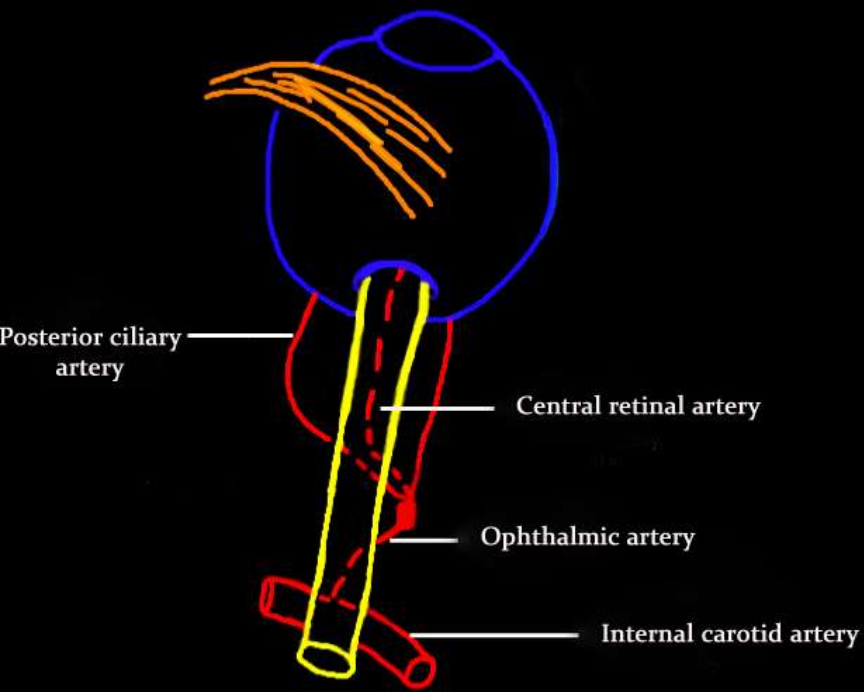
Differential

- Multiple Branch Retinal Arteriolar Occlusion
- Central Retinal Artery Occlusion with patent cilioretinal artery
- Giant Cell Arteritis

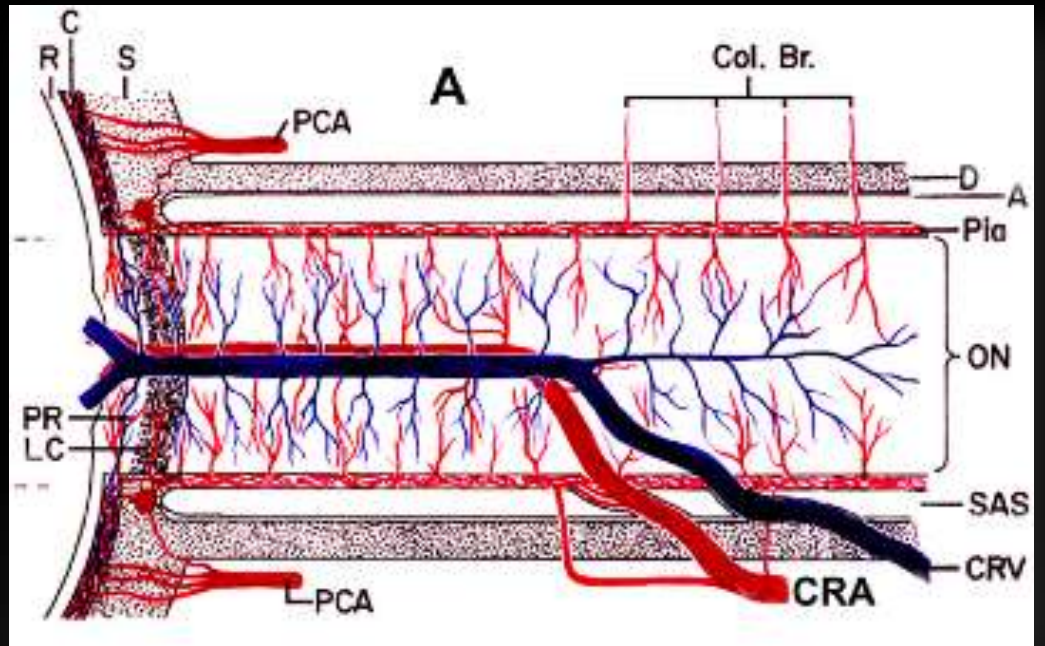
Workup

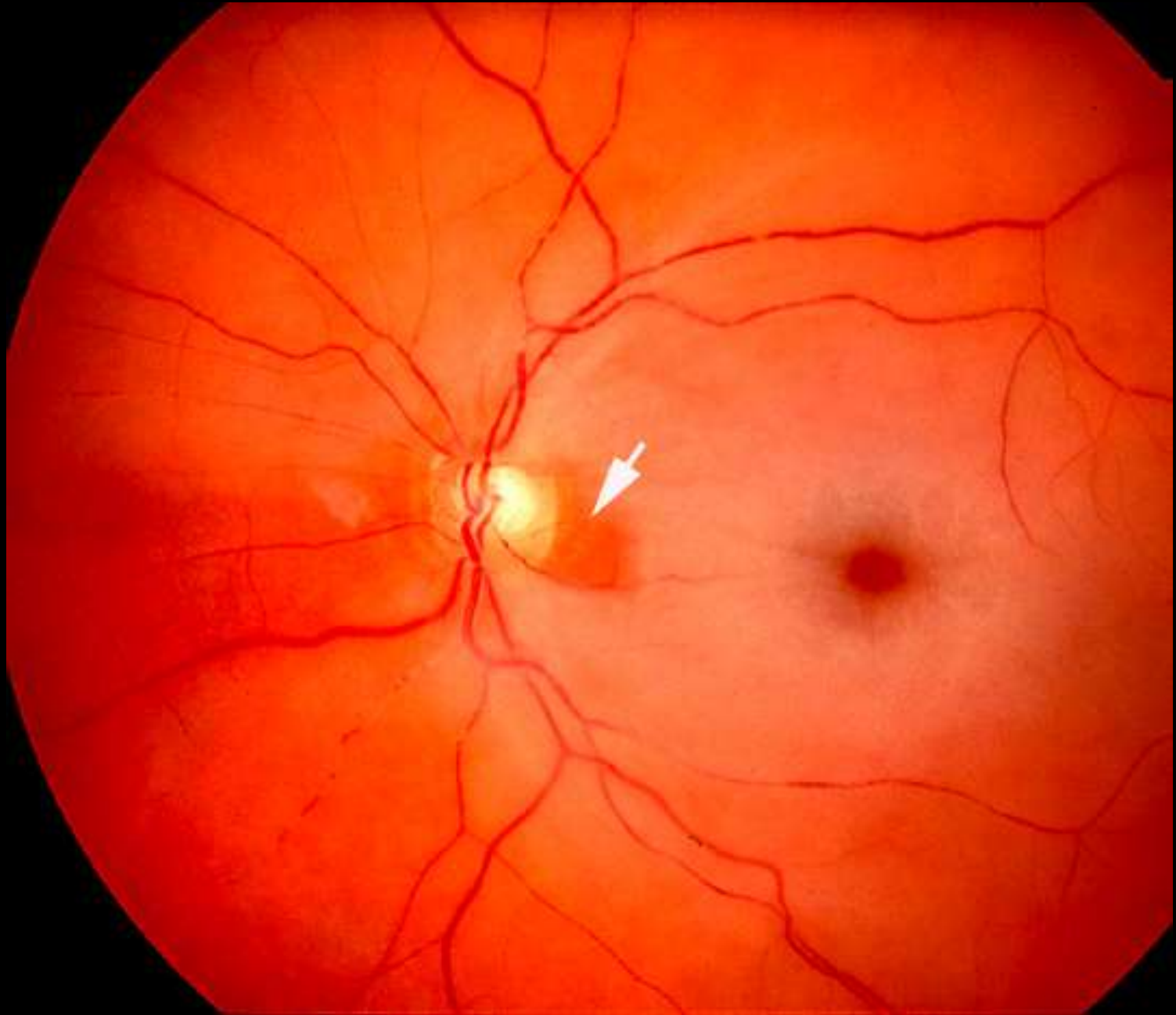
- CT head: wnl
- Bloodwork:
 - Hg: 14, Platelets: 200, WBC 9; FS 120
 - ESR 15, **CRP 16 (15)**
 - Toxo, homocysteine, RF, ANA, Lyme, RPR wnl
 - Protein C, S; Antithrombin III wnl
 - **LDL: 115**, Chol: 173, HDL: 41
- EKG: NSR
- Carotid: **1.6mm x 4.1 plaque in right carotid bulb**; 2 x 2 plaque in left carotid bulb. No stenosis
- Echo
 - Transthoracic: 55-65% EF. Limited exam
 - Transesophageal: **Moderate to severe 5.0mm atherosclerotic plaque at aortic arch(non-mobile)**
- Fluorescein Angiography



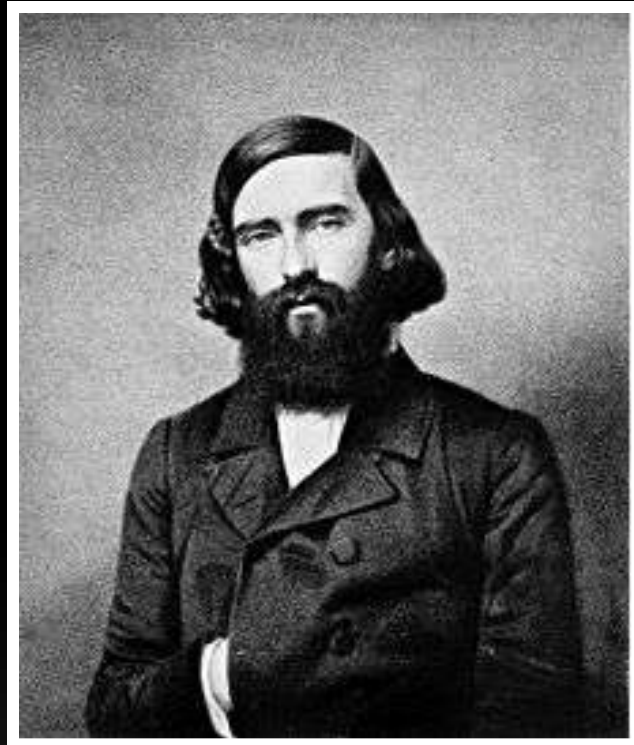


D. Mostafavi





Medical Knowledge



Albrecht Von Graefe



Sohan Hayreh

Retinal Tolerance Time to Ischemia

- 38 rhesus monkeys with HTN, atherosclerosis with clamping of CRA at entry into nerve
- Occlusion < **97 min: no retinal damage**
- Occlusion **105 min - 240 min: variable** degree of damage
- Occlusion > **240 min: total** optic nerve atrophy and nerve fiber **damage**

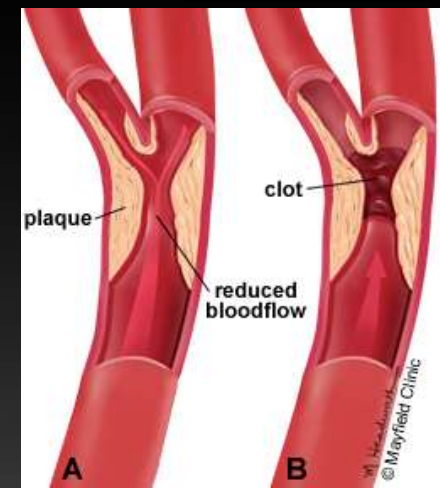


(Hayreh et al. Central Retinal Artery Occlusion. Retinal Survival Time. Exp Eye Research. 2004.78:723-36)

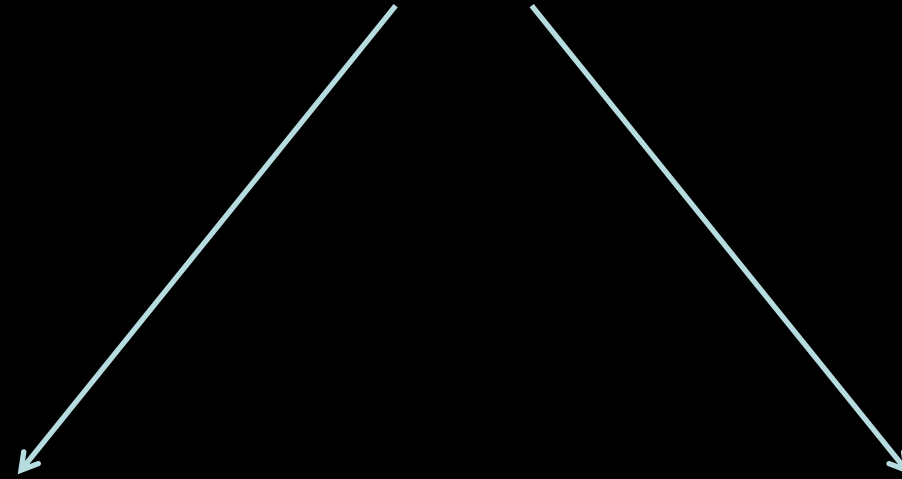
Risk Factors

- Higher incidence of **DM, HTN, CAD, CVA** compared to population
- Higher **smoking** prevalence
- 30% patients had ICA **stenosis** (> 50%)
- **70%** patients had ICA **plaques**
- **50%** patients had abnormal echo with a source of **embolus**

(Hayreh et al. Retinal artery occlusion: associated systemic and ophthalmic abnormalities. Ophthalmology. 2009. 116:1928-36)



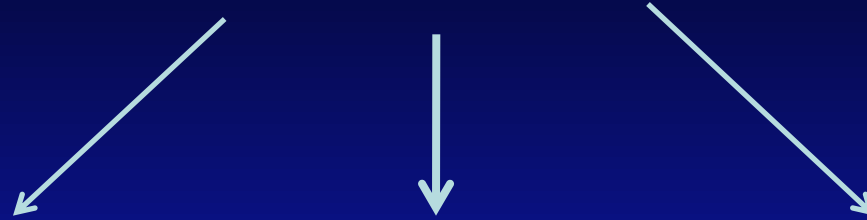
Cause



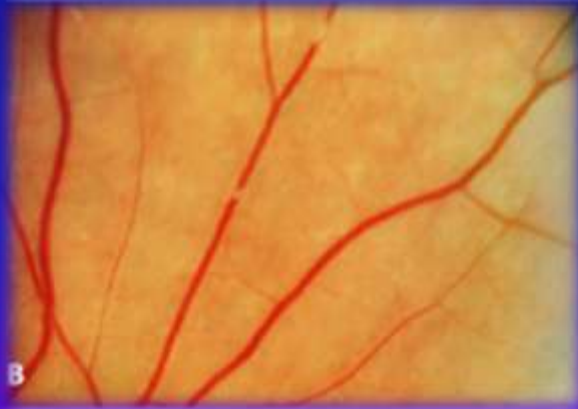
Atherosclerosis thrombosis
at lamina cribosa

Emboli
at CRA penetration site
into optic nerve

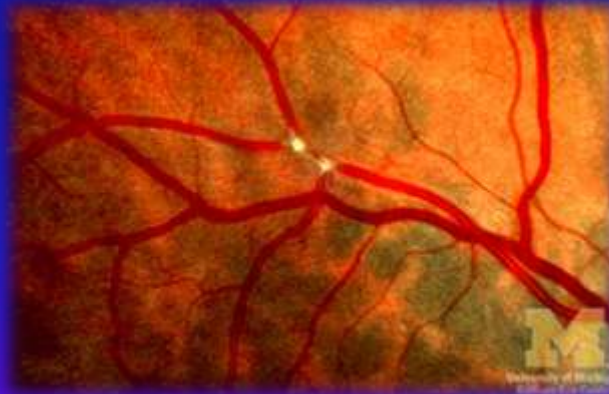
Emboli



Platelet-Fibrin
(grey-white)
15%



Cholesterol
(shiny iridescent)
75%



Calcific
(bright white)
10%



Arruga J, Sanders MD. Ophthalmologic findings in 70 patients with evidence of retinal embolism. *Ophthalmology*. 1982. 89. 1336-47

Other Causes CRAO/BRAO

- Serotonin induced arterial spasm
 - Released by platelet plaques in carotid artery
- Giant Cell Arteritis
 - 123 eyes with biopsy proven Temporal Arteritis: CRAO present in 18%, cilioretinal artery occlusion 25%

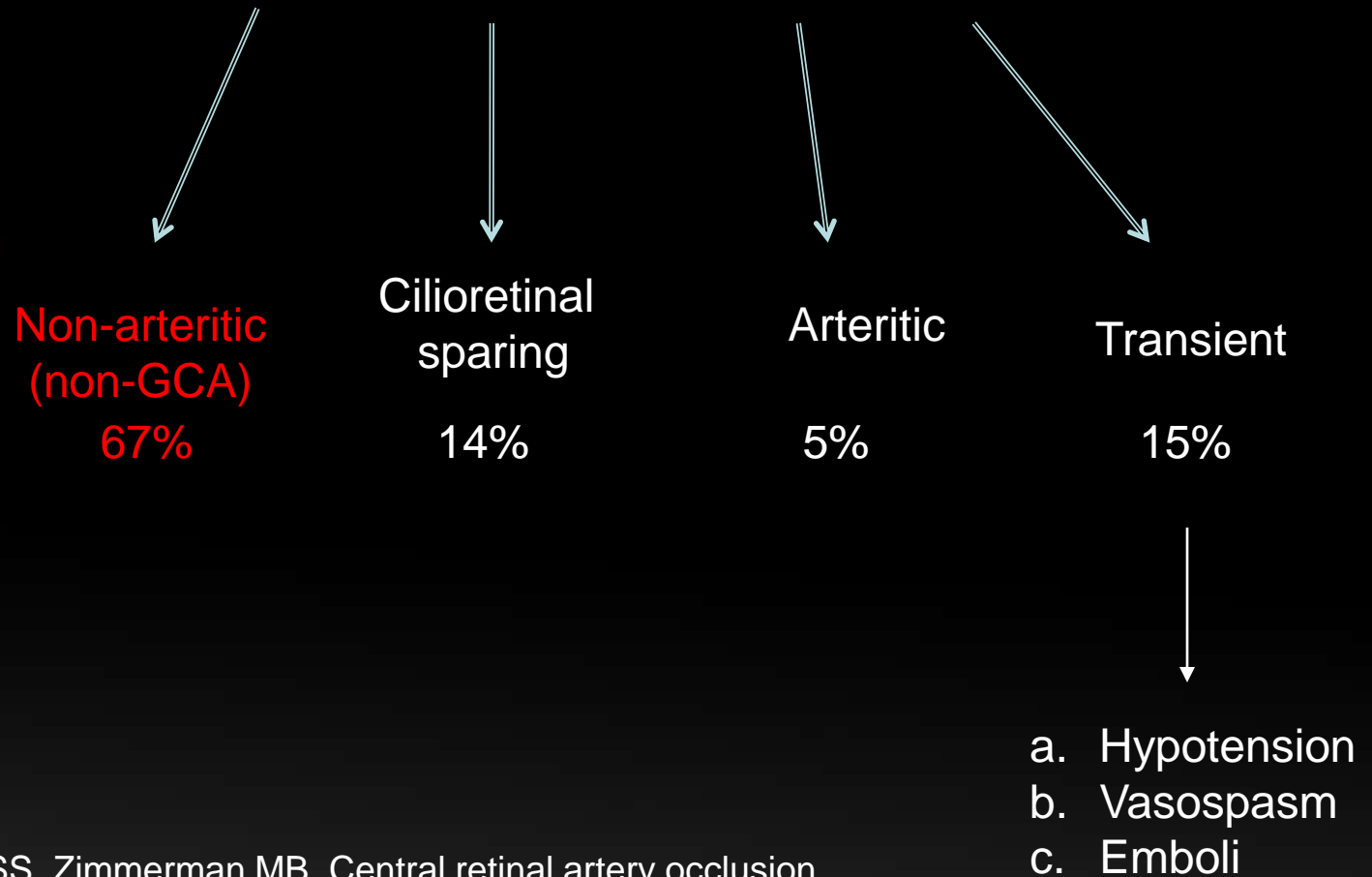
Hayreh et al. Ocular manifestations of giant cell arteritis. Am. J. Ophthalmology. 1999. 125. 509-20
- Polyarteritis nodosa, churg-strauss syndrome, behcets, sarcoidosis, sickle cell, carotid dissection, Wegeners, lupus, lymphoma, cat scratch, blow out fracture, peribulbar injection, viper snake bites, lyme, Susac's syndrome, migraines

Evaluation

- Find the **source** of **emboli**
- Carotid Doppler/Angiography
 - **Plaques!** Not Stenosis
- Echocardiography
 - **Transesophageal** superior to transthoracic
 - Aortic 40%, Mitral Valve 30%
 - **Calcific** valves

Hayreh et al. Retinal artery occlusion: associated systemic and Ophthalmic abnormalities. Ophthalmology. 2009. 116:1928-36)
- Systemic
 - **ESR/CRP** in patients **> 50 y/o** without a visible plaque
- **Fluorescein Angiography**
 - Assess posterior ciliary artery circulation

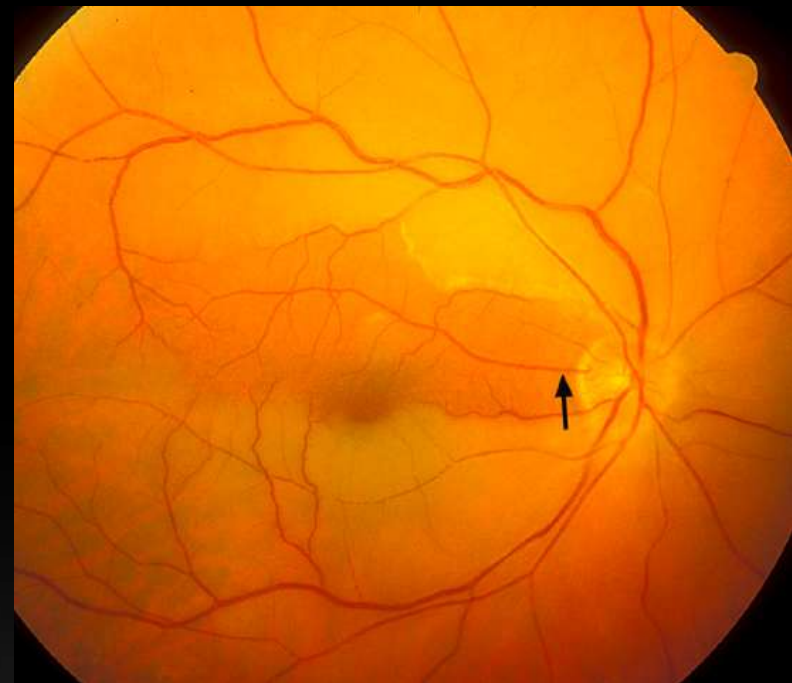
Types of CRAO/BRAO



Hayreh SS, Zimmerman MB. Central retinal artery occlusion. Visual outcome. Am.J Ophthalmology. 2005. 140:376-91

Visual Acuity

- CRAO - **On presentation**;
 - **CF 40%**; HM 25%; LP 15%
- CRAO with **cilioretinal artery sparing**
 - **20/30 30%**; CF 20%
- BRAO
 - **20/40 75%**
- Improvement?
 - 37% improvement if initial VA CF or less in the first 7 days



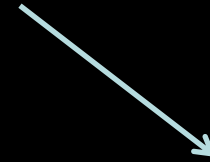
Hayreh SS, Zimmerman MB. Central retinal artery occlusion. Visual outcome. Am.J Ophthalmology. 2005. 140.376-91

Neovascular Glaucoma?



chronic ischemia (CRVO)

- thought to liberate vasoproliferative factors like VEGF



Acute Ischemia (CRAO)

Hayreh SS. Prevalent misconceptions about acute retinal vascular occlusive disorders. Prog Retina Eye Res. 2005. 24: 493-519



Management

- Conventional Advocated Treatments
 - **Ocular massage**
 - **Reduction of IOP** by medical or surgical
 - Vasodilatation of CRA
 - **Rebreathing CO₂**, retrobulbar vasodilators, sublingual nitroglycerin
 - Antiplatelet
 - Heparin
- Miscellaneous Treatments
 - **Thrombolysis**, hemodilution, hyperbaric oxygen, pentoxifylline, supraorbital artery antispasmodic, yag laser, surgical embolectomy
- **No treatment has proven to be effective**
 - Atebara et al. 1995 (90 eyes); Mueller et al. 2003 (102 eyes)
 - EAGLE trial 2006 and Frame et al. 2001: increased rate of stroke

Back to our patient...

- Ocular Massage with gonio lens
 - Patient deferred AC paracentesis
- BP medication, ASA, Statin, and Combigan
- DVAsc: 20/100 (hosp day#1)
- DVAsc: 20/100 Week 1, 2
- MRA carotids ordered (not done)
- Cardiology: continue with statin

Reflective Practice

- Patient was treated in a timely manner with appropriate means. We let the patient decide treatment plan delineated by evidence based medicine.
- Medicine team preferred to work him up as an outpatient. Understanding the risk of future strokes, we urged medicine to admit patient and have a thorough investigation as to cause of emboli, including TEE.
- Patient's vision improved "slightly". He was concerned about his ability to work as a welder. We stressed the importance of preventing a large cerebral stroke in the future. His medical doctor was notified as to the aforementioned events.

Core Competencies

- Patient Care: Was treated in a caring manner, with the priority of making him feel at ease being admitted to the hospital and making sure all that needed to be done was accomplished
- Medical Knowledge: First recognition of condition and possible treatment modalities were important in developing a treatment plan
- Practice Based Learning and Improvement: Scientific and clinical studies were reviewed on CRAO/BRAO. Understanding our patient population made it imperative to admit the patient rather than working him as an outpatient
- Interpersonal Communication Skills: Used language patient understood like “stroke in the eye”. Explained the prognosis and follow-up management with sincerity and compassion
- Professionalism: Was maintained at all times
- System Based Practice: close partnership was maintained with internal medicine. Cost of admission to hospital was factored; however benefit of early diagnosis of emboli was more effective in long term

Work Cited

- Hayreh S. Acute Retinal Arterial Occlusive Disorders. Progress in Retinal and Eye Research. 2011.30:359-394
- Hayreh et al. Central Retinal Artery Occlusion. Retinal Survival Time. Exp Eye Research. 2004.78:723-36
- Arruga J, Sanders MD. Ophthalmologic findings in 70 patients with evidence of retinal embolism. Ophthalmology. 1982. 89. 1336-47
- Hayreh et al. Retinal artery occlusion: associated systemic and ophthalmic abnormalities. Ophthalmology. 2009. 116:1928-36)
- Hayreh et al. Ocular manifestations of giant cell arteritis. Am. J. Ophthalmology. 1999. 125. 509-20
- Hayreh SS, Zimmerman MB. Central retinal artery occlusion. Visual outcome. Am.J Ophthalmology. 2005. 140.376-91
- Atebara, N.H., Brown, G.C., Cater, J., Efficacy of anterior chamber paracentesis and carbogen in treating acute nonarteritic central retinal artery occlusion.Ophthalmology. 1995. 102, 2029-2035
- Mueller, A.J et al. Evaluation of minimally invasive therapies and rationale for a prospective randomized trial to evaluate selective intra-arterial lysis for clinically complete central retinal artery occlusion. Arch. Ophthalmology.2003 121, 1377-1381.
- Feltgen et al. Multicenter study of the European Assessment Group for Lysis in the Eye (EAGLE) for the treatment of central retinal artery occlusion: design issues and implications. Study Report no. 1. Graefes Arach. Clini. Exp. Ophthamology. 2006. 244:950-56
- Framme et al. Central retinal artery occlusion. Importance of selective intra-arterial fibrinolysis. Ophthalmologe. 2001. 98: 725-30
- Hayreh SS. Prevalent misconceptions about acute retinal vascular occlusive disorders. Prog Retina Eye Res. 2005. 24: 493-519

Thank you

- Our patient
- Dr. EC Lazzaro
- Dr. Glatman

