Early Presymptomatic Screening for Dementia

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12th Annual Internal Medicine Conference
Boca Raton
March 29, 2015
Disclosures

- Pfizer, Inc. and Janssen Alzheimer Immunotherapy: Chair DMC
- Roche, Inc.: Consultant
- Merck, Inc.: Consultant
- Genentech, Inc.: Consultant
- Funding
  - National Institute on Aging:
    - U01 AG006786
    - P50 AG016574
    - R01 AG011378
    - R01 AG041581
    - U01 AG024904
Outline

• Cognitive continuum

• Gerontological Society of America

• Minnesota ACT on AD screening

• Prediction model
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Alzheimer’s Disease Spectrum

Preclinical AD

MCI Due to AD

Dementia Due to AD
Hypothetical Model of Dynamic Biomarkers of the Alzheimer’s Pathological Cascade

Normal Biomarker magnitude

Abnormal

Aβ
Tau-mediated neuronal injury and dysfunction
Brain structure
Memory
Clinical function

Clinical disease stage:
Cognitively normal
MCI
Dementia

Jack et al: Lancet Neurol 2010
Biomarkers for AD

• Early biomarkers
  Amyloid deposition
    PET imaging
    CSF amyloid

• Later biomarkers
  Neurodegeneration
    Structural MRI
    FDG PET
    CSF tau/PET tau
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Medicare Annual Wellness Visit as Springboard to Detection of Cognitive Impairment, Diagnosis, and Post-Diagnosis Support

Developed by The Gerontological Society of America with support from the Eli Lilly and Company
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GSA Workgroup Charge

- Summarize efforts currently underway by national governmental and related organizations to identify evidence-based assessment tools for detecting cognitive impairment.
- Propose how the Medicare Annual Wellness Visit (AWV) can be used as a springboard for more widespread use of evidence-based cognitive assessment tools by primary care providers (PCPs).
Medicare AWV as Springboard

- Established by the Patient Protection and Affordable Care Act of 2010.
- All Medicare beneficiaries are entitled to annual wellness visits where “detection of any cognitive impairment” is a mandated component.
- Opportunity to increase the use of evidence-based cognitive assessment tools to fulfill this mandate on a universal basis.
- No specific evidence-based assessment tools were mandated; as part of its charge, the GSA Workgroup reviewed other efforts to identify such tools.
Flow Diagram to Promote Cognitive Impairment Detection and Earlier Diagnosis of Dementia*

STEP 1**
If AWV, PCP learns or inquires about memory or cognitive complaints, or observes clinical signs and symptoms

STEP 2**
For symptomatic beneficiaries, PCP uses an evidence-based assessment tool to detect cognitive impairment

STEP 3
For beneficiaries with cognitive impairment, PCP rules out reversible causes; conducts or refers beneficiary for full diagnostic evaluation

STEP 4
Upon making diagnosis, PCP or specialist develops a care plan and refers beneficiary and family to community resources and clinical trials

Desired Outcomes
Beneficiary and family-specific health-related outcomes

*4-Step Process—STEP 1: **Kickstart** cognition conversation; STEP 2: **Assess** if symptomatic; STEP 3: **Evaluate** with full diagnostic workup if cognitive impairment detected; STEP 4: **Refer** to community resources and clinical trials.

**STEP 1 and STEP 2 represent the GSA Workgroup's original charge.
Candidate Assessment Tools Identified by GSA Workgroup

For Step 2, evidence-based cognitive impairment detection assessment tools, based on review of NIA internal working group and Alzheimer’s Association Workgroup findings:

<table>
<thead>
<tr>
<th>Tool</th>
<th>NIA Working Group</th>
<th>Alzheimer’s Association Workgroup</th>
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</thead>
<tbody>
<tr>
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<td>X</td>
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<tr>
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<tr>
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<td>Mini-Cog</td>
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## Screening Instruments

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Detection vs Diagnosis

• For **Step 3**, GSA Workgroup report noted:
  – PCPs should rule out reversible causes of cognitive impairment per published clinical practice guidelines
  – Important distinction between detecting cognitive impairment and arriving at accurate diagnosis
  – PCPs should refer patients with detected cognitive impairment to qualified specialists for full diagnostic workup.
Bottom Line:

Detection, Diagnosis, and Documentation of Cognitive Impairment and Dementia are essential for appropriate medical care, appropriate home and community-based services, and desired outcomes for people with dementia and their families.
Outline

• Cognitive continuum

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• Minnesota ACT on AD screening

• Prediction model
ACT on Alzheimer’s Disease

- Minnesota Alzheimer’s Work Group
- Minnesota State Plan for Alzheimer’s Disease released 2011
  - Plan but no funding
- ACT on AD founded to execute plan
Tools and Resources

**Dementia Capable Communities Toolkit**
This four-phase process guides a community in becoming dementia friendly. View videos of toolkit action steps at: http://www.youtube.com/ACTonALZ
**User:** Community leaders, organizations, and individuals

**Clinical Provider Practice Tool**
This easy-to-use tool gives physicians a streamlined protocol for managing cognitive impairment and guiding decisions for screening, diagnosis, and disease management.
**User:** Health care settings

**Electronic Medical Record Decision Support Tool**
This template with how-to guide helps clinicians implement within the health record a standardized approach to dementia care, including screening, diagnosis, and treatment/management.
**User:** Health care settings

**Managing Dementia Across the Continuum**
This tool includes a protocol for treating, managing and supporting persons with dementia beyond the early stages of the disease.
**User:** Medical and nursing directors in older adult settings and other professionals involved in dementia care
ACT Tools

After a Diagnosis
This resource has action steps, tips, and resources for persons diagnosed with Alzheimer’s and their caregivers and is a helpful resource to share and discuss after a diagnosis is made.
User: Health care and community-based providers serving persons with the disease and caregivers

Dementia Trainings for Direct Care Staff
This comprehensive list of dementia training resources provides options for organizations seeking best practices in preparing their direct care staff.
User: Dementia care settings

Dementia Curriculum
A 10-module dementia curriculum – including disease description and diagnosis, demographics, cognitive assessment, and societal impact – that can be used alone or with other education offerings.
User: Educators, practicing professionals, and health care students

Care Coordination and Community-Based Provider Practice Tool
This tool helps ensure that a care plan is guided by the goals, needs and preferences of the person with Alzheimer’s, thereby fostering support for the person and care partners.
User: Health care settings and community-based provider settings
Clinical Provider Practice Tool

• Best practice workflow for:
  1. Screening
  2. Dementia work-up
  3. Treatment / care

www.actonalz.org/provider-practice-tools
Annual Exam

Mini Screen

Tools

Mini-Cog or GPCOG AND
Family Questionnaire (if family available)

Normal

Follow up in 1 year

IF

Mini-Cog <4 or GPCOG <9
OR
Family Questionnaire >2

Cognitive Assessment

(same day or new visit)
+ include family

Normal

Follow up in 1 year

IF

Score falls outside of normal range

SLUMS = 27-30 (HS education)
MoCA = 26-30 (HS education)
Kokmen STMS = 29-30
MMSE/MMSE-2 = 27-30

Family Questionnaire <3

Option 1

Do complete dementia workup
(see provider checklist)

Option 2

Refer to: Champion in your practice,
neurologist, neuropsychologist*
Cognitive Screening Flow Chart

**Annual Exam**
- Mini Screen

**Tools**
- Mini-Cog or GPCOG AND Family Questionnaire (if family available)

**IF**
- Mini-Cog < 4 or GPCOG < 9
- Family Questionnaire > 2

**Normal**
- Follow up in 1 year
Cognitive Impairment Identification Flow Chart

Cognitive Assessment
(same day or new visit)
+ include family

Tools
One of the following: SLUMS, MoCA, Kokmen STMS, MMSE-2 or MMSE AND Family Questionnaire

IF

Normal

Follow up in 1 year

Score falls outside of normal range

SLUMS = 27–30 (HS education)
MoCA = 26–30 (HS education)
Kokmen STMS = 29–30
MMSE/MMSE-2 = 27–30
Family Questionnaire < 3

Option 1
Do complete dementia workup
(see provider checklist)

Option 2
Refer to: Champion in your practice, neurologist, neuropsychologist*

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Dementia Work-Up

Provider Checklist
Dementia Work-Up

Follow these diagnostic guidelines in response to patient failure on cognitive screening (e.g., Mini-Cog) or other signs of possible cognitive impairment.

History and Physical

- Review onset, course, and nature of memory and cognitive deficits (Alzheimer's Association Family Questionnaire may assist) and any associated behavioral, medical or psychosocial issues
- Assess ADLs and IADLs, including driving and possible medication and financial mismanagement
- Conduct structured mental status exam (e.g., MoCA, SLUMS, MMSE)
- Assess mental health (consider depression, anxiety, chemical dependency)
- Perform neurological exam focusing on focal/lateralizing signs, vision, including visual fields, and extraocular movements, hearing, speech, gait, coordination, and evidence of involuntary or impaired movements

Diagnostics

Lab Tests
- Routine: CBC, lyes, BUN, Cr, Ca, LFTs, glucose
- Dementia screening labs: TSH, B12
- Contingent labs (per patient history): RPR or MHA-TP, HIV, heavy metals

Neuroimaging
- CT or MRI when clinically indicated

Neuropsychological Testing
- Indicated in cases of early or mild symptom presentation, for differential diagnosis, determination of nature and severity of cognitive functioning, and/or development of appropriate treatment plan
- Typically maximally beneficial in the following score ranges: MoCA 19-27; SLUMS 18-27; MMSE 18-28
Diagnosis*

Mild Cognitive Impairment
- Mild deficit in one cognitive function: memory, executive, visuospatial, language, attention
- Intact ADLs and IADLs; does not meet criteria for dementia

Alzheimer's Disease
- Most common type of dementia (60–80% of cases)
- Memory loss, confusion, disorientation, dysnomia, impaired judgment/behavior, apathy/depression

Dementia With Lewy Bodies/Parkinson's Dementia
- Second most common type of dementia (up to 30% of cases)
- Hallmark symptoms include visual hallucinations, REM sleep disorder, parkinsonism, and significant fluctuations in cognition

Frontotemporal Dementia
- Third most common type of dementia primarily affecting individuals in their 50s and 60s
- EITHER marked changes in behavior/personality OR language variant (difficulty with speech production or loss of word meaning)

Vascular Dementia
- Relatively rare in pure form (6-10% of cases)
- Symptoms often overlap with those of AD; frequently there is relative sparing of recognition memory

* The latest DSM-5 manual uses the term “Major Neurocognitive Disorder” for dementia and “Mild Neurocognitive Disorder” for mild cognitive impairment. This ACT on Alzheimer's resource uses the more familiar terminology, as the new terms have yet to be universally adopted.

Follow Up Visit

- Include family members, friends, or other care partners
- Review intervention checklist for Alzheimer's disease and related dementias
- Refer to Alzheimer's Association Minnesota-North Dakota 24/7 Helpline at 1-800-272-3900 and/or the Senior LinkAge Line® at 1-800-333-2433
Care and Treatment

INTERVENTION CHECKLIST
For Alzheimer’s Disease and Related Dementias

Diagnostic Uncertainty & Behavior Management
- Refer to Specialist as Needed
  - Neurologist (dementia focus, if possible)
  - Geriatric Psychiatrist
  - Geriatrician
  - Memory Disorders Clinic

Counseling, Education, Support & Planning
- Link to Community Resources
  - Contact the Alzheimer’s Association Minnesota-North Dakota 24/7 Helpline at 1-800-272-3900 or the Senior LinkAge Line® at 1-800-333-2433
  - Provide After a Diagnosis³
  - Provide Taking Action Workbook⁷

Stimulation / Activity / Maximizing Function
- Daily Mental, Physical and Social Activity
  - Provide Living Well Workbook⁶
  - Adult day services
  - Sensory aids (hearing aids, pocket talker, glasses, etc.)
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Predicting the risk of mild cognitive impairment in the Mayo Clinic Study of Aging

Pankratz, Roberts, Mielke, Knopman, Jack, Geda, Rocca, Petersen

Neurology® 2015;84:1-10
Predicting MCI

Objective

To develop risk scores for the progression from cognitively normal (CN) to mild cognitive impairment (MCI) in the community setting
Mayo Clinic Study of Aging

- Population-based study of 50-89 y/o’s at enrollment
- Randomly sampled, equal sex distribution
- CN or MCI at enrollment
- > 5000 enrolled; ~ 3000 active
- CN:MCI ~ 3:1
Predicting Risk of MCI

- N = 1449 CN participants (70-89 y/o)
- 401 developed MCI
- Median duration of f/u 4.8 years
- 3 stage model developed
Predicting Risk of MCI

• Premises:
  • Biomarkers for AD very useful, but…
    • Expensive
    • Invasive
    • Not practical for public health purposes

• Can we develop a tool to help stratify risk of developing cognitive impairment?
Prediction Models

1. Basic model
   • EMR

2. Augmented model
   • In office evaluations
     • Mental status
     • Psychiatric inventory
     • Gait speed

3. ApoE
Elements in Basic Prediction Model

- Education
- Subjective concern
- Marital status
- Alcohol problem
- Stroke
- Diabetes mellitus
- Number of medications
Elements in Augmented Model

- Slow gait
- Anxiety
- Depression
- Mental Status
- FAQ
- CDR SB
- Hachinski
Three Models by Sex

Pankratz et al: Neurology 84:1, 2015
Basic Model

Pankratz et al: Neurology 84:1, 2015
Augmented Model

Women – MCI-free survival, %

Age, years

Men – MCI-free survival, %

Age, years

Pankratz et al: Neurology 84:1, 2015
Conclusions

• Patients can be stratified by risk in the Primary Care Setting
• Prediction can be enhanced by adding minimal exam data to EMR data
• ApoE may add some
• Allocation of further evaluations, eg, biomarkers, can be done on a rational basis
Further Thoughts

• Much activity in the PCP space
• Algorithms being developed
• Many commonalities
• Validation needed against ??
• Goal is improved detection and care of patients with cognitive disorders