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Theranostics of Brain, Spine & Neural Disord

How to Diagnose an Alzheimer Disease?

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Abstract

Alzheimer's disease is a neurodegenerative disorder characterized by an insidious onset, a gradual decline in cognitive functions, a constant but frequent occurrence of non-cognitive disturbances (psychological and behavioral disorders) and inexorably leading to a loss of functional autonomy. Alzheimer's dementia corresponds to the stage of the illness during which the clinical symptoms (affecting memory and other areas) are sufficient to alter the activities of everyday life. Typical Alzheimer's disease (common form) is characterized by the installation of an early and significant progressive deficit of the episodic memory that will always remain dominant. Behavioral and psychological symptoms of dementia represent common clinical features of dementias, contributing to the heterogeneous phenotypic expression of Alzheimer's disease. Recently proposed diagnostic criteria, in addition to the clinical neuropsychological examination aimed at identifying the typical AD symptoms, include staging criteria based on AD biological measures related to its pathology. Despite the obvious benefits of these new criteria, an accurate diagnosis is not always easily reached because, particularly in its earliest stages, the symptoms of the disease are very variable. Biological measures, or biomarkers, of the disease should first facilitate an early and accurate diagnosis, have a prognostic and predictive value, and have the capacity to monitor therapeutic efficacy. Amyloid imaging and CSF tau/A β ratio may be useful in the differential diagnosis with other neurodegenerative dementias, especially, in early onset cases the evolution during which it will associate with other cognitive disorders.

Keywords: Biomarkers; Dementia; Alzheimer's disease; Cognitive impairment; Behavioral disorder

Introduction

Alzheimer's disease is a neurodegenerative disorder characterized by an insidious onset, a gradual decline in cognitive functions, a constant but frequent occurrence of non-cognitive disturbances (psychological and behavioral disorders) and inexorably leading to a loss of functional autonomy. The disease usually begins after 60 years; its progression is slow and continuous. Alzheimer's disease is the most common cause of dementia and its prevalence increases with age. It is estimated that approximately 12-20% of those over 85 years of age are affected [1].

Physicians have long been helpless in the face of the disease because they have no treatment at their disposal. Only a decade ago, a specific pharmacological approach emerged. These new therapeutic possibilities have considerably modified the medical view of dementia and have encouraged the development of reliable and early diagnostic approaches.

Alzheimer's disease is a progressive amnestic dementia [2]. This means that:

A. The deficit of episodic memory is the cardinal sign of Alzheimer's disease, appearing in the early stages of the disease and gradually accompanied by a more comprehensive cognitive deficit responding to the attainment of instrumental functions.

B. Alzheimer's disease is part of dementia, which is defined by a deficit of episodic memory and another cognitive function (aphasia, apraxia, agnosia, disorders of executive functions) sufficiently severe to cause loss of consciousness, utonomy in everyday, professional or social life.

This progression of the disease gives an account of the mode of progression of the lesions. Thus, memory disorders are the first signs [3], reflecting the attainment of hippocampal formations. They are accompanied by secondary effects of instrumental functions (apraxia, agnosia, aphasia), reflecting the diffusion of lesions to the associative neocortex [4].

The Disease Begins with Memory Problems

Memory disorders characterize the clinical picture. They settle gradually and insidiously [5]. During the interview, one of the characteristics of memory disorders observed in Alzheimer's disease is the tendency of the subject to minimize his difficulties. It is often the entourage, worried, who motivated the first

consultation, while the patient adopts a rather reassuring role and trivializes his errors. However, in the early stage of the disease, the patient may have a certain awareness of his amnesia and describe with lucidity and precision his oversights, which can be a source of great anxiety [6]. The consequences of forgetfulness on everyday life are early, even if the patient can adapt using routines of functioning and habits. Forgetting may include making appointments or recent information, loss of conversation, a tendency to repeat the same questions, loss of objects. Obligations mainly affect recent events, such as telephone interviews, purchases at the store, a recent encounter. The old memories are on the contrary long preserved, which can sometimes wrongly reassure the entourage.

The memory deficit affects the episodic memory, which corresponds to the memory of events and events and involves explicit (voluntary and conscious) processes of recollection of memory. This memory deficit can be explored by specific neuropsychological tests that make it possible to objectify the decline in performance and direct the etiological diagnosis. Indeed, the profile of the memory deficit corresponds to what is called a "hippocampal profile". An accurate analysis of memory dysfunction allows us to distinguish between Alzheimer's disease, physiological aging, depression of the elderly, subcortical dementias [7]. When the disease evolves, the semantic memory (general knowledge) and autobiographical memory will be reached.

The Deficit of other Cognitive Functions is Gradual

Anosognosia is early and corresponds to ignorance by the subject of his disease with an inability to perceive his amnesia. Anosognosia is very disabling because it can impede good adherence and patient adherence to medical follow-up. Finally, it is often a source of patient irritability, or conflict with the environment, when it comes to bringing home help that the patient feels is an unwarranted intrusion into his private life [8].

Disorders of temporo-spatial orientation are early [9]. The patient may be early in the illness still able to go out into his familiar neighborhood, using over-learned paths but is no longer able to navigate to an unusual and new location. Gradually, he will not be able to leave without being accompanied.

The language disorders settle in a second time. This is initially a lack of word (aphasia anomaly). Sometimes the patient makes some semantic paraphasia (ex: dog for cat), or more rarely phonemic paraphasia (mark book instead of bookmark.). Understanding is long preserved, as well as repetition. The writing will be reached gradually, with an unusual dysorthography, then with an agrammatism and disorders of graphics [10]. Reading is kept longer. Sometimes the patient reduces his readings early but more because of his memory problems than because of an alexia. He can also re-read the same book in a loop.

In the later stages of the disease, language disorders are important, both in oral and written production and in comprehension skills. The conversation is no longer informative, even if the patient can be sensitive to the overall context of speech and use verbal stereotypes that may be illusory. At the terminal stage, aphasia is global. In rare cases, language disorders can inaugurate Alzheimer's disease. Note that the difficulties of access to proper names are very frequent during aging and are not necessarily pathological.

Apraxia often appears in conjunction with language disorders [11]. It must be sought after neurological examination because it is only apparent in the gestures of everyday life in the already evolved stages of the disease, since ideological apraxia (use of an object) is only late. In the beginning, it is a reflexive ideomotor limb apraxia, which one will seek by the imitation of gestures. Two-handed gestures are affected earlier than single-handed gestures. Mimicry gestures (mimicking a comb with a comb, brushing your teeth, playing the violin) are poorly done, with the use of the hand for the object (such as the index for the tooth brush) [12]. Symbolic gestures are approximate. Constructive apraxia is sought by asking to draw a cube, or by copies of drawings. The apraxia of the dressing is constant during the evolution of the disease. It manifests itself in an inability to dress alone or more discreetly to button his clothes. Sometimes the patient needs help in choosing his clothes as he tends to put on the same daily. This is not an apraxia of dressing properly so called [13].

Visual agnosia is late. It is characterized first by a disorder of the recognition of the images, and then the recognition of the objects is reached. Face recognition disorders are constant in the severe stages of the disease, even affecting the patient's own face in a mirror [14]. The disturbances of judgment and reasoning are gradually established. The capacities of conceptualization and abstraction are also achieved.

Psychological and Behavioral Disorders Accompaning the Progression of Cognitive Deficit

In general, psychological and behavioral disorders are rare at the onset of the disease and then frequent in the severe stages of the disease [15]. These may include mood changes. The patient shows a lack of interest in his previous activities, he experiences a sense of uselessness, guilt, loss of self-esteem, which can manifest itself in irritability and "mood swings". These signs may be a reflection of depression associated with dementia, especially if neurovegetative disorders, such as loss of appetite, sleep disturbance, are present [16]. However, some symptoms such as apathy and inertia are clinical features specific to AD. Impulsivity is also possible. A social withdrawal is constantly observed, the patient gradually stopping his activities and his spouse remaining more and more with him. Finally, the patient no longer pays attention to clothing, toilet, social appearance can be observed in the severe stages of the disease.

Delirious episodes and visual hallucinations can be observed in the severe stages of the disease. The delirium often contains themes of persecution and ideas of prejudice. The patient feels

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that visitors are robbing him, that his spouse is deceiving him, that a crime has been committed, that the identity of the visitors [17].

The Loss of Functional Autonomy is Constant

Intellectual deficit leads to dependence on the actions of everyday life. Activities involving cognitive processes are affected the earliest and are evaluated by the instrumental activity scales in everyday life: the ability to use the telephone, the ability to use public transit or one's own car, capacity to manage its budget and autonomy in taking medicines. Then the addiction touches the elementary gestures of daily life (dressing, toilet, meal) [18].

There is not a Single Biological Marker of Alzheimer's Disease

The biological assessment is essential for the etiological investigation. It is based on the minimal realization of: NFS, platelets, blood ionogram, serum calcium, protidemia, TSH, and depending on the context of B12 and folate assay, liver function. Venereal disease research laboratory (VDRL), treponema pallidum haemagglutination (TPHA) and inno-LIA tests confirmed the presence of neurosyphilis, in the absence of a biological marker of the disease; the aim is to look for comorbidities, or rare causes of dementia.

If a recent study indicates that the combined dosage of amyloid 1-42 and tau in the cerebrospinal fluid significantly increases the ability to discriminate against Alzheimer's disease [19], these techniques require a lumbar puncture.

Cerebral Imaging is Essential

At least one cerebral scan without injection of contrast medium is carried out, showing an increase in the size of the ventricles and cortical furrows, a reflection of cortical atrophy. There is no parenchymal abnormality. Periventricular, aspecific hypodensities are also referred to as leukoaraiosis, especially in elderly subjects with a vascular risk factor. Above all, one can visualize a medial temporal atrophy with in particular a predominant dilation of the temporal ventricular horns. Cerebral scan also eliminates intracerebral lesions (expansive process, sequelae of strokes, hydrocephalus under normal pressure) [20].

Cerebral MRI provides much more accurate morphological anatomical data than computerized tomography (CT) scan and may reveal white matter abnormalities not detectable by CT. It allows locating more precisely atrophy than the scanner allows. At the early stage of AD, atrophy predominates in the internal temporal region, particularly in the hippocampal formations, in a relatively symmetrical manner. At the later stage, atrophy is more diffuse, predominant on the temporo-parietal and then frontal regions [21].

Patients with Alzheimer's disease are also distinguished from normal elderly subjects in cerebral scintigraphy by hypoperfusion in the hippocampo-tonsillar region [22], and then the cerebral hypodébit appears in the posterior parieto-temporal cortical regions bilateral.

Thus, Alzheimer's disease is a progressive amnestic dementia. The diagnosis remains a clinical diagnosis. The analysis of the cognitive deficit, and more specifically of the memory deficit, by a specialized neuropsychological assessment is one of the keys to the etiological investigation.

In summary, what are the diagnostic criteria for Alzheimer type dementia [1]- **Prodromal Alzheimer's disease** [5]: includes: Clinical symptoms:

A. Including an episodic memory of the hippocampal type found in the context of an RL/RI type memory test (the indication does not significantly improve the recall).

B. Which are not sufficient to alter the activities of daily life.

The presence of biomarkers [23]:

A. LCR: peptide β amyloid, Tau, Phospho-Tau.

B. Imaging: hippocampal atrophy in MRI, hypometabolism in FDG-PET, senile plaques in PIB-PET.

Dementia Alzheimer's disease is the phase of the disease in which the clinical symptoms (affecting memory and other areas) are sufficient to alter the activities of daily life [24].

Typical Alzheimer's disease (common form) is characterized by installing an early and significant progressive deficit of the episodic memory that will always remain dominant in the evolution during which it will associate with other cognitive disorders (dysexectives, apraxic, aphasic or visual agnosics), and psychiatric, by the presence of biomarkers [25].

Atypical Alzheimer's disease is characterized by other well-characterized clinical phenotypes: nonfluent primary progressive aphasia, logopenic aphasia, frontal variant and posterior cortical atrophy [26] by the presence of biomarkers in the CSF or by imaging (senile plaques in PIB-PET).

Mixed Alzheimer's disease is characterized by the presence of all the diagnostic criteria of typical Alzheimer's disease, and by the presence of clinical signs and biomarkers showing a comorbidity (vascular, LBD) [27].

References

1. Qiu C, Kivipelto M, von Strauss E (2009) Epidemiology of Alzheimer's disease: occurrence, determinants, and strategies toward intervention. Dialogues Clin Neurosci 11(2): 111-128.

2. Dubois B (2000) Prodromal Alzheimer's disease: Editorial review. Curr Opin Neurology 13: 367-369.

3. Hodges J (1998) The amnestic prodrome of Alzheimer's disease. Brain 121: 1601-1602.

4. Weinstraub S, Mesulam MM (1993) Four neuropsychological profiles in dementia. In: Boller F, Grafman (Eds). Handbook of neuropsychology. Vol 8, Elsevier, Amsterdam, pp. 252-282.

5. Vega JN, Newhouse PA (2014) Mild cognitive impairment: diagnosis, longitudinal course, and emerging treatments. Curr Psychiatry Rep 16(10): 490.

6. Grober E, Wakefield D, Ehrlich AR, Mabie P, Lipton RB (2017)

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DOI: 10.19080/TBSND.2017.01.555566

Identifying memory impairment and early dementia in primary care. Alzheimers Dement (Amst) 6: 188-195.

7. Dubois B, Feldman HH, Jacova C, Cummings JL, Dekosky ST, et al. (2010) Revising the definition of Alzheimer's disease: a new lexicon. Lancet Neurol 9(11): 1118-1127.
8. Yoon B, Shim YS, Hong YJ, Choi SH, Park HK, et al. (2017) Anosognosia and its Relation to Psychiatric Symptoms in Early-Onset Alzheimer Disease. J Geriatr Psychiatry Neurol 30(3): 170-177.
9. Sadowsky CH, Galvin JE (2012) Guidelines for the management of cognitive and behavioral problems in dementia. J Am Board Fam Med 25(3): 350-366.
10. Magnin E, Démonet JF, Wallon D, Dumurgier J, Troussière AC, et al. (2016) Primary Progressive Aphasia in the Network of French Alzheimer Plan Memory Centers. J Alzheimers Dis 54(4): 1459-1471.
11. Ahmed S, Baker I, Thompson S, Husain M, Butler C (2016) Utility of testing for apraxia and associated features in dementia. J Neurol Neurosurg Psychiatry 87(11): 1158-1162.
12. Soulsby WD, El-Ruwie N, Gatla S, Anderson Zimmer K, Najmi S, et al. (2016) Ideomotor limb apraxia as a staging tool in individuals with Alzheimer's disease (ILIAD). Ann Clin Psychiatry 28(4): 255-262.
13. Lesourd M, Le Gall D, Baumard J, Croisile B, Jarry C, et al. (2013) Apraxia and Alzheimer's disease: review and perspectives. Neuropsychol Rev 23(3): 234-256.
14. Alegret M, Boada-Rovira M, Vinyes-Junqué G, Valero S, Espinosa A, et al. (2009) Detection of visuoperceptual deficits in preclinical and mild Alzheimer's disease. J Clin Exp Neuropsychol 31(7): 860-867.
15. Tokuchi R, Hishikawa N, Sato K, Hatanaka N, Fukui Y, et al. (2016) Differences between the behavioral and psychological symptoms of Alzheimer's disease and Parkinson's disease. J Neurol Sci 369: 278-282.
16. Vercelletto M, Martinez F, Lanier S, Magne C, Jaulin P, et al. (2002) Negative symptoms, depression and Alzheimer's disease. Int J Geriatr Psychiatry 17(4): 383-387.
17. Lerner AJ, Hedera P, Koss E, Stuckey J, Friedland RP (1997) Delirium in Alzheimer disease. Alzheimer Dis Assoc Disord 11(1): 16-20.
18. Kahle-Wrobleski K, Coley N, Lepage B, Cantet C, Vellas B, et al. (2014) Understanding the complexities of functional ability in Alzheimer's disease: more than just basic and instrumental factors. Curr Alzheimer Res 11(4): 357-366.
19. Schaffer C, Sarad N, DeCrumpe A, Goswami D, Herrmann S, et al. (2015) Biomarkers in the Diagnosis and Prognosis of Alzheimer's Disease. J Lab Autom 20(5): 589-600.
20. Tascone LDS, Payne ME, MacFall J, Azevedo D, De Castro CC, et al. (2017) Cortical brain volume abnormalities associated with few or multiple neuropsychiatric symptoms in Alzheimer's disease. PLoS One 12(5): e0177169.
21. Lajoie I, Nugent S, Debacker C, Dyson K, Tancredi FB, et al. (2017) Application of calibrated fMRI in Alzheimer's disease. Neuroimage Clin 15: 348-358.
22. Johnson KA, Jones K, Holman BL, Becker JA, Spiers PA, et al. (1998) Preclinical prediction of Alzheimer's disease using SPECT. Neurology 50(6): 1563-1571.
23. Tort-Merino A, Valech N, Peñaloza C, Grönholm-Nyman P, León M, et al. (2017) Early Detection of Learning Difficulties when Confronted with Novel Information in Preclinical Alzheimer's Disease Stage 1. J Alzheimers Dis 58(3): 855-870.
24. Dubois B, Croisile B, Auriacombe S, Etcharry-Bouyx F, Vercelletto M (2012) National Institute on Aging Alzheimer Association. The new 2011 recommendations of the National Institute on Aging and the Alzheimer's Association on diagnostic guidelines for Alzheimer's disease: Preclinical stages, mild cognitive impairment, and dementia Rev Neurol (Paris) 168: 471-82.
25. Ferreira D, Perestelo-Pérez L, Westman E, Wahlund LO, Sarría A, et al. (2014) Meta-Review of CSF Core Biomarkers in Alzheimer's Disease: The State-of-the-Art after the New Revised Diagnostic Criteria. Front Aging Neurosci 6: 47.
26. Dickerson BC, McGinnis SM, Xia C, Price BH, Atri A, et al. (2017) Approach to atypical Alzheimer's disease and case studies of the major subtypes. CNS Spectr 15: 1-11.
27. De Reuck JL, Deramecourt V, Auger F, Durieux N, Maurage CA, et al. (2017) Cerebrovascular Lesions in Mixed Neurodegenerative Dementia: A Neuropathological and Magnetic Resonance Study. Eur Neurol 78(1-2): 1-5.

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