



AMERICAN PARKINSON DISEASE ASSOCIATION

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EDUCATIONAL SUPPLEMENT 17

Neuro-ophthalmology and Parkinson's Disease

By **Andrew A. Berman, MD**

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 percent 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. First saccadic eye movements are rapid and involuntary 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 the 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). 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 becomes 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 PD. The blink reflex, which is normally about 16 to 18 times per minute, may decrease to one or 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 authorities 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, and dysfunction can lead to a loss of contrast sensitivity. There can also be color vision deficits, usually along the blue-yellow axis in PD patients. Others may hallucinate, possibly due becomes of medications but also possibly because of age and visual disturbances.

Management

Physicians always have to be aware of patients' medications - their dosages, effects and side effects. This is also true with PD. A good history of medications is paramount. It is important to know how the symptoms are affected by the dosage and by the medication. For instance patients may need different types of glasses depending upon where they are in their medication cycle.

First and foremost, vision management 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 a standard "lined" bifocal may be better than a progressive bifocal. For those with convergence insufficiency, there prisms for 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 double vision often experienced by 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 eyedrop and ointment form. At times I will perform punctual occlusion (block in the drainage opening) can 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 increasing a patient's vision.

The PD patients who have from blepharospasm may benefit from injections of botulinum toxin (Botox). Although it is usually repeated every three to four months, it can be helpful in restoring a patient's ability to

function. Similarly, those who have apraxia of the eyelid (inability to open) can get lid crutches or cosmetic lid tape to help keep the 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, the patient with PD can still get garden-variety eye diseases. Glaucoma, cataracts 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 PD 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, go to the North American Neuro-Ophthalmology Society (NANOS) web site www.nanosweb.org and click on Physician Referral.

The information contained in this supplement is solely for the information of the reader. It should not be used for treatment purposes, but rather for discussion with the patient's own physician.

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American Parkinson Disease Association

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