Cognitive and Psychological Changes in Parkinson’s Disease

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Agenda

- Background information on Parkinson’s disease (PD)
- Cognitive changes in PD
- Psychological changes in PD

Parkinson’s disease (PD)

- Chronic, progressive neurodegenerative movement disorder
- Frontal-subcortical dysfunction
- Cardinal symptoms:
  - Resting tremor
  - Bradykinesia
  - Rigidity
Prevalence and incidence

- PD affects 100-200 per 100,000 individuals
- Annual incidence rate is estimated to be 15 per 100,000
- Incidence increases with age
- More common in men

Non-motor symptoms

- Cognitive difficulties
  - PD-Mild Cognitive Impairment (PD-MCI)
  - PD-Dementia (PDD)
- Psychiatric problems
- Sleep disturbance
- Pain
- Sensory disturbance
- Autonomic dysfunction
Potential factors contributing to cognitive dysfunction in PD

- Age
- Cognitive reserve
- Genetics
- Lewy based pathology (Lewy bodies and Lewy neurites)
- Alzheimer's disease pathology
- Vascular disease, cerebral amyloid angiopathy, and hippocampal sclerosis

Cognitive changes in PD

- The most characteristic cognitive deficits in PD are in the domains of
  - Attention/working memory
  - Visuospatial function
  - Memory
  - Executive functions
Attention/working memory

- Attention: focus
- Concentration: prolonged/sustained focus
- Working memory: ability to hold information in mind and manipulate it

- Significant fluctuations in attention are commonly observed in established PDD
- Complex attention deficits
- Working memory is typically impaired

Processing speed

- Speed at which an individual processes information
- Commonly impaired in PD
Language

• Expressive
• Receptive

• Core language functions typically intact
• Hypophonia and dysarthria are common
• Diminished speech output

Visuospatial/constructional function

• Ability to perceive visuospatial material in the environment
• Ability to draw/construct material

• Visuospatial/constructional deficits are usually seen in established PDD
Memory

- Explicit and implicit memory
- Verbal and visual/visuospatial memory
- At the onset of PDD, memory deficits are less severe than those observed in Alzheimer’s disease
- Memory dysfunction in PD usually presents with a pattern of retrieval limitations

Executive functions

- Higher level cognitive functions associated with frontal lobe functioning and frontal subcortical circuitry
- Executive functions are commonly compromised in PDD
- Executive dysfunction may contribute to memory difficulties in PD
PD-Mild Cognitive Impairment

- MCI is common in individuals with PD without dementia
  - Approximately 27% of individuals with PD meet criteria for PD-MCI
- Predicts the development of dementia
- Associated with increasing age, disease duration, and disease severity

Diagnostic criteria for PD-MCI

- Inclusion criteria
  - PD diagnosis
  - Gradual decline in cognitive functioning
  - Cognitive deficits on formal neuropsychological testing or a scale of global cognitive abilities
  - Cognitive deficits are not sufficient to significantly interfere with functional independence
Diagnostic criteria for PD-MCI

• Exclusion criteria
  ◦ Diagnosis of PDD
  ◦ Other primary explanations for cognitive impairment
  ◦ Other PD-associated comorbid conditions that can potentially influence cognitive testing

• Abbreviated assessment
  ◦ Impairment on a scale of global cognitive abilities validated for use in PD
  or
  ◦ Impairment on at least two tests, when a limited battery of neuropsychological tests is performed
Diagnostic criteria for PD-MCI

- Comprehensive assessment
  - Neuropsychological testing that includes two tests from five cognitive domains
  - Impairment on at least two neuropsychological tests
  - Impairment on testing can be defined a few different ways

Subtype classification of PD-MCI

- Clinical profile of PD-MCI is varied
- PD-MCI single-domain
- PD-MCI multiple-domain
- Most common subtype is non-amnestic, single domain impairment
PD-MCI

- Predictors for PDD:
  - Non-amnestic, single domain MCI
  - Executive functioning limitations
  - Visuospatial deficits
  - Language weaknesses
  - Memory limitations

Parkinson’s disease dementia (PDD)

- 50% of individuals with PD develop dementia after 10 years
- More than 80% develop dementia after 20 years
- Mean age at PDD diagnosis is approximately 71.6 years old
Risk factors for PDD

- Age is the greatest risk factor for developing PDD
- Other risk factors include
  - Severity of motor dysfunction
  - Disease duration
  - Facial masking at presentation
  - Past/comorbid depression
  - Male sex
  - Lower education level/SES
  - Cerebrovascular disease
  - Levodopa side effects

Diagnostic Criteria for PDD

- Core features
  - PD diagnosis
  - Dementia syndrome with insidious onset and slow progression, developing within the context of established PD, as evidenced by:
    - Impairment in >1 cognitive domain
    - Decline from premorbid functioning level
    - Functional impairment
Diagnostic Criteria for PDD

- Associated clinical features
  - Cognitive features
    - Impairment in attention, visuospatial functions, memory, executive functions
    - Core language functions largely preserved, though word finding difficulties and deficits comprehending complex sentences may be observed
  - Behavioral features
    - Changes in mood or personality
    - Hallucinations
    - Delusions
    - Apathy
    - Excessive daytime sleepiness
Diagnostic Criteria for PDD

• Features which make PDD diagnosis uncertain or may rule it out
  ▫ Time interval between the development of motor and cognitive symptoms unknown
  ▫ Co-existence of any other abnormality which may independently cause cognitive impairment
  ▫ Delirium

Managing cognitive changes

• Thorough medical and psychiatric workup to explore other potential contributors to cognitive difficulties
• Medication review
• Pharmacological and psychological treatment
• Future planning
• Family support and caregiving resources
Psychological changes

Mood disturbance

- Affective disorders frequently predate onset of motor symptoms
- Depression occurs in 40-50% of individuals with PD; similar rate for anxiety
- Manic and hypomanic symptoms are not well characterized in PD
- Drug-induced or fluctuating mood states may correlated with “on-off” periods
Depression

- Persistent and pervasive low mood
- Reduced enjoyment from previously enjoyable activities
- Decline in interest level
- Significant pessimism
- Negative thinking
- Hopelessness and helplessness
- Guilt
- Tearfulness
- Suicidal ideation

Hallucinations and delusions

- Hallucinations are common in PD
- Hallucinations in non-demented individuals with PD are a strong predictor of subsequent dementia
- Visual hallucinations are approximately twice as common as auditory hallucinations
- Delusions are less common
Apathy

- Rates of apathy have been found to range from 17% in non-demented PD individuals to 54% of individuals with PDD
- Symptoms include deceased spontaneity, loss of motivation, reduced interest, diminished effortful behavior

Impulse Control Disorders (ICDs)

- Dopaminergic medication-related ICDs
- ICDs have been found to have a frequency of approximately 14% in PD
- Behaviors may include
  - Excessive gambling
  - Compulsive shopping
  - Hypersexuality
  - Compulsive eating
  - Overuse of dopaminergic medications
  - Hoarding
  - Impulsive smoking
  - Kleptomania
Managing psychological changes

- Antidepressants
- Psychotherapy (e.g., CBT)
- Exercise
- Sleep hygiene
- Peer support groups
- Caregiver support

References