Approach to assessment of cognitive disorders

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Before we start

*Please remember*

- Advanced modules expect you to think independently, not regurgitate material from lectures
- The aim is to develop a coherent – *and independent* – argument in your writing
- Show critical appraisal of literature, marshalling evidence in favour or against a point of view
- Discuss limitations of techniques, studies and theories
- Consider ways in which those limitations might be overcome, e.g., using findings from different techniques to provide convergent evidence
Take a history from patient and someone who knows them

*Probably the most crucial part of the assessment*

- Often best, if possible, to start with both the patient and an informant who knows them well
- I start by taking a brief history from the patient
- Put them at ease. Listen carefully and observe how the patient expresses themselves
- What is the interaction between patient and informant?
Take a history from patient and someone who knows them

*Probably the most crucial part of the assessment*

- Often best, if possible, to start with both the patient and an informant who knows them well
- I start by taking a brief history from the patient
- Put them at ease. Listen carefully and observe how the patient expresses themselves
- What is the interaction between patient and informant?
- Then take the history from the informant alone, without the patient in the room
- Did the patient fail to mention key facts?
- Now take a brief history independently from the patient
- Check whether the two accounts are concordant
- Is the patient appropriate in their interactions with you? Are they slow to respond?
- Are they overly familiar, disinhibited, indifferent, low in mood?
Key points to extract

*Probably the most crucial part of the assessment*

- What are the problems – if any – as far as the patient and informant are concerned?
- How long has there been a problem?
- Is it progressive? Or was it sudden-onset and has been stable since? Does it fluctuate?
- How seriously do they impact on everyday life? What’s the worst thing that’s happened?
Key points to extract

*Probably the most crucial part of the assessment*

- What are the problems – if any – as far as the patient and informant is concerned?
- How long have they been a problem?
- Is it progressive? Or was it sudden-onset and has been stable since?
- How seriously do they impact on everyday life? What’s the worst thing that’s happened?
- Are there important life events / stresses at work or home? Or in physical health?
- Who is is at home? What are the interactions like?
- Sleep pattern – altered behaviour (e.g. as in REM sleep behaviour disorder), sleep apnoea
- Mood – including ‘biological symptoms’ of depression
- Would people say there has been a change in personality or behaviour?
- Social / emotional engagement
Background history

Important other factors that might have a bearing

- **Past medical history** | Vascular risk factors (hypertension, diabetes, smoking, raised cholesterol), systemic disorders, infections (e.g. HIV), sleep disorders, etc.
- **Past psychiatric history** | Anxiety, mood disorders, etc.
- **Drug history** | Prescribed and recreational drug use, alcohol
- **Family history** | Is there a family history of young-onset dementia (<65 yrs age)?
Patient video
Cognitive screen

To obtain a brief overview of cognitive performance across several domains

- There are a range of screening tests which vary in time taken to administer and complexity
- **MMSE** | Mini-mental state examination
- **MOCA** | Montreal Cognitive Assessment
- **ACE** | Addenbrooke’s Cognitive Examination
Do you understand? Are you ready? You have one minute. I'm going to give you a letter of the alphabet to begin with that letter, but not names of people or places. For example, if I give you the letter "C", you could give me words like "cat, cry, clock" and so on. But, you can't give me words like Catherine or Canada.

After subject repeats, say "Try to remember them because I'm going to ask you later". So you have a chance to learn, we'll be doing that 3 times. I'll ask you the name and address later.

Tell: "I'm going to give you a name and address and I'd like you to repeat the name and address after me. If the subject makes a mistake, do not stop them. Let the subject carry on and check subsequent answers without interruption."

Language 

Ask: "Which 3 words did I ask you to repeat and remember?"

Ask: "Which 3 words did I ask you to repeat and remember?"

Tell: "If subject makes a mistake, do not stop them. Let the subject carry on and check subsequent answers without interruption."

Tell: "I'm going to give you three words and I'd like you to repeat them after me: lemon, key and ball."

Score only the third trial.

Language 

Ask: "Could you take 7 away from 100? I'd like you to keep taking 7 away from each new number until I tell you to stop."

Language 

Ask: "Can you name as many animals as possible. It can begin with any letter."

Score 2 if all are correct; score 1 if 3 are correct; and score 0 if 2 or less are correct.

Memory 

Ask: "Can you name as many animals as possible. It can begin with any letter."

Score 2 if all are correct; score 1 if 3 are correct; and score 0 if 2 or less are correct.

Language 


Score 2 if all are correct; score 1 if 3 are correct; and score 0 if 2 or less are correct.

Language 


Score 2 if all are correct; score 1 if 3 are correct; and score 0 if 2 or less are correct.
Language

- Ask the subject to repeat: ‘All that glitters is not gold’
- Ask the subject to repeat: ‘A stitch in time saves nine’

Language

- Ask the subject to name the following pictures:

Language

- Using the pictures above, ask the subject to:
  - Point to the one which is associated with the monarchy
  - Point to the one which is a marsupial
  - Point to the one which is found in the Antarctic
  - Point to the one which has a nautical connection

Language

- Ask the subject to read the following words: (Score 1 only if all correct)
  - sew
  - pint
  - soot
  - dough
  - height

Visuospatial Abilities

- Infinity Diagram: Ask the subject to copy this diagram

Visuospatial

- Wire cube: Ask the subject to copy this drawing (for scoring, see instructions guide).

Visuospatial

- Clock: Ask the subject to draw a clock face with numbers and the hands at ten past five. (For scoring see instruction guide: circle = 1, numbers = 2, hands = 2 if all correct).
VISUOSPATIAL ABILITIES

- Ask the subject to count the dots without pointing to them

- Ask the subject to identify the letters

MEMORY

- Ask "Now tell me what you remember about that name and address we were repeating at the beginning"

Harry Barnes
73 Orchard Close
Kingsbridge
Devon

Jerry Barnes
Harry Barnes
Harry Bradfield
recalled

S C O R E S

TOTAL ACE-III SCORE /100
Attention 18
Memory 22
Fluency 14
Language 25
Visualspatial 16
Structured information from informant

To obtain a brief overview of cognitive performance across several domains

- Questionnaires for them to fill in, e.g. **Cambridge Behavioural Inventory**
We would like to ask you a number of questions about various changes in the patient's behaviour that you may have noticed. It is important that we obtain your view as it will help us in our assessment.

Please read the description of each problem carefully. Then circle the number under the heading "Frequency" that best describes the occurrence of the behavioural change.

Some of the everyday skill questions may not apply, if for instance the person you care for has never done the shopping. Please enter N/A (not applicable).

All questions apply to the patient's behaviour OVER THE PAST MONTH.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1 a few times per month</th>
<th>2 a few times per week</th>
<th>3 daily</th>
<th>4 constantly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory and Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has poor day-to-day memory (e.g. about conversations, trips etc.)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Asks the same questions over and over again</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Loses or misplaces things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Forgets the names of familiar people</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Forgets the names of objects and things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Shows poor concentration when reading or watching television</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Forgets what day it is</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Becomes confused or muddled in unusual surroundings</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Everyday Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has difficulties using electrical appliances (e.g. TV, radio, cooker, washing machine)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has difficulties writing (letters, Christmas cards, lists etc.)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has difficulties using the telephone</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has difficulties making a hot drink (e.g. tea/coffee)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has problems handling money or paying bills</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Self Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has difficulties grooming self (e.g. shaving or putting on make-up)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has difficulties dressing self</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has problems feeding self without assistance</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has problems bathing or showering self</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Abnormal Behaviour</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Finds humour or laughs at things others do not find funny</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has temper outbursts</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Is uncooperative when asked to do something</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Shows socially embarrassing behaviour</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Makes tactless or suggestive remarks</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Acts impulsively without thinking</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Thank you for your time.
Structured information from informant

To obtain a brief overview of cognitive performance across several domains

- Questionnaires for them to fill in, e.g. **Cambridge Behavioural Inventory** or
- Structured interviews, e.g.:  
  - **CDR** | Clinical Dementia Rating  
  - **NPI** | Neuropsychiatric Inventory
Physical neurological examination

Assists in narrowing the differential diagnosis – the possible diagnoses that fit the case

- Many patients will have no physical neurological signs
- But if present such signs can help to make the diagnosis or differentiate between them

- Gait
- Speech
- Weakness
- Pyramidal or upper motor neuron signs
- Lower motor neuron signs
- Parkinsonism
- Limb apraxia
## Physical neurological examination

Assists in narrowing the differential diagnosis – the possible diagnoses that fit the case

<table>
<thead>
<tr>
<th>Ataxia</th>
<th>Limb apraxia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spino cerebellar ataxia (particularly types 2, 12, and 17), paraneoplastic diseases, prion diseases (particularly familial forms and variant CJD), DRPLA (common in Japan), fragile X-associated tremor ataxia syndrome, familial British and Danish dementias, mitochondrial disorders, superficial siderosis, neuronal ceroid lipofuscinosis (Kuf's disease), Niemann-Pick disease type C, multiple system atrophy (dementia usually mild, if present), Alexander's disease, and multiple sclerosis</td>
<td>Alzheimer's disease, corticobasal syndrome</td>
</tr>
</tbody>
</table>

### Pyramid signs
- Multiple sclerosis, frontotemporal lobar degeneration with motor neuron disease, Alzheimer's disease (some presenilin mutations), spinocerebellar ataxias, phenylketonuria, familial British and Danish dementias, hereditary spastic paraparesis (SPG4), adrenoleukodystrophy, vanishing white matter disease, polycystic kidney disease, polycystic lipomembranous sclerosing leukoencephalopathy (Nasu-Hakola disease)

### Dystonia/choorea
- Huntington's disease (and Huntington's disease-like syndromes 1–3), Kuf's disease (characteristic facial dyskinesia), Wilson's disease, neuroacanthocytosis, pantonthene kinase-associated neurodegeneration (neurodegeneration with brain iron accumulation), Lesch-Nyhan syndrome, DRPLA, corticobasal degeneration, neuroferritinopathy, anti-NMDA receptor-mediated limbic encephalitis, variant CJD

### Bucco-lingual mutilation
- Neuroacanthocytosis, Lesch-Nyhan syndrome

### Gaze palsy
- Niemann Pick disease type C (vertical supranuclear; early downgaze loss), Gaucher's disease (horizontal supranuclear), progressive supranuclear palsy (vertical supranuclear), mitochondrial disorders, spinocerebellar ataxias (particularly type 2), paraneoplastic disorders, Whipple's disease

### Limb apraxia
- Alzheimer's disease, corticobasal syndrome

### Akinetic-rigid syndrome
- Progressive supranuclear palsy, multiple system atrophy (dementia usually mild, if present), Huntington's disease (particularly juvenile onset), corticobasal degeneration, dementia pugilistica, Wilson's disease, pantonthene kinase-associated neurodegeneration (neurodegeneration with brain iron accumulation), frontotemporal lobar degeneration with parkinsonism-17, Alzheimer's disease (usually advanced)

### Peripheral neuropathy
- Neuroacanthocytosis, cerebroretinogenous xanthomatosis, HIV infection, giant axonal neuropathy, alcohol-related diseases, metachromatic leukodystrophy, porphyria, adrenoleukodystrophy, GM2 gangliosidosis, polycystic kidney disease, Krabbe's disease, sialidosis, Fabry's disease, mitochondrial disorders, spinocerebellar ataxias (particularly type 3)

### Myoclonus or early seizures
- Prion disease, Alzheimer's disease, Levy body disease, DRPLA, mitochondrial disorders, Gaucher's disease, GM2 gangliosidosis, neuroserpinopathy, polycystic lipomembranous sclerosing leukoencephalopathy, subacute sclerosing panencephalitis, progressive myoclonic epilepsy syndromes, Kuf's disease, Lafora body disease, sialidosis

### Deafness
- Superficial siderosis, mitochondrial disorders, familial Danish dementia, alpha mannosidosis, sialidosis

### Dysautonomia
- Levy body disease, multiple system atrophy, prion disease (fatal familial insomnia), porphyria, adrenoleukodystrophy, anti-NMDA receptor-mediated limbic encephalitis
Patient video
Patient video
Formal neuropsychological assessment

Very few patients undergo this

- This takes time to perform: 1-3 hrs depending upon protocols used at different centres
- History taken and in-depth examination of neuropsychological function performed
- Different centres use different batteries
- Most will try to obtain an estimate of premorbid intelligence (e.g., using NART in the UK)
- Verbal and performance IQ five some general estimates
- Domain specific tests of: attention, memory, visuospatial, language and executive functions commonly used
- In addition, if appropriate, tests of praxis, visual object recognition and semantic knowledge
Clinical diagnosis rests on first defining the syndrome

Ancillary investigations can help refine the diagnosis

- What are the key features of the history – from both patient and informant?
- What are the findings on cognitive assessment?
- Are there any physical signs?
- Most diagnoses are made on the basis of these factors
Investigations

To exclude treatable causes and to find supporting evidence for a clinical diagnosis

- **Screening blood tests**: to exclude, for example, metabolic / hormonal / vitamin / inflammatory / chronic infectious causes

- **Structural brain imaging**, ideally MRI but often CT (to exclude, for example, a tumour)

- **Cerebrospinal fluid (CSF)** examination via lumbar puncture: to exclude inflammatory / infectious cause but also to measure amyloid-beta and tau protein levels

- **FDG PET (fluorodeoxyglucose positron emission tomography)** brain imaging to examine regional brain metabolism

- **Amyloid and / or tau PET brain imaging** in some specialized centres
What is dementia?

*This is a clinical definition* | Diagnostic and Statistical Manual of Mental Disorders

<table>
<thead>
<tr>
<th>DSM-IV criteria for dementia</th>
<th>DSM-5 criteria for major neurocognitive disorder (previously dementia)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A1. Memory impairment</strong></td>
<td>*<em>A. Evidence of significant cognitive decline from a previous level of performance in one or more cognitive domains</em>:</td>
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<tr>
<td></td>
<td>- Learning and memory</td>
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<td></td>
<td>- Language</td>
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<td></td>
<td>- Executive function</td>
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<td></td>
<td>- Complex attention</td>
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<td></td>
<td>- Perceptual-motor</td>
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<td></td>
<td>- Social cognition</td>
</tr>
<tr>
<td><strong>A2. At least one of the following:</strong></td>
<td><strong>B. The cognitive deficits interfere with independence in everyday activities. At a minimum, assistance should be required with complex instrumental activities of daily living, such as paying bills or managing medications.</strong></td>
</tr>
<tr>
<td>- Aphasia</td>
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<tr>
<td>- Apraxia</td>
<td></td>
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<tr>
<td>- Agnosia</td>
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<tr>
<td>- Disturbance in executive functioning</td>
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<tr>
<td><strong>B. The cognitive deficits in A1 and A2 each cause significant impairment in social or occupational functioning and represent a significant decline from a previous level of functioning</strong></td>
<td><strong>C. The cognitive deficits do not occur exclusively during the course of delirium</strong></td>
</tr>
<tr>
<td><strong>C. The cognitive deficits do not occur exclusively during the course of delirium</strong></td>
<td><strong>D. The cognitive deficits are not better explained by another mental disorder (eg, major depressive disorder, schizophrenia)</strong></td>
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<tr>
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</table>
What is dementia?

National Institute of Aging – Alzheimer’s Association guidelines require two domains

1. Interfere with the ability to function at work or at usual activities; and
2. Represent a decline from previous levels of functioning and performing; and
3. Are not explained by delirium or major psychiatric disorder;
4. Cognitive impairment is detected and diagnosed through a combination of (1) history-taking from the patient and a knowledgeable informant and (2) an objective cognitive assessment, either a “bedside” mental status examination or neuropsychological testing. Neuropsychological testing should be performed when the routine history and bedside mental status examination cannot provide a confident diagnosis.

5. The cognitive or behavioral impairment involves a minimum of two of the following domains:
   a. Impaired ability to acquire and remember new information—symptoms include: repetitive questions or conversations, misplacing personal belongings, forgetting events or appointments, getting lost on a familiar route.
   b. Impaired reasoning and handling of complex tasks, poor judgment—symptoms include: poor understanding of safety risks, inability to manage finances, poor decision-making ability, inability to plan complex or sequential activities.
   c. Impaired visuospatial abilities—symptoms include: inability to recognize faces or common objects or to find objects in direct view despite good acuity, inability to operate simple implements, or orient clothing to the body.
   d. Impaired language functions (speaking, reading, writing)—symptoms include: difficulty thinking of common words while speaking, hesitations; speech, spelling, and writing errors.
   e. Changes in personality, behavior, or comportment—symptoms include: uncharacteristic mood fluctuations such as agitation, impaired motivation, initiative, apathy, loss of drive, social withdrawal, decreased interest in previous activities, loss of empathy, compulsive or obsessive behaviors, socially unacceptable behaviors.

Neurological diseases

Common causes of dementia

- Alzheimer's disease: 62%
- Vascular dementia: 17%
- Mixed dementia: 10%
- Rarer causes of dementia: 5%
- Dementia with Lewy bodies: 4%
- Frontotemporal dementia: 2%
Neurological diseases

Common causes of dementia

Figure 1: Epidemiology of young-onset dementia
Data from the community study of Harvey and colleagues.6
Neurological diseases

Causes of young-onset dementia (<65 yrs old)

- Huntington’s disease
- Dementia in multiple sclerosis
- Dementia in Down’s syndrome
- Corticobasal degeneration
- Prion disease
- Dementia in Parkinson’s disease
- Dementia due to carbon monoxide poisoning
- Other causes

MANY

Figure 1: Epidemiology of young-onset dementia
Data from the community study of Harvey and colleagues.6

Neurological diseases

Causes of young-onset dementia (<65 yrs old)

1 out of 20 people living with dementia are under the age of 65.

Figure 1: Epidemiology of young-onset dementia
Data from the community study of Harvey and colleagues.6

Demographics of dementia

*Increased risk with age*

1 in 688 people under 65 have dementia.

1 in 14 people over 65 have dementia.

1 in 6 people over 80 have dementia.
What is Alzheimer’s disease?

A neurodegenerative condition associated with brain atrophy and amyloid and tau pathology

Figure 2  Light micrograph of Alzheimer disease neuropathology. Section from the cortex of a patient with Alzheimer disease showing tangles and plaques. The intraneuronal tangle (arrow) is stained dark brown with an antibody that specifically targets paired helical filaments. These filaments are also seen as the dense brown material (dystrophic processes) embedded in the extracellular plaque (arrowhead). The lighter reddish staining of the plaque is from another antibody directed specifically against β-amyloid.

But we can’t get a pathological diagnosis unless we perform a brain biopsy which is associated with risks, so we have guidelines for making a clinical diagnosis.

Clinical diagnosis of Alzheimer’s disease

*Doesn’t have to be associated with memory loss, although this is the typical presentation*

Criteria for Probable Alzheimer's disease (AD)

1. Meets criteria for dementia described earlier in the text, and in addition, has the following characteristics:
   A. Insidious onset. Symptoms have a gradual onset over months to years, not sudden over hours or days;
   B. Clear-cut history of worsening of cognition by report or observation; and
   C. The initial and most prominent cognitive deficits are evident on history and examination in one of the following categories.
      a. Amnestic presentation: It is the most common syndromic presentation of AD dementia. The deficits should include impairment in learning and recall of recently learned information. There should also be evidence of cognitive dysfunction in at least one other cognitive domain, as defined earlier in the text.
      b. Nonamnestic presentations:
         • Language presentation: The most prominent deficits are in word-finding, but deficits in other cognitive domains should be present.
         • Visuospatial presentation: The most prominent deficits are in spatial cognition, including object agnosia, impaired face recognition, simultanagnosia, and alexia. Deficits in other cognitive domains should be present.
         • Executive dysfunction: The most prominent deficits are impaired reasoning, judgment, and problem solving. Deficits in other cognitive domains should be present.
Clinical diagnosis of Alzheimer’s disease

*Doesn’t have to be associated with memory loss, although this is the typical presentation*

Criteria for Probable Alzheimer's disease (AD)

D. The diagnosis of probable AD dementia *should not* be applied when there is evidence of (a) *substantial concomitant cerebrovascular disease*, defined by a history of a stroke temporally related to the onset or worsening of cognitive impairment; or the presence of multiple or extensive infarcts or severe white matter hyperintensity burden; or (b) *core features of Dementia with Lewy bodies* other than dementia itself; or (c) prominent features of behavioral variant frontotemporal dementia; or (d) prominent features of semantic variant primary progressive aphasia or non-fluent/agrammatic variant primary progressive aphasia; or (e) *evidence for another concurrent, active neurological disease, or a non-neurological medical comorbidity or use of medication that could have a substantial effect on cognition.*
## Typical presentations of common dementias

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Typical presentation</th>
<th>Investigations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alzheimer’s disease (AD)</strong></td>
<td>Memory disorder PLUS other domains affected</td>
<td>MRI: Hippocampal and biparietal atrophy. <strong>CSF:</strong> Raised tau; decreased amyloid-beta. <strong>FDG PET:</strong> Temporoparietal hypometabolism</td>
</tr>
<tr>
<td></td>
<td>BUT note that AD can also present with:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Visuospatial deficits and visual agnosia (PCA</td>
<td>Posterior cortical atrophy)</td>
</tr>
<tr>
<td></td>
<td>2) Language dysfunction (<strong>logopenic primary progressive aphasia</strong>)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) Executive dysfunction (<strong>atypical frontal variant AD</strong>)</td>
<td></td>
</tr>
<tr>
<td><strong>Vascular dementia</strong></td>
<td>Executive function deficits and slow processing speed</td>
<td></td>
</tr>
<tr>
<td><strong>Mixed dementia (AD + vascular dementia)</strong></td>
<td>Memory disorder PLUS other domains affected and executive function deficits and slow processing speed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MRI: Hippocampal and biparietal atrophy plus substantial small vessel cerebrovascular disease</td>
<td></td>
</tr>
<tr>
<td><strong>Lewy body dementia (LBD) or Parkinson’s disease dementia (PDD)</strong></td>
<td>Fluctuating attention, executive function and visuospatial deficits, visual hallucinations PLUS possibly physical signs of Parkinsonism</td>
<td>DAT (Dopamine transporter) scan may be abnormal</td>
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Structural MRI | Alzheimer’s disease

Bilateral hippocampal atrophy and biparietal atrophy

This can also be observed in PCA (posterior cortical atrophy)

## Typical presentations of common dementias

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### Structural MRI | Vascular dementia

*White matter signal change associated with small vessel cerebrovascular disease*

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**Example image**

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See Chapter 25: Biessels & Scheltens in Husain & Schott textbook
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DAT scan | Parkinson’s / Dementia with Lewy bodies (DLB)

*Dopamine transporter scan*

*Asymmetric involvement often the early hallmark*
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Cognitive and behavioural ‘fingerprints’

For some dementia syndromes

Cognitive and behavioural ‘fingerprints’

For some dementia syndromes

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Image: Diagram showing cognitive and behavioral 'fingerprints' for different dementia syndromes. The diagram includes brain scans and sections highlighting specific regions and functions affected by different types of dementia.
Cognitive and behavioural ‘fingerprints’

For some dementia syndromes
Cognitive and behavioural ‘fingerprints’

For some dementia syndromes

Cognitive and behavioural ‘fingerprints’

For some dementia syndromes

Semantic dementia

Progressive non-fluent aphasia

Verbal memory

Speech

Verbal knowledge

Action

Literacy

Calculation

Object representation

Executive

Nonverbal memory

Emotion

Nonverbal knowledge

Space

Behavioral variant frontotemporal lobar degeneration

Alzheimer's disease

Posterior cortical atrophy
‘Pseudodementia’

*Important to remember that the commonest cause of cognitive symptoms is NOT dementia*

- Depression and mood disorders
Psychiatric diseases

Associated with cognitive dysfunction

Universal domains:
- Attention, working memory, executive function
- Procedural learning and memory
- Speed of processing
- Fear-extinction learning
- Semantic memory

Higher domains:
- Episodic memory
- Social cognition
- Theory of mind
- Verbal learning and memory
- Language (use and understanding)
Case History

Middle aged woman with memory complaints

- 50yr old left-handed woman presenting with attention and memory complaints
- Looses the thread of conversations, difficulty remembering plans, can no longer multi-task
- Forgets where she puts things down; no major serious events due to memory symptoms
- Low mood, lost her confidence, irritable and less motivated
- Two years previously walked out of her job because it seemed overwhelming
- **Past history** | Depression, fibromyalgia and osteoarthritis
- **Medication** | Antidepressant and analgesics
- **ACE-III score** | Total 65/100 (attention 14/18, memory 9/26, fluency 7/14, language 20/26, visuospatial 15/16).
- **Neurological examination** | Normal – including no evidence of limb apraxia
- **Investigations** | MRI brain and screening blood tests normal
- **Impression** | 'Pseudodementia' / cognitive impairment associated with depression
Case History

Middle aged woman with memory complaints

- Returns 16 months later. She is unable to give a history
- Family feel her symptoms have worsened significantly. Can no longer be left on her own
- Has to be prompted to do things and accompanied to events
- She says her mood is good and family say that it fluctuates
- **ACE-III score** | Total 39/100 (attention 7/18, memory 3/26, fluency 1/14, language 19/26, visuospatial 9/16).
- **Neurological examination** | Limb apraxia with difficulty copying meaningless gestures
- **MRI brain** | MRI within normal limits
- **FDG PET scan** | Marked left temporoparietal hypometabolism including left medial temporal lobe. Smaller region of hypometabolism in right posterior temporal parietal zone and left frontal lobe.
- **CSF** | Tau/a-beta amyloid ratio raised at 1.79 (normal range less than 1.00) with raised total tau and reduced a-beta amyloid.
Patient video
Reading

Core text is available online

- **Chapters 10, 11 and 21** cover the assessment and investigation of the person presenting with cognitive symptoms

- **Chapter 33** deals with different presentations of Alzheimer’s disease


For next week

Read the chapter on Disorders of Attention

- Ch 15 Disorders of Attentional Processes by Paolo Bartolomeo