Cognitive Evaluation in Primary Care

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Objectives

• Understand the subtypes of dementia, and the DSM-5 categorization of neurocognitive disorders

• Demonstrate when/whom to screen for cognitive impairment

• Discuss the different screening instruments

• Discuss the utility of laboratory and imaging tests in the cognitive evaluation

• Discuss ways to approach evaluation of the cognitively impaired unsafe driver
Dementia is NOT normal aging

• While age is a significant risk factor for developing dementia, dementia is NOT to be considered a “normal” or inevitable part of aging

• There are normal neurologic changes in older adults which are not necessarily pathologic
  • Overall decreases in speed of action potentials, number of neurons, and neurotransmitter levels
  • Levels of acetylcholine and dopamine probably decrease with normal aging
  • Brain volume loss related to neuron loss in cerebellar and cerebrum
  • Lipofuscin, neurofibrillary tangles, and beta-amyloid (“senile plaques”) accumulate
    • Note the presence of these deposits is NOT sufficient for clinically-relevant pathology
Normal cognitive changes

• Normal cognition changes include decreases in processing speed, working memory, ability to learn new things, and attention.
  
  • Working memory is the ability to temporarily hold information in memory while simultaneously manipulating that information
    • Example: mentally calculating a tip at a restaurant
  
  • Vocabulary generally should stay stable (or even improve) with age, though speed of word finding often slows

  • Visuospatial abilities should remain intact

  • Executive function decreases, as mental flexibility and ability for abstract thought diminish
Abnormal cognitive changes

• Abnormal cognition may be noticed by the patient, family/friends, or clinician.

  • Amnestic memory problems (worsening or frequent forgetfulness)
    • Forgetting about conversations or recent events, forgetting appointments or financial obligations

  • Visuospatial problems (difficulty recognizing objects, difficulty interpreting visual stimuli such as maps)

  • Difficulty making plans to accomplish tasks, or difficulty making decisions

  • Personality changes, such as poor judgment, impulsivity, apathy, mood changes

  • Significant word-finding problems
Dementia subtypes

- **Alzheimer’s disease**
  - Most common, 60-80% of dementia cases
  - Classic features include problems with memory and executive function, will eventually progress to loss of speaking, swallowing, ambulating

- **Vascular dementia**
  - 10% of patients with dementia have isolated vascular dementia, otherwise 40% have vascular changes
  - Presentation is heterogenous, but more often tends to include more problems with judgment and decision-making

- **Lewy body dementia**
  - Typically includes visual hallucinations, gait/movement changes (parkinsonism), sleep disturbances
  - May have less memory impairment than Alzheimer’s

- **Frontotemporal dementia**
  - 10% of dementia cases, majority in ages 45-60
  - Patients present with significant personality and behavior changes (often loss of inhibition), problems with language

- **Mixed dementia**
  - It is very common to have features of more than one, often with vascular changes

- **Other causes**
  - HIV, normal pressure hydrocephalus, prion disease, Huntington’s disease, alcohol/substance/medication-related dementia, Parkinson’s dementia
Prevalence of Alzheimer’s disease

- Starting at age 65, the risk of developing Alzheimer’s disease doubles every 5 years
  - At age 85 years and older, 25-50% of people will exhibit signs of Alzheimer's disease

Neurocognitive disorders

- DSM-5 simply differentiates between **mild neurocognitive disorder** and **major neurocognitive disorder**

- Ultimately the ability to differentiate dementia subtype may have little to no impact on treatment
Major Neurocognitive Disorder (DSM-5)

- Significant decline in one or more domains:
  - Learning and memory
  - Language
  - Executive function
  - Complex attention
  - Perceptual-motor
  - Social cognition
- Deficits interfere with instrumental activities of daily living (IADLs)
- Not explained by delirium
- Not explained by another mental disorder
Minor Neurocognitive Disorder (DSM-5)

• *Modest* decline in one or more domains:
  • Learning and memory
  • Language
  • Executive function
  • Complex attention
  • Perceptual-motor
  • Social cognition

• **Deficits do NOT significantly interfere with instrumental activities of daily living (IADLs), but they do require more time and effort**

• Not explained by delirium
• Not explained by another mental disorder
Population screening for cognitive impairment

- USPSTF currently finds insufficient evidence to balance the benefits/harms of screening all elderly adults for cognitive impairment (grade I)
  - A good screening test generally needs to have a good potential treatment
Evaluating cognition at Medicare visits

• Medicare does NOT include cognitive evaluation in the Initial Preventative Physical Examination (the “welcome to Medicare physical”) within the first 12 months of enrolling in Medicare

• Medicare DOES require cognitive evaluation during first annual wellness visit and subsequent annual wellness visits
Who should be evaluated?

• Patients with subjective memory complaint, family concern, or concern based on your history and examination should be screened for cognitive impairment

• Remember the abnormal cognitive changes
  • Amnestic memory problems
  • Visuospatial problems
  • Difficulty making plans to accomplish tasks, or difficulty making decisions
  • Personality changes, such as poor judgment, impulsivity, apathy, mood changes
  • Significant word-finding problems
Screening instruments

• Mini-Cog

• Folstein Mini-Mental Status Exam (MMSE)

• Montreal Cognitive Assessment (MoCA)

• There are many other instruments, such as the St. Louis Mental Status Exam (SLUMS), which will not be covered in this lecture
## Screening instruments

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<th>Instrument</th>
<th>Components</th>
<th>Benefits</th>
<th>Drawbacks</th>
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<tr>
<td>Mini-Cog</td>
<td>3-word recall</td>
<td>- Quick to administer</td>
<td>- Not very comprehensive</td>
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<td></td>
<td>Clock-draw test</td>
<td></td>
<td>- Only 76% sensitivity</td>
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<tr>
<td>Folstein Mini-Mental Status Exam (MMSE)</td>
<td>30-point scale</td>
<td>- High specificity for dementia</td>
<td>- Low sensitivity for mild cognitive impairment</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Technically under copyright</td>
</tr>
<tr>
<td>Montreal Cognitive Assessment (MoCA)</td>
<td>30-point scale</td>
<td>- High sensitivity for mild cognitive impairment</td>
<td>- Generally takes 10 minutes to administer</td>
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Mini-Cog screening

• 3 word recall
  • I typically use the words “penny”, “apple”, and “table”

• Clock draw test
  • Drawing a clock is complicated, and requires executive function and visuospatial reasoning

• Mini-Cog has been found by one study to have 76% sensitivity and 89% specificity for dementia screening
  • Though a 2015 Cochrane Review noted a need to compare the Mini-Cog to other screening instruments to fully determine accuracy of the test
Mini-Cog Scoring Algorithm

(Reproduced from Borson et al., 2000, with permission from John Wiley & Sons Ltd.)
<table>
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<th>Example 1</th>
<th>Example 2</th>
<th>Example 3</th>
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<td>Baseline</td>
<td>6 Months</td>
<td>12 Months</td>
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(Reproduced from Shulman, 2000, with permission from John Wiley & Sons Ltd.)
Draw CLOCK (Ten past eleven)  
(3 points)
Folstein Mini-Mental Status Examination (MMSE)

- Commonly used screening test

- Tests orientation, attention, 3-word recall, language, and praxis

- 86% sensitivity and 81% specificity for detecting dementia
Montreal Cognitive Assessment (MoCA)

- Initially designed for mild cognitive impairment
- Evaluates multiple domains of function
  - Does NOT cover social cognition
- Excellent sensitivity: Alzheimer’s disease 100% sensitivity, and mild cognitive impairment 90% sensitivity
- Specificity of 87% compared to 100% by MMSE
- Test-retest reliability and internal consistency
- If concern for mild cognitive impairment use MoCA
- Has been validated by several studies from different cultures
  - Multiple languages available
Score Interpretation

- Normal cognitive function ≥ 26
- Mild cognitive impairment mean=22
- Alzheimer’s type dementia mean=16
Further evaluation

• Once a cognitive problem has been identified, further laboratory and/or imaging tests may be warranted
Laboratory testing

• CBC
  • If signs of macrocytic anemia, evaluate folate and B12

• BMP
  • Diuretics and SSRIs can lead to decreased serum sodium
  • Calcium abnormalities can affect cognition
  • Diabetes likely contributes to cognitive decline

• TSH with reflex free T4

• Vitamin B12
  • Serum homocysteine and methylmalonic acid levels may be more accurate

• Syphilis testing (RPR or IgG) and HIV testing can be performed if risk factors are present
Tests you probably likely don’t need to order

• EEG

• Genetic testing
  • Consider referral to a genetic counselor if patient is diagnosed at a young age with Alzheimer’s disease and has numerous family members with Alzheimer’s disease

• CSF analysis
  • Can be useful for rapidly progressing symptoms, if you suspect prion disease
  • There is no utility in Alzheimer’s disease
Neuroimaging

• Every patient with cognitive changes probably does NOT require neuroimaging
  • There is controversy regarding this
    • American Academy of Neurology and American College of Radiology recommend routine structural neuroimaging
    • A 2002 review in *Lancet* found imaging only found a reversible cause in 1% of patients

• Consider neuroimaging if:
  • Onset of symptoms <65 years of age
  • Sudden or rapid onset of symptoms
  • Evidence of focal/asymmetric neurologic deficit
    • New onset seizures
    • Signs of intracranial pressure (papilledema)
  • Clinical findings concerning for normal pressure hydrocephalus (NPH)
    • Accompanying incontinence and gait abnormalities ("wacky, wet, wobbly")
  • Recent head trauma or fall
    • Non-contrast CT can assess for brain bleeds such as subdural hematoma
Neuroimaging

• **Consider:**
  - MRI brain w/o contrast
    • Useful to assess for parenchymal volume loss, chronic ischemic changes, NPH, masses, etc.
  - CT head w/o contrast
    • Useful to assess for bleeding (subdural hematoma)
    • Can be beneficial if patient is claustrophobic or otherwise cannot tolerate MRI

• **Defer to specialist:**
  - FDG-PET/CT
    • Can potentially help to differentiate type of dementia
  - Amyloid PET
    • Can be potentially useful in cases of atypical presentation, or in patients with early onset age <65 years

• **Generally unnecessary:**
  - fMRI brain
    • Primarily used in research
Other things to consider

• Inappropriate medication use can contribute to or worsen cognitive problems in older adults
  • Benzodiazepines
  • Opioids
  • Anticholinergic medications

• Obstructive sleep apnea (OSA) can contribute to cognitive problems
  • Consider polysomnogram if clinical features of OSA are present

• “Pseudodementia” caused by untreated depression

• Substance abuse, such as alcoholism
Psychological assessment

• Depression screening – USPSTF, January 2016
  • Recommends annual depression screening (Grade B)

• The Geriatric Depression Scale (GDS) is a validated depression screening questionnaire which is intended for use in older adults
  • Can also use the PHQ-2 or PHQ-9
Patient Health Questionnaire-2 (PHQ-2)

Scored 0-6

Score of 3 (with 7% prevalence of MDD) yields 83% sensitivity and 90% specificity for MDD

If positive, proceed to PHQ-9 or Geriatric Depression Scale (GDS)
Patient Health Questionnaire-9

- Scored 0-27
- PHQ-9 score ≥10 has a sensitivity of 88% and a specificity of 88% for major depression
Geriatric Depression Scale (GDS)

MOOD SCALE (short form)

Choose the best answer for how you have felt over the past week:
1. Are you basically satisfied with your life? YES / NO
2. Have you dropped many of your activities and interests? YES / NO
3. Do you feel that your life is empty? YES / NO
4. Do you often get bored? YES / NO
5. Are you in good spirits most of the time? YES / NO
6. Are you afraid that something bad is going to happen to you? YES / NO
7. Do you feel happy most of the time? YES / NO
8. Do you often feel helpless? YES / NO
9. Do you prefer to stay at home, rather than going out and doing new things? YES / NO
10. Do you feel you have more problems with memory than most? YES / NO
11. Do you think it is wonderful to be alive now? YES / NO
12. Do you feel pretty worthless the way you are now? YES / NO
13. Do you feel full of energy? YES / NO
14. Do you feel that your situation is hopeless? YES / NO
15. Do you think that most people are better off than you are? YES / NO

- **Scoring:**
  - A score > 5 points is suggestive of depression and should warrant a follow-up interview
  - Scores > 10 are very likely to be depression

- Unlike PHQ-9, GDS doesn’t rely on somatic symptoms which can be related to other common comorbidities in older adults
Substance use

• Alcohol misuse screening
  • The American Geriatric Society recommends annual screening using the Alcohol Use Disorders Identification Test (AUDIT) in all adults ages 65 and older
    • http://auditscreen.org
  • Moderate alcohol consumption can be defined as 1 or fewer drinks per day in adults ages 65 and older
When to refer

• **Neurology**
  • Consider if diagnosis remains unclear, or if there is comorbid movement disorder or other confounding neurologic findings in addition to cognitive concerns

• **Psychiatry**
  • Consider if there are significant mood or behavioral disturbances in addition to cognitive concerns

• **Neuropsychology**
  • Consider if you need further diagnostic clarity or formal determination of deficits
    • Neuropsychologist can often estimate of the patient’s abilities to care for self, drive a vehicle, or manage their finances, given severity of cognitive deficits
    • Series of tests examining intelligence, attention, language, memory and learning, motor control, visual-spatial reasoning, social functioning, executive function, and behavior
    • Generally takes around 4 hours to complete
Driving assessment

• Driving is a complicated task with numerous physical and cognitive requirements

• Ability to drive is very important for a patient to maintain independence

• Driving may eventually become unsafe even in patients without cognitive impairment, due to normal physiologic changes of aging
Driving assessment

• Driving can be evaluated by asking about recent traffic violations, vehicular collisions, or “close calls” within the past 6-12 months
  • New scratches/dents on the vehicle

• Ask both patient and family member(s) for their perception of the patient’s driving capabilities
  • Ask family member about risky left turns, hitting curbs, failing to observe traffic signs, riding the brakes, driving at inappropriate speed getting lost (particularly while traveling to familiar places), requiring a “co-pilot”
Driving assessment

• There are also questionnaires available to help discern on-the-road safety

• If indicated, referral can be made to the local DOT/DMV for on-road driving assessment

• Some specific occupational therapists can formally evaluate ability to drive
  • St. Luke’s Rehabilitation in Cedar Rapids has a driving program: https://www.stlukesonline.org/health-services/specialties/programs/driving-program
Dementia and unsafe driving

• Some patients with dementia who are unsafe drivers will not want to stop driving

• The clinician’s role in this case is to facilitate the conversation about retiring from driving

• Discuss ways that family/friends, community transportation, or taxi service can help to facilitate transportation for the patient

• Consider a written “DO NOT DRIVE” prescription

• Consider having family disable or limit access to the vehicle
Questions?
Resources for clinicians

• AAFP tools for cognitive evaluation

• Montreal Cognitive Assessment
  • http://www.mocatest.org/

• 2018 Alzheimer’s disease facts and figures
  • https://www.alz.org/facts/overview.asp

• Dementia and driving safety
  • https://www.alz.org/care/alzheimers-dementia-and-driving.asp
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