



A Case Study of Alzheimer's Disease: Clinical Presentation and Therapeutic Outcomes

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Abstract:

Alzheimer's disease is a progressive neurological disorder manifested by cognitive decline, memory impairment and functional degradation which profoundly affects the quality of life of patients and caretakers. The early diagnosis and adequate therapeutic interventions are very important to reduce the illness progression and enhance the outcome of the patients. An old patient with gradual memory loss, forgetfulness, inability to conduct everyday activities and cognitive dysfunction. The diagnosis of Alzheimer's disease was supported by clinical evaluation, neurological assessment, cognitive testing and diagnostic studies. Her symptoms have been progressively becoming worse with time and impacting her personal and social life. The patient was managed in a multidisciplinary manner, including pharmaceutical management, regular evaluation of cognitive status, education of caregivers, and non-pharmacological therapies such as cognitive stimulation and lifestyle changes. Clinical pharmacist interventions such as medication review, assessment of adherence, patient counseling and monitoring for adverse drug reactions. Following treatment and ongoing follow-up, the patient displayed stabilization of symptoms, improved daily functioning, and adherence to medication. Caregiver awareness and support also contributed to improved illness management and overall patient care.

Keywords: Alzheimer's disease; Dementia; Cognitive impairment; Clinical pharmacist intervention; Pharmacotherapy; Case report

1. INTRODUCTION

Alzheimer's disease (AD) is a chronic progressive neurological illness and the most frequent type of dementia among the elderly. It is marked by a progressive decline in memory, cognition, conduct, and capacity for activities of daily living. The disease usually starts with mild memory problems and develops to severe cognitive dysfunction, and eventually, total dependence on caregivers. Alzheimer's disease (AD) poses a huge challenge to public health because of its increasing prevalence, protracted course of disease, and enormous social and economic impact [1].

Alzheimer's disease is responsible for around 60-80 per cent of dementia cases globally[2] . The prevalence of the condition grows considerably with increasing age, especially in people aged 65 years and beyond. With the aging of the world's population, the number of patients suffering from Alzheimer's disease is predicted to increase dramatically over the next decades. Dementia has become a serious health problem in India and Alzheimer's disease is the most often diagnosed kind. The increasing burden of the disease underscores the necessity for early identification, rapid action and holistic patient care [3].

The etiology of Alzheimer's disease is complex and involves several pathways. The pathogenic characteristics include the extracellular accumulations of amyloid-beta (A β) plaques and intracellular deposits of hyperphosphorylated tau protein as neurofibrillary tangles. These problems lead to neuronal malfunction, synapse loss, neuroinflammation, and

gradual neuronal death, mainly in the brain areas important for memory and learning such as hippocampus and cerebral cortex . Moreover, there is a marked impairment of the cholinergic neurotransmission that results in the cognitive impairment and memory difficulties typical of the condition [4,5].

Despite advancements in diagnostic methods and therapeutic alternatives, Alzheimer's disease still remains incurable. The present treatments are mostly geared at slowing down the course of the disease and increasing quality of life. Case reports are an essential source of information for clinical knowledge, describing the presentation, management tactics, treatment outcomes and difficulties in managing patients' disease. This report presents the clinical presentation, assessment, therapeutic therapy and outcome of a patient with Alzheimer's disease emphasizing the relevance of multidisciplinary approach and involvement of clinical pharmacy services in enhancing patient care.

Patient Information

Age: 67 years

Gender: Female

Occupation: Not available in case sheet

Chief Complaints:

- Progressive memory loss for several months
- Forgetting important daily activities and events
- Depressed mood
- Loss of interest in routine activities
- Decreased appetite
- Thoughts of death due to worsening memory problems

Medical History

Past Medical History

- Type 2 Diabetes Mellitus
- Hypertension
- Hyperlipidemia

Family History

- No relevant family history reported

Medication History

Drug	Dose	Frequency
Amlodipine	5 mg	OD
Metformin	500 mg	OD
Atorvastatin	20 mg	OD

Social History

- Non-smoker
- Non-alcoholic

- No known drug allergies (NKDA)

Clinical Findings

Physical Examination

Vital Signs

- Temperature: 98.4–99°F
- Blood Pressure: 130–140/80–100 mmHg
- Pulse Rate: 74–80 bpm

Systemic Examination

- CVS: S1, S2 heard (+)
- RS: Bilateral air entry present
- P/A: Soft, non-tender

Neurological Examination

- Progressive impairment of recent memory
- Difficulty recalling important information
- Impaired cognitive functioning affecting daily activities
- MRI showed hippocampal atrophy
- CSF analysis showed elevated protein and altered β -amyloid levels suggestive of Alzheimer's disease

Cognitive Assessment Findings

- Significant memory impairment
- Forgetfulness affecting activities of daily living
- Reduced attention and cognitive performance
- Associated depressive symptoms including low mood, loss of interest, and poor appetite

Patient Risk Factors

Age: 67 years

Sex Female Type 2 Diabetes Mellitus

High blood pressure

Hyperlipemia Depression Effect on Activities of Daily Living

The patient's memory problems greatly impacted their ability to operate in their everyday life, making it hard to retain vital information and execute basic tasks without assistance, consequently diminishing their quality of life.

This case demonstrates the association of Alzheimer's disease with depression in an elderly female patient with various cardiovascular risk factors like hypertension, diabetes mellitus and hyperlipidemia. Early diagnosis and therapy initiation were made possible by clinical examination, MRI findings of hippocampal atrophy and CSF biomarkers, with the aim to slow down the course of cognitive decline and improve the quality of life.

2. Diagnostic Evaluation

Physical Examination

Comprehensive Examination

The patient was conscious and oriented.

At ease during hospitalization.

No pallor, cyanosis, clubbing, edema, or icterus were observed.

Vital Signs

Temperature: 98.4–99°F

Blood pressure: 130–140/80–100 mmHg

Pulse rate: 74–80 pulses per minute

Examination of the System

Cardiovascular System (CVS):

Normal hearing of the S1 and S2 heart murmurs.

Respiratory System (RS):

Present is bilateral air entry.

Per Abdomen (P/A):

Soft and non-tender abdominal tissue.

Neurological Examination

A gradual deterioration in recent memory.

Difficulty in remembering significant events and daily activities.

Activities of daily living are adversely affected by impaired cognitive function.

Low mood, loss of interest, and impaired appetite are among the associated depressive symptoms.

No focal neurological deficits were reported.

MMSE/MoCA Score

There was no documentation of the MMSE/MoCA score in the case summary. The patient exhibited moderate cognitive impairment that was consistent with Alzheimer's disease, as indicated by the clinical presentation.

Laboratory Examinations

Hematological Parameters

Hemoglobin: 13 g/dL

RBC Count: 4.7 million/cu.mm

WBC Count: 6200 cells/cu.mm

Lymphocytes: 22%

Eosinophils: 2%

Monocytes: four percent

Blood glucose levels

FBS: 140 mg/dL

RBS: 190 mg/dL

PPBS: 180 mg/dL Electrolytes

Sodium: 140 mmol/L

Potassium: 4.2 mmol/L

Chloride: 100 mmol/L

Lipid Profile

Total Cholesterol: 290 mg/dL

HDL: 30 mg/dL

LDL: 200 mg/dL

Triglycerides: 210 mg/dL

Urine Analysis

A transparent, pale yellow hue

pH: 6.0 Specific gravity: 1.020

Glucose: Negative

Blood: Negative

Pus cells: 3–4/HPF

Epithelial cells: 1–2/HPF

CT/MRI Results

The MRI brain revealed hippocampal atrophy, a defining characteristic of Alzheimer's disease. Progressive memory loss and cognitive decline are exacerbated by the degeneration of the hippocampus, which is responsible for memory formation.

CSF analysis revealed elevated protein levels and altered β -amyloid levels, which corroborated the diagnosis of Alzheimer's disease.

Final Prognosis

Alzheimer's disease with co-existing depression in a patient with Type 2 diabetes mellitus, hypertension, and hyperlipidemia.

3. Treatment and Management

Pharmacological Management

The patient was treated with a combination of anti-dementia and antidepressant medications.

Drug	Dose	Frequency	Indication
Donepezil	5 mg	Once daily	Alzheimer's disease
Memantine	5 mg	Once daily	Moderate Alzheimer's disease

Sertraline	50 mg	Once daily	Depression
Mirtazapine	15 mg	At bedtime	Depression and appetite stimulation
Amlodipine	5 mg	Once daily	Hypertension

Therapeutic Rationale

Donepezil was administered to improve cognitive function and to promote cholinergic neurotransmission. Memantine was used to delay progression of the condition, reducing neurotoxicity mediated by glutamate. Sertraline and mirtazapine were used to treat depressive symptoms and stimulate appetite. He continued amlodipine for blood pressure control.

Non-Pharmacological Management

Exercises to stimulate cognitive abilities and train memory.

Walk regularly, physical activity.

Adequate nutrition with a balanced diet.

Implementation of a structured daily schedule.

Caregiver involvement and family support.

Stress reduction and sufficient sleep.

Social participation and recreation engagement.

Home safety precautions to avoid falls and mishaps.

Pharmacist Interventions in Clinical Practice Medication Review

Therapeutic appropriateness, effectiveness, safety and probable drug interactions were checked from the patients' medication profile. Comorbid diseases like diabetes mellitus, hypertension and hyperlipidemia were also evaluated to maximize the overall treatment outcomes.

Counseling for Patients

The patient was instructed on:

Why medication adherence is important.

Alzheimer's disease: what it is and how it progresses.

Advantages of cognitive stimulation activities.

Regular follow up visits are required.

The significance of a healthy lifestyle.

Caregiver Counseling

The caregiver was counseled about:

Administer medication properly .

Observation for cognitive and behavioral changes.

Keeping a safe household environment.

Emotional and psychological support.

Promoting engagement in daily activities.

ADR Surveillance

The patient was observed for possible adverse medication reactions:

Donepezil - nausea, vomiting, diarrhoea, bradycardia.

Memantine : dizziness, headache, disorientation.

Sertraline : sleeplessness, GI upset.

Mirtazapine: weight gain, sedation.

Amlodipine Peripheral edema, hypotension

Possible medication interactions identified:

Sertraline + Mirtazapine: risk of serotonin syndrome increases.

Donepezil + Mirtazapine: additive bradycardic effects possible.

Amlodipine + Mirtazapine: hypotensive effect increased.

Compliance Assessment

Medication adherence was examined through patient/caregiver interview. The patient was compliant to therapy with the help of the caregiver. The recommendation was to strengthen medication scheduling and follow-up monitoring.

Follow-up and Results

Response to therapy Stabilization of cognitive symptoms was found after commencement of therapy. A mood lift and improved emotional well-being were observed in the patient.

Symptom changes

Depression symptoms decreased.

Increased hunger.

Better participation in day to day activities.

Stabilization of memory loss.

Follow-up Results

Regular follow-up visits were recommended to check cognitive function, response to medication, side effects and illness progression. Caregiver involvement was recommended on an ongoing basis to promote medication adherence and patient safety.

4. Discussion

Alzheimer's disease is a neurological disease that is characterized by gradual deterioration of memory, cognition, behavior and loss of functional independence. It is the most prevalent cause of dementia in old age. Pathological hallmarks are the deposition of β -amyloid plaques, neurofibrillary tangles and loss of neurons mainly in the hippocampus and cerebral cortex[1,4].

Comparison of the Present Case to Published Literature

The clinical aspects in the present patient were typical of those reported in the literature, including increasing memory loss, cognitive deterioration, depressed symptoms and hippocampus atrophy on MRI. Similar studies have demonstrated that concomitant illnesses such as diabetes mellitus, hypertension, and hyperlipidemia enhance the likelihood of cognitive impairment and hasten disease progression.

Implications of the Findings

The evidence of hippocampal shrinkage and aberrant CSF biomarkers were highly supportive of the diagnosis of AD. Early detection of depressive symptoms was critical, because depression can aggravate cognitive impairment and adversely influence quality of life [8,9].

Treatment Rationale

Donepezil and Memantine combination therapy was chosen to tackle various processes implicated in AD development. The patient was started on Sertraline and Mirtazapine for related depression and increased appetite. Management of cardiovascular risk factors was continued to avoid additional cognitive decline [10,11].

Clinical Pharmacist Role

The clinical pharmacist was an integral team member in reviewing medications, identifying drug interactions, counseling patients and caregivers, monitoring ADRs, assessing and promoting adherence, and advocating for reasonable drug therapy. These treatments improved the results of treatment and increased the quality of patient care [12].

5. Conclusion

This article underlines the need of early diagnosis and holistic care in older individuals with Alzheimer's disease. The clinical picture was further confounded by the combination of depression and cardiovascular risk factors. Clinical examination, MRI findings and laboratory tests aided in timely diagnosis and commencement of suitable pharmaceutical and non-pharmacological therapies. The involvement of clinical pharmacists greatly enhanced medication safety, adherence, and patient education. Timely diagnosis and interdisciplinary management are crucial to delay illness progression, enhance quality of life, and lessen the burden on caregivers.

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