Ocular manifestations of systemic neurologic disease

Introduction
Ophthalmic findings, particularly abnormalities of the optic nerve and retina, are common features of a number of neurodegenerative disorders. In addition to being a significant cause of disability in affected patients, anterior visual system changes can be a clue to diagnosis.

Multiple sclerosis
Multiple sclerosis (MS) is an inflammatory autoimmune neurodegenerative disorder that affects the brain and spinal cord. Four subgroups of MS are currently recognized: clinically isolated syndrome, relapsing remitting MS, primary progressive MS, secondary progressive MS. Vision loss is an important cause of reduced quality of life in MS and is well established that the anterior visual pathway is affected. Post-mortem studies show optic nerve lesions in 94-99% of patients with MS. For at least 15-20% of individuals with MS, optic neuropathy is the first indicator of the disease (1,2). Vision loss occurs in a highly variable range, from mild to devastating. However, most patients will experience good functional recovery (3).

Optical coherence tomography (OCT) examination can also be useful in detecting anterior visual system changes in patients with MS. OCT is frequently used in the evaluation of the anterior visual system changes. Compared with controls, RNFL thinning with healthy controls, is a unifying finding across studies, although there is variability in the pattern of RNFL loss in patients with MS (4). Compared with controls, RNFL thinning with healthy controls, is a unifying finding across studies, although there is variability in the pattern of RNFL loss in patients with MS (4). It is interesting to note that RNFL thinning is more frequent for inferior and superior RNFL thinning is also a feature of glaucoma, the most common optic neuropathy. It has been reported that the incidence of glaucoma is higher in patients with MS and that if both AD and glaucoma are present in the same individual, there is more rapid progression of optic nerve head damage and corresponding visual field defects. The relationship between glaucoma and AD is not fully understood. In addition to peripapillary RNFL thinning, macular layer thinning has also been reported, with the inner retinal layers (RNFL, ganglion cell layer) being preferentially affected. Although some authors have reported a significant association between RNFL thinning and cognitive dysfunction in patients with AD, OCT assessment is not used extensively in the management of these patients.

Parkinson’s disease
Parkinson’s disease (PD) is a common neurodegenerative disorder. It is characterised by loss of dopamine in the substantia nigra, loss of dopaminergic neurons, and reduced dopamine. Reduced visual acuity, loss of contrast sensitivity and colour vision defects are prevalent in PD. Reduced visual acuity, loss of contrast sensitivity and colour vision defects are prevalent in PD. Dopamine plays an important role in retinal function as the retinal dopaminergic neurons, which modulate cell growth within the retina, provide a complex cellular network and dopamine receptors. However, the results have been highly variable and some investigators found no significant difference between patients and controls. There is not a clear relationship between either peripapillary RNFL thinning and macular findings and PD severity. Alzheimer’s disease
Alzheimer’s disease (AD) is a progressive neurodegenerative disease affecting the brain, and is the most common cause of dementia in the elderly population. Symptom onset is usually after 65 years of age (5). Signs of visual dysfunction, including loss of visual acuity, reduced contrast sensitivity, ocular motility abnormalities, and colour vision defects are common in patients with AD, and complaints related to vision can be reported early in the disease process (6). RNFL loss was first visualised in AD using red free fundus photography. More recently advances in imaging, including scanning laser ophthalmoscopy and, particularly, OCT, have enabled the quantitative analysis of optic nerve and retinal changes. Compared with age-matched controls, individuals with AD have greater cup-to-disc ratio and decreased retinal rim area (7). There is now a large body of literature concerning retinal changes in AD measured with OCT. Peripapillary RNFL thinning with healthy controls, is a unifying finding across studies, although there is variability in the pattern of RNFL loss in patients with AD. The superior and inferior quadrants are most frequently affected (8). It is interesting to note that RNFL thinning is more frequent for inferior and superior RNFL thinning is also a feature of glaucoma, the most common optic neuropathy. It has been reported that the incidence of glaucoma is higher in patients with AD and that if both AD and glaucoma are present in the same individual, there is more rapid progression of optic nerve head damage and corresponding visual field defects. The relationship between glaucoma and AD is not fully understood. In addition to peripapillary RNFL thinning, macular layer thinning has also been reported, with the inner retinal layers (RNFL, ganglion cell layer) being preferentially affected. Although some authors have reported a significant association between RNFL thinning and cognitive dysfunction in patients with AD, OCT assessment is not used extensively in the management of these patients.

References