

# **DEMENTIA**

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Continuing Professional Development  
Friday, February 14th 2020

# objectives

- Define normal cognitive changes with aging
- Define dementia and understand how it differs from normal aging
- Understand the different subtypes of dementia and their unique features
- Understand treatment options

# conflicts of interest

- NONE

# Disclosure

- Relationship with commercial interests:
  - Grants/Research support: none
  - Speakers Bureau / Honoraria: none
  - Consulting Fees: none
  - Other: none

# the aging brain

- Mild decline in memory
- Slower recall of new information
- New learning slower, but still occurs
- Decline does not impair function

- General intellectual functioning
  - Crystallized abilities remain relatively intact
  - Fluid intelligence declines

- Attention

- Sustained attention & vigilance remain relatively unchanged when controlling for reaction time and sensory changes
- Divided attention changes over time
- Pronounced difficulties in attention are not considered a normal part of aging

- Executive function
  - Successful aging appears to produce little impact on “real world” executive functions requiring planning & executing multiple tasks
  - Neuropsych tests show decreased performance on executive tasks



- Different types of memory, but overall healthy older adults don't show major deficits
- Older adults have increased difficulty learning new information compared to young cohorts
- Remote memory & sensory memory remain relatively intact
- Procedural memory appears to be

## • Language

- Language comprehension is generally associated with few age-related impairments
- Language production remains relatively unchanged, but minor repetitions, longer pauses & increased use of vague words has been noted
- “Tip-of-the-tongue” phenomenon related more to difficulties retrieving information than storage

- Visuospatial skills
  - Generally, people become slower at completing visuospatial tasks
  - Confounded by slowing

# dementia

- Major neurocognitive disorder (DSM-V)
- Not a normal part of aging

- Evidence of significant cognitive decline from a **previous level of performance** in one/more cognitive domains (complex attention, executive function, learning & memory, language, perceptual-motor, or social cognition) based on:
  - Concern of the individual, knowledgeable informant or clinician that there has been a significant decline
  - Substantial impairment in cognitive performance, preferably documented by standardized neuropsychological testing
- The cognitive deficits **interfere with independence in everyday activities** (at least requiring assistance with IADLs)
- The cognitive deficits do not occur exclusively in the context of a delirium
- The cognitive deficits are not better explained by another mental disorder

- Dementia - a disorder of cognition that interferes with daily functioning & results in a loss of independence

- Involves cognitive impairment that interferes with daily functioning AND represents a decline from previous functioning or performance
- Cognitive impairment involves >2 domains:
  - Ability to acquire/remember new information
  - Reasoning or complex tasks (judgment)
  - Visuospatial skills
  - Language
  - Personality/behaviour

- Prevalence: 6-8% of people >65 years old have dementia
- Prevalence doubles Q5yrs after age 60
- For the 85+ crowd, nearly 45% or more have dementia



- Protective factors:
  - Definite: ?
  - Possible: NSAIDs, antioxidants, education, physical activity, statins
- Risk factors:
  - Definite: age, FHx, ApoE4 allele, Down syndrome
  - Possible: head trauma, less education, PMHx

- Apolipoprotein E gene
  - Chromosome 19
  - Three alleles: epsilon 2/3/4
    - ApoE4 = risk of AD
    - ApoE2 = protective
    - ApoE3 = neutral
- Other genes (early onset) - amyloid precursor protein (APP), presenilin proteins 1 & 2 (PS1, PS2)

# Sub-types of dementia

- Alzheimer disease
- Vascular dementia
- Dementia with Lewy bodies
- Frontotemporal dementia

# Alzheimer dementia

- Gradual & progressive decline in cognitive function
- Accounts for ~67% of all dementia cases
- Core feature is memory impairment

# Alzheimer dementia

- Difficulty learning & retaining new information with impairment most prominent in short-term memory
- Later stages show impaired ability to access older/distant memories
- Aphasia, apraxia, disorientation, visuospatial, impaired judgment

# Alzheimer dementia

- Progresses over 8-10 years on average
- Imaging: possible global atrophy, small hippocampal volumes

# Vascular dementia

- Accounts for 15-20% of dementia cases
- Classical onset is sudden & stepwise
- Symptoms depend on area of damage
  - Small-vessel ischemic disease involves white-matter damage & subcortical vessel damage

# Vascular dementia

- Apraxia would correlate with anatomical area of damage
- Progression can be halted if no further damage/insult
- Can worsen already present ALD



# Dementia with lewy bodies

- Gradual progression, but faster than ALD
- Must have dementia & one of the following:
  - Recurrent & detailed visual hallucinations
  - Parkinsonian signs
  - Fluctuating changes in alertness or attention

# dementia with lewy bodies

- Other suggestive features:
  - Autonomic dysfunction
  - Sleep disorder
  - Severe neuroleptic sensitivity
  - Psychiatric misidentification syndromes

# Frontotemporal dementia

- Gradual onset, but usually younger population
- Cognitive symptoms: executive dysfunction, decreased inhibition, apathy, aphasia
  - Profound effects on social functioning
  - Memory deficits not as predominant early on

# Frontotemporal dementia

- Behaviour variant - characterized by prominent behaviour issues such as disinhibition, hyperorality, lack of social awareness and impulsivity
- Non-fluent / agrammatic variant PPA - word selection hesitancy, anomia, eventually speech laboured
- Semantic variant PPA - dissolution of meaning or words/objects, object agnosia & prosopagnosia

# Diagnosis

- Clinical Practice Guidelines
  - Recommendations of the 4th Canadian Consensus Conference on the Diagnosis and Treatment of Dementia (CCCDTD4)

- Few key points:
  - Given the presence of brain amyloid in normal people is of uncertain significance, we discourage the use of amyloid imaging in individuals without memory loss, outside the research setting
  - Issue of structural imaging debated at every CCCDTD conference; practical message is that structural imaging is not required in all persons with cognitive impairment; MRI preferable to CT

- **CLINICAL DIAGNOSIS**

# Treatment

- No cure for dementia
- All current FDA-approved medications are symptomatic; none has been shown to halt cognitive & functional decline



- Non-pharmacologic treatments:
  - Supportive therapy
  - Family & caregiver education
  - Environmental modifications

- Cholinesterase Inhibitors
  - Donepezil, rivastigmine, galantamine
  - Modest delay in cognitive decline

- Practical messages from 4th CCCDTD:
  - CIs are recommended for ALD in mild to severe stages of dementia, ALD with a cerebrovascular component, PD dementia, but not for probable vascular dementia
  - Combination of CIs + memantine is logical, but additive benefit has not been conclusively demonstrated

- Adverse side effects:
  - GI upset / anorexia / weight loss
  - Nausea, diarrhea
  - Insomnia
  - Headaches
  - Dizziness, orthostasis
  - Bradycardia

- Memantine
  - N-methyl-d-aspartate antagonist
  - Minimal benefit
  - FDA approved for mod-severe Alzheimer
  - S/E: constipation, dizziness, headache

# question #1

- The diagnosis of dementia / MND requires which of the following:
- A) MMSE < 26/30
- B) Cognitive decline
- C) Cognitive decline & functional decline
- D) Family members saying the patient has changed

# Question #2

- The most common type of dementia diagnosis is:
- A) Alzheimer dementia
- B) Vascular dementia
- C) Mixed dementia

# references

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