



EDUCATIVE CASE STUDY – ALZHEIMER'S DISEASE

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ABSTRACT

Organic mental disorders are behavioral or psychological disorders associated with transient or permanent brain dysfunction. These disorders have a demonstrable and independently diagnosable cerebral disease or disorder. Dementia is an acquired global impairment of intellect, memory and personality but without impairment of consciousness. Alzheimer's type dementia is an irreversible disease marked by global, progressive impairment of cognitive functioning, memory and personality.

Keywords: dementia, brain dysfunction, Alzheimer.

INTRODUCTION

Alzheimer's disease (AD) is a chronic slowly progressive degenerative disease of the brain that slowly damages our cognitive, psychomotor and affective skills¹. It is the most common form of Dementia, accounting for 60% to 80% of all cases². Alois Alzheimer a German physician first described Alzheimer's disease in 1906. Alzheimer had a patient named Auguste D, in her fifties who suffered from what seemed to be a mental illness.³ but when she died in 1906, an autopsy revealed dense deposits, now called neuritic plaques outside and around the nerve cells in her brain⁴. Inside the cells were twisted strands of fiber or neurofibrillary tangles. Since Dr. Alois Alzheimer was the first person who discovered the disease, AD was named after her³. Brain disorder gradually destroys the ability to remember, reason, imagine, and learn.⁵

INCIDENCE.

- Global it is estimated to affect 57 million people⁶
- In India 7.4% prevalence dementia in individuals aged 60 and above⁶
- When we estimated north India 1.07%⁷
- South India the rate increases 7.4%⁷
- Worldwide China affect more as per report of 2019⁸
- 0.84% people suffer at the age of 55 years⁸
- 1.36% affect after 65 years³
- When assessing gender female suffer more than male.²
- Alzheimer's is a neurodegenerative disease it damages and destroy cells in your brain¹ over time About 1 in 9 people aged 65 and older (10.7%) have Alzheimer's.³
- More than 3 million Indians are estimated to have dementia, which is set to rise to 6 million by 2050.²
- Almost two-thirds of Americans with Alzheimer's are women.¹
- Older Black Americans are about twice as likely to have Alzheimer's or other dementias After the age of 65³
- May affect around 50 % of persons over the age of 85¹

INTRODUCTION OF THE CASE STUDY

I came to know with a patient with Alzheimer's aged 77 years; he was in south India. I explored here that, He was a retired government employee, good father to his children and good husband to his wife, had good social contact. When he cross his 69 years he felt some confusion stage and his children took him for health checkup. They found he is in the stage 1 Alzheimer .He acrossed moderate and advanced stage and died his 77 years of aged.

STAGES OF ALZHEIMER'S COMPARISON¹²

Stages	Book picture	Patient picture
Stage I Predetermine mind		
	Forgetfulness beyond what is seen in a normal person	NIL
	The cardinal features of this stage: Short-term memory loss with inability to learn new tasks	NIL
	Loss of initiative and interest/Small personality change	PRESENT
	Difficulty in completing complex daily activities	PRESENT
	Slowly loses the ability to plan and organize	PRESENT
Stage II Moderate stage		
	Has more trouble organizing, planning, and following directions	PRESENT
	Memory loss and confusion become more obvious	PRESENT
	May need help getting dressed, behavioural problems	PRESENT
	Trouble recognizing family members and friends/trouble sleeping	PRESENT
	Mood changes- aggressiveness, irritability, agitation, delusion, disorientation, and wandering symptoms are more	PRESENT
	prominent in the evening called 'sundown syndrome'	PRESENT
Stage III		

Advanced stage/ severe		
	Unable to perform self-care activities and completely dependent upon caregivers	PRESENT
	Cannot understand words	PRESENT
	May have difficulty eating and swallowing	PRESENT
	May not be able to talk	PRESENT
	Urine and stool incontinence	PRESENT
	Losses mobility and bedridden	PRESENT

Above explained patient is in the moderate to advanced stage. He was bedridden, had urine stool incontinence, difficult in eating and swallowing and losses mobility

RISK FACTOR COMPARES WITH BOOK PICTURE ^{13, 14, 15,16,17,18}

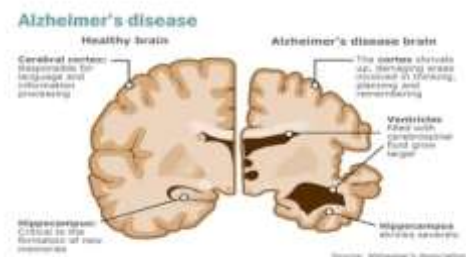
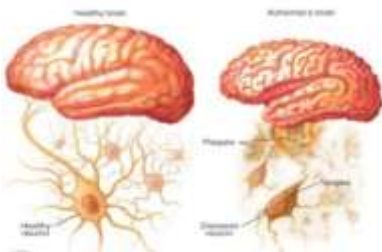
Risk factor	Book picture	Patient picture
Age	After 65	After 65
Gender	Women than men	Male
Family history	yes	Nil
Health condition		
Blood pressure level	High B.P	Low blood pressure
Serum cholesterol	Increase cholesterol	normal
Blood glucose	Blood glucose increase	Increase blood glucose
obesity	Obesity	Nil
injuiry	Head injury	Nil
Chronic stress	Chronic stress	Chronic stress
Environmental factor		
toxins	Exposure to heavy metals like lead, mercury, aluminum, and arsenic, solvents, and certain pesticides	No history
pollutant	Air pollution	Minimal pollution
Hearing loss	Hearing loss	Nil
Genetic factor		
Amyloid Precursor Protein (APP) gene on chromosome 21	Amyloid Precursor Protein (APP) gene on chromosome 21	Unknown, no genetic test done
Presenilin 1 (PSEN1)gene on chromosome 14	Presenilin 1 (PSEN1)gene on chromosome 14	Unknown, no genetic test done
Presenilin 2 (PSEN2) gene on chromosome 1	Presenilin 2 (PSEN2) gene on chromosome 1	Unknown, no genetic test done
Neurochemical factors		
acetylcholine, somatostatin, and norepinephrine	acetylcholine, somatostatin, and norepinephrine	Unknown, no genetic test done
Apo E4 gene	Atleast 1 copy of APOE4 gene present in DNA	Unknown, no genetic test done

Same review study Stephen, Pasternak, wells,jennie (2018) conducted a brief case report of a 63 years old patient with Alzheimer disease and a novel presenilin 2 mutation. The report reveals that B-Amyloid (AB) is a 38-43 aminoacid peptide that aggregates in AD forming toxic soluble amyloid fibrils which form plaques. There is no family history of dementia.the autopsy findings do not support. So the genetic mutation caused by multiple pathology types

CLINICAL MANIFESTATION COMPARISON ^{19,20,21,22}

Clinical manifestation	Book picture	Patient picture
Cognitive & behavioural symptoms	Loss of memory	Loss of recent memory
Memory loss that affects job skills	Present	Daily activity decline
Confusion	present	present
Problems with language	present	present
Disorientation to time and place	Present	Present
Poor or decreased judgment	Present	Present
Problems with abstract thinking	present	present
Misplacing things	Present	Present
Changes in mood and behavior	Present	Present
Changes in personality	Present	Present
Problems with abstract thinking	present	present
Loss of initiative	Present	Present
Physical symptoms		
Difficulty performing familiar tasks	Present	Present
Difficult in physical movement	Present	Present
Problem with daily care	present	present
Swallowing issue	Present	Present
Loss of bodily control	Present	Present
Weight loss	Present	Present
Sleeping disorder	present	present

Same review study Lim Het.al (2017) conducted a case report of a 37 years old alzheimer's disease patient with prominent striatum amyloid retention, he has the complaints of gradual cognitive decline, apraxia, disorientation and sleep disturbance, 18F-Flobetaben amyloid imaging of patient shows diffuse amyloid retention with prominent striatal uptake. This finding supports the clinical utility of amyloid imaging in diagnostic process of early onset AD



PATHOPHYSIOLOGY ^{23,24}

Due to etiological factors

Changes occur in patient nerve cell of the cerebral cortex

Accumulation of neurofibrillary tangles and plaque

Amyloid plaques (More plaques appear in certain parts of the brain eg., Hippocampus-forming and storing short term memories and cerebral cortex-responsible for language and reasoning)

↓
Neurofibrillary tangles (abnormal collections of twisted protein threads inside nerve cells).

↓
Loss of connections between neurons and neuron death

↓
Structural damage

↓
Granulovascular degeneration

↓
Loss of cholinergic nerve cell

↓
Loss of memory, function, cognition

Impression: No autopsy done-so no pathophysiology reports available

DIAGNOSTIC EVALUATION WITH BOOK PICTURE ^{25,26,27,28,}

Assessment	Book picture	Patient picture
Cognitive & behavioral finding		
A. Language difficulty		
a. Use circumlocution	Use wrong words, troubling finding words	Use wrong words, troubling finding words
b. Make paraphasic error	Difficult with comprehension	Difficult with comprehension
c. Vagueness	present	Present
d. Aphasia / echolia	echolia	echolia
B. Semantic memory impairment	Loss of general knowledge, difficult with name and object, selective category memory loss	Recent memory loss. Remote memory present
Mood and personality changes (depending on the types of dementia)	Bipolar disorder Organic personality change Borderline personality disorder Stress and anxiety	Depression Personality disorder/ change stress
Visuoperceptual problem	Difficult in reading & writing Distinguishing object Spatial & organizing skill decrease	Not able to write Difficult in write Organizing skill nil.
Neurological finding		
Primitive reflex	Negative / positive	
a. Release sign	Positive / can be Negative	Grasp reflex present Other reflex negative
b. Snout reflex	Negative/ positive	Negative
Mini mental status examination	19-23-mild 10-18- moderate Less 9 - severe	Score 18
Gait & coordination		
Stooped posture	Present / absent	Absent
Gait disorder	Slow, unsteady , shuffling gait	No coordination in walking Unsteady, risk of falling
Sensory & motor deficit		
sternognosis	Not able to find object by touch	Not able to find object by touch

Graphesthesia	Not able to find letters by touch	Not able to find letters by touch
Tremor & Rigidity	Increase muscle tone / rigidity	Increase muscle tone / rigidity
Cerebellar sign	Negative	Negative
Lab investigation		
Blood glucose	Hyper glycemia may or may not be	Hyper glycemia
Thyroid test	Hypothyroidism may or may not be	Hypothyroidism
Vitamin level	B12 Deficiency may or may not be	B12 Deficiency (when given supplementary)
Beta amyloid & tau protein	Increase level	Not done
CSF BIOMARKERS	Amyloid –beta 42- decreased Total tau- increase Phosphorylated tau-increase	Not done
Montreal cognitive assessment	Below 18	Not done
COMPUTED TOMOGRAPHY	Shrinkage of brain region Cerebral atrophy Enlarged sulci & ventricle	Cerebral atrophy Enlarged sulci & ventricle
POSITRON EMISSION TOMOGRAPHY	Amyloid plaques & detect tau tangles , accumulation of tau protein	Not done
MAGNETIC RESONANCE IMAGING	Atrophied structure and shrunk	Shlvian fissures are prominent Evidence of third& lateral ventricle , temporal horn of right lateral ventricle dilated Diffuse periventricularT2W hypersensitivity Diffuse cerebral atrophy, predominantly involving bi-frontal and right temporal lobes Sulci are prominent
SINGLE PHOTON EMISSION	Reduced blood flow & function in the partial & temporal lobe of brain	Not done
Fluorodeoxyglucose (FDG)	Measure the energy use in brain	Not done

MANAGEMENT

MEDICAL MANAGEMENT^{29, 30}

Medical management	Book picture	Patient picture
Cholinesterase inhibitors – prevent the breakdown of acetylcholine, a chemical messenger important for Cognition and Memory	. Donepezil, Rivastigmine, Galantamine.	. Donepezil
N-methyl D-aspartate receptor antagonist- blocks the NMDA receptor and inhibits overstimulation by glutamate	Memantine	Memantine

Antioxidants–prevent nerve cell damage by destroying toxic free radicals	–vitamin C, vitamin E, and Selegiline	vitamin C, vitamin E, and Selegiline
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NON MEDICAL MANAGEMENT 32

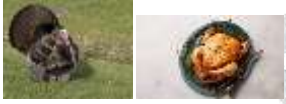
Complementary therapy	Book picture	Patient picture
	Cognitive stimulation therapy	
	Cognitive rehabilitation	
	Reminiscence and life story work	Reminiscence and life story work
	Behavioral and life story work	Behavioral and life story work
	Lifestyle support	Lifestyle support

NURSING MANAGEMENT ³³

Nursing management	Book picture home/ hospital setting	Patient picture – at home
	Establish effective communication with the patient and his family to help them adjust to the patient's altered cognitive abilities Provide emotional support to the patient and his family Administer ordered medications Encourage the patient to exercise as ordered to help maintain mobility Frequently check the vital signs Take the patient to the bathroom at least every 2 hours and make sure he knows the location of the bathroom	Establish effective communication with the patient and his family to help them adjust to the patient's altered cognitive abilities Emotional support given Medication were administered Behavioral management of bladder training given

DIETARY MANAGEMENT ^{34,35}

Nursing management	Book picture	Patient picture
	Nuts (Almond, Cashews, Walnuts): a minimum of 5 servings a week	Nuts (Almond, Cashews, Walnuts): a minimum of 5 servings a week
	Green leafy vegetables (kale, spinach, collard greens, lettuce): a minimum of 6 servings a week	Green leafy vegetables (kale, spinach, collard greens, lettuce): a minimum of 6 servings a week
	Berries (Strawberries, blueberries, raspberries, blackberries): a minimum of 2 servings a week	Nil (in india limited availability)

	Beans (black beans, pinto beans, kidney beans): a minimum of 3 servings a week	Beans (black beans, pinto beans, kidney beans): a minimum of 3 servings a week
	Whole grains (Quinoa , Oatmeal , Brown rice, Whole-grain pasta, and Bread) a minimum of 3 servings a day	Given
	Fish (salmon, tuna, trout): at least 1 serving a week	Fish (salmon, tuna, trout): at least 1 serving a week
	Olive oil is the primary oil used	Nil. Coconut oil used in cooking
	Poultry (chicken , turkey): at least twice a week.	chicken given

PROMOTION HEALTHY TIPS

- Avoid harmful substances
- Challenge yourself via reading frequently, and doing crossword puzzles. Keep mentally active and learn new skills.
- Exercise regularly to make you feel better
- Stay socially active
- Avoid trauma to the brain / recognize and treat depression early
- Early recognition and treatment of AD are important

Normandin P, Chen A, McGillivray L (2023) Conducted a case report on care of the agitated emergency department patient with Alzheimer's disease. It is important that these statistics are understood by emergency nurses because their assigned emergency nurses because their assigned emergency patient it is important that in stage of Alzheimer's disease. A gap in emergency nurses knowledge of available resources to help family members navigate home care of loved ones. Palliative and hospice services available for loved one with alzheimer's disease.

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CONCLUSION

This is a descriptive case study for educational purposes wherein a classic book case was compared with a real life moderate to advanced stage of Alzheimer's patient after his death. However since this patient was residing in south India and had limited resources the test required towards formal definitive diagnosis were done. These to prove diagnosis like genetic studies, PET amyloid scan. CSF studies and postpartum brain autopsy for pathophysiological tests were not done and there by not mentioned in the case study. The management was as per APA guidelines of dementia with some differences due to geographical

location and cultural differences. The case study patient was a classic care of alzheimer's disease and this is highlighted throughout the presentation (by comparison with book picture) and is for educational purposes for students, nurses, clinicians and general public. Same review Normandin P, Chen A

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