

## CLINICAL REVIEW

## Cognitive assessment of older people

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This is the second in a series of four articles about assessing older people

Cognitive assessment involves examination of higher cortical functions, particularly memory, attention, orientation, language, executive function (planning activities), and praxis (sequencing of activities). This article will focus on cognitive assessment of older people (those aged over about 65 years) in the context of possible dementia, delirium, and depression. These are common and serious clinical syndromes affecting older people, and accurate cognitive assessment is an essential component for diagnosis. Dementia affects 20% of people aged over 80 years,<sup>1</sup> and delirium may affect 30-50% of older people in hospitals and an estimated 16% in long term care facilities.<sup>2</sup> The annual incidence of major depression in the general older population is about 15% a year and doubles after age 70.<sup>3</sup>

### Sources and selection criteria

We have used personal archives of references and our own experience. We also examined the guidelines on dementia, delirium, and depression published by the National Institute for Health and Clinical Excellence (NICE) and a systematic review of cognitive assessment instruments.

### Why does cognitive assessment matter?

Cognitive assessment helps to clarify the presence of one or more of the clinical syndromes of dementia, delirium, and depression. The case scenario box (part 1) describes a patient presenting with a gradual deterioration of cognitive function and a recent, abrupt deterioration. The abrupt change in mental state with reported sleepiness is highly suggestive of delirium, with a urinary tract infection (new onset incontinence) as a possible trigger. Dementia or depressive illness (loss of interest, poor concentration, forgetfulness), or both, are also possible so need consideration, but the immediate priority is to assess for delirium.

Patients with dementia have a very high risk of developing delirium (often triggered by an infection, surgery, or drugs),

and delirium is often associated with progression of dementia.<sup>4</sup> Conversely, patients without baseline dementia who present with delirium may develop persisting cognitive deficits and effectively a new onset of dementia.<sup>5</sup> Depression in older people often presents with complaints of memory impairment, and people with dementia may have an associated depression.<sup>3</sup>

Cognitive assessment helps to clarify the presence of these syndromes. Currently many older people presenting with dementia, delirium, and depression do not receive a diagnosis, or they receive a misdiagnosis. In a 2010 observational study, only 25% of patients with delirium presenting to a medical assessment unit received a correct diagnosis.<sup>6</sup> Failure to detect delirium may mean missing a treatable condition (such as a chest or urinary infection, or a drug side effect), which may be life threatening as every 48 hours spent with delirium is associated with an 11% increase in mortality.<sup>7</sup> Hence, patients presenting with rapid (hours, days) onset of cognitive symptoms or a worsening of established symptoms should be assessed urgently for delirium. The timely recognition of dementia when symptoms are causing anxiety to the patient or carer brings the possibility of better support, anticipatory care, initiation of drug treatment, and reduced distress for the patient and their carers.<sup>1</sup> Failure to detect depression denies the opportunity for identifying a potentially treatable and debilitating illness. Depression in older people is just as treatable as in younger people.<sup>3</sup>

### What is the best way to assess cognition?

The key to the reliable identification of cognitive impairment is to integrate three components: observation of the patient; a collateral account from a carer; and the results of standardised tests. These components should consider key questions for immediate and ongoing management (box 1).

### Observation of the patient

The clues to the presence of cognitive impairment may be subtle and are often overlooked, particularly in dementia, where the

**Summary points**

Dementia, depression, and delirium are common and serious clinical syndromes in older people that are underdiagnosed in routine care

Formal detection of these syndromes may enable identification of treatable conditions, is associated with better outcomes for patients, and requires routine cognitive assessment

Cognitive assessment requires integration of information acquired from observing the patient and talking with carers, and from the results of an assessment instrument

Cognitive assessment instruments are brief, easy to use, and sensitive to cognitive impairment, but an overall clinical assessment is needed to establish the underlying cause

The character and time frame of cognitive problems are key considerations in establishing an accurate diagnosis and a coherent management plan

**Case scenario: part 1**

A woman aged 89 years attends your clinic accompanied by her daughter. The daughter explains that her mother has not been herself over the past few months, that she is less interested in her usual activities, has poor concentration during conversation, and forgets day to day events. Two days ago she became incontinent of urine, which was unusual for her, and was noted to be confused and sleepy.

**Box 1 Key aspects of cognitive assessment to guide ongoing management**

- Does this patient have substantial cognitive impairment now, and what was his or her baseline function?
- What is the time frame over which this has developed?
- What is the character of this impairment? (For example, short term memory difficulties might point to dementia, and prominent inattention to delirium)
- Are there associated disturbances of behaviour? (For example, a day-night sleep reversal pattern is common in delirium; restlessness and wandering in dementia; and lethargy indicates possible depression)
- Do the problems follow a pattern indicative of delirium, depression, or dementia?
- Could the patient have a serious underlying physical cause for this presentation (typically “yes” for suspected delirium), and is immediate intervention or urgent investigation needed? (Immediate intervention is warranted, for example, if the patient’s safety is at risk (such as high risk of falls or dehydration), and urgent investigation is warranted if delirium is suspected or cognitive decline is marked or sudden)
- Is specialist input needed to clarify diagnosis, conduct more detailed assessment, or advise on management?

onset may be insidious, with the family adapting to the impairments, regarding them as “normal” behaviour. The discussion with the patient can be sensitively directed to inquiries about intrusions into everyday life, such as forgetting appointments, problems with finances, mislaying objects, and kitchen mishaps. There may be indicators of personal neglect—sometimes obvious (such as a dishevelled appearance), sometimes less so (a mis-buttoned jacket in a previously fastidious man, or a usually immaculate lady who has left off her lipstick). The primary care practitioner, who may have known the person for some years, is particularly well placed to notice these. Close attention to the content, organisation, and presentation of the patient’s narrative is critical. Points to look out for:

- **Dementia**—Features include impaired fluency of language, vagueness with dates and sequence of events, a tendency to repeat phrases, or a predilection to dwell excessively on distant events
- **Delirium**—Features include poor attention (such as seemingly not following questions; distractibility; or inability to focus), incoherent speech (hard to fully understand what the patient is trying to say), and altered level of alertness (sleepiness or agitation). The key is substantial change or fluctuation in mental status over hours or days: this is the cardinal feature of delirium

- **Depression**—Features include low mood, loss of interest and diminished capacity for enjoyment, poor self care, and a negative outlook with feelings of hopelessness that can include suicidal thoughts. However, it is important to be aware that these features are less prominent in older patients, in whom somatic symptoms (reduced energy, poor appetite, insomnia) are more typical.

Drugs are a common cause of delirium in older people, and a medication review is therefore essential. A systematic review of 14 randomised controlled trials and observational studies showed that opioids, benzodiazepines, and dihydropyridines (such as amlodipine)—and possibly antihistamines ( $H_1$  antagonists)—confer an increased risk of delirium. Digoxin and antipsychotics confer no increased risk, and uncertainty remains for other drug classes.<sup>8</sup>

**Examination**

Examination should specifically assess for nutritional status (evidence of self neglect) and for uncorrected visual and hearing problems (easy to resolve and risk factors for delirium and depression). Examination should also assess for new physical illness (such as anaemia and cardiac or respiratory failure) or deterioration in a pre-existing chronic disease, as these are possible aggravating factors for dementia or depression or precipitants for delirium. For suspected delirium, focus the examination on detecting chest, urinary, and skin infections;

heart failure and new or fast atrial fibrillation; urinary retention; and rectal examination if impaction is suspected. In suspected dementia perform a neurological examination to assess for abnormalities in the pyramidal pathway (brisk reflexes and extensor plantar responses may indicate vascular dementia) and the extrapyramidal system (expressionless face, bradykinesia, and cogwheel rigidity may indicate dementia with Lewy bodies).

### Investigations

The investigations for suspected dementia, depression, and delirium are similar (box 2) but have different rationale. For dementia the aim is to detect potentially reversible causes for the cognitive impairment; for depression to identify physical problems that might be contributing to the low mood; and for delirium, to identify possible precipitants. Brain imaging is recommended for suspected dementia to identify the very few people with intracerebral tumours or normal pressure hydrocephalus, and to contribute to the diagnosis of the specific dementia type.<sup>1</sup>

### Collateral account from carer

A collateral account from a carer is essential for clarifying what the symptoms are, their timescale (weeks or months for dementia and depression, and hours or days for delirium), and their relation to baseline mental function. Again, a primary care practitioner who is familiar with the person is often better placed than a practitioner in secondary care, who must purposefully seek collateral information. Failure to undertake this straightforward task may result in misdiagnosis. Informant based questionnaires such as the AD8 (ascertain dementia 8) (box 3)<sup>9</sup> or the short form of the informant questionnaire on cognitive decline in the elderly<sup>10</sup> may be used to structure the conversation. They are both simple and quick to complete (three and five minutes respectively), either face to face or over the telephone. The questionnaires focus on long term changes in aspects of cognitive function and behaviour rather than current function and are thus less influenced by a person's cultural and educational background and can reliably contribute to the diagnosis of early, mild, or more severe dementia. Reports of recent changes in usual behaviour (box 4) as an indication of delirium should also be specifically sought in any older person who is unwell. Indeed, the question, "Do you think [patient's name] has been more confused lately?" had 80% sensitivity for delirium.<sup>11</sup>

### Standardised assessments

Although the routine use of standardised assessment instruments is recommended, they are not diagnostic instruments—the diagnosis of dementia, delirium, and depression is eventually a clinical one that synthesises all available evidence. Indeed, the testing process can sometimes be more diagnostically informative than the actual test score achieved because it provides insights into cognitive processes such as attentiveness and disorganised thinking. "Untestability" is itself an important sign of severe disturbance of the mental status and often indicates delirium. No consensus has been reached on which standardised assessments to use, but by becoming thoroughly familiar with and competent in the use of a few core instruments and basing this selection on local use, practitioners can maximise communication between teams. The reliability of responses on brief standardised assessments of depression can be reduced in people with moderate to severe cognitive impairment. However, coexisting depression is common, and if any uncertainty remains, consider referral for specialist assessment.

### Brief cognitive tests

Many brief, standardised tests of cognitive function have been developed, mostly assessing memory and orientation.<sup>12</sup> The test scores may help to gauge dementia severity and progression, and repeated scores (such as preoperatively and postoperatively) can also help with the diagnosis of delirium, especially if superimposed on dementia. Falsely low scores may arise in people with a low educational background, deafness (through mishearing questions), or depression (no interest in questions). The tests need to be conducted with sensitivity to prevent undue distress. Some commonly used tests are described below.

#### Mini-mental state examination

The mini-mental state examination is a widely used, well validated, 30 point cognitive test that comprises 11 items and takes about eight minutes to complete. It has a low ceiling, so people with mild cognitive impairment may score in the "normal" range of 25-30 points, particularly if they have high educational attainment. Scores of 21-24, 10-20, and 9 or less indicate mild, moderate, and severe cognitive impairment respectively. However, copyright protection is now enforced, and the mini-mental state examination must be purchased from the publishers ([www.parinc.com/](http://www.parinc.com/)).

#### Abbreviated mental test score

This 10 item assessment (box 5) is commonly used in hospitals, although it has lower sensitivity and specificity to detect cognitive impairment than the mini-mental state examination. A four item version of the 10 item test (known as the four item abbreviated mental test score) is used in emergency departments or acute assessment units, and its performance seems broadly equivalent to the full version;<sup>13</sup> completion of this shorter abbreviated version takes less than one minute, and failure on any of the four items (age, date of birth, place, and year) implies cognitive impairment.

#### The general practitioner assessment of cognition (GPCOG)

This simple, two step assessment was developed for use in primary care and is particularly suited to multicultural populations. It is available as a web based tool ([www.gpcog.com.au/index.php](http://www.gpcog.com.au/index.php)) and takes less than four minutes to administer. Step 1 comprises an assessment of orientation and memory, and requires the completion of the clock drawing test (figure 1). A score of  $\leq 4$  (out of 9) indicates cognitive impairment. A score of 5-8 is indeterminate and triggers an informant based assessment (step 2) with six questions. A negative response to three of these items suggests cognitive impairment (sensitivity 85%, specificity 86%).<sup>14</sup>

### Brief assessment for depression

A quick, validated example is the patient health questionnaire 2 (PHQ2), a two item screening test that focuses on two key symptoms of depression: depressed mood and lack of interest or pleasure in activities (anhedonia).<sup>15</sup> The stem question is, "Over the last two weeks, how often have you been bothered by any of the following problems: (1) Little interest or pleasure in doing things; (2) Feeling down, depressed, or hopeless?" For each option the respondent chooses from "not at all" (score 0), "several days" (1), "more than half the days" (2), and "nearly every day" (3). A score of  $\geq 3$  suggests depression. A large study of over 8000 community dwelling older people showed a sensitivity of 100% and specificity of 77%.<sup>15</sup>

**Box 2 Investigations for suspected dementia, depression, and delirium\***

Full blood count  
 Electrolytes  
 Renal function tests  
 Liver function tests  
 Thyroid function tests  
 Calcium  
 Glucose  
 C reactive protein  
 Serum folate  
 Serum vitamin B<sub>12</sub>

*Additional investigations for suspected dementia*

Brain imaging (computed tomography or magnetic resonance imaging)

*Additional investigations for suspected delirium*

Chest radiography  
 Urine microscopy and culture  
 Blood cultures (if bacteraemia is suspected)

\*Adapted from NICE guidance<sup>2</sup>

**Box 3 Informant based AD8 (ascertain dementia 8) questionnaire**

An informant who knows the patient well is asked to respond yes or no to the eight questions of the AD8 questionnaire (below). The instructions are given to the informant either in person or over the phone: "Remember, 'yes, a change' indicates that you think there has been a change in the last several years caused by cognitive (thinking and memory) problems." Two positive responses indicate possible dementia (sensitivity 92%, specificity 46%).<sup>10</sup>

- 1 Has problems with judgment (such as falling for scams, bad financial decisions, buying gifts inappropriate for recipients)?
- 2 Shows reduced interest in hobbies and activities?
- 3 Repeats questions, stories, or statements?
- 4 Has trouble learning how to use a tool, appliance, or gadget (such as computer, microwave, remote control)?
- 5 Forgets correct month or year?
- 6 Has difficulty handling complicated financial affairs (such as balancing a bank account, dealing with income tax, paying bills)?
- 7 Has difficulty remembering appointments?
- 8 Has consistent problems with thinking and/or memory?

**Box 4 Common presenting symptoms of delirium\***

*Cognitive function*—for example, worsened concentration, slow responses, confusion

*Perception*—for example, visual or auditory hallucinations

*Physical function*—for example, reduced mobility, reduced movement, restlessness, agitation, changes in appetite, sleep disturbance

*Social behaviour*—for example, lack of cooperation with reasonable requests, withdrawal, or alterations in communication, mood, and/or attitude

\*From NICE guidance<sup>2</sup>

**Brief assessment for delirium**

The confusion assessment method (box 6) is a tool for screening for delirium.<sup>16</sup> Training in its use is recommended to ensure adequate sensitivity and reliability.<sup>17</sup> A cognitive test such as the mini-mental state examination must be done before completion of the confusion assessment method, and the total time for completion (of the two combined) is typically 10-12 minutes.

**What are the challenges?**

The unenlightened but entrenched view that memory loss is a normal consequence of old age limits clinical thinking, as does the intellectually lazy use of the term "confusion" as a diagnosis. Becoming more open to the possibility of the three inter-related syndromes of dementia, depression, and delirium in day to day practice is a critical first step, and healthcare professionals could overcome the idea that cognitive assessment is too complicated or time consuming by becoming familiar with selected core instruments. Better training in how to diagnose dementia, depression, and delirium is also needed.<sup>18 19</sup> Embedding brief

**Box 5 Abbreviated mental test score**

Score 1 for each correct answer. A score of  $\leq 7$  out of a possible 10 suggests cognitive impairment.

- 1 How old are you?
- 2 What is the time (to the nearest hour)?
- 3 Give the patient an address (such as "42 West Street") for recall at the end of the test
- 4 What year is it?
- 5 What is the name of this place?
- 6 Can the patient recognise two relevant people (such as a nurse and a doctor)?
- 7 What was the date of your birth?
- 8 When was the second world war?
- 9 Who is the present prime minister?
- 10 Count down from 20 to 1. (Allow no errors, and give no cues)

**Box 6 Confusion assessment method to diagnose delirium\***

The diagnosis of delirium requires a present or abnormal rating for criteria 1 and 2, plus a present or abnormal rating for either criterion 3 or criterion 4.

**1 Acute onset and fluctuating course**

Is there evidence of an acute change in mental status from the patient's baseline? Has this behaviour fluctuated during the past day—that is, tended to come and go, or increase and decrease in severity?

**2 Inattention**

Does the patient have difficulty in focusing attention (for example, is he or she easily distracted) or in keeping track of what is being said?

**3 Disorganised thinking**

Is the patient's speech disorganised or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?

**4 Altered level of consciousness**

Overall, how would you rate this patient's level of consciousness? Alert (normal), vigilant (hyperalert), lethargic (drowsy, easily aroused), stupor (difficult to arouse), coma (unrousable). Any rating other than "alert" is scored as abnormal

**Rating the four items**

The four items of this assessment method provide prompts for the cardinal features of delirium. To establish an acute onset and/or fluctuating course usually requires information from a family member or carers. Inattention can be detected by the digit span test or reciting days of the week backwards. Disorganised thinking and sleepiness (altered level of consciousness) can be detected during conversation with the patient—this implies spending some time with the patient. The features of delirium typically fluctuate with deceptively lucid moments; this further emphasises the importance of information from family members and carers.

\*Adapted from: Inouye et al<sup>16</sup> and Inouye<sup>17</sup>

cognitive assessment tests and prompts to seek information from carers within patient documentation systems could also improve accuracy and speed of diagnosis. The reliable diagnosis of dementia and depression in older people may emerge only over time (box, Case scenario: part 2), and regular reviews over several weeks are usually needed.

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**Case scenario: part 2**

Your patient has a score on the mini-mental state examination of 15 out of 30, indicating moderate cognitive impairment. During testing, you observe that her attention is poor. Questions to her daughter confirm a recent change in mental status. You review your patient's drugs and do not find any that might be responsible. You diagnose delirium, probably triggered by a urinary tract infection on a background of dementia and/or depression. You request blood and urine tests (box 2) and initiate antibiotics.

A week later, your patient is now alert and attentive, but her daughter is still worried that she remains "quiet," withdrawn, and lacking in spontaneity. She continues to struggle to recall recent events. Her score on the mini-mental state examination has improved to 21. Both questions of the patient health questionnaire 2 are answered positively, supporting the clinical suspicion of depression. Antidepressant treatment is started, and regular review over the coming weeks confirms improvement in her depressive symptoms, with a brighter mood, greater spontaneity, and more interest in usual activities and self care. However, she remains forgetful and struggles to perform day to day tasks. Her score on the mini-mental state examination (23) has still not reached a "normal" level (25-30). You therefore refer her to the local memory clinic, where Alzheimer's dementia is diagnosed and she is started on a cholinesterase inhibitor.

**How can I change my practice?***General resources*

- Depression: <http://guidance.nice.org.uk/CG90/SlideSet/ppt/English>
- Dementia: <http://guidance.nice.org.uk/CG42/SlideSet/ppt/English>
- Delirium: <http://guidance.nice.org.uk/CG103/SlideSet/ppt/English>
- Management of patients with dementia. SIGN guideline 86. [www.sign.ac.uk/pdf/sign86.pdf](http://www.sign.ac.uk/pdf/sign86.pdf). (Highly practical dementia guideline)
- Woodford HJ, George J. Cognitive assessment in the elderly: a review of clinical methods. *Q J Med* 2007;100:469-84. <http://qjmed.oxfordjournals.org/content/100/8/469.full>. (Thorough review of the role of cognitive assessment and the instruments that can be used)

*BMJ Group resources**BMJ Learning modules*

- Dementia: diagnosis and assessment. <http://learning.bmj.com/learning/search-result.html?moduleId=5004452>
- Alzheimer's disease: diagnosis and management <http://learning.bmj.com/learning/search-result.html?moduleId=5004421>

*Best Practice*

- Assessment of memory deficit: <http://bestpractice.bmj.com/best-practice/monograph/710.html>
- Assessment of dementia: <http://bestpractice.bmj.com/best-practice/monograph/242.html>

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## Figure



An example of the clock drawing test. The patient is asked to draw a circle, add the clock numbers, and set the hands (one small, one long) to "10 past 11," with a potential total score of 3 (1 for each element). This patient has drawn an incomplete circle (score 0); used uneven spacing of clock numbers (0); but has drawn reasonably correct clock hands (1). Total score is 1 out of 3, interpreted as evidence of cognitive impairment. Although the clock test is part of the general practitioner assessment of cognition (GPCOG) test, it can be used separately to test for visuospatial, constructional praxis and for executive (planning) impairments, which are common in dementia