History of Present Illness

- 70 y/o black male with HTN c/o sudden painless vision loss right eye 9 hours prior to presentation while watching TV
- Described as “darkness” with some areas of light
- Denies ocular pain, headache, numbness, tingling, weakness, jaw claudication, trauma
- Stated he had not taken BP medication for several weeks

- PMHx: HTN (dx 2/11)
- POHx: presbyopia
- FHx: none
- Eye gtts: none
- Meds: HCTZ
- Social: Denies past drug/alcohol use. 25 year pack history, quit 5 years prior. Works as painter/welder
Physical Exam

BP: 150/100

nVAcc: 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
Albrecht Von Graefe  
Sohan Hayreh  
Medical Knowledge
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

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**

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%
- Polyarteritis nodosa, churg-straus 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

- Systemic
  - **ESR/CRP** in patients > 50 y/o without a visible plaque
- Fluorescein Angiography
  - Assess posterior ciliary artery circulation
Types of CRAO/BRAO

- Non-arteritic (non-GCA) 67%
- Cilioretinal sparing 14%
- Arteritic 5%
- Transient 15%

- a. Hypotension
- b. Vasospasm
- c. Emboli

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

Neovascular Glaucoma?

chronic ischemia (CRVO)
– thought to liberate vasoproliferative factors like VEGF

Acute Ischemia (CRAO)

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

Patient Care, Medical Knowledge, Professionalism, Communication
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 “stoke 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

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

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