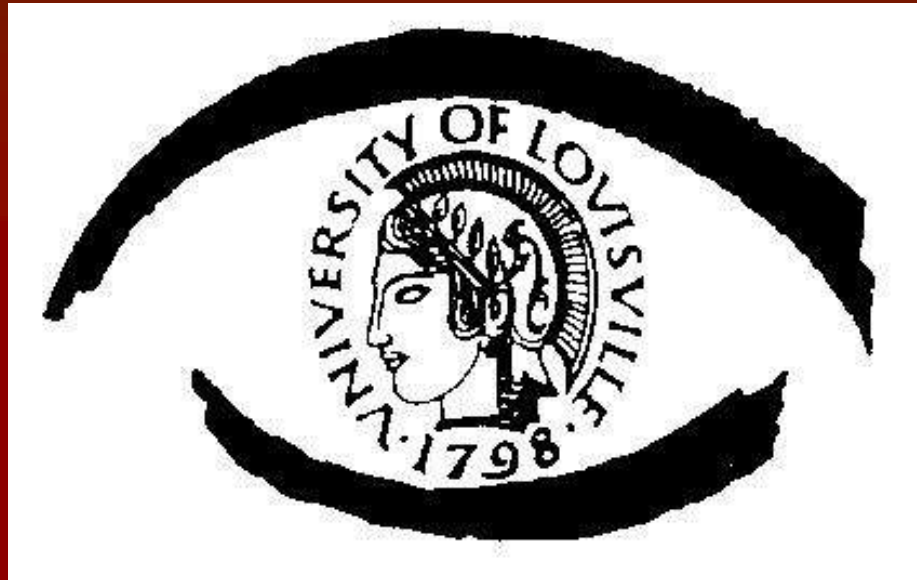


Retina Conference



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Thursday, October 14th, 2010

Patient Presentation

CC: Decreased vision OD since AM

HPI: 69yo WF, sent to Private Retina Clinic from outside ophthalmologist c/o decreased vision in her right eye since that morning. She denies eye pain, jaw claudication or weakness. (-) HA

POH: Ocular shingles

Ocular Meds: None

PMH: Shingles, Depression, h/o PE

Systemic Meds: Gabapentin 300mg po TID, Anti-depressant

ROS: (+) weight loss (+) fatigue

Initial Exam

VA $\left\{ \begin{array}{l} 20/CF @ 3ft \\ 20/20^{-2} \end{array} \right.$

P $\left\{ \begin{array}{l} Pharm \\ dilated \\ Pharm \\ dilated \end{array} \right.$

TP $\left\{ \begin{array}{l} 13 \\ 13 \end{array} \right.$

SLE:

Ext

C/S

K

AC

I/L

OD

WNL OU

clear OU

clear OU

formed OU

cataracts OU

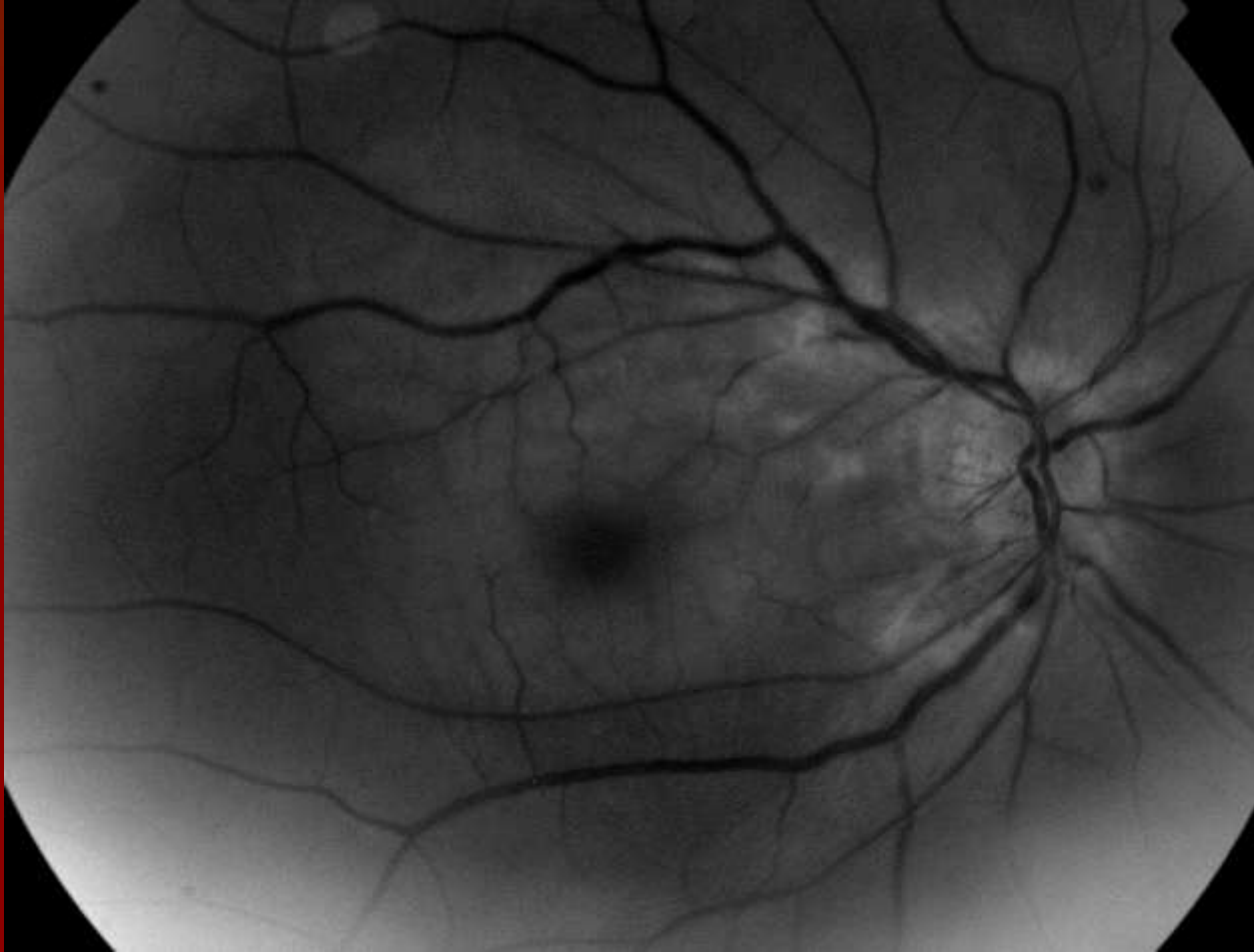
OS

Fundus Photo



Color photo OD: Edema in macular area and cherry red spot

Red Free Photo



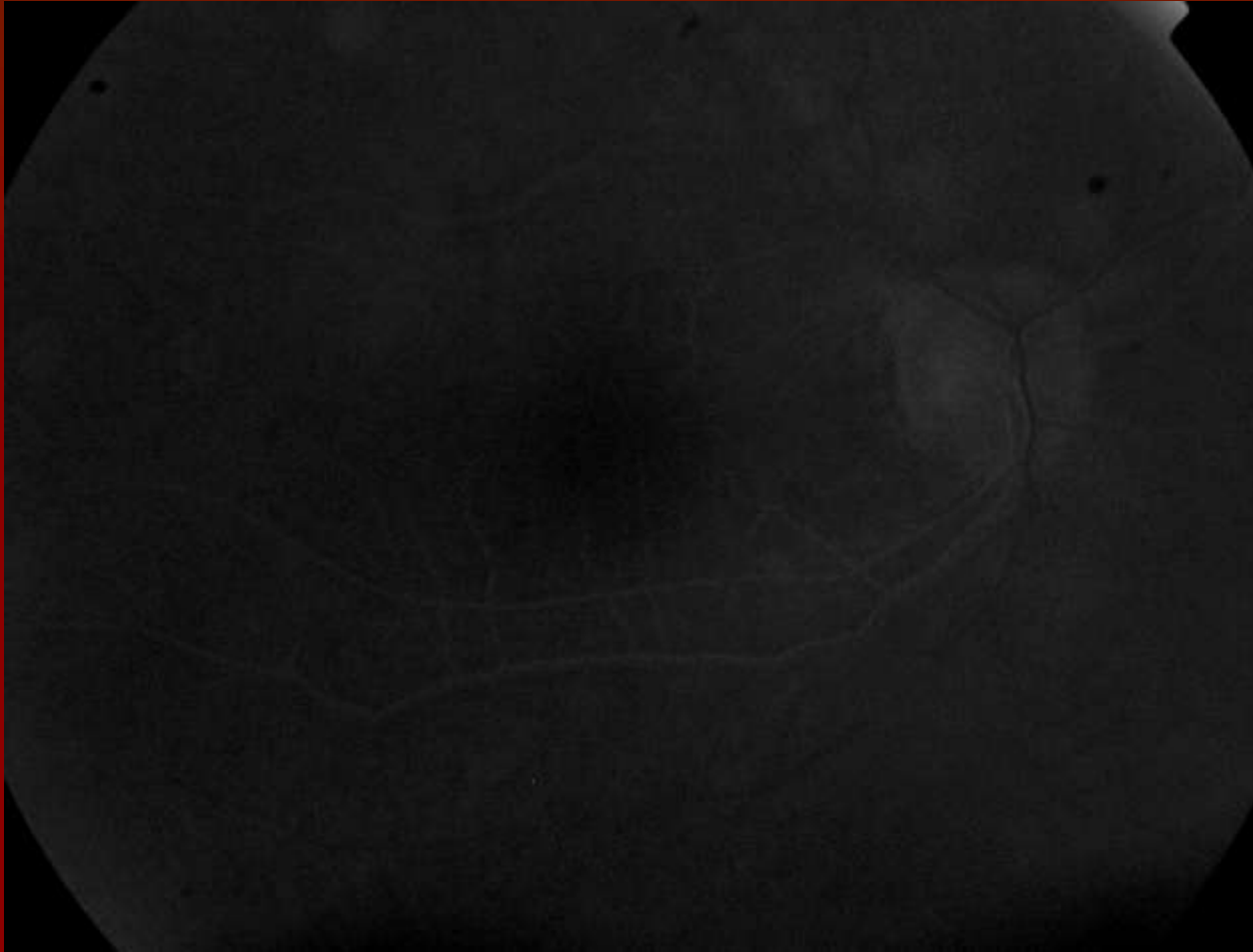
Red free photo OD: Edema in macular area

Fluorescein Angiogram



Early Phase OD: Absent choroidal flush.
Delayed arterial filling.

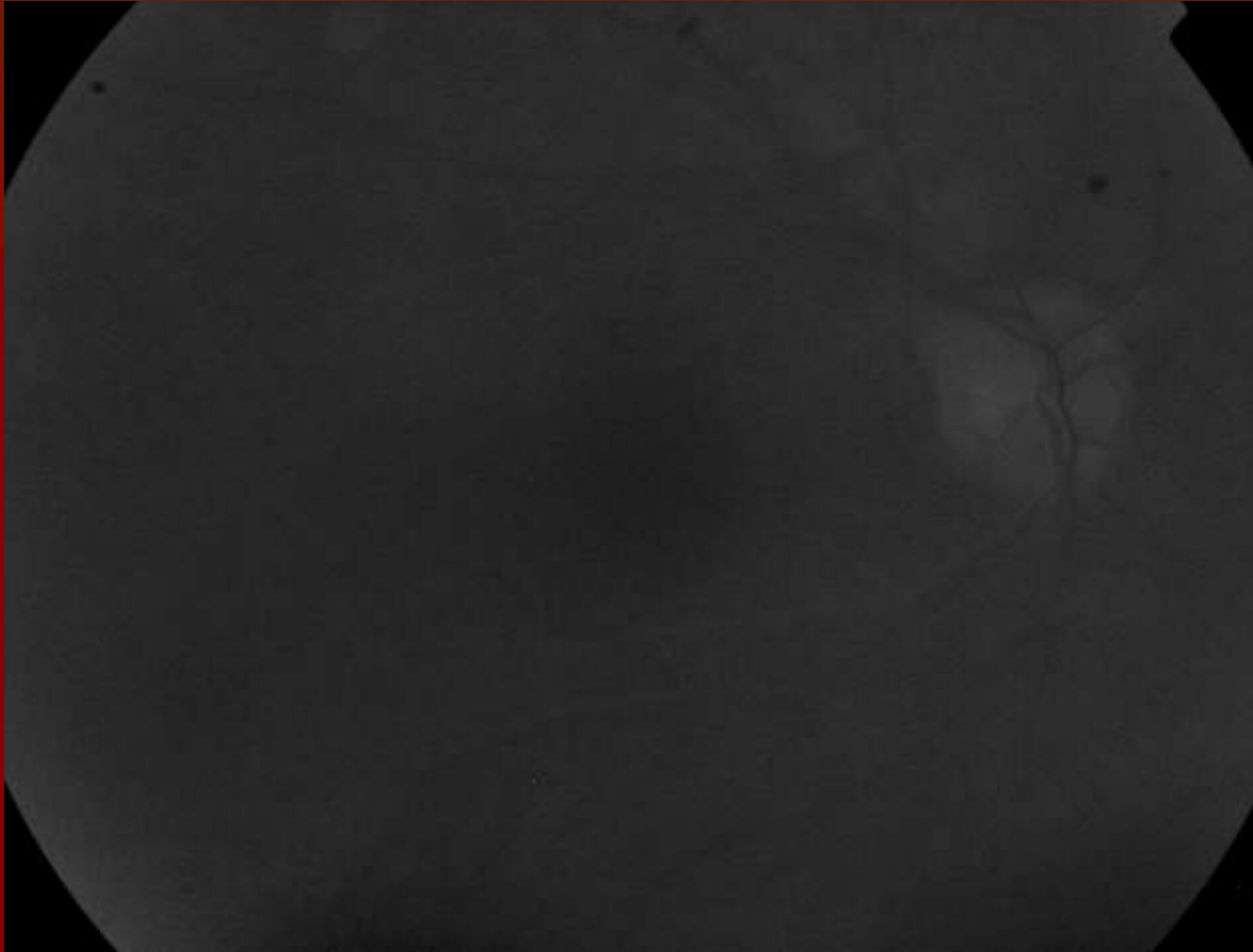
Fluorescein Angiogram



Late Phase (Recirculation) OD:

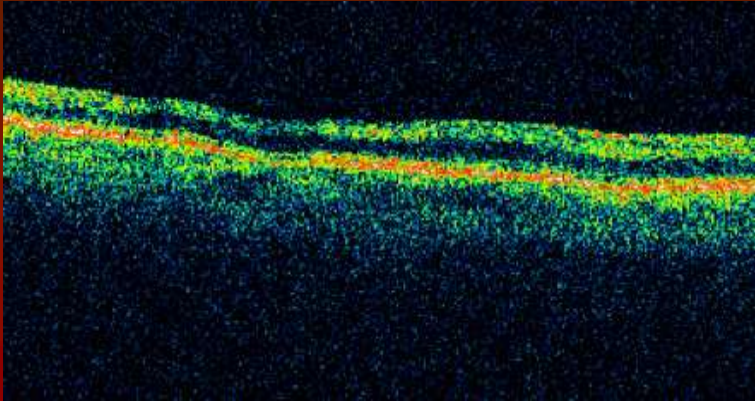
Minimal arterial filling. Veins still do not have flow.

Fluorescein Angiogram

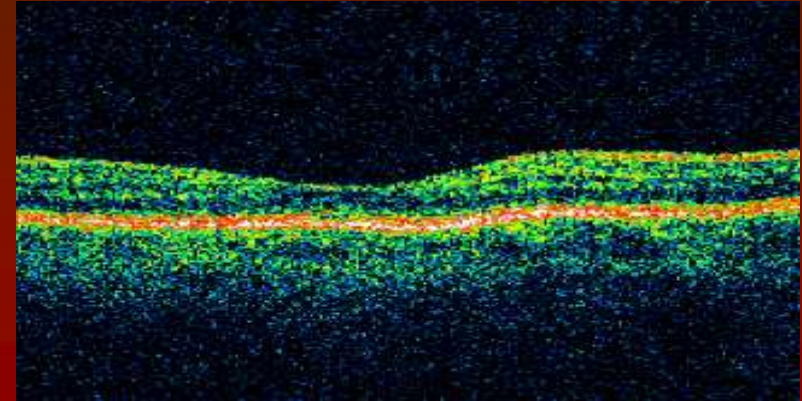
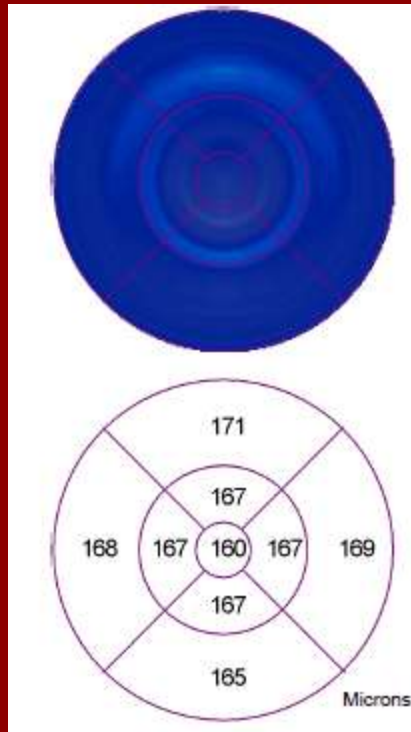


Late Phase OD: Minimal choroidal filling and delayed flow.

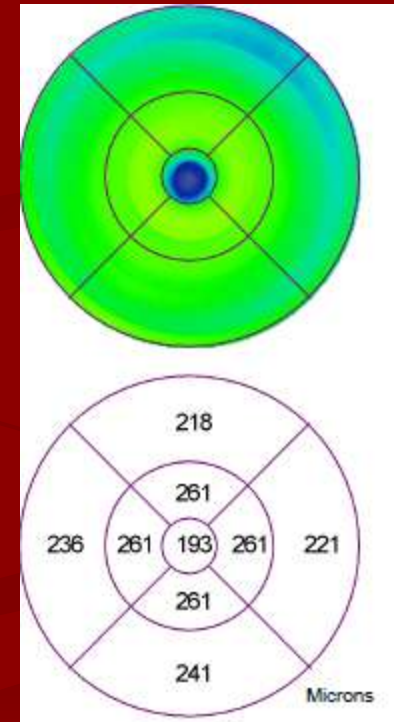
OCT



OCT OD:
Despite deep
widespread edema
in outer layer, the
retina is thinned
out.



OCT OS:
Normal Retina



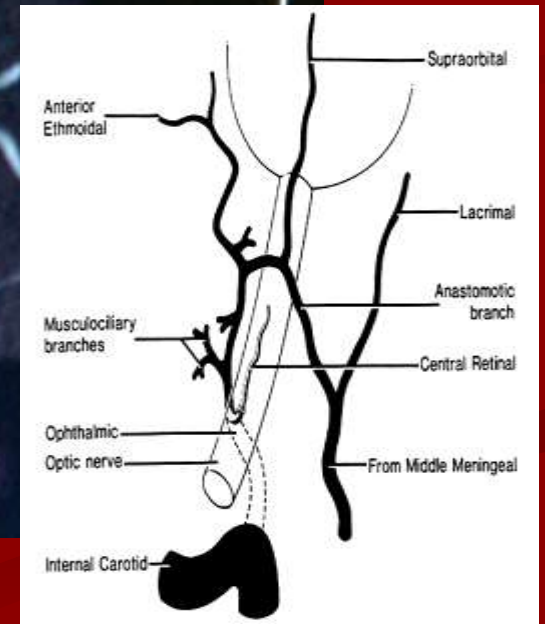
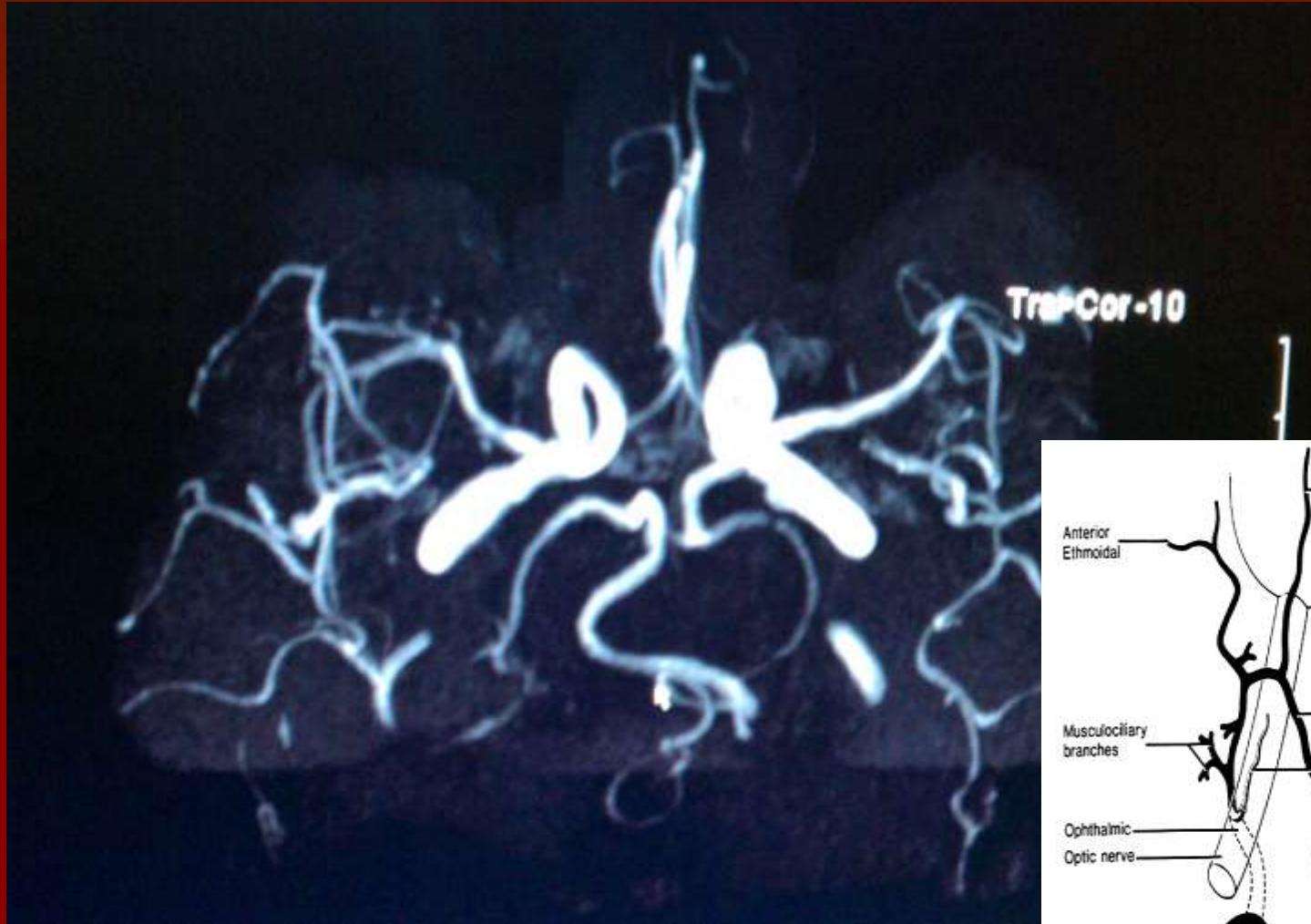
Impression/Differential Diagnosis

- 69yo WF with painless vision loss OD with absent choroidal filling on FA
- DDX:
 - Ophthalmic Artery occlusion
 - CRAO

Plan

- Labs
- Carotid duplex
- Echo
- MRA
- ERG
- CBC WNL
- ESR 8
- CRP <0.5
- Carotid Duplex: WNL
- Echo: EF 60-65%, WNL
- ANA (-)
- Anti-phospholipid Ab (-)
- RF (-)
- PT/PTT: WNL
- Factor V Leiden (-)
- Protein C/Protein S: WNL
- **Homocysteine: *elevated***
 - Folate: WNL
 - Vitamin B12: WNL

MRA



MRA: Partial obstruction of Ophthalmic Artery

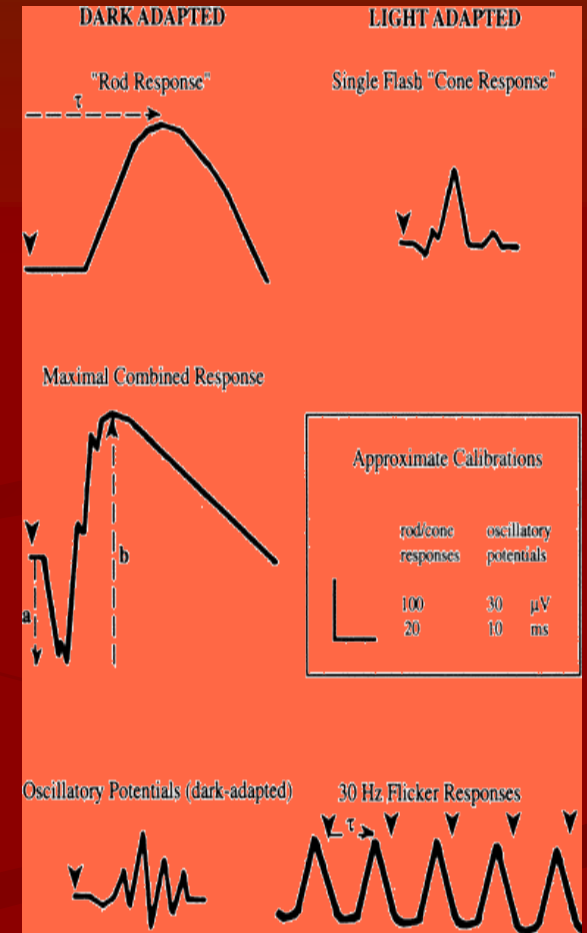
International Society for Clinical Electrophysiology for Vision (ISCEV) Protocol for ERG

■ Dark Adapted

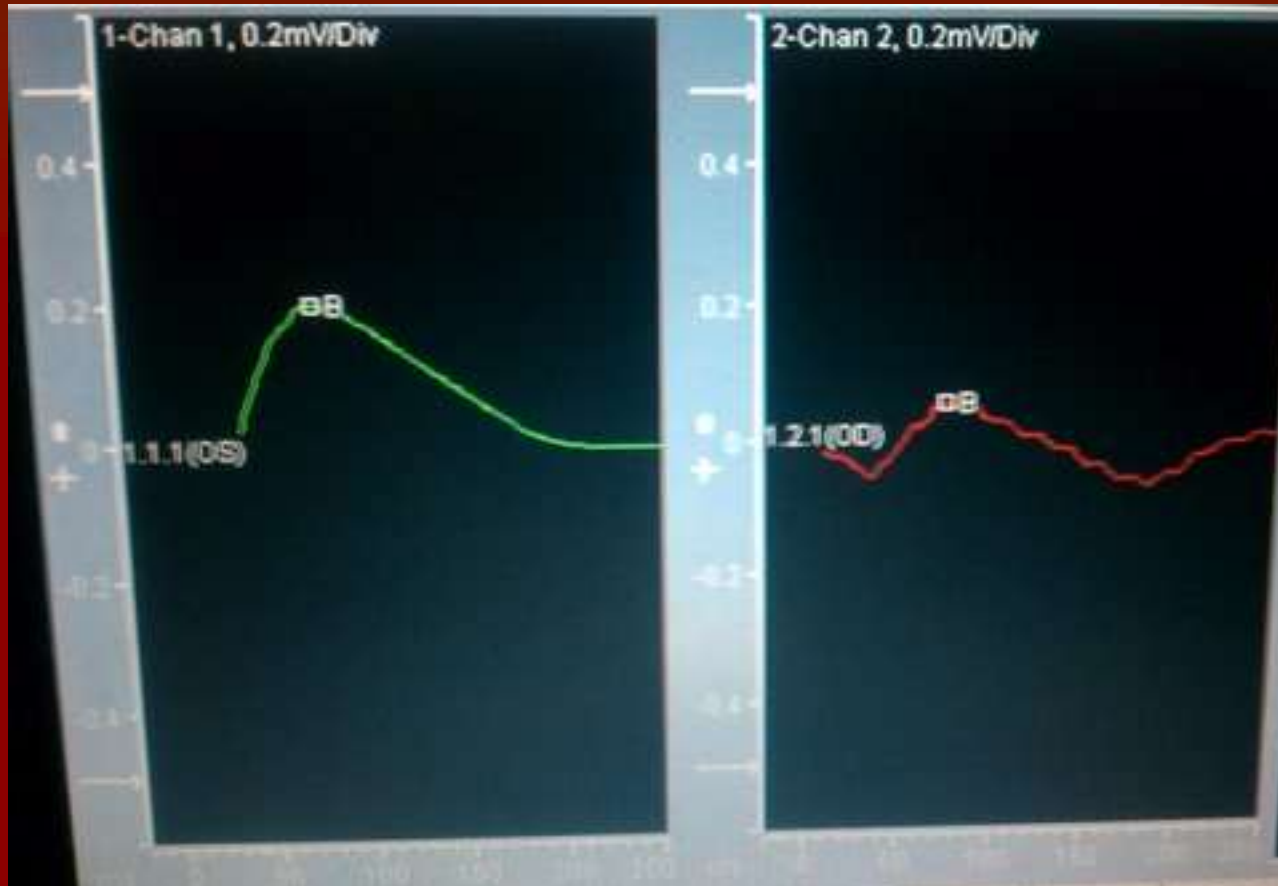
- Step 1 – Dim flash scotopic (Rod ERG)
- Step 2 – Bright flash scotopic (Rod-Cone mix ERG)
- Step 3 – Oscillatory potentials generated by bright flash (Inner retina – amacrine and ganglion cells)

■ Light Adapted

- Step 4 – Bright flash photopic (Cone ERG)
- Step 5 – Bright flicker (Cone ERG)

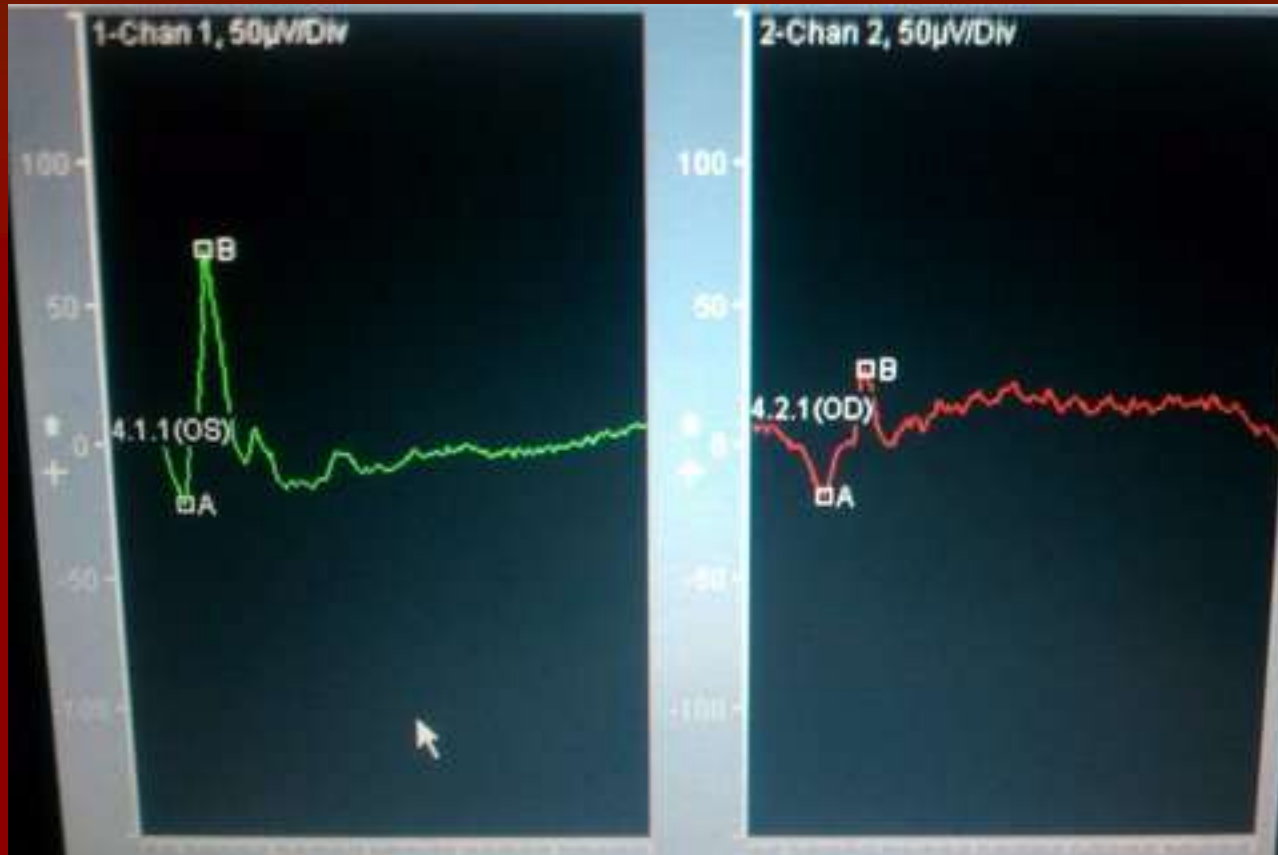


ERG



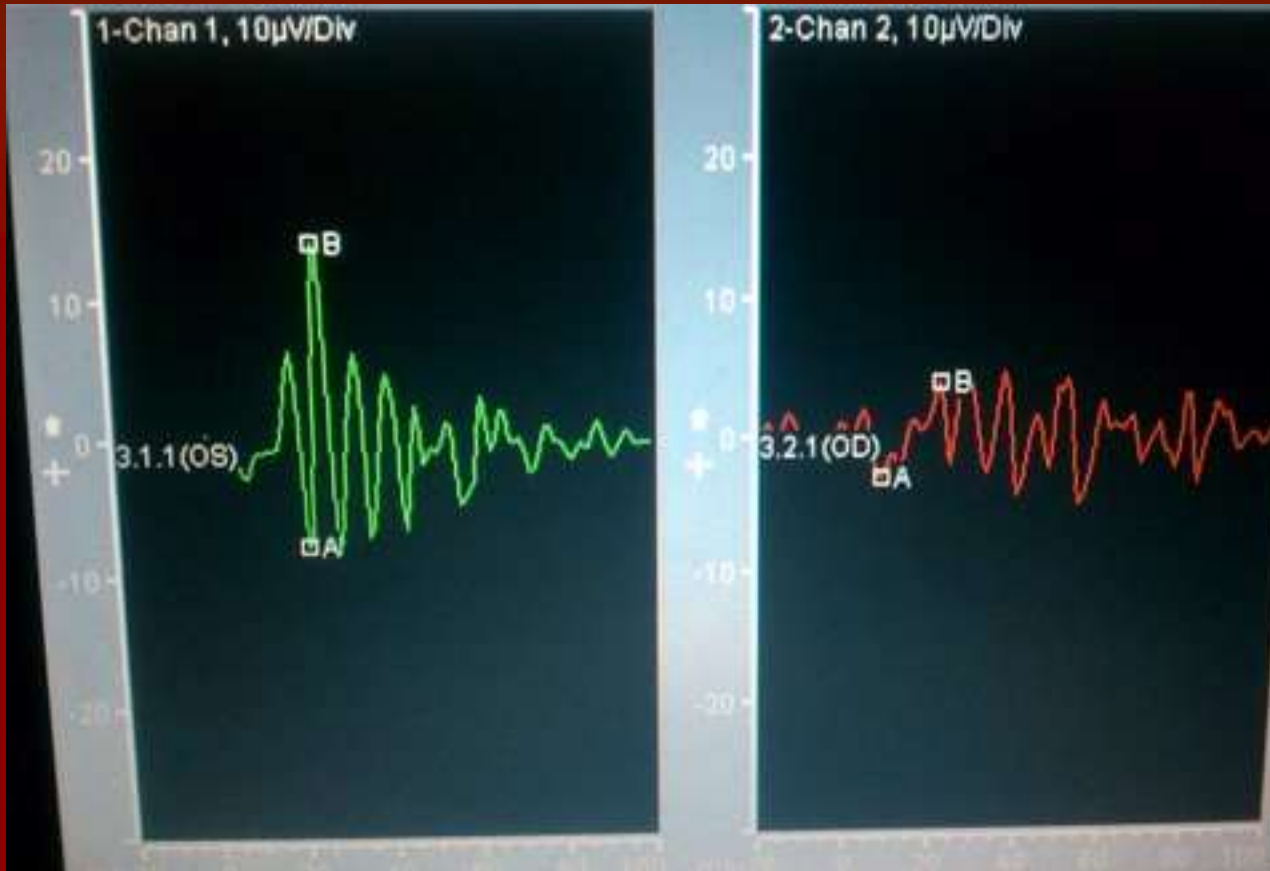
- Step 1: Dim flash scotopic (Rod ERG)
OS (left) = Normal
OD (right) = Decreased

ERG



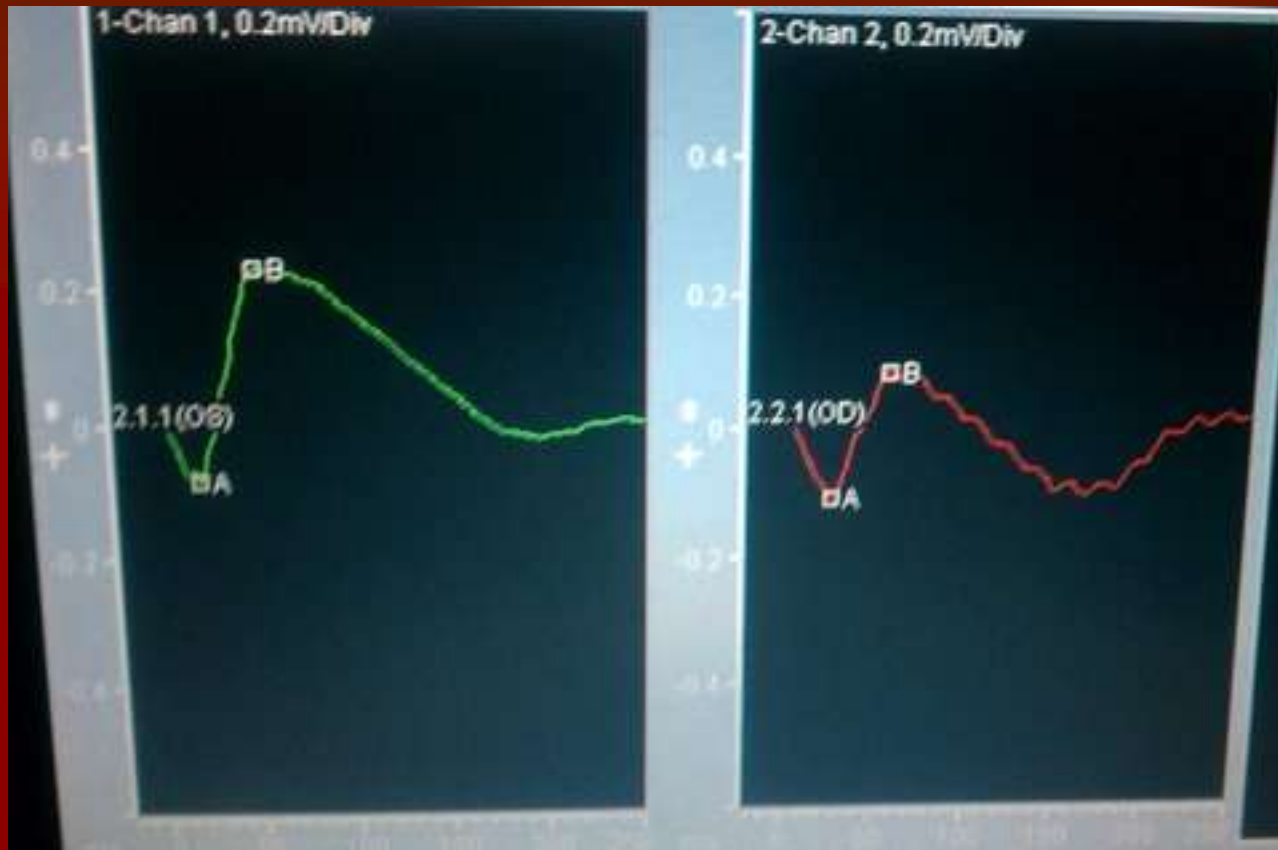
- Step 2: Bright flash scotopic (Rod-Cone mix ERG)
OS (left) = Normal
OD (right) = Widened a wave
Decreased b wave

ERG



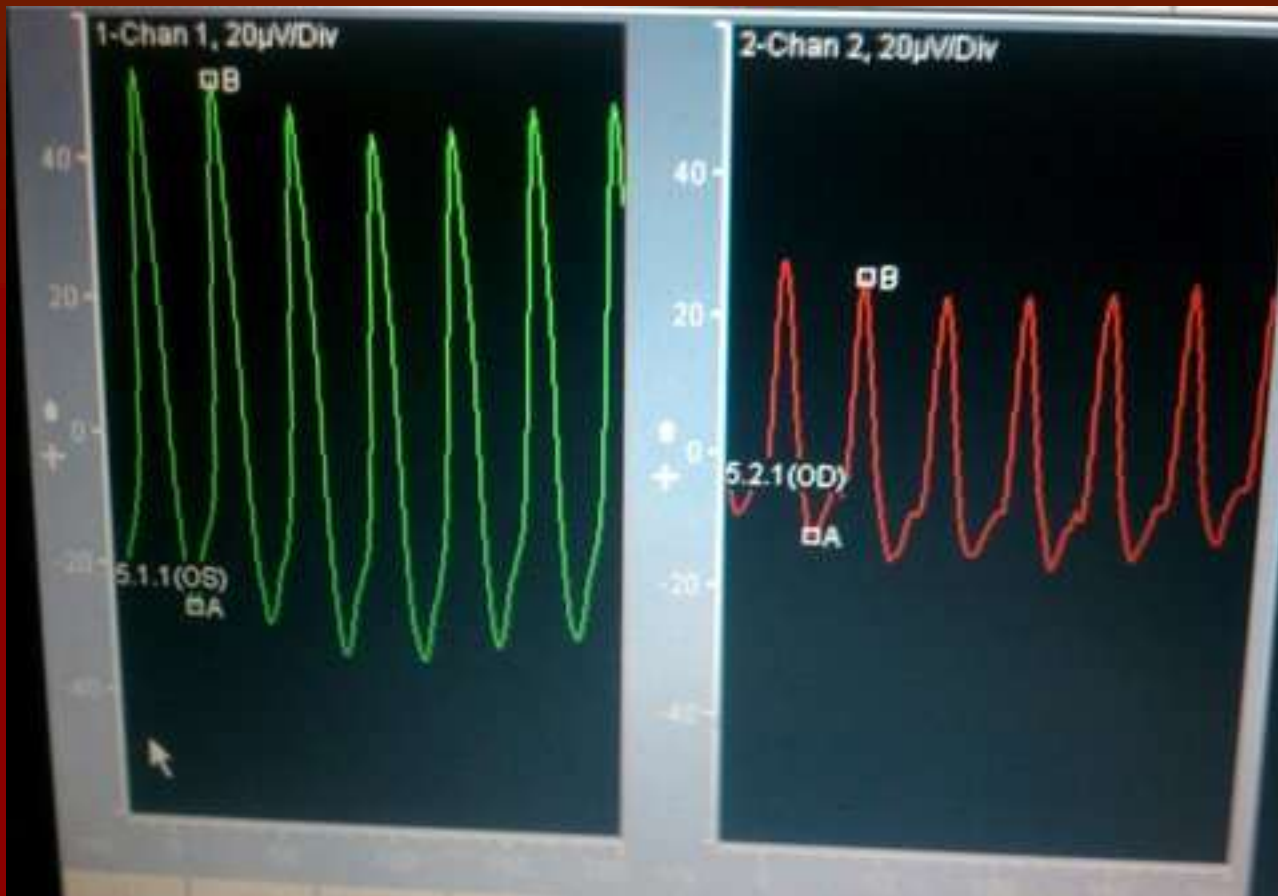
- Step 3: OPs generated by bright flash (inner retina contribution)
OS (left): Normal
OD (right): Diminished amplitude

ERG



- Step 4: Bright flash photopic (Cone ERG)
OS (left) = Normal
OD (right) = Widened a wave
Decreased b wave

ERG

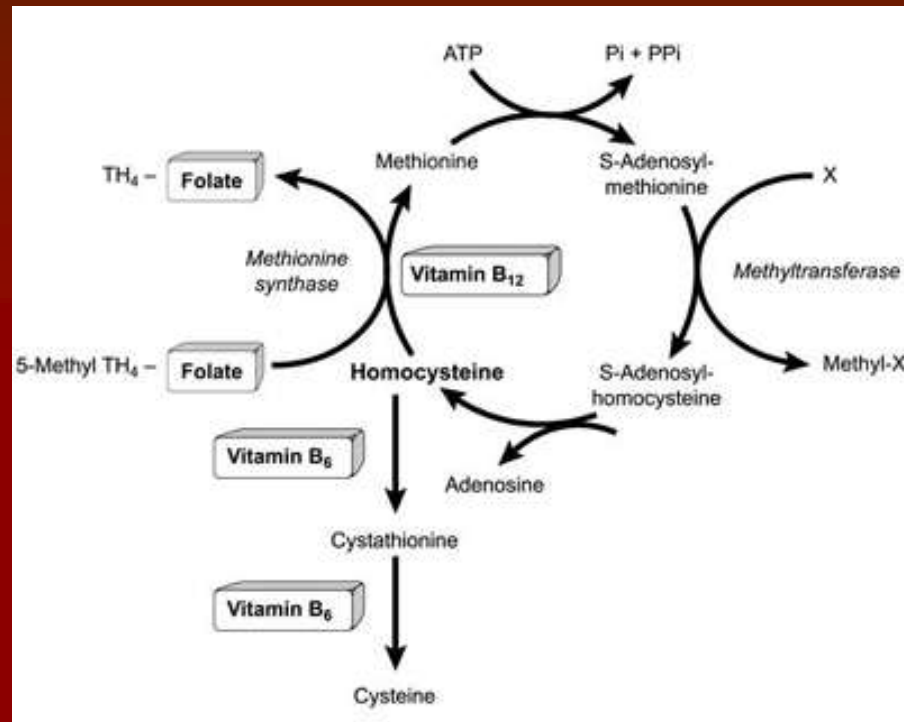


Step 5: Bright flicker (Cone ERG)
OS (left) = Normal
OD (right) = Decreased

Ophthalmic Artery Occlusion

- Potential causes:
 - Atherosclerotic diseases
 - GCA
 - Inflammatory conditions
 - Blood disorders
 - Iatrogenic

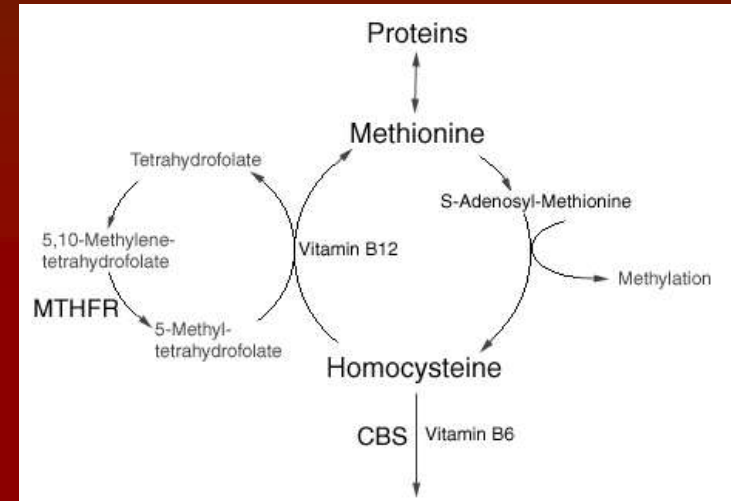
Hyperhomocysteinemia



- Risk factor for embolic events
- May be caused by vitamin deficiency, genetic mutation (MTHFR gene)

MTHFR Gene

- Chromosome 1
- Encodes methylenetetrahydrofolate reductase (MTHFR)
 - Catalyzes the production of 5-methyltetrahydrofolate, a cosubstrate for homocysteine remethylation to methionine.
- Genetic variation in this gene influences susceptibility to occlusive vascular disease, neural tube defects, colon cancer, and acute leukemia



- Genetic polymorphisms associated with MTHFR gene
 - C677 is one of the most studied
 - MTHFR nucleotide at position 677 in the gene can be: C (cytosine) or T (thymine)
 - C at position 677 (→ alanine) = normal
 - T at position 677 (→ valine) = abnormal
 - C677CC = “wild type”
 - C677CT (heterozygous) = normal
 - C677TT (homozygous) = mild MTHFR deficiency
 - Predisposed to mild hyperhomocysteinemia because less active MTHFR available to produce 5-methyltetrahydrofolate (which is used to decrease homocysteine).

Hyperhomocysteinemia and Retinal Vascular Disease

- (European Journal of Ophthalmology, 2002)
 - Prospective study comparing total homocysteine levels in patients with retinal vascular occlusive disease (n=56) and matched controls (n = 59)
 - RESULTS: 66% of patients (vs. 3.4% of controls) had significant elevation in homocysteine
- (American Journal of Ophthalmology, 2002)
 - Retrospective case control study comparing fasting plasma homocysteine and genotypes of MTHFR C677T mutation) in patients with retinal artery occlusion n=105) and matched controls (n=105)
 - RESULTS: Patients with retinal artery occlusion showed higher fasting plasma homocysteine, lower folate levels, but no difference in prevalence of homozygosity in MTHFR C677T mutation.

References

1. Creel, D. Clinical electrophysiology. July 2007.
<http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=webvision&part=ch36clinicalerg#ch36clinicalerg.References>. Last accessed December 7, 2010.
2. Chen CS, Miller NR. Compr Ophthalmol Update. 2007 Jan-Feb;8(1):17-28.
3. Marmor MF and Zrenner E. Standard for clinical electroretinography (1999 Update) International Society for Clinical Electrophysiology of Vision.
<http://www.iscev.org/standards/erg1999.html>. Last Accessed December 8, 2010.
4. Brown G. Retinal arterial occlusive disease. In: Guyer DR, ed. *Retina-Vitreous-Macula*. Vol. 1. WB Saunders; 1999:271-85.
5. Weger, et al. The role of hyperhomocysteinemia and MTHFR C677T mutation in patients with retinal artery occlusion. *Am J Ophthalmol*. 2002; 134(1):57-61.
6. Abu El-Asrai, et al. Hyperhomocysteinemia and retinal vascular occlusive disease. *Eur J Ophthalmol*. 2002; 12(6):495-500.

Thank You!