



Alzheimer's disease: a case study involving the most prevalent neurocognitive disorder in older people

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Abstract

Objective: To analyze the clinical evolution of a patient affected by Alzheimer's disease and discuss the repercussions of an early diagnosis. **Method:** Instrumental case study of qualitative and descriptive type that was developed in three stages: 1) selection and delimitation of the case; 2) collection of data in the field; and 3) organization and writing of the report. This study is based on the analysis of the clinical evolution described in the medical records of a patient diagnosed with Alzheimer's disease, treated and followed-up by the Center for Psychosocial Care (CAPS), for a period of 10 years, in the Alto Vale do Rio do Peixe region. **Results:** This study was conducted with the patient M.R., female, 71 years old, married, housewife, with incomplete elementary education, carrier of AD and hypothyroidism, who started her follow-up at CAPS II on September 10, 2012. Patient submitted to the Mini Mental State Examination (MMSE), with a result of 14 points in the first test, below the cut-off point for the patient's level of education. Later, in 2018, she scored 10 points on the MMSE, and in 2020 she scored 11, already under medication treatment for AD: memantine 10mg 2x/day and donepezilla 5mg 1x/day. **Conclusion:** Early diagnosis of AD is extremely important for appropriate treatment to slow the progression of the disease. However, mental disorders such as depression are barriers in the initial clinical analysis of patients and in some cases presents itself as a prodrome for AD.

Keywords: Alzheimer
Dementia. Early diagnosis.
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INTRODUCTION

Alzheimer's Disease (AD) is characterized as a neurocognitive disorder with a progressive course. The condition first affects the hippocampus, the region of the brain responsible for memory, and later involves other areas of the brain. The disease represents the leading cause of dementia in older adults and directly impacts the autonomy and quality of life of this group^{1,2,3}.

In the mild stage, the disease is characterized by symptoms such as memory loss and impaired learning, which may be accompanied by motor difficulties. More advanced stages may be marked by declines in cognitive, executive and language abilities. In relation to the disease, Câmara⁵ noted that 60-80% of dementia cases are due to AD, making it the most common chronic incurable neurodegenerative disorder in the population worldwide^{4,5}.

Alzheimer's disease is a multifactorial idiopathic disease. Disease progression is influenced by both environmental factors (e.g. advanced age, *diabetes mellitus*, stroke, obesity, smoking, sedentarism, inadequate diet, and depression) and genetic factors (apolipoprotein E ϵ 4 allele)^{5,6}.

Diagnosis of the disorder is complex and patients often face underdiagnosis because of the difficulty identifying initial symptoms, with diagnosis typically being late, when cognitive impairment has become severe. Currently, AD is recognized by a group of clinical symptoms perceived by the patient and/or family members, together with neuropsychological screening tests such as the Mini-Mental state Exam (MMSE), and complementary imaging scans such as MRI^{3,7}.

Physiopathologically, AD is characterized by the aggregation of beta-amyloid ($A\beta$) proteins associated with the pathological alteration in the *tau* protein, where elevated levels in cerebrospinal fluid (CSF) are explained by axonal loss. In addition, the acetylcholine neurotransmitter (ACh) undergoes changes in its function and is low in the brain of AD patients, an event associated with cognitive damage^{5,7,8}.

With regard to treatment, a multidisciplinary care plan, in conjunction with drugs treatment, should be established, based mainly on classes of acetylcholinesterase inhibitors (AChE) and the N-methyl-D-aspartate (NMDA) receptor antagonist^{2,5}. Regarding non-pharmacological approaches, Costa et al.⁹ notes that most studies involve older adults with mild-to-moderate AD, where non-pharmacological methods are typically used, e.g. physical activity or aerobic activity, followed by cognitive intervention or rehabilitation, music therapy and MAKS therapy (motor stimulation, activity of daily living, cognitive stimulation and social element).

Against this backdrop, the importance of identifying the aspects involved in the process of AD progression and disease screening is clear, given the current underdiagnosis of the condition, precluding early treatment of AD patients. Therefore, the objective of the present study was to analyze the clinical course of a patient with Alzheimer's Disease and to discuss the repercussion of early diagnosis.

METHOD

A descriptive qualitative instrumental case study was conducted in 3 stages: 1) selection and defining of the case; 2) data collection in the field; and 3) organization and write-up of the case report. This study was centered on a patient with AD, selected irrespective of gender, who had a clinically-confirmed (by psychiatrist) diagnosis of the condition, and continued follow-up at the health service. Data were drawn from the patient's medical chart and electronic records, containing medical notes containing information on: a) mental health status at presentation to the health service (Psychosocial Care Center II); b) medication dosages prescribed for treatment; c) signs exhibited by patient at onset of neurodegeneration; and d) results of mental evaluations using the MMSE.

In accordance with legal precepts, participation of the patient entailed a visit scheduled with both patient and spouse (legal guardian) during which the aims of the case study were explained, together with the rights of participants, and anonymity and confidentiality of clinical data.

Data analysis entailed 3 stages: 1) pre-analytical, consisting of reading and exhaustive examination of the literature selected by authors; 2) exploring the material to determine the theoretical and empirical categories guiding the specification of the topics; 3) interpretation of the results in light of the study objectives outlined.

Data analysis was initially focused on the patient's sociodemographic data, including age, place of birth and employment background. Subsequently, the analysis centered on clinical anamnesis of the patient, with an emphasis not only on the patient history upon presenting at the health service, but also on the AD diagnosis, medications prescribed during follow-up, as well as improvement or worsening of prognosis based on MMSE performance. To this end, the case was elucidated by performing an in-depth analysis of the patient's medical records, followed by extraction of the pertinent information to build the case study.

After signing the Free and Informed Consent Form, data were compiled for the case study between July and August 2022, following approval of the documentation by the Municipal Health Secretariat and by the local Research Ethics Committee (permit no. 5.616.881).

RESULTS

The study involved M.R., a 71-year-old female patient, married, housewife, with incomplete primary education, diagnosed with AD and hypothyroidism, followed at the CAPS II since presenting at the service on 10 September 2012. Screening anamnesis by professionals at the center revealed the patient had previously been admitted to the psychiatric ward of the Hospital e Maternidade de Santa Cecília, in the city of Santa Cecília, Santa Catarina state after numerous suicide attempts. During the stay at the clinic, the patient was placed on a treatment regimen consisting of risperidone 1 mg 3x/day, chlorpromazine 100 mg 1x/day, diazepam 10 mg 1x/day and Puran® T4 100 mg/day, progressing well until discharge. Subsequently, on 4 October 2012, the patient returned to the CAPS II for a consultation with a neuropsychiatric professional, who prescribed the same medication doses and, in their report, suggested

a possible diagnosis of schizophrenia or AD in view of the symptoms exhibited by the patient. On 17 of October 2012, the patient returned to the service with anxious symptoms, for which the drug Amplictil (chlorpromazine) 100mg 2x/day was prescribed.

The patient ceased follow-up due to problems getting to the health service, returning in February 2013 for a consultation with a neuropsychiatrist, who prescribed risperidone 1 mg 3x/day, diazepam 10 mg 2x/day, Amplictil 100 mg 2x/day and biperiden 2 mg 2x/day. On 13 March 2013, the first MMSE test was applied, on which the participant scored 14 points, below the cut-off for the patient's educational level.

In September 2013, the patient was seen by another psychiatrist and given a new prescription of memantine 20mg 1x/day, risperidone 1mg 1x/day, Amplictil 100mg 1x/day. On 11 June 2014, the definitive diagnosis of AD was established. In the medical records, the multidisciplinary team noted that, during dance therapy sessions, the patient was participative despite coordination problems. The patient continued receiving psychiatric treatment, with the disease remaining stable in 2015, and also engaged in alternative therapies (art therapy). In the medical records, the team reported that the patient's daughter had collected the medications for treatment continuation.

In 2018, the patient (accompanied by daughter) was seen by a different physician who conducted an anamnesis. Based on results, the psychiatrist documented the onset of cognitive decline 6 years prior, with the family reporting symptoms that included selling of personal items and furniture, irritability, visual hallucinations, hetero-aggressiveness, failure to recognize close individuals (except for son-in-law), decline in self-care activities, and compromised discourse. The patient was in a stable condition but exhibited impaired recent memory. The prescribed therapy of memantine 10mg 1x/day, Amplictil 100mg 1x/day and risperidone 1mg 2x/day was maintained.

At a return visit on 10 October 2018, the doctor noted stabilization of neurocognitive deficits after use of memantine in the medical record, altering the prescription to memantine 10mg 1x/day, risperidone 1mg 2x/day and chlorpromazine 100mg 1x/day. On

3 December 2018, the patient underwent another cognitive assessment, scoring 10 points on the MMSE. The Clinical Dementia Rating (CDR) was also applied, yielding a score of 3 on the standard version and 2 points on the adapted scale. On 10 February 2020, another assessment of mental state was performed, where the patient scored 11 points on the MMSE and 2 on the CDR. The prescribed medication was also changed (memantine 10mg 2x/day and donepezil 5mg 1x/day).

The patient suspended face-to-face follow-up at the CAPS II due to the COVID-19 pandemic, but continued taking the prescribed medications. The patient returned in the middle of 2022 to renew the medical prescription and again in June 2022, scoring 11 on the MMSE.

DISCUSSION

The diagnosis of Alzheimer's Disease (AD) is reached based on clinical analysis. Among the risk factors, depression is most notable because it develops with cognitive decline, as does AD, and thus may help or hinder early diagnosis of dementia⁶. In the first case, worsening depressive symptoms may prompt seeking of mental health services, leading to a differential early diagnosis for AD, as occurred in the present case. In some cases, however, depression may present as a prodrome of AD, given that the neurodegeneration associated with dementia can trigger depressive symptoms which, in turn, may mimic dementia¹⁰.

Regarding AD diagnosis, 3 clinical stages are defined: 1) mild, corresponding to the onset of amnesia and cognitive decline; 2) moderate, worsening of cognitive and neuropsychiatric symptoms, such as *delirium*, agitation and hallucinations; and 3) severe, patient totally dependent and overall reduction in neurocognitive domains. Recent studies show that the pathogenicity of AD commences long before the onset of first symptoms. During this asymptomatic stage, mild behavioral/cognitive alterations may occur, although these do not characterize mild cognitive impairment, being amenable to intervention for slowing or preventing disease progression¹¹.

With respect to the clinical assessment of the disease, clinicians rely on tests to measure the status of neurocognitive domains and determine dementia progression. The MMSE is the most widely used cognitive screening instrument owing to its accessibility, where other health professionals can also use this tool, and to its rapid application¹².

In the case reported, the patient underwent cognitive assessment using the MMSE, one of the most applied tests for assessing cognitive function in older people. The tool encompasses the 5 domains of orientation, calculation/working memory, delayed recall, immediate and episodic memory, language and visuospatial ability¹³. In the case described, the patient had 4 MMSE assessments between 2013 and 2022, yielding scores of 14, 10, 11 and 11 points.

In Brazil, Brucki et al.¹⁴ adjusted MMSE score according to educational level, with the original scored on a scale of 30 points. In the case study, the patient had studied to incomplete primary level, corresponding to 1-4 years of education on Brucki's classification, giving a score of 25 points. Thus, the performance of the patient outlined earlier indicates a deficit in cognitive function.

Pharmacological therapy is based on two pillars: disease-modifying drugs, i.e. acetylcholinesterase inhibitors (AChE) and N-methyl-d-aspartate receptor (NMDA) antagonists, and anti-psychotics/neuroleptics¹⁵. Early in the investigation, the patient was administered risperidone and chlorpromazine for suspected schizophrenia. At a later juncture, after the MMSE evidenced cognitive decline, the drugs prescription included memantine – representing the main NMDA receptor antagonist – risperidone and Ampticitil, employed as an anti-psychotic/neuroleptic. The patient also had difficulty recognizing close people, exhibited compromised discourse and impaired recent memory, suggesting cognitive decline and justifying the use of donepezil, an acetylcholinesterase inhibitor (AChE). This class of drugs is recommended for patients at mild-to-moderate stages of the disease, with the aim of delaying cognitive dysfunction. These medications act by inhibiting the catabolic enzyme AChE, slowing the reduction in acetylcholine levels, thereby improving its availability^{16,17}.

This case study has some limitations. First, there were difficulties finding eligible patients diagnosed with AD. Second, the patient's medical records were lacking some information on disease course, hindering the follow-up of AD progression. Lastly, despite these limitations, the findings of the present case report remain valid, with sufficient information collected for a satisfactory investigation of the disease.

CONCLUSION

The symptoms of the patient in this case study suggest the presence of mild-to-moderate dementia. After use of the disease-modifying drugs, stabilization of the condition was evident on the MMSE test. This outcome underscores the importance of early diagnosis and timely treatment of Alzheimer's Disease to stabilize the condition and promote quality of life. However, there are barriers hampering initial clinical analysis, particularly depression which manifests as a prodrome for AD in some cases.

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