Initial Evaluation of the Patient with Suspected Dementia

ALAN M. ADELMAN, M.D., M.S., Penn State University College of Medicine, Hershey, Pennsylvania
MEL P. DALY, M.D., Johns Hopkins University School of Medicine, Baltimore, Maryland

Dementia is a common disorder among older persons, and projections indicate that the number of patients with dementia in the United States will continue to grow. Alzheimer’s disease and vascular dementia account for the majority of cases of dementia. After a thorough history and physical examination, including a discussion with other family members, a baseline measurement of cognitive function should be obtained. The Mini-Mental State Examination is the most commonly used instrument to document cognitive impairment. Initial laboratory evaluation includes tests for thyroid-stimulating hormone and vitamin B₁₂ levels. Structural neuroimaging with noncontrast computed tomography or magnetic resonance imaging also is recommended. Other testing should be guided by the history and physical examination. Neuropsychologic testing can help determine the extent of cognitive impairment, but it is not recommended on a routine basis. Neuropsychologic testing may be most helpful in situations where screening tests are normal or equivocal, but there remains a high level of concern that the person may be cognitively impaired. (Am Fam Physician 2005;71:1745-50. Copyright© 2005 American Academy of Family Physicians.)
insults, microvascular pathology) are common in 15 to 20 percent of patients, and often occur with Alzheimer’s disease. The combination of Alzheimer’s disease and vascular dementia or other dementing disorders is termed “mixed dementias.” Conditions that may cause dementia are listed by frequency in Table 1. Less than 10 percent of dementias are caused by treatable conditions (“reversible dementia”). Because depression, vitamin B₁₂ deficiency, and hypothyroidism often are comorbid conditions, it is not uncommon to treat an apparently reversible dementia only to find that symptoms were really caused by Alzheimer’s disease or vascular dementia.

Mental Status Examinations
Mental status examinations are used to measure the degree of cognitive impairment. A number of instruments have been developed for this purpose. Five commonly used instruments and their characteristics are shown in Table 2. These instruments measure performance in similar areas of cognitive function and take five to 10 minutes to administer and score. Each is reliable for ruling out dementia when results are negative.

**Summary of Recommendations**

<table>
<thead>
<tr>
<th>Key clinical recommendation</th>
<th>Label</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians should measure the patient’s cognitive impairment using a test that they are familiar with and adept in, such as the Mini-Mental State Examination.</td>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>Initial laboratory evaluation, including tests for complete blood count, thyroid-stimulating hormone, serum electrolytes, serum calcium, and serum glucose, should be performed.</td>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>Structural neuroimaging (noncontrast computed tomography or magnetic resonance imaging) should be performed.</td>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>Referral for neuropsychologic testing cannot be recommended on a routine basis.</td>
<td>C</td>
<td>13, 16</td>
</tr>
<tr>
<td>A thorough history should include discussion with other family members and evaluation of the patient for depression. The Geriatric Depression Scale is an example of an instrument that can be used.</td>
<td>C</td>
<td>17</td>
</tr>
</tbody>
</table>

**MINI-MENTAL STATE EXAMINATION**
The most frequently used mental state examination in North America is the Mini-Mental State Examination (MMSE). The MMSE measures many areas of cognitive functioning including memory, orientation to place and time, naming, reading, copying (visuospatial orientation), writing, and the ability to follow a three-stage command. It can be administered in five to 10 minutes and is scored from zero to 30 points. A score of fewer than 24 points signifies cognitive impairment, although the test can be adjusted for educational level. The MMSE is more specific but less sensitive (i.e., gives more false negatives but fewer false positives) in highly educated individuals. It is available online at http://www.minimental.com and http://www.aafp.org/afp/20010215/703.html.

**BLESSED INFORMATION MEMORY CONCENTRATION**
The Blessed Information Memory Concentration (BIMC) instrument primarily assesses orientation, memory, and concentration (counting forward and backward, and naming the months of the year in reverse order). Errors are counted and can total from zero to 28. Making more than 10 errors indicates cognitive impairment.
Suspected Dementia

BLESSED ORIENTATION MEMORY CONCENTRATION

The Blessed Orientation Memory Concentration instrument is a shortened version of the BIMC with six questions assessing orientation to time, recall of a short phrase, counting backward, and reciting the months in reverse order. A weighted score of errors is calculated. As with the BIMC, making more than 10 errors is indicative of cognitive impairment.

SHORT TEST OF MENTAL STATUS

The Short Test of Mental Status (STMS) assesses orientation, attention, recall, calculation, abstraction, clock drawing, and copying. The STMS has a total score of 38. A score of 29 or lower indicates impaired cognitive function.

FUNCTIONAL ACTIVITIES QUESTIONNAIRE

Although it is not a mental status examination, the Functional Activities Questionnaire (FAQ) measures functional activities that may be impaired by dementia (e.g., ability to shop, cook, pay bills). The FAQ is answered by a family member or friend who knows and has observed the patient. The “informant” is asked to rate the performance of the patient in 10 activities as someone who is dependent,

### TABLE 1
Frequency of Common Causes of Dementia

<table>
<thead>
<tr>
<th>Cause</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alzheimer’s disease</td>
<td>50 to 60</td>
</tr>
<tr>
<td>Vascular disease</td>
<td>15 to 20</td>
</tr>
<tr>
<td>Mixed dementia</td>
<td>10 to 20</td>
</tr>
<tr>
<td>Other</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Diffuse Lewy-Body dementia</td>
<td></td>
</tr>
<tr>
<td>Frontotemporal dementia (Pick’s disease)</td>
<td></td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td></td>
</tr>
<tr>
<td>Alcohol-related dementia</td>
<td></td>
</tr>
<tr>
<td>Huntington’s disease</td>
<td></td>
</tr>
<tr>
<td>Prion disease (Jacob-Creutzfeldt disease/slow virus)</td>
<td></td>
</tr>
<tr>
<td>Trauma (subdural hematoma)</td>
<td></td>
</tr>
<tr>
<td>Infections (syphilis, acquired immunodeficiency syndrome, opportunistic infections)</td>
<td></td>
</tr>
<tr>
<td>Encephalitis</td>
<td></td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td></td>
</tr>
<tr>
<td>Vitamin B12 deficiency</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td></td>
</tr>
</tbody>
</table>

Information from references 6 and 8.

### TABLE 2
Commonly Used Instruments to Evaluate Mental Status

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Positive predictive value (%)*</th>
<th>Negative predictive value (%)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini-Mental State Examination</td>
<td>71 to 92</td>
<td>56 to 96</td>
<td>15 to 72</td>
<td>95 to 99</td>
</tr>
<tr>
<td>Blessed Information Memory Concentration</td>
<td>90</td>
<td>65 to 90</td>
<td>22 to 50</td>
<td>98 to 99</td>
</tr>
<tr>
<td>Blessed Orientation Memory Concentration</td>
<td>69</td>
<td>90</td>
<td>43</td>
<td>96</td>
</tr>
<tr>
<td>Short Test of Mental Status</td>
<td>81</td>
<td>90</td>
<td>47</td>
<td>98</td>
</tr>
<tr>
<td>Functional Activity Questionnaire</td>
<td>90</td>
<td>90</td>
<td>50</td>
<td>90</td>
</tr>
</tbody>
</table>

*—Percentage of persons who have dementia and an abnormal test.
†—Percentage of persons who do not have dementia and have a normal test.

requires assistance, or has difficulty but does independently. Scores range from zero to 30 with a cutoff of 9 (i.e., dependent in three or more activities) signifying impairment. This information may be useful in a clinical context, but the patient’s cognitive function still needs to be evaluated.

Initial Laboratory Evaluation

The purpose of laboratory testing is to exclude potentially reversible causes of dementia. The American Academy of Neurology recommends two laboratory tests for the initial evaluation of the patient with suspected dementia—thyroid function and vitamin B₁₂ level. The Second Canadian Consensus Conference on Dementia (CCCD) recommends obtaining results for complete blood cell count, thyroid-stimulating hormone level, serum electrolytes, serum calcium, and serum glucose to exclude potential infections or metabolic causes for cognitive impairment. Other testing, such as serology for syphilis, Lyme disease titer, human immunodeficiency virus (HIV), urinalysis, culture and sensitivity, heavy metal assays, erythrocyte sedimentation rate, liver function, serum folic acid level, or other vitamin level assays should be performed only when clinical suspicion warrants.

A lumbar puncture is not recommended for routine evaluation, but should be considered for patients with suspected neurosyphilis, cerebral vasculitis, HIV infection, slow-virus diseases, or cerebral Lyme disease. Routine testing for genetic markers such as apolipoprotein E is not recommended.

Imaging Studies

Neuroimaging may diagnose vascular disease, normal pressure hydrocephalus, tumors, abscess, or subdural hematoma. However, the yield from neuroimaging in identifying a potentially reversible cause of dementia is low. Therefore, there is some controversy regarding the routine use of neuroimaging in the primary evaluation of dementia. The CCCD recommends the following criteria for neuroimaging: age younger than 60 years, atypical or rapid cognitive decline, recent head trauma, localized neurologic signs or symptoms, gait disturbance, urinary incontinence (early in the course of the dementia), use of anticoagulants, and history of cancer. The American Academy of Neurology recommends that all patients have a magnetic resonance imaging study or noncontrast computed tomography as part of the initial evaluation. Neuropsychologic testing can comprehensively assess multiple domains of higher cognitive functioning including intelligence and behavioral functioning. A trained psychologist or psychometrician performs neuropsychologic testing. Higher cognitive functioning (logical reasoning, abstract and conceptual reasoning, visuospatial orientation, constructional ability, abstract thinking, memory, verbal reasoning, verbal fluency, etc.) is evaluated. Neuropsychologic testing has the potential to identify cognitive impairment objectively in patients with higher baseline cognitive abilities. It also may reveal subtle cognitive impairment in persons with

The Authors

ALAN M. ADELMAN, M.D., M.S., is a professor in the Department of Family and Community Medicine at Penn State University College of Medicine, Hershey, Pa., and is vice chair for academic affairs and research. He received his medical degree from Temple University School of Medicine, Philadelphia, and completed a family practice residency at Kaiser Foundation Hospital–Sunset in Los Angeles.

MEL P. DALY, M.D., is director of the subacute unit at the Greater Baltimore Medical Center and associate professor of medicine at Johns Hopkins University School of Medicine, Baltimore. He received his medical degree from Trinity College University of Dublin, Dublin, Ireland, and completed a family practice residency and a geriatric medicine fellowship at the University of Maryland, Baltimore.

Address correspondence to Alan M. Adelman, M.D., M.S., Department of Family and Community Medicine, Penn State University College of Medicine, 500 University Dr., H154, Hershey, PA 17033-0850 (e-mail: aadelman@psu.edu). Reprints are not available from the authors.
suspected cognitive impairment or dementia and in persons at increased risk of cognitive impairment, and may be useful in distinguishing patients with mild cognitive impairment from those with dementia. Neuropsychologic testing may be considered as an adjunctive option for patients and families who are anxious to define and measure (in a standardized fashion) cognitive functioning and then monitor for changes over time. Other candidates for possible formal testing include persons who are not well educated, those who do not have English as their native language, and persons who are functioning “normally” or who are minimally impaired on screening. Although it can be useful in evaluating the impact of depression, anxiety, and other psychologic symptoms on cognitive functioning, neuropsychologic testing is not recommended routinely for all patients with suspected dementia.

**Evaluation**

An algorithm to guide the initial evaluation of the patient with dementia is shown in [Figure 1](#). In the majority of patients, a thorough history and physical examination

---

**Initial Evaluation of Dementia**

Clinical suspicion of dementia  
History and physical examination  

**Mini-Mental State Examination (MMSE)**

- **< 24**
  - Assess for depression; consider using Geriatric Depression Scale or psychiatry consult.
  - MMSE < 24  
  - MMSE and cognition normal  
  - Recheck every three months.
- **> 24**
  - Consider neuropsychologic testing or subspecialist evaluation (i.e., neurology, psychiatry, geriatric medicine).
  - Work-up for reversible causes of dementia: laboratory testing (thyroid-stimulating hormone, B12); consider neurologic imaging (see text).

- **Normal**  
  - Alzheimer’s disease likely  
  - Reevaluate cognition.
- **Abnormal**  
  - Treat reversible cause.
  - Recheck every three months.

---

*Figure 1. Algorithm for initial evaluation of the patient with dementia.*
will identify the most likely cause of cognitive decline. Although relatively uncommon, potentially treatable causes of dementia can be ruled out by further laboratory testing and neuroimaging. In many patients, reversible conditions such as hypothyroidism or depression are comorbid rather than being the actual cause of cognitive decline.

The authors indicate that they do not have any conflicts of interest. Sources of funding: none reported.

This article is one in a series coordinated by the Department of Family Practice at Michigan State University College of Human Medicine, East Lansing, Mich. Guest editor of the series is Mark Ebell, M.D., M.S.

REFERENCES