

THE AMERICAN PARKINSON DISEASE ASSOCIATION, INC.

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EDUCATIONAL SUPPLEMENT #17

Neuro-ophthalmology And Parkinson's Disease

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Neuro-ophthalmology is a medical specialty studying the impact of neurological diseases on vision. A neuro-ophthalmologist is either an ophthalmologist or a neurologist who has additional training and expertise in problems of the eye and nervous system. Neuro-ophthalmologists attempt to bridge the gap between the two disciplines by diagnosing and treating the visual manifestations of a neurological disease.

Parkinson's disease (PD) is a neurological disorder caused by the death of

dopaminergic neurons in the substantia nigra and therefore lowers production of dopamine in the putamen as well as the visual cortex and some cells in the retina. Also it is known that 75% of patients may have oculomotor signs (relating to movements of the eye ball) and most patients will have ophthalmic complaints such as blurred vision, trouble reading, double vision and dry eyes. For these reasons a neuro-ophthalmologist is frequently asked to care for the PD patient.

Eye Movements

There are three fundamental types of eye movements. Saccadic eye movements are the rapid involuntary eye movements that redirect our gaze to pick up an object of interest. They are important in following the lines of a printed page when reading. Secondly, there are the pursuit eye movements which will stabilize (fix) an object on our retina and follow it as it moves slowly through space. Thirdly, the vergence eye movements move the eyes in different directions, either together (convergence) or apart (divergence), keeping the image moving toward or away from our eyes stable on the retina and avoiding double vision.

In PD the saccades tend to be slow (hypometric) and show delayed initiation. Some patients will require a blink to change their saccadic position (this is called Wilson's sign). As you can imagine, this makes it hard to fixate upon changing targets in the environment and to read, as well. Often these problems can normalize with L-dopa, but if one has Levodopa induced dyskinesia, the saccades can become hypermetric (fast).

The pursuit gain becomes decreased causing what is called cog-wheel (jerky) slow-eye movements. Finally, insufficient convergence of the eyes causes eyestrain, headaches and double vision when working on near tasks. It is also common to have some insufficiency of accommodation. The eye response to a near stimulus is accommodation, of which convergence is a

part. This, too, will cause problems with reading and double vision.

External Eye Disease

Eyelid abnormalities are common in Parkinson's disease. The blink reflex, which is normally about 16 to 18 times per minute, may decrease to one to two times per minute. This causes the ocular surface to become dry in a setting of already reduced and abnormal tear film production. The dryness leads to a foreign body sensation, blurred vision, itching and burning. Some suggest that this may contribute to excessive blinking and lid spasms, called benign essential blepharospasm. Others with PD can develop apraxia, which is an inability to open the eyes voluntarily.

As a result of the dysfunction of the autonomic nervous system (the nerves that regulate automatic functions of the body), there is frequently seborrheic blepharitis (eyelid irritation associated with oily facial skin) and dermatitis. There also can be inflammation of the cornea and ocular surface. This exacerbates the symptoms of dry eyes.

Sensory Deficits

There are dopaminergic receptors in the retina, the dysfunction can lead to a loss of contrast sensitivity. There can also be color vision deficits, usually along the blue-yellow axis in Parkinson's disease patients. Others

may hallucinate, possibly due to their medications but also possibly because of age and visual disturbances.

Management

As physicians, we always have to be aware of our patients' medications - their dosages, effects and side effects. This is also true with Parkinson's disease. A good history of medications is paramount. It is important to know how the symptoms are affected by the dosage and by the schedule of medication. For instance, I have patients who need different types of glasses depending upon where they are in their medication cycle.

First and foremost, the management of vision requires an accurate and thorough eye examination and correction of refractive errors. Most of the time, when eye movement abnormalities are found, it is best to prescribe one pair of glasses for distance and another for reading. This is in preference to single bifocal glasses. However, if patients insist on bifocals, then I will recommend a standard "lined" bifocal rather than a progressive bifocal. For those with convergence insufficiency, I will prescribe prisms in their glasses. Prisms help to bend light to the proper focal point on the retina when the eyes cannot move properly to accomplish the same thing. This helps with the ocular fatigue and diplopia often experienced by my patients.

The management of ocular external disease and dry eyes is constant. These conditions cannot be cured. This

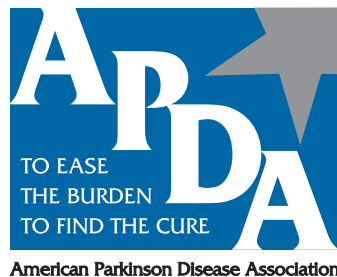
management usually involves warm, moist compresses, hygienic lid scrubs, and at times, medicated ointments. Dry eyes can be treated with artificial tear substitutes in both an eyedrop and ointment form. At times I will perform punctal occlusion (that is, block the drainage opening) because it will increase the contact time of the tears with the ocular surface. All of these techniques can go a long way toward making the eyes look and feel better, as well as, increase a patient's vision.

The Parkinson's disease patients who suffer from blepharospasm may benefit from injections of botulinum toxin (Botox). Although it is usually repeated every three to four months, it can be very helpful in restoring a patient's ability to function. Similarly, those who suffer from apraxia of the eyelid (inability to open) can get lid crutches or cosmetic lid tape to help keep their eyes open. It is difficult to treat the sensory deficits which at times can affect people with PD. Sometimes certain tints for lenses can be helpful, and hallucinations may respond to some central nervous system depressants.

Finally, in addition to everything already discussed, the patient with PD can still get the garden-variety eye diseases. Diseases such as glaucoma, cataracts and macular degeneration must also be properly diagnosed and managed. With the proper attention to the particular problems faced by these patients, as well as their routine eye-care needs, patients with Parkinson's disease and their families can enjoy a fine quality of life.

APDA Note: If you or your health care professional would like to find a neuro-ophthalmologist in your area, you can go to the North American Neuro-Ophthalmology Society (NANOS) website www.nanosweb.org and click of Physician Referral.

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