Diagnosis of Dementia: Clinical aspects

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Food for thoughts?!

- Memory is everything!
- If you lose your memory, you lose everything?

- Dementia prevalence increases with age!
- All of us will, eventually, develop dementia?
Ageing and cognitive decline

- Age related cognitive can occur in the healthiest elderly person.
- The normal elderly less frequently experience impairment in cognitive areas other than memory.
- Not universal but variable
- Slowing of intellectual and physical performance but maintain reasonable level of functioning.
- Other factors associated with age:
  - Illness
  - Medications
  - Sensory deprivation
  - Social isolation
Measuring Intellectual Changes in Old Age

- **Psychometrics**
  - Designed for you people
  - Longitudinal Vs Cross-section studies
    - Do not show individual variations

- **Crystallized Vs Fluid intelligence**
  - Crystallized intelligence (e.g. knowledge)
    - Not affected by age, could even get better
  - Fluid intelligence (native wit)
    - Tested by IQ test.
    - General decline after the age of 60

- **Older skills:**
  - Bridge and chess
  - Old typists
Features of normal ageing

- Decreased sensory processing and under-arousal
- Slowed neuronal processing
- Decreased complex and sustained attention
- Accentuation of personality traits
  - Decreased flexibility and tolerance to change
  - Decreased excitability & impulsivity; more cautious
- Ageing and intelligence:
  - Preserved crystalized intelligence
  - Decreased fluid intelligence
  - Stable verbal IQ but decline in performance IQ
- Decrease in naming ability
- Decrease in primary and working memory
- Decreased retrieval of stored memory
- Language relatively well spared
- Sleep; fragmented, increased daytime somnolence
Estimated Population aged 100 years and over, 1970-2010

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<thead>
<tr>
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<tbody>
<tr>
<td>England &amp; Wales</td>
<td>1,080</td>
<td>2,280</td>
<td>4,030</td>
<td>6,230</td>
<td>11,610</td>
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<tr>
<td>Scotland</td>
<td>80</td>
<td>150</td>
<td>260</td>
<td>480</td>
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<td>N Ireland</td>
<td>30</td>
<td>70</td>
<td>100</td>
<td>140</td>
<td>210</td>
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<tr>
<td>UK Total</td>
<td>1,180</td>
<td>2,500</td>
<td>4,380</td>
<td>6,860</td>
<td>12,640</td>
</tr>
</tbody>
</table>

Table source: Office for National Statistics, September 2011
Telegram overload - centenarians will continue to be the fastest growing age group

Thousands, UK
UK Ageing Population

- Life expectancy in the UK has reached its highest level on record for both males and females, 78.1 years at birth for males and 82.1 years at birth for females (2008-2010)
- The number of centenarians in the UK in 2010 was estimated to be 12,640; a five fold increase on the 1980 estimate of 2,500
- At 4.1 years, the UK has the smallest gap between male and female life expectancy across the EU-27 countries.
Irony ends in pathos in Saul Steinberg’s ‘Untitled, 1954’, a version of the traditional diagram of the Ages of Man. The successful man rises from infant, through boy scout, academic, business man, tycoon to... playboy on a beach in Florida, retired, relaxed, happy but—useless.
Dementias

- 0.01% before the age of 40.
- 5-8% of all individuals over 65.
- 15-20% of all individuals over 75.
- 25-50% of all individuals over 85.
- 60-80% of all individuals over 95.
- 90% of all individuals over 100
- 100% of all individuals over ??
- 50% of all individuals in nursing homes.
- 820,000 persons in the UK.
Size and cost of Dementia

- It is estimated that 35.6 million people living with dementia worldwide in 2010,
  - increasing to 65.7 million by 2030 and 115.4 million by 2050.
  - The total estimated worldwide costs of dementia are US$604 billion in 2010.
- The United Dementia Republic
  - What if dementia was a republic in terms of population economy?
  - It would have ranked 18th Largest economy in the world
- About 70% of the costs occur in Western Europe and North America.
- Approximately 30% of the total annual cost of AD is invested in the direct management of BPSD.
- 820,000 people with dementia in the UK
  - The cost of dementia care exceeds that of cancer, heart disease and stroke combined.
  - £17 billions/ year
  - Triple to £50 billions/ year over the next 30 years
People with/without dementia

- Census 2001: 20% above the age of 65.
  - How many in Birmingham?
- 2050: 25% of the population would be over 65 with far more bigger number of old old people (Centenarians)
- 820,000 in UK today with dementia.
- More with cognitive impairment …!!
- 37% in institutional care
- 50% live with a carer
- 13% live alone, usually supported by a carer.
Dementia Diagnosis in Primary Care

- Only 47% of GPs had sufficient training in dementia management,
- A third were not confident in diagnosing dementia.
- 10% of GPs aware of the National Dementia Strategy.
- Only 58% of GPs believe that providing a patient with a diagnosis is usually more helpful than harmful.
- Significant numbers of dementia related admissions are directed to acute hospitals through GPs referrals.
- It also could be due to lack of coordination between primary and secondary care.

Dementia diagnosis in Acute Hospitals

- Dementia CQUIN
  - FAR
  - Dementia training

- The size
  - 70% of patients are elderly
  - 50% of elderly patients have dementia or other cognitive impairment

- The effect
  - Reduced quality (Counting the cost report)
  - Collapsing system (Our hospitals on the edge)

- The recognition
  - Our MAU study
  - Retrospective study 110/1000 (11%) had the diagnosis of dementia, delirium, depression, or any combination
  - Proactive screening 450/750 had D, D or D while the hospital still identified 90 patients only, ie 360 missing!!

- The future
  - Training
  - Integration (Primary & secondary, Mental and physical health)
Diagnosis of dementia in BME

- Under diagnosed
- Stigma
- Lack of awareness
- Unhelpful professional attitudes in primary and secondary care
- False cultural beliefs
- No valid culturally sensitive tools
- Complexity in cognitive assessment of elderly British minority ethnic groups: Cultural perspective

Faroq Khan & George Tadros, Dementia March 2013
What is Cognition?

- Cognition is the ability to use and integrate basic capacities such as perception, language, behaviour, actions, memory and thoughts in order to interact appropriately with the world.
- Dementia is a disorder of cognition not only memory
Stages of memory

- **LIBRARY ANALOGY**
  1. **ENCODING** - catalogue and label books
  2. **STORAGE** - shelve systematically, store safely
  3. **RETRIEVAL** - locate and retrieve on request
- Forgetting – Loss and decay
What is Memory

- Explicit
  - Long Term
    - Episodic
    - Semantic
  - Short Term
- Implicit
  - Conditioning
  - Motor Skills

- Verbal
- Spatial
Where is memory based?

- Explicit memory is mainly based in the limbic system (Hippocampus, Parahippocampal gyrus, Amygdala, Mammillary body, Fornix, Thalamus and Dentate gyrus) and temporal neocortex.
- Implicit memory is mainly based in the basal ganglia and different parts of the cerebral cortex.
Traditional Definition of Dementia

- Dementia is a syndrome of global cognitive impairment that is due to disease of the brain, usually of a chronic or progressive nature. Consciousness is not clouded. Impairments of cognitive functions are commonly accompanied, and occasionally preceded, by deterioration in emotional control, social behaviour or motivation.
Another definition of dementia

- It is an acquired, persistent impairment in multiple areas of intellectual function, not due to delirium.

- Operationally, there is a compromise in three or more of the following nine spheres of mental activities:
  - Memory, language, perception, praxis, calculation, conceptual or semantic knowledge, executive functions, personality, emotional expression.
Dementia Myths (true or false)

- Dementia is a global impairment
- Dementia always impairs memory
- Dementia always impairs insight
- Dementia is a cognitive disorder and not a behavioural problems.
- Dementia is an inevitable part of ageing
- Dementia is necessarily a progressive disorder.
- Dementia is never acute.
- Dementia is an untreatable disorder.
- All False!!
What is dementia

- Wide spread cognitive impairment affecting:
  - Memory (STM & LTM)
  - Orientation into time, place, person.
  - Visiospatial awareness.
  - Speech.
  - Activity of Daily Living.
  - Personality & judgment.
  - Behaviour.
  - Associated features
Associated features

- Depression
- Anxiety
- Phobias
- Sleep problems
- Delusions
- Hallucinations
- Behavioural problems
Causes of dementia

*Common*

- Alzheimer’s disease 40%
- Vascular dementia 20%
- Mixed AD/VaD 20%
- Dementia with Lewy bodies 10%
  - (Dementia of Parkinson’s Disease)
Rarer causes of dementia (selected)

- Fronto-temporal dementia (2-5%)
- Normal Pressure Hydrocephalus
- Subdural haematoma
- Alcohol-related dementia
- Dementia in Huntington’s disease
- HIV dementia
- Prion dementias (under 0.1%)
Types of Dementia

- AD
- VaD
- FTD
- DLB
- NPH
- Psych Dis
- Toxic
- Infection
# Reversible Causes of Dementia

<table>
<thead>
<tr>
<th>Physical Causes</th>
<th>Psychological Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal pressure hydrocephalus</td>
<td>Pseudodementia</td>
</tr>
<tr>
<td>Subdural haematoma</td>
<td>Dissociative amnesia</td>
</tr>
<tr>
<td>Anaemia</td>
<td>Transient global amnesia</td>
</tr>
<tr>
<td>B1, B6, B12 deficiency</td>
<td></td>
</tr>
<tr>
<td>Endocrine disorders e.g. hypothyroidism, Cushing’s syndrome, Addison’s disease.</td>
<td></td>
</tr>
<tr>
<td>Infections e.g. AIDS, Syphilis.</td>
<td></td>
</tr>
<tr>
<td>Alcohol related dementias (early stage).</td>
<td></td>
</tr>
<tr>
<td>Wilson’s disease.</td>
<td></td>
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<tr>
<td>Electrolytes imbalance</td>
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## Dementia Vs Delirium

<table>
<thead>
<tr>
<th>Delirium</th>
<th>Dementia</th>
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<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
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<tr>
<td>4.</td>
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# Dementia Vs Depressive Pseudo-dementia

<table>
<thead>
<tr>
<th></th>
<th>Dementia</th>
<th>Pseudo-dementia</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>History of depression</td>
<td>History of depression</td>
</tr>
<tr>
<td>2.</td>
<td>Biological symptoms of depression</td>
<td>Biological symptoms of depression</td>
</tr>
<tr>
<td>3.</td>
<td>Worse in the morning</td>
<td>Worse in the morning</td>
</tr>
<tr>
<td>4.</td>
<td>I do not know</td>
<td>I do not know</td>
</tr>
<tr>
<td></td>
<td>The ultimate test!!</td>
<td>The ultimate test!!</td>
</tr>
</tbody>
</table>
Clinical Diagnosis of Dementia

- History taking
- Physical examination
- Clinical cognitive assessment
- Investigations
- Disclosing diagnosis
- Treatment
- Long term support
Clinical Scales

- Screening
  - MMSE (sMMSE)
  - 6 CIT
  - AMT(10), AMT(4)
  - MOCA
  - Clock face test

- More in depth scales
  - Full Neuropsychological assessment
  - ACE-III
  - CAMCOG
  - CANTAB
ADDENBROOKE’S COGNITIVE EXAMINATION – ACE-III
English Version A (2012)

Name: _____________________________ Date of testing: __/__/____
Date of Birth: ____________________________ Tester’s name: ____________________________
Hospital No. or Address: ____________________________
Age at leaving full-time education: ____________________________
Occupation: ____________________________ Hand edness: ____________________________

ATTENTION
➢ Ask: What is the Day __________ Date __________ Month __________ Year __________ Season __________
➢ Ask: Which No./Floor _________ Street/Hospital _________ Town _________ County _________ Country _________

ATTENTION
➢ Tell: "I’m going to give you three words and I’d like you to repeat them after me: lemon, key and ball.”
  After subject repeats, say "Try to remember them because I’m going to ask you later."
➢ Score only the first trial (repeat 3 times if necessary).
➢ Register number of trials: _________

ATTENTION
➢ Ask the subject: "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.”
➢ If subject makes a mistake, do not stop them. Let the subject carry on and check subsequent answers
  (e.g., 93, 86, 79, 72, 65 – score 4).
➢ Stop after five subtractions (93, 86, 79, 72, 65): _________ _________ _________ _________ _________

MEMORY
➢ Ask: ‘Which 3 words did I ask you to repeat and remember?’ _________ _________ _________

FLUENCY
➢ Letters
  Say: "I’m going to give you a letter of the alphabet and I’d like you to generate as many words as you can
  beginning 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.
  Do you understand? Are you ready? You have one minute. The letter I want you to use is the letter “P”.

Fluency
Total _________ Correct _________

➢ Animals
  Say: "Now can you name as many animals as possible. It can begin with any letter.”

Fluency
Total _________ Correct _________
### Montreal Cognitive Assessment (MOCA)

#### VISUOSPATIAL / EXECUTIVE

- **Copy Cube**: 3 points
- **Draw Clock (Ten past eleven)**: 3 points

#### NAMING

- **Contour**: [ ]
- **Numbers**: [ ]
- **Hands**: [ ]

#### MEMORY

<table>
<thead>
<tr>
<th></th>
<th>FACE</th>
<th>VELVET</th>
<th>CHURCH</th>
<th>DAISY</th>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st trial</td>
<td>[ ]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2nd trial</td>
<td>[ ]</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

- **No points** if ≥2 errors

#### ATTENTION

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</tbody>
</table>

- **No points** if ≥2 errors

- **Serial 7 subtraction starting at 100**: [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65
  - 4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct: 1 pt, 0 correct: 0 pt

#### LANGUAGE

- **Repeat**: I only know that John is the one to help today. [ ]
- **The cat always hid under the couch when dogs were in the room.** [ ]

- **Fluency**: Name maximum number of words in one minute that begin with the letter F [ ] (N ≥ 11 words)

#### ABSTRACTION

- **Similarity between e.g. banana - orange - fruit**: [ ]
- **train - bicycle**: [ ]
- **watch - ruler**: [ ]

#### DELAYED RECALL

<table>
<thead>
<tr>
<th></th>
<th>FACE</th>
<th>VELVET</th>
<th>CHURCH</th>
<th>DAISY</th>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ ]</td>
<td>[ ]</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

- **Points for UNCUED recall only**: [ ]

#### ORIENTATION

<table>
<thead>
<tr>
<th></th>
<th>Date</th>
<th>Month</th>
<th>Year</th>
<th>Day</th>
<th>Place</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
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</tr>
</tbody>
</table>

- **Add 1 point if ≤12 yr edu**

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www.mocatest.org

Administered by: ___________________________

**Total**: ______/30

**Normal**: ≥ 26/30
Memory

Tell: "I'm going to give you a name and address and I'd like you to repeat the name and address after me. So you have a chance to learn, we'll be doing that 3 times. I'll ask you the name and address later."

Score only the third trial.

<table>
<thead>
<tr>
<th>1st Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harry Barnes</td>
</tr>
<tr>
<td>73 Orchard Close</td>
</tr>
<tr>
<td>Kingsbridge</td>
</tr>
<tr>
<td>Devon</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd Trial</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>3rd Trial</th>
</tr>
</thead>
</table>

Memory

Name of the current Prime Minister.................................................................
Name of the woman who was Prime Minister.........................................................
Name of the USA president...........................................................................
Name of the USA president who was assassinated in the 1960s.

Language

Place a pencil and a piece of paper in front of the subject. As a practice trial, ask the subject to "Pick up the pencil and then the paper." If incorrect, score 0 and do not continue further.

If the subject is correct on the practice trial, continue with the following three commands below.

- Ask the subject to "Place the paper on top of the pencil"
- Ask the subject to "Pick up the pencil but not the paper"
- Ask the subject to "Pass me the pencil after touching the paper"

Note: Place the pencil and paper in front of the subject before each command.

Language

Ask the subject to write two (or more) complete sentences about his/her last holiday/weekend/Christmas. Write in complete sentences and do not use abbreviations. Give 1 point if there are two (or more) complete sentences about the one topic; and give another 1 point if grammar and spelling are correct.

Language

Ask the subject to repeat: "caterpillar"; "eccentricity"; "unintelligible"; "statistician"
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:

  - [Image of spoon]
  - [Image of book]
  - [Image of kangaroo]
  - [Image of penguin]
  - [Image of anchor]
  - [Image of camel]
  - [Image of harp]
  - [Image of rhinoceros]
  - [Image of barrel]
  - [Image of crown]
  - [Image of crocodile]
  - [Image of accordion]

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

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

- 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.)
Ask the subject to count the dots without pointing to them.
**VISUOSPATIAL ABILITIES**

- 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

- Memory
  - [Score 0-7]

**MEMORY**

- This test should be done if the subject failed to recall one or more items above. It all items were recalled, skip the test and score 5. If only part was recalled start by ticking items recalled in the shadowed column on the right hand side; and then test not recalled items by telling the subject "Ok, I'll give you some hints: was the name X, Y or Z?" and so on. Each recognised item scores one point, which is added to the point gained by recalling.

- Jerry Barnes
  - 37
  - Orchard Place
  - Oakhampton
  - Devon

- Harry Barnes
  - 73
  - Oak Close
  - Kingsbridge
  - Dorset

- Harry Bradford
  - 76
  - Orchard Close
  - Darlington
  - Somerset

- Memory
  - [Score 0-5]

**SCORES**

<table>
<thead>
<tr>
<th>TOTAL ACE-III SCORE</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>18</td>
</tr>
<tr>
<td>Memory</td>
<td>26</td>
</tr>
<tr>
<td>Fluency</td>
<td>14</td>
</tr>
<tr>
<td>Language</td>
<td>26</td>
</tr>
<tr>
<td>Visuospatial</td>
<td>16</td>
</tr>
</tbody>
</table>
Diagnosis of Dementia

- Is an essential medical skill in almost all specialties.
- It is a clinical diagnosis
- Different levels at different services.
- Dementia is a terminal illness
- Dementia diagnosis would have significant effects on the whole family.
- Evolving as science and technology improving.