Ophthalmological Literature Review 2017

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Areas to be Covered

1. LHON
2. Optic Neuritis and MS
3. NAION
4. OCT-A
Lebers Hereditary Optic Neuropathy

• Key Points:
  • Higher cellular mtDNA content in peripheral blood cells of unaffected heteroplasmic mutation carriers with respect to the affected persons.
  • This suggest that increase of cellular mtDNA content may prevent loss of vision despite the presence of a heteroplasmic state of LHON primary mutation.

• Strengths and Limitations of Paper:

Lebers Hereditary Optic Neuropathy

**Key Points:**

**Co-morbidities identified**
- two-fold mortality risk
  - with a specific increased incidence of atherosclerosis and stroke (RR=2.38X)
  - association between LHON patients and an increased prevalence of neurologic conditions:
    - demylinating disorders (RR=12.9X),
    - dementia (RR=4X), epilepsy (RR=3X),
    - alcohol-related disorders.

**Strengths and Limitations of Paper:**

Lebers Hereditary Optic Neuropathy

• Key Points:
  • Natural history of LHON: prospective observational case study
    – Identified 6 patients who were unaffected mutation carriers who converted to affected status
    – An increase in the RNFL thickness preceded conversion as early as 4 to 6 months, peaked at conversion, and decreased until individual plateaus.
    – This suggests that structural changes precede clinically significant vision loss. Hence, the natural history of LHON is not a subacute process, as previously believed, but progresses more slowly, taking up to 8 months to plateau.

• Strengths and Limitations of Paper:

Optic Neuritis and MS

• Key Points:
  • An observational longitudinal study followed 100 patients with relapsing-remitting MS and 50 controls for 5 years.
    – Patients with MS had thinning of the average RNFL thickness and the P100 latency of visual evoked potentials.
    – This suggests that there is progressive axonal loss in the optic nerve which was shown to correlate with increased disability and reduced quality of life.

• Strengths and Limitations of Paper:

Garcia-Martin E, Ara JR, Martin J. Retinal and Optic Nerve Degeneration in Patients with Multiple Sclerosis Followed up for 5 Years. Ophthalmology 2017;124:688-696
Optic Neuritis and MS

• **Key Points:**
  • Retrospective cross-sectional study considered the diagnostic error rate of optic neuritis.
    — An overdiagnosis rate of nearly 60% was shown for those referred with acute optic neuritis.
    — Overdiagnosis was most commonly caused by:
      • Errors in taking the history in particular related to eye pain.
      • Discounting normal examination (importantly, a RAPD was one of the more consistent examination findings that correlated with a true diagnosis of optic neuritis and its absence should lead to consideration of other diagnosis.
      • Misinterpreting MRI findings also led to diagnostic errors. In particular, making the diagnosis of optic neuritis in the presence of normal imaging should be cautioned.

• **Strengths and Limitations of Paper:**

Optic Neuritis and MS

• Key Points:
  • Corneal nerve fiber density in patients with MS.
    – Corneal confocal microscopy demonstrated significant reduction in corneal nerve fiber density, branch density and length that correlated with a clinical measure of MS severity.
    – Findings were independent of age, MS duration and stage, and RNFL loss.
    – Axonal loss occurring in MS is partially independent of primary demyelination, and is predictive of irreversible neurological disability.
    – This raises the intriguing possibility that corneal subbasal innervation may be a useful biomarker for the detection of neuroaxonal injury.

• Strengths and Limitations of Paper:

• Key Points:
• Association of cataract surgery and NAION
• Retrospective study over 5 years
• While 9.6% had undergone surgery during the year prior to developing NAION, there was no significant temporal relationship between cataract surgery and the subsequent development of NAION using modern (phacoemulsification) techniques.

• Strengths and Limitations of Paper:

NAION

- Key Points:
  - A case-control study of 92 patients demonstrated that patients with diabetes who have an NAION event do not have a worse visual outcome.
  
  - In nondiabetics the most prevalent risk factor was hyperlipidemia (63%), while for diabetics it was both hypertension (83%) and hyperlipidemia (83%).
  
  - Diabetes was not correlated with visual outcome, however, ischemic heart disease and older age, independently correlated with worse VA.

- Strengths and Limitations of Paper:

Key Points:
A prospective study of 10 patients with acute NAION:
- aqueous humor samples were shown to have increased levels of vascular endothelial growth factor (VEGF) and lower levels of interleukin-2
- This may have potential implications for therapeutic interventions and is an area worthy of further investigation.

Strengths and Limitations of Paper:

Key Points:

- Case-control study of 67 patients peripapillary retinal nerve fibre layer (NFL) thickness, macular ganglion cell complex (GCC) thickness and were optic nerve head perfusion were measured.

- Compared to patients without MS, patients with MS had both thinner GCC thickness and decreased optic nerve head perfusion.

- Eyes without documented optic neuritis also demonstrated structural loss and decreased optic nerve head perfusion.

Strengths and Limitations of Paper:

Optical Coherence Tomography Angiography

• Key Points:
  – Neurological explored with OCTA technology.
  – A case control study of patients with Alzheimer's dementia showed a decrease in retinal vascular density and enlarged foveal avascular zone.
  – Significant correlations were found between the the Mini Mental Status Examination and all vascular density parameters. Given the close association between retinal and cerebral circulations deficits.
  – This raises the interesting question whether microvasculature deficits detected early with OCTA can be used as a new biomarker in the early detection of Alzheimer's type dementia or monitoring of its progression and response to therapies.

• Strengths and Limitations of Paper:

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