Diagnosing Dementia in Long Term Care Facilities

37th Annual Meeting - CALTCM

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David Geffen School of Medicine at UCLA
VA Greater Los Angeles Healthcare System
True or False!

- Over 75% of nursing home residents meet MDS-based criteria for dementia.
- MDS 3.0 utilizes direct mental state assessment as part of cognitive assessment.
- A delirium assessment is one component of establishing a dementia diagnosis.
Overview

- Dementia prevalence
- Consequences of Cognitive Impairment
- Practical approaches to diagnosis
- MDS 3.0 - Brief Interview of Mental Status (BIMS)
- Diagnostic Conundrums
- Management Issues
Dementia Ascertainment

- Many nursing home residents have cognitive impairment
- Variety of etiologies:
  - Comorbid conditions
  - Medications
  - Dementia-related illness
- Limited data on prevalence due to:
  - Lack of reliable methods (observational approaches)
  - Lack of valid ascertainment in diverse populations
- Prevalence estimates: 25% to 74%
Prevalence - one study*

- 2285 new admissions - 59 Maryland NHs
- Interviews with residents, staff, significant others
- Medical records including MDS evaluations
- Applied DSM-III-R criteria (expert panel)
- Within-rater kappa: 0.77; agreement 83%
- 48.2% given diagnosis of dementia
  - 20.3% indeterminate (e.g., missing data, delirium or other confounders)

Adverse Consequences

- 73% dependent in toileting, transfers, continence, and feeding versus 21% for others (non-demented, indeterminate)
- Advanced dementia continues to be treated with antipsychotic medications without clear indication
- Prediction of 6-month survival remains relatively poor (AUROC: 67-68%)

Practical Approaches to Diagnosis

- DSM-IV Criteria
- Screening
- Observation (subjective) versus Objective Assessment
DSM-IV Dementia Diagnosis

- An acquired impairment in multiple areas of intellectual function: memory + (language, praxis, object recognition, or executive function)
- Interferes with either occupational or social functioning or interpersonal relationships and represents a decline
- Is not secondary to delirium
Screening

- A basic tenet of geriatric assessment and nursing home care
- USPHTF conclusions about primary care do not apply
- 50% pre-test probability
- Prevalence of related symptoms moves us past the screening debate
- Creates greater risk for false attribution
Subjective versus Objective Assessment

- Prior MDS 2.0 assessment was observational (subjective)
- Observational items included in MDS derived cognitive scales (Cognitive Performance Scale (CPS); MDS Cogs)
- Correlation between facility-originated scales and Mini-Mental State Exam scores: $r = .65-.75$
- CPS requires complex calculation
- MDS Cogs may over-estimate level of severity
Rationale for Specific Cognitive Changes

- **New cognitive items:**
  - Directly test domains common to most cognitive tests in other settings – working memory, temporal orientation, recall
    - Partial credit for close answers & response to prompts increases population-based relevance
    - Similar to those used in other well-known brief screeners
  - Direct measurement of cognitive function improves accuracy and is feasible in long-term care setting
Cognitive Performance Scale (CPS)

- MDS items completed during routine MDS assessments by staff who knew residents and typically perform assessments
- Items include:
  - Whether resident is comatose (excluded)
  - Intact short-term memory
  - Cognitive skills for daily decision-making
  - Understood by others
  - Independence in eating
- Hierarchical scoring system: 0 = “intact”; 6 = “very severe impairment”
## BI MS Test Details

<table>
<thead>
<tr>
<th>Task</th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>Repeat 3 words</td>
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<td>Give category cues (for use later)</td>
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<td>Current year if correct</td>
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</tr>
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<td>If incorrect but within - 1 year</td>
<td>(2)</td>
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<tr>
<td>Total Score</td>
<td>15</td>
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</table>
Pilot Results

- 374 of 417 residents approached (89.7%) completed both the 3MS and BIMS-R
- 212 residents also received a facility nurse-administered BIMS (BIMS-N)
- Mean age: 74 yrs; SD: 11.7; Range: 37-99
- 19.0% were 85 years and older (n=71)
- 214 at least high school educated (25% missing data)
- 213 (68.7%) White/ Caucasian
Instrument Development

Receiver Operator Characteristic Curves (ROC)

BIMS Versus CPS for Identifying Any Impairment (3MS<78)

BIMS ROC area: 0.86
CPS ROC area: 0.77
Instrument Development

Receiver Operator Characteristic Curves (ROC)

BIMS Versus CPS for Identifying Severe Impairment (3MS<48)

BIMS ROC area: 0.94  CPS ROC area: 0.85
MDS 3.0 Cognitive Assessment
National Validation

**Brief Interview for Mental Status (BIMS)**
New structured test replaces staff assessment for residents who can be understood

**Staff Assessment for Mental Status**
Only completed for residents who cannot complete interview

**Modified Mini-Mental State Exam (3MS)**
Gold standard measure, an expanded version of the Mini-Mental State exam (MMSE) range: 0-100
BI MS Validation Test

- One gold standard nurse administered BI MS
- The other administered the 3MS
- Conducted independently within 24 hours of each other
  - Order and assessor switched for ½ the sample
- MDS 2.0 collected per facility protocols on entire validation sample in same time frame
- 85% were able to complete the BI MS
# Validation Sample

## Age Distribution for Validation Sample

<table>
<thead>
<tr>
<th>Age</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;65</td>
<td>15</td>
</tr>
<tr>
<td>65-84</td>
<td>43</td>
</tr>
<tr>
<td>≥85</td>
<td>42</td>
</tr>
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# Validation Sample

**3MS (Gold Standard Measure) Distribution**

<table>
<thead>
<tr>
<th>3MS Groups</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>Intact/ Mild (78-100)</td>
<td>43</td>
</tr>
<tr>
<td>Moderate impairment (77-48)</td>
<td>30</td>
</tr>
<tr>
<td>Severe impairment (&lt;48)</td>
<td>26</td>
</tr>
</tbody>
</table>
Time to Complete BIMS

- From Validation Interviews
  - Most common time
    - 2 Min
  - Average time
    - 4 Min
## How Well Does BIMS Versus CPS Detect Impairment?

<table>
<thead>
<tr>
<th>Predicting Any Cognitive Impairment (3MS &lt; 78)</th>
<th>AUC</th>
<th>Optimal Cut Point</th>
<th>Sensitivity</th>
<th>Specificity</th>
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<td>BIMS Score</td>
<td>0.930</td>
<td>≤ 12</td>
<td>0.83</td>
<td>0.91</td>
</tr>
<tr>
<td>CPS Score</td>
<td>0.824</td>
<td>2</td>
<td>0.84</td>
<td>0.67</td>
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<tr>
<td>CPS Score</td>
<td>0.857</td>
<td>3</td>
<td>0.75</td>
<td>0.82</td>
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BI MS Has Excellent Test Performance

- BI MS: higher correlation with gold-standard measure
  - MDS 3.0 BI MS = 0.91 (p < .0001)
  - MDS 2.0 CPS = -0.74 (p < .0001)
- BI MS predicting 3MS: gender & age not significant
- MDS 2.0 CPS predicting 3MS: p = .0001 for age
DSM-IV Dementia Diagnosis

- An acquired impairment in multiple areas of intellectual function: memory + (language, praxis, object recognition, or executive function)
- Interferes with either occupational or social functioning or interpersonal relationships and represents a decline
- Is not secondary to delirium
A Confusing Case of Confusion

- 89 year old woman, Mrs. D., transferred from the inpatient unit, unable to care for herself
- Hospitalized for pneumonia
- Living at home, clearly failing at home (retrospective review)
- Trouble with bathing, dressing, transfers, and continence
- Transient “confusion” during hospitalization
First Questions

- Has there been pre-hospitalization cognitive impairment?
- Is there cognitive impairment now?
- Are there current exacerbating factors?
“Pre-morbid” State

- Essential to establish prior to “institutionalization”
- Family interview: waning memory of past year, less social interaction
- Check on her home during hospitalization: uncharacteristically dirty, multiple unpaid bills and late notices
Admission NH Assessment

- History and physical
- BI MS = 7
- Delirium assessment
- Medications
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Confusion Assessment Method

1) Acute onset and fluctuating course
   - AND
2) Inattention
   - AND EITHER
3) Disorganized thinking
   - OR
4) Altered level of consciousness
   - 95% sensitivity and specificity
   - Meta-analysis (2008) of 1,071 patients:
     - Sens:94% ; Spec: 89%

Relationship Between Dementia and Delirium

- Dementia strongest risk factor: 25-75% of patients with delirium have dementia (5-fold risk increase)
- Cohort of 193 older patients diagnosed with delirium at admission or 1st week of hospitalization

<table>
<thead>
<tr>
<th>Delirium Type</th>
<th>Overall (N=193)</th>
<th>Dementia (N=136)</th>
<th>No Dementia (N=45)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalent</td>
<td>165 (85.5)</td>
<td>123 (90.4)</td>
<td>33 (73.3)</td>
</tr>
<tr>
<td>Incident</td>
<td>28 (14.5)</td>
<td>13 (9.6)</td>
<td>12 (26.7)</td>
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Mrs. D.

- History revealed atrial fibrillation treated with Digoxin 0.125mg and warfarin 2 mg with an INR of 2.1; osteoarthritis; and stress incontinence
- On clonazepam for anxiety
- Other hospital labs: mild anemia, otherwise normal
- Not inattentive (3 of 3 on immediate recall); attended to the interview
Medications That Challenge Cognition

- Benzodiazepines
- Tricyclic antidepressants (amitriptyline)
- Other anticholinergic medications (diphenhydramine, meclizine)
- Narcotics
- Drugs with narrow therapeutic windows (digoxin)
- Withdrawal states
Does Mrs. D. Have Dementia?

- 92% specificity of severe cognitive impairment per 3MS criteria
- Consider taper of clonazepam in favor of antidepressant (serotonin reuptake inhibitor – SSRI)
- Monitor and retest cognition in 6 weeks
- If unchanged, probable dementia
Does Mrs. D. Have Depression?

**Major Depression**
- Depressive symptoms/ anxiety
- Subacute onset of dementia associated with mood changes
- History of depression
- Aphasia, apraxia absent
- Orientation generally intact
- Concentration impaired
- Patient emphasizes memory complaints
- Patient gives up on testing

**Alzheimer’s**
- Euthymia
- Insidious onset of dementia
- History of depression less common
- Aphasia, apraxia present
- Orientation impaired
- Recent memory impaired
- Patient minimizes memory complaints
- Patient makes effort on testing
True or False

- Over 75% of nursing home residents meet MDS-based criteria for dementia.
- MDS 3.0 utilizes direct mental state assessment as part of cognitive assessment.
- A delirium assessment is one component of establishing a dementia diagnosis.
Conclusion

- Dementia is common but there is a risk to attribute other symptoms to this diagnosis.
- MDS 3.0 represents a significant improvement in cognitive impairment recognition and in diagnostic accuracy.
- Dementia can be diagnosed using a practical application of DSM-IV in a majority of cases.
Additional Slides
How Well Does BI MS Detect Impairment of Different Severity?

### BI MS Scores Predicting Any Cognitive Impairment (3MS <78)

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<tr>
<th>BI MS Scores</th>
<th>True Positive</th>
<th>False Positive</th>
<th>Sensitivity</th>
<th>Specificity</th>
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<tbody>
<tr>
<td>11</td>
<td>0.65</td>
<td>0.01</td>
<td>0.65</td>
<td>0.99</td>
</tr>
<tr>
<td>12</td>
<td>0.73</td>
<td>0.03</td>
<td>0.73</td>
<td>0.97</td>
</tr>
<tr>
<td>13</td>
<td>0.83</td>
<td>0.09</td>
<td>0.83</td>
<td>0.91</td>
</tr>
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Receiver Operating Characteristic Curve (ROC) AUC = 0.93

### BI MS Scores Predicting Severe Cognitive Impairment (3MS <48)

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</thead>
<tbody>
<tr>
<td>6</td>
<td>0.73</td>
<td>0.03</td>
<td>0.73</td>
<td>0.97</td>
</tr>
<tr>
<td>7</td>
<td>0.79</td>
<td>0.05</td>
<td>0.79</td>
<td>0.95</td>
</tr>
<tr>
<td>8</td>
<td>0.83</td>
<td>0.08</td>
<td>0.83</td>
<td>0.92</td>
</tr>
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Receiver Operating Characteristic Curve (ROC) AUC= 0.96

*N= 375 for all analyses (for residents completing BI MS, MDS 2.0 CPS, and 3MS)*
How Well Does MDS 2.0 CPS Detect Impairment of Different Severity?

Receiver Operating Characteristic Curve (ROC) AUC = 0.82

<table>
<thead>
<tr>
<th>CPS Scores</th>
<th>True Positive</th>
<th>False Positive</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.59</td>
<td>0.12</td>
<td>0.59</td>
<td>0.88</td>
</tr>
<tr>
<td>2</td>
<td>0.83</td>
<td>0.33</td>
<td>0.84</td>
<td>0.67</td>
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Receiver Operating Characteristic Curve (ROC) AUC = 0.86

*(AUC: 1 = a perfect test; 0.5 = worthless)*

**N= 375 for all analyses (for residents completing BIMS, MDS 2.0 CPS, and 3MS)**
**Instrument Development**

- Focused on 3 commonly tested domains of cognitive function (memory, orientation, judgment)
- Selected from existing interview and scoring metrics typically used for testing such domains
- Candidate items tested in 374 residents in 6 VA NHs
Instrument Development

- Compared Brief Interview of Mental Status (BIMS) and MDS 2.0 CPS
- Modified Mini-Mental State Exam (3MS) expanded version of Mini-Mental State Exam (MMSE) range: 0-100 as gold standard
- Research assistants administered BIMS and 3MS to all subjects; Facility nurses administered same BIMS to sub-sample
References