Dementia: An Overview

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How many times have you been at your breaking point and life dumps more on you?

That is the way it is living with dementia.
Contents

- Definition
- Types of Dementia
- Diagnosis of Dementia
- Management of Dementia
Forgetfulness ≠ Dementia
Definition of Dementia

A clinical syndrome of cognitive decline that is sufficiently severe to interfere with social or occupational functioning.
I am getting more forgetful these days !!!
Is it because of age or am I demented?

Forgetting is intrinsically human and increases with aging.
Mild Cognitive Impairment (MCI)

Clinical syndrome defined as cognitive decline greater than that expected for a person’s age and education level but does not affect notably with activities of daily life.

Age related cognitive decline < MCI < Dementia

- **Normal Aging**: Everyone experiences slight cognitive changes during aging.
- **Preclinical**:
  - Silent phase: brain changes without measurable symptoms
  - Individual may notice changes, but not detectable on tests
  - “A stage where the patient knows, but the doctor doesn’t”
- **MCI**:
  - Cognitive changes are of concern to individual and/or family
  - One or more cognitive domains impaired significantly
  - Preserved activities of daily living
- **Dementia**:
  - Cognitive impairment severe enough to interfere with everyday abilities

- **Mild**: 
- **Moderate**:
- **Severely**: 

**Time (Years)**
DSM IV criteria for Dementia

Impairment of memory and at least one of the following domains:

- language,
- praxias,
- gnosis, or
- executive functioning

- sufficiently severe to impair social or professional life
- must not occur as a consequence of a delirium, or be caused by another medical, neurological or psychiatric condition.
Atrophic Brain

Reduced function
Causes of Dementia

Reversible

Irreversible
Irreversible Causes of Dementia

Primary dementia (neurodegenerative)

- Alzheimer’s disease
- Dementia with Lewy bodies
- Frontal or fronto-temporal dementia
- Parkinson-dementia
- Corticobasal degeneration
- Huntington’s disease

Vascular dementia

- Infarction
- Haemorrhage
- Cardiovascular disease
- Binswanger’s encephalopathy

Source: Semin Reprod Med © 2009 Thieme Medical Publishers
Reversible causes of Dementia

**Infectious**
- HIV
- Syphilis
- Lyme disease
- Meningoencephalitides including TB

**Inflammatory**
- Cerebral vasculitis
- Hashimoto’s encephalopathy
- Limbic encephalitis
  - paraneoplastic
  - non-paraneoplastic, including VGKC, anti-NMDAR
- Multiple sclerosis

**Neoplastic/space occupying**
- Lymphoma
- Glioblastoma multiforme
- Subdural haematoma

**Toxic & Metabolic**
- Ethanol
- Drugs

**Endocrine disorders**
- Diabetes
- Thyroid disease
- Parathyroid disease
- Cushing’s disease
- Addison’s disease

**Vitamin deficiencies**
- B12, thiamine and nicotinic acid
Diagnosis of Dementia

• History
• Clinical assessment
  - Physical/neurological examination
  - Cognitive assessment
  - Neuropsychiatric assessment
• Laboratory Evaluation
• Neuroimaging
Diagnosis of Dementia – History

• **Onset**
  - Acute/insidious

• **Course**
  - Progressive/fluctuating/stepwise

• **Memory**
  - Almost all patients present with poor memory
  - Memory span: rapid forgetting, lose track (parietal)
Diagnosis of Dementia – History

• **Language**
  - word finding ↓ (fronto/subcortical)
  - wrong words, severe naming difficulty, comprehending, poor literacy [reading, writing] (perisylvian parietotemporal)
  - echolalia (frontal)

• **Calculation**
  - reckon change, finances (fronto, subcortical or parietal)
Diagnosis of Dementia – History

• Spatial
  - lost in unfamiliar &/or familiar surroundings; unable to lay table, disoriented while dressing (biparietal)

• Perception
  - unable to recognise faces, objects [agnosia] (temporal)

• Personality change
  - change in social, personal conduct; disinhibition, apathy/amotivational state (frontal cortical)
Diagnosis of Dementia – History

- Ritualistic, stereotypic behaviours (temporal)
- Depression (distinguish from apathy)
  hallucinations, illusions, misperceptions, delusions, anxiety
Diagnosis of Dementia – History

• **Physical**
  - focal symptoms, poor balance, gait, tremor, myoclonus, seizures, incontinence, TIAs

• **Sleep disturbances**
  - sleep apnoea, insomnia, sleep associated movement disorder

• **Medical history**
  - hypertension, diabetes, strokes, heart disease, smoking, alcohol

• **Family history**
  - dementia, psychiatric, Parkinson’s etc.
Diagnosis of Dementia – Clinical assessment (physical/neurological)

Thorough physical examination

• Look for signs of nervous system involvement (specific neurological examination in dementia)
  - observe behaviour, myoclonus, chorea etc.
  - eye movements, rigidity/spasticity,
  - focal weakness/signs (brisk reflexes, Babinski), ataxia, tactile localisation/attention,
  - primitive reflexes, hand postures (spatial/praxis), gait

• Signs of systemic diseases
  - metabolic, infection, skin manifestation etc.
Diagnosis of Dementia –
Clinical assessment (cognitive assessment)

Primary purpose is to document objectively cognitive deficits inferred to be present from the history or chief complaint

1. Formal testing by using cognitive assessment tests

2. Informal testing
Cognitive assessment - Formal testing

**MMSE**

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### The Mini-Mental State Exam

<table>
<thead>
<tr>
<th>Patient</th>
<th>Examiner</th>
<th>Date</th>
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<tr>
<th>Maximum</th>
<th>Score</th>
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**Orientation**

What is the (year) (season) (date) (day) (month)?
Where are we (state) (country) (town) (hospital) (floor)?

**Registration**

Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record.

Trials _________

**Attention and Calculation**

Serial 7's. 1 point for each correct answer. Stop after 5 answers.
Alternatively spell “world” backward.

**Recall**

Ask for the 3 objects repeated above. Give 1 point for each correct answer.

**Language**

Name a pencil and watch.
Repeat the following “No ifs, ands, or buts”
Follow a 3-stage command: “Take a paper in your hand, fold it in half, and put it on the floor.”
Read and obey the following: CLOSE YOUR EYES
Write a sentence.
Copy the design shown.

---

**Total Score**

ASSESS level of consciousness along a continuum

Alert  Drowsy  Stupor  Coma
Cognitive assessment - Formal testing

MOCA

MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

NAME:
Education:
Date of birth:
Sex:
DATE:

VISUOSPATIAL / EXECUTIVE

Copy cube
Draw CLOCK (Ten past eleven) (5 points)

NAMING

MEMORY
Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

1st trial
2nd trial

ATTENTION
Read list of digits (1 digit/sec). Subject has to repeat them in the forward order
Subject has to repeat them in the backward order

Read list of letters. The subject must tap with his hand at each letter A. No points if 2 errors

Serial 7 subtraction starting at 100

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

ABSTRACTION
Similarity between e.g. banana - orange = fruit

DELAYED RECALL
Has to recall words WITH NO CUE

Optional

ORIENTATION

[ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City

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Normal ≥ 26 / 30

TOTAL __/30

Add 1 point if ≤ 12 yr old
Cognitive assessment - Formal testing

CLOCK DRAWING TEST

Patient name_________________
Patient ID #_________________
Date__/__/__

Instructions
1) Inside the circle, please draw the hours of a clock as they normally appear
2) Place the hands of the clock to represent the time: “ten minutes after eleven o’clock”
Cognitive assessment- Formal testing
Mini-Cog Test

Mini-Cog™

Instructions for Administration & Scoring
ID: ___________  Date: ________________

Step 1: Three Word Registration

Look directly at person and say, “Please listen carefully. I am going to say three words that I want you to repeat back to me now and try to remember. The words are [select a list of words from the versions below]. Please say them for me now.” If the person is unable to repeat the words after three attempts, move on to Step 2 (clock drawing).

The following and other word lists have been used in one or more clinical studies.¹³ For repeated administrations, use of an alternative word list is recommended.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Banana</td>
<td>Leader</td>
<td>Village</td>
<td>River</td>
<td>Captain</td>
<td>Daughter</td>
</tr>
<tr>
<td>Sunrise</td>
<td>Season</td>
<td>Kitchen</td>
<td>Nation</td>
<td>Garden</td>
<td>Heaven</td>
</tr>
<tr>
<td>Chair</td>
<td>Table</td>
<td>Baby</td>
<td>Finger</td>
<td>Picture</td>
<td>Mountain</td>
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</tbody>
</table>

Step 2: Clock Drawing

Say: “Next, I want you to draw a clock for me. First, put in all of the numbers where they go.” When that is completed, say: “Now, set the hands to 10 past 11.”

Use preprinted circle (see next page) for this exercise. Repeat instructions as needed as this is not a memory test. Move to Step 3 if the clock is not complete within three minutes.

Step 3: Three Word Recall

Ask the person to recall the three words you stated in Step 1. Say: “What were the three words I asked you to remember?” Record the word list version number and the person’s answers below.

Word List Version: _____  Person’s Answers: ____________  ____________  ____________
The Mini-Cog scoring algorithm. The Mini-Cog uses a three-item recall test for memory and the intuitive clock-drawing test. The latter serves as an “informative distractor,” helping to clarify scores when the memory recall score is intermediate.
## Domains measured by cognitive screening tools

<table>
<thead>
<tr>
<th>Test</th>
<th>Personal Information</th>
<th>Orientation</th>
<th>Short-Term Memory</th>
<th>Remote Memory</th>
<th>Attention</th>
<th>Naming</th>
<th>Visuospatial Visuosconstruction</th>
<th>Other</th>
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<tbody>
<tr>
<td>MMSE</td>
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<td>3MS</td>
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<td>AMTS</td>
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<td>GPCOG</td>
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<td>RUDAS</td>
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<td>*</td>
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<tr>
<td>MOCA</td>
<td>*</td>
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<tr>
<td>NUCOG</td>
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MMSE = Mini Mental State Examination; 3MS = Modified MMSE; AMTS = Abbreviated Mental Test Score; SPMSQ = Short Portable Mental Status Questionnaire; GPCOG = General Practitioner Assessment of Cognition; RUDAS = Rowland Universal Dementia Assessment Scale; MOCA = Montreal Cognitive Assessment; NUCOG = Neuropsychiatry Unit Cognitive Assessment Tool.
Cognitive assessment-Informal testing

- responses to simple questions in terms of conversational fluency,
- informational content (vague: detailed responses)
- general fund of knowledge (pertinent recent events)
- personally important information regarding hobbies, occupational history and family)
Neuropsychiatric assessment

- Important role in differential diagnosis between dementia and primary psychiatric disorder such as depression
- Provides insight into social behavior (passivity, impulsiveness, disinhibition)
- Mood state (depressed, euphoric)
- Vegetative state (eating, sleeping)
- Changes in personality (apathetic, disinhibited)
- Alteration in perception (hallucination) or thoughts (delusion)
- Structured interview for neuropsychiatric assessment - neuropsychiatric inventory questionnaire (NPIQ)
Diagnosis of Dementia - Laboratory Evaluation

**Blood Tests**
- Complete blood cell count
- Glucose
- Serum B12 levels
- Liver function test
- Screening for syphilis (if high risk, living in a high-incidence region)

• Depression screening

• **Electroencephalogram (EEG)** is not recommended routinely, but it can be considered in atypical presentations

• CSF tau protein and amyloid Aβ 42 shows different patterns with various dementia but Cerebrospinal fluid analysis is not recommended routinely except in atypical presentations

• Routine genetic test for apoE is not recommended
Diagnosis of Dementia - Neuroimaging

- **CT/MRI**
  - to exclude treatable disease
  - to identify comorbid disease - stroke, ischaemic changes

- **Functional imaging (SPECT/PET)**
  - Indication - early diagnosis and differential diagnosis
  - used as biomarkers of pathological process in diagnosis of dementia
  - Positive PET amyloid imaging is a biomarker of brain amyloid –β deposition
  - hypometabolism in the temporal and parietal cortices in FDG-PET is a biomarker of neuronal degeneration
PET

Can identify disease specific pattern

- temporal-parietal abnormalities in AD
- frontal - anterior temporal abnormalities in FTD
- temporal-parietal-occipital abnormalities in DLB
## Alzheimer’s Dementia

<table>
<thead>
<tr>
<th>Type of Dementia</th>
<th>History</th>
<th>Signs and symptoms</th>
<th>Pathology/Imaging</th>
</tr>
</thead>
</table>
| Alzheimer’s Disease | Gradual, progressive onset | - Memory loss especially for names and recent events  
- Language deficits  
- Rapid forgetting  
- Impaired visuospatial skills  
- Normal gait and neuro exam early  
- Later affective disturbances, behavioral symptoms such as aggression | Generalized atrophy (esply median temporal)  
Beta amyloid plaques  
Neurofibrillary Tangles |
Alzheimer’s Dementia

Pathology

Anatomy

Imaging - PET
## Lewy Body dementia

<table>
<thead>
<tr>
<th>Type of Dementia</th>
<th>History</th>
<th>Signs and symptoms</th>
<th>Pathology/ Imaging</th>
</tr>
</thead>
</table>
| Lewy Body        | Insidious onset, Progressive with fluctuations | • Fluctuating cognition  
• Visual hallucinations  
• Neuroleptic sensitivity  
• Shuffling gait  
• Increased tone  
• Tremors  
• Falls | Generalized atrophy  
Lewy bodies in cortex and midbrain |
What differentiates Lewy body dementia from Alzheimer's in early stage dementia?

- Visual hallucinations during early course of disease!!!
Lewy Body Dementia

Anatomy

Pathology – lewy body

Imaging- PET
# Frontotemporal Dementia (FTD)

<table>
<thead>
<tr>
<th>Type of Dementia</th>
<th>History</th>
<th>Signs and symptoms</th>
<th>Pathology/Imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fronto temporal</td>
<td>Insidious onset</td>
<td>• Disinhibition</td>
<td>Frontal and temporal atrophy</td>
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<tr>
<td></td>
<td>Typically in 50-60 yrs</td>
<td>• Socially inappropriate behavior</td>
<td>Pick cells and pick bodies in cortex</td>
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<td></td>
<td>Rapid progression</td>
<td>• Poor judgment</td>
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<tr>
<td></td>
<td></td>
<td>• Apathy</td>
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<td></td>
<td></td>
<td>• Decreased motivation</td>
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<td>• Poor executive function</td>
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</tbody>
</table>
Discovery

First description: Auguste H.
Arnold Pick, 1892.

Pathology

Pick Bodies
Numerous neurons with round intracytoplasmic Pick bodies
Heavy metal stain

Anatomy

FTD: Imaging
Gross pathologic hallmark: Frontal and temporal cortical atrophy

PET imaging

NORMAL
FTD
Management of Dementias

- Non-pharmacological
- Pharmacological
- Evaluation and management of typical BPSD (behavioral and psychological symptoms)
- Caregiver support
- Decision-making and advanced care planning
- Palliative care
Non-pharmacology Management

– Incorporate values, cultures and specific needs in care plans and interventions

Exercise and recreational activities are encouraged

Encourage participation in programs aimed at cognitive stimulation
Non-pharmacology Management

– Involve patient and family in pharmacotherapy decision, including discussion of medication risks, benefits and side-effects

– Assess and monitor changes in medications, the effects and adherence at every visit
Regularly re-evaluate disease progression in a comprehensive manner, including the option of using scales such as the MMSE, CDT

At the time of diagnosis

After 6 months of treatment
Serial CDT, no good response to treatment

At the time of diagnosis

After 3 months

After 1 year

Patient's Name: 
Age: 
Reg No: 

Date: 25/10/18
Pharmacological management

1. Centrally acting ChEIs (Choline Esterase inhibitors) prevent the breakdown of acetylcholine. (Donepezil, Rivastigmine, Galantamine)

2. NMDA receptor antagonist - memantine
   - modest benefit on measures of cognitive function and activities of daily living
   - also alleviate the non-cognitive manifestations of AD, such as agitation, wandering, and socially inappropriate behavior.
Pharmacological management

• AD  - ChEIs in mild to moderate dementia
   - Memantine in moderate to severe dementia

• DLB  - as above

• FTD  - both are not recommended
Pharmacological management

- Supplements, herbal products
- Gingko biloba,
- Folic acid,
- Vitamin B12,
- Vitamin E,
- Steroidal and non-steroidal anti-inflammatory drugs,
  hormonal therapy
- Statin therapy

are not recommended routinely for dementia management
Combination therapy in AD

• Several studies have demonstrated that memantine can be safely used in combination with ChEIs.

• The combination of memantine with a ChEI has been shown to significantly delay institutionalization in AD patients.
Carer Support

Dementia carers can become isolated.
They need the support of their family and friends.
Take home message

• Forgetfulness does not always denote dementia.
• It is essential to look for the reversible cause of dementia.
• Appropriate use of diagnostic tests is important to be cost effective in the management of dementia.
• Both non-pharmacological management and management of BSPD play a major role and so as carer support.
THANK YOU
<table>
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<tr>
<th>Criterion</th>
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<tbody>
<tr>
<td>Memory complaint, preferably corroborated by an informant</td>
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<tr>
<td>Memory impairment documented according to appropriate reference values</td>
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<tr>
<td>Essentially normal performance in nonmemory cognitive domains</td>
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<tr>
<td>Generally preserved activities of daily living</td>
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<tr>
<td>Not demented</td>
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*a Based on information from Petersen et al.³*