ABSTRACTS

Neuro-Ophthalmic Literature Review

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Michael Vaphiades, and An-Guor Wang

POSTERIOR CORTICAL ATROPHY: A REVIEW

Beh SC, Muthusamy B, Calabresi P, Hart J, Zee D, Patel V, Frohman E. Hiding in plain sight: a closer look at posterior cortical atrophy. *Pract Neurol* 2015;15:5–13.

Posterior cortical atrophy (PCA) is an uncommon neurodegenerative disorder that affects higher visual functions. PCA patients may present with non-specific visual symptoms to ophthalmologists and neurologists. Since the ophthalmic examination may be normal, these patients are often underdiagnosed. In this comprehensive review, the authors summarised the salient features of the condition, especially the visual manifestations (in particular, simultanagnosia, optic apraxia, and optic ataxia), and illustrated with a typical case presentation. Other aspects such as the work-up, diagnostic criteria, and differential diagnoses are included.

Carmen Chan

DATA FROM THE IIHTT STUDY GROUP

OCT Sub-Study Committee for NORDIC Idiopathic Intracranial Hypertension Study Group, Auinger P, Durbin M, Feldon S, Garvin M, Kardon R, Keltner J, Kupersmith M, Sibony P, Plumb K, Wang JK, Werner JS. Baseline OCT measurements in the Idiopathic Intracranial Hypertension Treatment Trial: part I. Quality control, comparisons and variability. *Invest Ophthalmol Vis Sci* 2014;55:8180–8188.

OCT Sub-Study Committee for NORDIC Idiopathic Intracranial Hypertension Study Group, Auinger P, Durbin M, Feldon S, Garvin M, Kardon R, Keltner J, Kupersmith M, Sibony P, Plumb K, Wang JK, Werner JS. Baseline OCT Measurements in the Idiopathic Intracranial Hypertension Treatment Trial: part II. Correlations and relationship to clinical features. *Invest Ophthalmol Vis Sci* 2014;55:8173–8179.

Most neuro-ophthalmologists are familiar with the IIHTT, a recently published, multicentre, randomised, double-masked, placebo-controlled study of treating IIH patients with mild visual loss with acetazolamide. It demonstrated that acetazolamide with a low-sodium weight-reduction diet compared with diet alone resulted in modest improvement in visual field function within the trial period of 6 months. In this study, disc swelling was graded using the Frisén scale, a non-continuous ordinal grading method based on clinical appearance/disc photo, which is not sensitive to small changes and somewhat subjective. In this OCT sub-study, the authors explored the use of spectral domain OCT (SD-OCT) to measure the changes in the optic nerve head (ONH) and macular structure. Scans of the optic nerve head and macula were obtained with Cirrus SD-OCT and measurements of various parameters (retinal nerve fibre layer [RNFL], total retinal thickness [TRT], optic nerve volume [ONHV], and retinal ganglion cell layer [GCL] thickness) were derived using the commercial built-in algorithm and a custom 3D segmentation algorithm. Part I demonstrated that SD-OCT provided reliable, reproducible continuous measurements of various ONH/macula parameters even in the presence of disc swelling. It was interesting to note that proprietary algorithm derived RNFL, TRT, and GCL thickness measurements had failure rates of 10%, 16%, and 20% respectively, but the failure rates were much lower with the 3D algorithm. In part II, using parameters derived using the 3D algorithm, the authors demonstrated that the OCT parameters had a good correlation with the Frisén scale, a small but significant correlation with CSF opening pressure, but no correlation

with visual acuity or visual field defect. The latter might be explained by the fact the IIHTT targeted patients with mild visual loss.

Carmen Chan

ORBITAL ULTRASOUND IS USEFUL FOR DISTINGUISHING PAPILLOEDEMA FROM PSEUDOPAPILLOEDEMA

Carter SB, Pistilli M, Livingston KG, Gold DR, Volpe NJ, Shindler KS, Liu GT, Tamhankar MA. The role of orbital ultrasonography in distinguishing papilledema from pseudopapilledema. *Eye (Lond)* 2014;28:1425–1430.

Neuro-ophthalmologists are frequently asked to distinguish papilloedema from pseudopapilloedema. Orbital ultrasonography is non-invasive and can be used to detect optic nerve head drusen as a cause for pseudopapilloedema. In this study the authors evaluated the usefulness of measuring the optic nerve sheath width (ONSW) using ultrasound A scan at primary gaze, in conjunction with the 30° test for evaluating (pseudo)papilloedema. The 30° test is performed by first measuring the ONSW at primary gaze, then the patient is asked to re-fixate at least 30° away from primary gaze towards the ultrasound probe and the ONSW is re-measured. In cases of true papilloedema, there should be fluid around the optic nerve that is compressed and re-distributed when the patient is eccentrically fixated. A reduction of ONSW by >10% is considered a positive result. In this retrospective chart review study at a single centre with 87 patients, they found an ONSW of at least 3.3 mm plus a positive 30° test was 90% sensitive and 79% specific for diagnosing papilloedema. Of note, all the ultrasounds were performed by a single experienced ultrasonographer, which may not be available in most centres.

Carmen Chan

IGG4 DISEASE

Yamamoto M, Hashimoto M, Takahashi H, Shinomura Y. IgG4 disease. *J Neuro-Ophthalmol* 2014;34:393–399.

Immunoglobulin (Ig) G4-related disease is a chronic inflammatory disorder involving multiple organs. It is characterised by high serum IgG4 level and pathological findings. The authors reviewed the history of the disease, organ involvement, pathology, diagnosis criteria, and treatments. Common orbital sites include lacrimal glands, extraocular muscles, and orbital nerves. Extraocular myositis often occurs after dacryadenitis. Double vision and pain on eye movement are commonly found. Supraorbital and infraorbital nerves may be impaired, causing numbness in those areas. It responds well to corticosteroid.

Panitha Jindahra

VIGABATRIN-INDUCED RETINAL DAMAGE

Westall CA, Wright T, Cortese F, Kumarappah A, Snead OC, Buncic JR. Vigabatrin retinal toxicity in children with infantile spasms: an observational cohort study. *Neurology* 2014;83:2262–2268.

The study was the largest cohort of vigabatrin-induced retinal damage (VGB-RD) in children with infantile spasm. The authors studied 146 cases aged 3 to 34.9 months. Electroretinograms (30-Hz flicker cone retinal responses) were performed before or within 4 weeks of starting VGB and at follow-up visits. VGB-RD was identified if the amplitude significantly reduced on two occasions. VGB-RD was found in 30 cases (21%). VGB-RD was related with treatment duration but not with cumulative dosage.

Panitha Jindahra

OCT AND WHITE MATTER DAMAGE

Scheel M, Finke C, Oberwahrenbrock T, Freing A, Pech LM, Schlichting J, Sömmmer C, Wuerfel J, Paul F, Brandt AU. Retinal nerve fibre layer thickness correlates with brain white matter damage in multiple sclerosis: a combined optical coherence tomography and diffusion tensor imaging study. *Mult Scler* 2014;20:1904–1907.

This is a cross-sectional study in a heterogeneous group of patients with MS, including with optic neuritis. Patients with MS ($n=44$) and controls ($n=30$) were included. Those who have read the enticing Editorial by Balcer and Galetta “OCT and NMO: are there methods to our madness?” (*J Neuroophthalmol* 2013;33:209–212) will be satisfied to see their statistical advice being implemented, using generalised estimating equation models (GEE). This more rigorous statistical approach notwithstanding significant relationships were found between the global average RNFL with FA and RD, but not with MD and PD. Note that this study used the global average. In addition, this study favoured tract-based spatial statistics (TBSS) over tractography because it may be less bias prone. Interestingly, this approach revealed an association between RNFL thinning and changes of DTI in the corpus callosum that cannot readily be explained by trans-synaptic axonal degeneration and may, as the authors speculate, reflect on more global disease pathology.

Axel Petzold

NON-PARAFOVEAL RETINAL DAMAGE IN HYDROXYCHLOROQUINE TOXICITY

Melles RB, Marmor MF. Pericentral retinopathy and racial differences in hydroxychloroquine toxicity. *Ophthalmology* 2015;122:110–116.

This retrospective study of roughly 200 patients exposes a pattern of retinal damage and visual field loss that is not commonly thought to be associated with hydroxychloroquine toxicity. All patients carried a diagnosis of hydroxychloroquine retinopathy on the basis of abnormalities on automated perimetry or spectral-domain optical coherence tomography (SD-OCT). Patients with diffuse, “end-stage” disease were excluded. Although 76% of cases were noted to have typical parafoveal pathology only, 12% were noted to have pericentral changes (at least 8° from the fovea) as well and 12% were noted to have pericentral changes only. A full 50% of Asian patients (who constituted 18% of the study group) were noted to have pericentral changes only, a finding seen in only 2% of whites. Ninety-two percent of patients with a pericentral or mixed pattern of damage were initially diagnosed with moderate or severe disease. When compared with patients with a parafoveal pattern of damage, the patients with pericentral disease had been on the medication for a longer period of time and had received a larger cumulative dose. This information is perhaps indicative of an opportunity to diagnose patients with pericentral disease earlier in their disease course. The authors stress the importance of evaluating the edge of 10-2 Humphrey visual fields and SD-OCT scans, particularly in Asian patients. It is also possible that 30-2 fields are indicated in selected cases.

Evan Price

PAEDIATRIC SECONDARY PSEUDOTUMOR: WHAT ABOUT WEIGHT?

Paley GL, Sheldon CA, Burrows EK, Chilutti MR, Liu GT, McCormack SE. Overweight and obesity in pediatric secondary pseudotumor cerebri syndrome. *Am J Ophthalmol* 2015;159:344–352.

Pseudotumor cerebri syndrome (PTCS) is known to affect the paediatric population differently than the adult population. In this retrospective study, the authors examine the characteristics of possible and definite secondary PTCS to those of primary PTCS. In accordance with recently revised diagnostic criteria, 59 cases of definite primary PTCS and 16 cases of definite secondary PTCS were identified at a tertiary-care children’s hospital. Of the secondary PTCS cases, 11 were found to be due to exposure to tetracycline antibiotics in the 3 months prior to onset of symptoms, 3 were found to be due to chronic kidney disease, and a case each were found to be due to glucocorticoid cessation and lithium exposure. Of note, the secondary PTCS patients were found to be older than the primary PTCS patients (15.0 vs. 11.6 years). Seventy-nine percent of definite secondary PTCS cases were overweight or obese per US Centers for Disease Control and Prevention guidelines (as compared with a national average of 32%). This differs from previous studies that argue normal-weight children are more likely than

overweight children to have secondary PTCS. When comparing median body mass index Z-scores, the primary and secondary PTCS cases appeared similar, although the authors note the study was not sufficiently powered to assess for statistical significance. It is proposed that in secondary PTCS, known aetiological factors, such as tetracycline antibiotics, may actually serve to incite PTCS in predisposed, overweight children. Weight loss should be advocated in these patients.

Evan Price

A MYSTERY DIAGNOSIS

David WS, Temin ES, Kraeft JJ, Hooper DC. Case records of the Massachusetts General Hospital. Case 3-2015. A 60-year-old woman with abdominal pain, dyspnea, and diplopia. *N Engl J Med* 2015;372:364–372.

The authors report the case of a woman who arrived at the emergency department with diffuse abdominal pain and bulbar symptoms. She reported diplopia, but eye movements were initially normal. On her follow-up examination, she had bilateral ptosis with weakness on eye abduction and elevation. Her head computed tomography (CT) was normal. Her eye movements worsened to the point of complete ptosis and ophthalmoparesis with anisocoria and abnormally shaped pupils. She later developed vocal cord paralysis and required intubation. The authors describe the clinical decision-making that took place in this case, the differential, subsequent studies, and hospital course, and finally reveal the diagnosis of this unusual presentation.

John H. Pula

GIANT CELL ARTERITIS

Smith JH, Swanson JW. Giant cell arteritis. *Headache* 2014;54:1273–1289.

Giant cell arteritis (GCA) is an important cause of headache, visual loss, and even death in older adults. In this extensive review, the authors discuss the history of GCA, its epidemiology, diagnosis, treatment, and prognosis in addition to newer diagnostic modalities (ultrasound, magnetic resonance imaging, and positron emission tomography) that may play a role in directing treatment for biopsy negative cases.

Michael Vaphiades

PALINOPSIA REVAMPED: A SYSTEMIC REVIEW OF THE LITERATURE

Gersztenkorn D, Lee AG. Palinopsia revamped: a systematic review of the literature. *Surv Ophthalmol* 2015;60:1–35.

The authors write a very comprehensive review of palinopsia, which is the persistence or recurrence of a visual image after the stimulus has been removed. They reviewed all the published cases of palinopsia and subdivide it into two clinically relevant categories: illusory palinopsia and hallucinatory palinopsia. They comment on visual snow, epileptic discharges, release phenomena, medications, and illicit drugs in addition to visual trailing, migraine, and light streaking. This is a must read for anyone interested in these disorders.

Michael Vaphiades

VISION LOSS WITH BENDING OVER

Lee MD, Odel JG, Rudich DS, Ritch R, Moster ML. Vision loss with bending over. *Surv Ophthalmol* 2015;60:78–81.

A 66-year-old African American man presented with episodic transient visual loss triggered by bending forward. Gonioscopy revealed a microhyphema causing a “snow globe” effect in the anterior chamber, most likely related to recent bleb manipulation in the affected eye.

Michael Vaphiades

MYCOBACTERIUM W TO TREAT STEROID RESISTANT OPTIC NEURITIS?

Sudhalkar A, Khamar M, Khamar B. Mycobacterium w administration for steroid resistant optic neuritis with long-term follow-up. *Graefes Arch Clin Exp Ophthalmol* 2014;252:1999–2003.

The role of toll-like receptors (TLRs), especially TLR 9, in the pathogenesis of autoimmune disorders such as multiple sclerosis and optic neuritis has been suggested in the literature. A heat-killed extract of Mycobacterium w (Mw) has been approved in India since 1998 to be used as an immunomodulator, and has shown profound immunomodulatory effects in psoriasis. Its components are found to have TLR 9 antagonistic activity and could be useful in the management of TLR-overexpressing diseases, such as sepsis, multiple sclerosis, and optic neuritis. The authors conducted a pilot study in 2012 to examine the therapeutic effect of Mw in the treatment of steroid resistant optic neuritis. In the present report, the authors show the long-term safety and outcomes of the 8 patients receiving Mw treatment in the pilot study, and conclude that Mw appears to be safe in the long term to improve steroid resistant optic neuritis.

An-Guor Wang

CSF PRESSURE AND PERIPAPILLARY RETINAL SHAPE

Sibony P, Kupersmith MJ, Honkanen R, Rohlf FJ, Torab-Parhiz A. Effects of lowering cerebrospinal fluid pressure on the shape of the peripapillary retina in intracranial hypertension. *Invest Ophthalmol Vis Sci* 2014;55:8223–8231.

The authors analyse the deformations of the peripapillary retinal pigment epithelium– basement membrane (ppRPE/BM) layer and correlate it with interventions that lower cerebrospinal fluid (CSF) pressure including lumbar puncture, CSF shunt, and medical treatment. They found the asymmetric anterior deformation of ppRPE/BM layer will move posteriorly and become more V-shaped after each pressure-lowering intervention. The authors conclude that the contour of the ppRPE/BM layer is a dynamic property that changes with CSF pressure-lowering interventions and direct measurements of the ppRPE/BM displacement may provide useful information about intracranial pressure.

An-Guor Wang

EECP FOR NON-ARTERITIC AION

Zhu W, Liao R, Chen Y, Liu L, Zhang Y. Effect of enhanced extracorporeal counterpulsation in patients with non-arteritic anterior ischaemic optic neuropathy. *Graefes Arch Clin Exp Ophthalmol* 2015;253:127–133.

The enhanced extracorporeal counterpulsation (EECP) device is a non-invasive mechanical circulatory support device that could improve venous return and increase blood perfusion to the ischaemic organ. It is consisted of a series of cuffs wrapping around the patient's lower body (leg, thigh, and buttocks) that exerts sequential compression on the lower body during ventricular diastole. It may increase venous return to the heart and elevate

cardiac output, which in turn improves the blood perfusion of ischaemic organs. EECp is currently used as an adjunctive therapy for patients with myocardial ischaemia and ischaemic stroke. The authors applied EECp to 16 patients with unilateral non-arteritic AION (NAION). Twelve 1-hour daily EECp treatment sessions were given for each patient. The authors found that visual acuity and visual field function improve after the EECp treatment.

An-Guor Wang