Ischemic Optic neuropathy: is it or isn’t it?
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Introduction
- Anterior ischemic optic neuropathy (AION) is believed to be the result of infarction of the short posterior ciliary arteries supplying the optic nerve at the level of the post-laminar optic nerve.

Non-arteritic Ischemic optic neuropathy
- Much more common (~90% of cases)
- Usually acute painless unilateral vision loss
- Most often noticed upon waking in the morning
- May worsen for a few days

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Non-arteritic Ischemic optic neuropathy

- More than 50% of patients have acuity better than 20/60
- Optic disc may be diffusely or segmentally swollen
- Optic disc in the **fellow eye should be a disc at risk**
- Risk factors: diabetes, hypertension, smoking

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Non-Arteritic Ischemic optic neuropathy

- Visual recovery is minimal
  - Unlikely to have a recurrent attack in same eye
  - Fellow eye is at risk, if involved usually within months to years
- No effective treatment but should manage arteriosclerotic risk factors while watching for over-treated hypertension
  - Customary to start aspirin after NAION in one eye

Case 1

- Chief Complaint: 47 year old male presents emergently with a chief complaint of blurry vision OD
- Vision was blurry upon waking
- Blur has been constant and stable since
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Case 1: Medical History

- Had a tooth extracted 1 week prior (upper right molar) to vision loss
- Had notable pain 1 week after procedure and was diagnosed with dry socket and given antibiotics
- Type 2 Diabetes
  - Unknown HgA1c/LFBS, ran out of metformin a few days ago
  - Diagnosed 2-3 years ago and has been on and off medication
  - Elevated cholesterol
  - Hypertension
- Told of irregular heart beat when he was younger, stress test 10 years ago was normal

Case 1: Examination

- BCVA: 20/25 OD, 20/20 OS
- Confrontation fields:
  - Inferior constriction peripheral and central OD
  - Full to finger count OS
- Pupils:
  - OD: pupil reactive, round, APD >1.8 log
    - Bright Illumination: 4 mm
    - Dim Illumination: 5 mm
  - OS: pupil round, reactive, no APD
    - Bright Illumination: 3.5 mm
    - Dim Illumination: 4.5 mm
- Color Vision: 2/14 OD, 14/14 OS

Case 1: Examination continued

- More than 50% of patients have acuity better than 20/60

Case 1: Medical History

- Efferent exam unremarkable
- IOP with GAT:
  - 24mmHg OD
  - 30mmHg OS
- Blood pressure:
  - 140/90mmHg RAS
- Gonioscopy: Open to ciliary body 360 OU
- Anterior segment:
  - Unremarkable with no NVI OU

Case 1: Posterior Segment

- Efferent exam unremarkable
- IOP with GAT:
  - 24mmHg OD
  - 30mmHg OS
- Blood pressure:
  - 140/90mmHg RAS
- Gonioscopy: Open to ciliary body 360 OU
- Anterior segment:
  - Unremarkable with no NVI OU

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Case 1: OCT

Assessment, Plan

**NAION OD**
- risk factors: uncontrolled diabetes, hypertension, and high cholesterol
- He does snore and never had a sleep study
- follow up with PCP ASAP to restart treatment of his vasculopathic risk factors
- There have been some reports of ION associated with dental procedures

**Ocular Hypertension**
- No evidence of glaucomatous damage on OCT or HVF
- Given his risk of NAION (disc at risk) in the setting of elevated IOP OU, we initiated treatment with latanoprost QPM OU

Case 1 Follow up (1 month later)

- Felt as though vision is a lot better
- Saw PCP a few days after our appointment and was restarted on his medications
- Has been compliant with Latanoprost QHS OU

Case 1: Exam findings

- BCVA 20/125 OD, 20/20 OS
- Confrontation fields: inferior temporal constriction OD, full to finger counting OS
- Pupils: PEERL, >1.8 log APD OD
- Color vision: 0/14 OD, 14/14 OS
- IOP: 16mmHG OU
- Blood pressure: 125/88 mmHg RAS

Case 1: Fundus 1 month later
Case 1: visual fields (follow up)

Case 2: Assessment, Plan

- Sequelae of NAION resulting in optic neuropathy OD
- Concern for start of early NAION OS

Arteritic Ischemic Optic Neuropathy

- Less common, but more concerning because the etiology is giant cell arteritis
- Visual acuity loss is usually greater than NAION
- Swelling of the optic disc is usually more pallid

“The diamondback of optic neuropathies, it strikes quickly and unexpectedly with deadly effects.” –Dr. Jonathon Trobe

Diagnosis

- Erythrocyte sedimentation rate and C-reactive protein are elevated in >80%
  - Calculate based on age
  - Make sure you also order a CBC and consider hemoglobin and platelet counts
  - Be careful of false positives and false negatives

- Men = Age/2
- Women = Age + 10/2
Diagnosis

- Superficial Temporal artery biopsy is quite sensitive and specific (with 2 cm segment cut into 1 mm segments)
- Look for fragmentation due to autoimmune reaction against internal elastic lamina
- This causes thrombosis and thickening of the blood vessel wall resulting in narrowing and ischemia
- Look for enlarged, bulbous, tortuous appearance of superficial temporal artery on clinical exam

Arteritic Ischemic Optic Neuropathy

- May have coexisting ocular ischemia
  - Cilioretinal artery occlusion
  - Anterior segment including cell and flare
  - Reduced choroidal perfusion on fluorescein angiography
  - Diplopia (CN III is most common)

Arteritic Ischemic Optic Neuropathy

- Most will have symptoms of polymyalgia rheumatica
  - Malaise
  - Hip/shoulder pain
  - Fatigue
  - Fever
  - Weight loss

Arteritic Ischemic Optic Neuropathy

- Treatment:
  - High dose IV methylprednisone treatment is recommended (1-4 g/day)

Case 2:

**Chief Complaint**
- 52 year old Caucasian male presents a referral for a suspicious optic disc appearance OS
- He is largely asymptomatic
- He notes occasional blur at distance in both eyes while wearing his glasses

**Medical History**
- Thalamic stroke and myocardial infarction 1 year prior
  - Noticed a "lazy eye" right after the stroke
- Diagnosed with high blood pressure at age 14
- Elevated lipids
- Asthma
- Type 2 Diabetes
  - Last HgA1c 7.5 and LFBS 140mg/dL
- Sleep apnea
- Schizophrenia
Case 2

- Review of systems:
  - Headaches about 1x per week in the frontal area
  - Pain in left shoulder
  - Denies
    - Scalp tenderness
    - Jaw claudication
    - Decreased appetite/weight loss
    - Malaise

Case 2: Examination (afferent)

- BCVA: 20/20 OD, OS
- Confrontation fields:
  - Full to finger counting, inferior temporal red desat OD
  - Full to finger counting with no red desaturation OS
- Pupils: PERRL (-) APD
- Color Vision: 14/14 OD, 13/14 OS
- Red desaturation: 0% between the two eyes
- No decreased bright sense between the two eyes

Case 2: Examination (efferent)

- 8 exo 4 right hyper
- 6-8 exo 5 right hyper
- Inocyle OD and exocyle OS

Exam:

- IOP GAT: 16mHg/17mmHg
- Blood Pressure: 143/89mmHg RAS
- Slit Lamp examination: unremarkable (-) NVI OU

Case 2: Dilated Exam

- Slit Lamp images showing retinal structures
Case 2: fields

Case 2: OCT

Case 2: Assessment and Plan

- Suspect ischemic optic neuropathy OS
  - however, the right optic nerve demonstrates moderately large cupping, it cannot be considered a disc at risk therefore a NAION cannot be the presumed diagnosis despite his known vasculopathic risk factors at this time.
  - We must rule out GCA!
    - Ordered blood work: CBC with Differential, Platelet Count, ESR (Westergren), C-Reactive Protein (inflammatory/quantitative), Lyme Titer, RPR, FTA-ABS, ACE, ANA with reflex titer, Hemoglobin A1c, serum glucose, BUN, and creatinine
    - Pending his kidney function tests, we would then like to proceed with an MRI of the brain/orbits preferably with and without contrast.

Case 2 Follow up

- No new visual or ocular symptoms
- Blood work results:
  - CBC with differential, ESR, CRP, ACE, ANA were found to be unremarkable.
  - HgA1c was 7.8. Glucose was 177
  - Platelets were 382 (high)
  - FTA-ABS was positive but RPR was negative
- Did not complete neuroimaging
- Examination stable aside from…

Dilated Examination

Follow up Assessment/Plan

- Repeat blood work in order to determine if the positive FTA-ABS is repeatable or if it was a false positive
- Repeated platelet count, ESR and CRP as his platelets were 382 at his initial blood draw
- Re-order MRI
- Consult with colleagues!

MRI: unchanged from prior imaging, no new findings
- Still awaiting blood work….
- “Get a spectralis!”
Case 2: Vitreopapillary traction

Conclusion

- Ischemic optic neuropathy is often classified as two variants: non-arteritic and arteritic.
- Clinicians must be aware of the similarities and differences in their presentation.
- Non-arteritic ischemic optic neuropathy is much more common, but given the potential vision loss and systemic sequellae associated with arteritic ischemic optic neuropathy it is **often imperative to be over-cautious.**

Thank you!