**OPTIC NEURITIS**

What is the typical clinical presentation of “demyelinating optic neuritis”?
- Annual incidence: 5/100,000 per year; affect young adults (ages 20-50 y.o.); highest in Caucasians, women, spring months and at high altitudes.
- **Subacute unilateral vision loss**: central visual loss followed by progressive reduction of visual acuity days to two weeks, not to exceed two weeks; associated with loss of color vision and contrast sensitivity. Uhthoff’s phenomenon—temporary vision loss with elevation of body temperature.
- Ocular pain: very common (90%) but transient, precedes onset of visual loss, may exacerbated by eye movement (not specific).
- **Afferent papillary defect**: a must on the side of the affected eye.
- Funduscopic exam: the discs commonly appear normal (2/3 cases, especially if the retrobulbar nerve is affected or early stages) or may appear subtly congested (papillitis, especially if anterior part of nerve is affected), then after several weeks optic disc pallor can be visualized (not acute finding).
- Spontaneous clinical improvement within weeks: 93% of cases show some improvement within 5 weeks and takes up to one year.
- MRI: normal in 40% cases, may reveal enhancement of optic nerve with gadolinium and possible swelling.

What are the possible etiologies of optic neuritis? (Usually, implies demyelination injury, however, other inflammatory causes must be considered if the clinical presentation does not progress as above)
- Demyelinating disease: idiopathic, multiple sclerosis
- Infectious: tuberculosis, syphilis, CMV in HIV patients with retinitis, toxoplasmosis, crypococcus, HSV, Bartonella, Borellia
- Immune- mediated: post viral (measles, mumps, VZV, influenza, EBV); Guillain-Barre syndrome, SLE, Bechet’s
- Contiguous inflammatory disease: mucormycosis, meningitis, encephalitis, sinusitis
- Granulomatous infiltration: sarcoidosis, eosinophilic granuloma
- Neoplastic infiltration: meningioma, glioma, lymphoma
- Nutritional/toxin neuropathies: B12/B1/folate deficiencies; lead, arsenic, methanol, ethylene glycol; ethambutol, INH, rifampin, disulfiram, amiodarone
- Hereditary: Leber’s hereditary optic neuropathy, a mitochondrial defect, affects young males, becomes bilateral within time.
- Trauma/Compression: pituitary tumors, aneurysms, craniopharygiomas, orbit disease

What else is on the DDX for mono-ocular blindness?
- Vascular ischemia: sudden, acute, non-progressive vision loss
  - Retinal artery occlusion: Amaurosis fugax (transient ischemic attack of the retina usually due to an embolic occlusion of retinal arteriole, “curtain descending” over eye); vasculitis (temporal arteritis, SLE, PAN, CS); hypercoagulable states (protein C and S deficiencies, APLAS, pregnancy); systemic hypertension (retinal artery sclerosis and vasospasm accompanying macular exudates); cherry red spot on exam
  - Central retinal vein occlusion: engorged veins with numerous retinal hemorrhages, usually idiopathic, but may be related to DM, HTN or glaucoma
  - Anterior ischemic optic neuropathy: insufficient blood flow through the posterior ciliary arteries supplying the optic disc; the optic disc appears swollen and is surrounded by a nerve layer with hemorrhages; associated with DM and HTN and also with temporal arteritis.
Posterior ischemic optic neuropathy: infarction of the retrobulbar optic nerve due to severe anemia and hypotension; seen after huge blood loss; swollen optic disc.

- Chronic papilledema: increased ICP due to mass or pseudotumor cerebri; usually bilateral, disc is milky
- Vitreous degeneration with vitreous hemorrhage:
- Retinal detachment/degeneration/inflammation
- Glaucoma
- Stroke: presents with contralateral homonymous heminopsia
- Migraine

**What is the appropriate work up?**

- An excellent history and physical exam is crucial: funduscopic and slit lamp exam should be able to exclude most of the above mechanical etiologies.
- MRI needed to evaluate for white matter lesions and visualize masses/tumors.
- If the history is not classic and the patient has risk factors/clinical signs of other systemic diseases; an LP should be done, serologies for RPR, ANA, and CXR.

**What are the possible treatments?**

- Steroids: The optic Neuritis Treatment Trial (ONTT) carried out a DBRCT, with three treatment arms (placebo, high dose IV methylprednisolone, high dose oral steroids) and results revealed NO statistical difference in visual acuity at 6 months and one year (acuity >20/40, 95% vs. 94% vs. 91%). Of note, the patients that received oral prednisone experienced higher recurrence rates of optic neuritis. Also, the subset of patients with abnormal MRI scans who were treated with IV methylprednisolone had much lower rates of clinically definite MS at 2 years, but not longer.
- Interferon-beta 1: The CHAMPS study, conducted a DBRCT of patients with acute demyelinating event (optic neuritis 50 % cases) and abnormal MRI with two lesions, with two treatment arms (initial treatment with IV methylprednisolone and oral taper then either weekly injection interferon or placebo). At three years, the cumulative probability of developing CDMS was 35% in interferon group vs. 50% in placebo. NO data on whether this intervention prevents disability in the future.

**What about prognosis?**

- Progression to clinically definite MS: only prognostic indicator is the presence of an abnormal MRI with three or more white matter lesions. At 5 years, 16 % patients with normal MRI’s had progressed vs. 51 % patients with abnormal scans.
- Recurrence rates: 19 % for affected eye, 17% for fellow eye, 30 % for either eye

References: