The 4 Most Common Visual Symptoms in Parkinson’s Disease

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What is Vision?

• Vision ≠ Visual Acuity!
• Vision includes:
  – Spatial resolution (visual acuity, “20/20”)
  – Color perception (color vision testing)
  – Peripheral vision (visual field testing)
  – Contrast sensitivity
  – Depth perception and stereopsis
  – Visual tracking
  – Higher level visual processing (synthesizing visual information)
Vision and the Brain

• Large amount of brain devoted to vision
• Most neurologic disease affect visual pathways
• Can affect multiple levels of visual function
Parkinson’s Disease

• Increasing incidence- 31-657/100,000
• Characterized by classic findings:
  – Rest tremor
  – Bradykinesia ("slowing of movement")
  – Freezing phenomenon
  – Rigid posture
  – Loss of postural reflexes and balance
• Visual symptoms common in PD
Other Parkinsonian Disorders

- **Progressive Supranuclear Palsy**
  - Early dementia
  - More prominent eye movement abnormalities
  - Minimal response to Rx
- **Diffuse Lewy Body Disease**
  - More prominent visual hallucinations
  - Dementia more common
  - Sleep disorders
- **Cortical Basal Degeneration**
  - Higher order sensory and motor dysfunction
  - Behavioral changes
- **Multi-system Atrophy**
  - Variable depending upon sub type
  - Gait imbalance, low blood pressure, dementia
PD and Vision

• Most patients with PD have visual dysfunction
• Usually manifest after diagnosis of PD has been made
• Visual dysfunction can compromise quality of life:
  – Reading
  – Driving
  – Navigating environment
• Most symptoms can be addressed by comprehensive ophthalmologist
4 Common Symptoms

- Blurred vision
- Difficulty reading
- Eyelid twitching
- Seeing things that aren’t there (hallucinations)
Ocular surface disease

- **Dry eye:**
  - Occurs in up to 2/3 of PD patients
  - Related to poor tear film quality
  - Reduced blink rate contributes to dry eye and OSD
  - Causes visual blur and may degrade visual acuity by up to 3 lines
  - Tearing frequent accompaniment
  - Often worse toward the end of the day
Normal blink rate = 10-30 closures/minute

Blink rate in PD = 0-5 closures/minute

Results in less even distribution of tear film and increased concentration of ocular surface debris and irritants.
Ocular surface disease

• Blepharitis
  – Occurs in up to 75% of PD patients
  – Partly related to reduced blink rate
  – Typically causes pain and irritation
  – Contributes to visual blur and tearing
Treatment

• Lubrication of eye surface:
  – Artificial tears- OTC- be aggressive!
  – Restasis- reduces inflammation and increases tear production
  – Long acting strips
  – Antibiotics- may reduce overgrowth of bacteria or eyelids
Punctal Occlusion

- Silicone plugs
  - Increase concentration of tears
  - Removable
- Thermal cautery
  - Permanent occlusion of puncta with heat
Difficulty Reading

- Presbyopia
- Downgaze limitation
- Convergence insufficiency
- Processing visual information (alexia)
Reading Fluency

• Dependent upon coordination between afferent (sensory) and efferent (motor) systems

• PD disrupts reading fluency through multiple mechanisms:
  – Abnormal saccades
  – Impaired smooth pursuit
  – Impaired convergence
  – Alexia
Parkinson’s and Eye movements

- Parkinson’s Disease:
  - hypometric saccades, particularly vertically
- Progressive Supranuclear Palsy
  - slow vertical saccades, initially downward; horizontal saccades slow and dysmetric
- Bifocals problematic if downward eye movements limited
- Separate readers/reading platform/iPad or Kindle
Convergence Insufficiency

- Often associated with PD and other Parkinsonian disorders
- Symptoms include eyestrain, diplopia or blurring at near
- Symptoms often start several minutes after beginning to read
- Relief with monocular occlusion
CI- Treatment

- Improve visual acuity (treat presbyopia, remove cataract, etc) to improve fusion
- Convergence exercises (“pencil push-ups”) - rarely helpful in PD
- Prisms for reading glasses
- Surgery (rarely)
Higher Cortical Visual Dysfunction

• Damage to areas of brain involved in visual processing
• Patients may have intact fields and acuity leading to delayed diagnosis
• Often affects routine activities (reading and driving)
Higher Order Visual Loss

- Alexia = inability to read
- Agnosia = difficulty recognizing objects
  - Prosopagnosia = difficulty recognizing faces
  - Object agnosia = absence of object recognition
- Visual-spatial dysfunction
- Balint syndrome
Cortical Visual Dysfunction

• Less common in PD
• More common in:
  – Cortico-Basal Degeneration
  – Diffuse Lewy Body Disease
  – Multi-System Atrophy
• Often unrecognized and undiagnosed
• Can be treated with directed OT and Visual Rehab
Eyelid Twitching

- Blepharospasm
- Apraxia of Eyelid Opening
Blepharospasm

• Frequent contraction of eyelid and peri-ocular muscles
• Usually bilateral, symmetric, and synchronized
• May be mild and minimally bothersome or disabling
• Associated with PD and PSP
Apraxia of Eyelid Opening

• Difficulty voluntarily opening eyelids
• Nearly always bilateral and symmetric
• Can occur with PD and PSP but possibly more common in PSP
Treatment

• Medical treatment
  – Usually unsatisfactory- incomplete and short-lived relief
  – Relax muscles and decrease cholinergic tone
  – Benzodiazepines and Artane in selected patients

• Botox
  – Treatment of choice
  – Complete or nearly complete relief for most
  – Injections need to be repeated

• Orbital myectomy:
  – Last resort
  – May result in exposure and dry eye
Visual hallucinations

• Perception of visual stimulus where none is present ("seeing something that isn’t there")
• Range from complex and formed to simple and unformed
• Wide variety of causes
PD and Visual Hallucinations

• Occur in ~1/3 of PD patients, but ~75% of patient experience hallucinations at some point
• Typically formed: humans, animals, or both
• Usually non-threatening and patient has insight into non-real nature
Medication-related?

• Previously thought to be related to dopaminergic treatment
• However, most studies show that dosage of dopaminergic medications does not predict hallucinations
• More frequent in PD patients with cognitive dysfunction, sleep disturbance, and impaired visual perception
Treatment of Visual Hallucinations

• Assess for secondary causes (stroke, tumor, delirium)
• Re-evaluation primary diagnosis: is this Lewy Body disease, Alzheimer’s, etc?
• Good sleep hygiene
• Medications:
  – Atypical neuroleptics: Clozapine, Seroquel
  – Antidepressants
  – Altering dosage of dopaminergic meds unlikely to help
Summary

• Most visual symptoms in PD can be managed by good ophthalmologist
• Dry eye and ocular surface disease major issues and often overlooked
• Convergence insufficiency an important cause of poor reading fluency
• Blepharospasm common and usually treatable
• Visual hallucinations can be challenging to manage