Thinking, Memory and Parkinson’s Disease

Benzi M. Kluger, MD, MS
Director, Movement Disorders Center
Associate Professor of Neurology and Psychiatry
University of Colorado Denver
“...left the senses and intellect uninjured”-James Parkinson
The Impact of Cognition in Parkinson’s Disease

• Approximately one-third of patients will have cognitive changes at time of diagnosis
• Over 20 years up to 75% of patients may develop dementia
• Dementia is the leading cause of nursing home placement and caregiver distress
• After a cure, many people feel that dementia is our number one research priority
Clarification of Terms

• Normal Aging: age expected changes in thinking and memory, particularly processing speed
• Mild Cognitive Impairment (MCI): cognitive dysfunction greater than expected for age
• Dementia: cognitive dysfunction in multiple domains of sufficient severity to interfere with self-care
Clarification of Terms (cont)

• Dementia with Lewy Bodies (DLB): cognitive impairment within 12 months of symptom onset, may include early visual hallucinations and fluctuations in arousal

• Parkinson’s disease dementia (PDD): cognitive impairment beginning after 12 months of parkinsonism
I HAVE A PHOTOGRAPHIC MEMORY.

IT TAKES AT LEAST AN HOUR TO DEVELOP.
Cognitive Domains

- Memory
- Language
- Attention
- Executive Function
- Visual-Spatial
Classical View of PD
The Lewy Body
The Substantia Nigra
Motor Symptoms of PD

- Tremor
- Stooped posture
- Masklike facies
- Rigidity
- Arms flexed at elbows and wrists
- Hips and knees slightly flexed
- Short shuffling steps
Non-motor Symptoms of PD

- Cognition
- Fatigue
- Depression
- Anxiety
- Pain
- Constipation
- Sleep
- Hallucinations
- Urinary urgency
- Sexual dysfunction
- Sweating
- Compulsive Behaviors
- Skin Cancer
- Osteoporosis
- Visual dysfunction
The evolution of PD

This figure shows how PD progresses from the earliest symptoms (often non-motor symptoms) to diagnosis and start of treatment through to the early and advanced stages of the condition.

**Preclinical PD**
- Olfactory loss
- RBD
- Constipation
- Anxiety
- Depression
- Impaired colour vision

**Early treated PD (stable)**
- Bradykinesia
- Rigidity
- Rest-tremor
  (+/- non-motor symptoms)

**Onset motor symptoms**
- 0 years

**Advanced PD**
- Motor complications
  - Wearing off / Dyskinesias
  - Gait & balance problems
  - Axial deformities
  - Dysarthria / Dysphagia
- Non-motor complications
  - Cognitive decline / Dementia
  - Depression
  - Psychosis
  - Autonomic dysfunction
  - Sleep-awake dysregulation

**5 years**

**10 years**

**15 years**

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Figure 1 - Frontal-striatal connections.

DL: dorsolateral; DM: dorsomedial; VL: ventrolateral; VA: ventroanterior; VM: ventromedial.
MEG/MRI
Current Treatment Options

• Treat other causes of memory loss (e.g. medications, sleep, depression)
• Acetylcholinesterase inhibitors
• Stimulation of other neurotransmitters, e.g. antidepressants and stimulants
• Exercise
Transcranial Magnetic Stimulation
Deep Brain Stimulation