

# DEMENTIA: EARLY DETECTION AND DIAGNOSIS

## DEFINITION AND SPECTRUM

Presence of multiple cognitive deficits like memory and other deficits is dementia. To be more precise, dementia is defined as a progressive deterioration of memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgement and may lead to impairment of emotional control, social behaviour, maturation and activities of daily living (ADL). Dementia is thought to exist in about 10-15% of elderly in the west and 2-3% in India. It may be noted that dementia is different and should not be mistaken for memory impairment that accompanies normal aging process. Latter is just the age associated memory impairment or AAMI also known as benign senescent forgetfulness or BSF

**Mild cognitive impairment (MCI)** also termed as Age Associated Cognitive Deficit (AACD) on the other hand is not an accompaniment of normal aging process but rather it is the earliest abnormal stage. In fact, 10-15% of MCI patients convert to AD annually as opposed to only 1-2% of normal elderly who may convert to AD during the same period. Further, AD like changes in CSF, imaging, and pathology are known to appear in MCI. Even, non memory deficits can appear and therefore, MCI can exist in the form of multi cognitive or single domain varieties. It may however be remembered that in MCI, full dementia criteria as detailed below are not present and no psychiatric or ADL problems appear at this stage. Also, no cognitive deterioration occurs for next one year in MCI.

**Following are the DSM IV Diagnostic Criteria of Dementia:** These are taken from Diagnostic and Statistical Manual of Mental Disorders (DSM). In brief, these include

(1). Presence of multiple cognitive deficits including memory plus at least one of the following: aphasia (difficulty in language), apraxia (difficulty in familiar tasks), agnosia (difficulty in recognising) and executive functioning despite being fully conscious.

(2). Should be a progressive disorder with impairment of occupational and/or social functioning without any disturbed consciousness, confusion or delirium\*.

(3). A medical condition or substance abuse or their combination can cause dementia

\* A patient can have delirium and dementia at different times.

## What is normal vs.dementia behaviour ?

Quite frequently an aging subject or his family members may find it hard to understand if the behaviour of this subject is within normal limits or it is getting into early stage of dementia.Following are some examples in routine chores to illustrate normal functioning in aging individuals vs cognitive dysfunctioning in cases of dementia (table 1)

**TABLE 1: Normal functioning versus cognitive functioning**

NORMAL	DEMENTIA
Forgets relative's name	Confuses own room & road
Forgets keys, wallet	Puts his glass not in sink but in the fridge
Forgets date, but he knows day & night	Confuses his room, and day from night
Confuses in money changing	Does not recognise money
Understands proverb	But can not interpret proverb
Identifies carrot from radish	Can not identify rose from tulip
Pays more for merchandise by mistake	Wears sweater in june
Forgets to check the mail	Fails how to brush teeth or salute flag
Speak slowly but meaningfully	Speak unmeaningfully , no proper word
Recognises objects & faces but not name	Not recognising even objects & faces
Does not work due to fatigue	No work due to lack of interest
May take extra care in doing a task	Suspicious/paranoid on a simple issue
Sad for valid reason	Rapid mood swings

## CAUSES AND CLASSIFICATION OF DEMENTIA

Dementia is only an outward clinical manifestation of an underlying disease which may actually be hidden and may require a series of medical investigations for unmasking it. On the other hand in many cases of dementia a specific cause may not actually exist and then it is called as the idiopathic dementia.The two most common types of dementia are Alzheimers Disease which is specially common in the western countries and the Vascular Dementia which is also quite common specially in the developing countries. Alzheimers disease is a progressive disorder of recent episodic memory, language, visuospatial function and executive function associated with high frequency of neuro behavioural abnormalities at some point in course.Vascular dementia is a deterioration of mental capabilities caused by multiple repeated strokes (infarcts) in the brain often with a background of hypertension. Its onset may be sudden and finally it may also affect several cognitive functions.

In addition to these two main types of dementia, there are many others, though not so common. These include Parkinsons disease, Acquired Immune Deficiency Syndrome (AIDS), Normal Pressure Hydrocephalous (NPH), Lewy Body

dementia (LBD), Frontotemporal dementia (FTD) and Picks disease, Huntingtons chorea, Downs syndrome and many reversible dementias which comprise of diseases like hypothyroidism, head trauma, vitamin B12 deficiency, chronic renal failure, alcoholism, drugs, hypoglycaemia etc.

Since Alzheimer's disease is a prominent type of dementia, some of the subsequent paragraphs will be devoted to this disease.

**Alzheimers disease**, the commonest and one of the most devastating varieties of dementia is a slowly progressive disease and like any other dementia, can have a confusing overlap with normal aging behavior in early stages resulting in failure on the part of family members to report to physician in time. National Institute of Neurologic and Communicative Disorders and Stroke (NINCDS) in association with Alzheimers Disease and Related Disorders Association have laid down certain criteria for the diagnosis of this condition and these are given below.

#### **NINCDS/ADRDA criteria for diagnosis of Alzheimers disease**

- (i). Firstly, dementia should be established by clinical examination, and confirmed by cognitive screening done by mini mental state examination (MMSE)
- (ii). There should be deficit in two or more areas of cognition
- (iii). There should be evidence of progressive worsening
- (iv). There should be no disturbance of consciousness
- (v). Onset is most often after the age of 65 years (range 40-90 years)
- (vi). No other disorder or brain disease should be there to account for cognitive defect & its progression.

#### **10 WARNING SIGNS OF ALZHEIMER'S**

1. Memory loss
2. Difficulty performing familiar tasks
3. Problems with language
4. Disorientation to time and place
5. Poor or decreased judgment
6. Problem with abstract thinking
7. Misplacing things
8. Changes in mood or behaviour
9. Changes in personality
10. Loss of initiative

## STAGES OF ALZHEIMERS DISEASE

Course of Alzheimers disease is generally accompanied by three stages and each stage is characterized by some broad features and their clinical impact. Further, relatively specific cognitive disturbances may characterize each stage. All this helps in determining the prognostication of disease. It may however be noted that it is not essential for each patient to exhibit all the three sequential stages and it is for the clinician to decide the progression of disease in individual cases. Tables 2, 3 and 4 depict main features, clinical impact and cognitive dysfunctions in different stages of Alzheimer's disease respectively.

**TABLE 2: STAGES OF ALZHEIMERS DISEASE----MAIN FEATURES**

	FIRST	SECOND	THIRD
Severity	mild	Moderate	severe
Duration yrs	2-4	2-12	1-3
Changes	gradual	progressive	advanced
Family	unaware	aware	aware
Diagnosis	unknown	known	known
MMSE score	21-30	10-20	<10

**TABLE 3: STAGES OF ALZHEIMERS DISEASE----CLINICAL IMPACT**

FIRST	SECOND	THIRD
forgetting names, managing money, house keeping, cooking, hobbying	misplacing objects, forgets appointment, no orientaion, difficulty in dressing, phoning, reading, writing, confusing day/night, aimless wandering	not recognizing, no ADL, lethargy, emotionless, unresponsive, emaciation, seizures, bedridden

**TABLE 4: ALZHEIMERS DISEASE STAGES----COGNITIVE DYSFUNCTIONS**

FIRST	SECOND	THIRD
Recent memory, new information, reasoning, logic, judgement, simple task performance, focusing attention, absent minded, naming difficulty, word finding, depression,	Defects of stage 1 plus time date & place disorientation, Visuospatial skills, delusion Depression, hallucinations,	Defects of stage 1 &2 plus Impaired remote memory, Unintelligible speech, little Respons to stimuli,

social withdrawal, calculation,	Inappropri. behavior, aggression	social agitation,	apraxia, Purposeless movements, Total dependence and physical care are required
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**CLINICAL ASSESSMENT OF DEMENTIA**

From a professional point of view, assessment of dementia requires careful history taking from the patient as well as from his family members, a thorough physical examination by the physician, patient’s cognitive testing by employing the well known mini mental state examination (MMSE), a complete neuropsychological evaluation, relevant laboratory investigations and the neuroimaging techniques (table 5) .

**TABLE 5: STEPS IN THE CLINICAL ASSESSMENT OF DEMENTIA**

HISTORY PHYSICAL EXAM COGNITIVE ASSESS	NEUROPSYCH ASSESS LAB. EVALUATION NEUROIMAGING
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Patient’s history should include an enquiry of the type of onset and progression of disease, type of cognitive defect(s) present, any history of associated diseases like hypertension, diabetes or seizures and any family history of dementia. Physical examination should lay emphasis on the type of patient’s gait, and presence of rigidity and myoclonus, if any. Mini Mental State Examination (MMSE) tests orientation, working, episodic memory, language comprehension, naming and copying etc. It is however less sensitive in evaluating executive functioning and thus in the frontal lobe assessment. Neuropsychological assessment is for depression and many other symptoms which are often treatable. A Neuropsychologic Inventory Questionnaire has also been developed for this. Laboratory investigations carried out as relevant to a particular case include testing for thyroid function, vitamin B 12, blood counts, ESR, sodium and potassium, VDRL, HIV, liver and kidney functions, Apolipoprotein E, parathormone, cortisol, and CSF examination. Decreased levels of B-amyloid and aB1-42 and increased levels of ubiquitin, Tau and phosphate Tau in the CSF suggest the diagnosis of Alzheimer’s disease. Neuroimaging techniques include brain CT scan, MRI, SPECT and PET scan in addition to an X-ray chest. PET scan gives disease specific information and measures energy utilization in brain. Fluorodeoxyglucose PET (FDG PET) can differentiate between Alzheimer’s disease (temporoparietal deficit), vascular dementia, FTD and corticobasal degeneration. For further diagnosis, pathological, special biochemical, and neurotransmitter abnormalities can be

investigated.

**Further reading:**

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