Study of senses in the early diagnosis of Alzheimer's Disease

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Objectives

The impairment of five senses is often present in more neurodegenerative diseases, in particular in AD linked cognitive decline or the onset of disease. Several studies show that the five senses are compromised in Alzheimer's Disease (1) (AD). However, it is not clear if the impairment of senses is a early marker of early marker of dementia or a modifiable risk factor.
Evoked Potentials can be a useful method in the study of the five senses. The aim of the our study is to demonstrate the importance of neurophysiological techniques in the early diagnosis of AD.

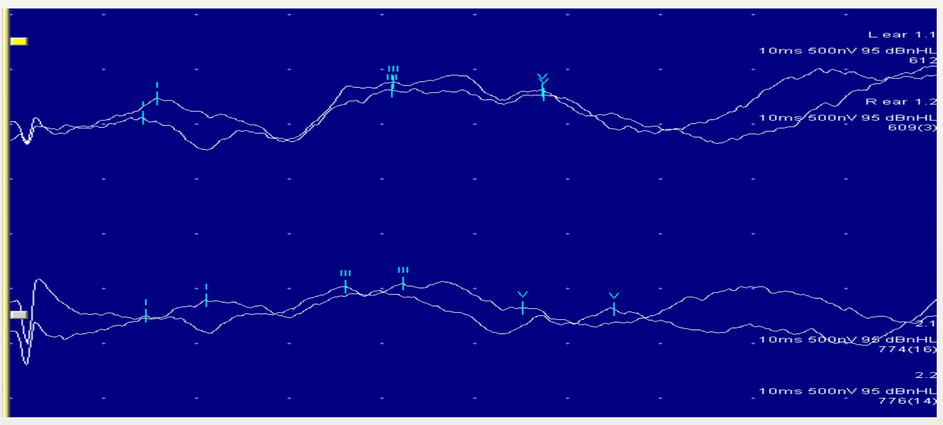


Fig. 1 Acustic Evoked Potentials

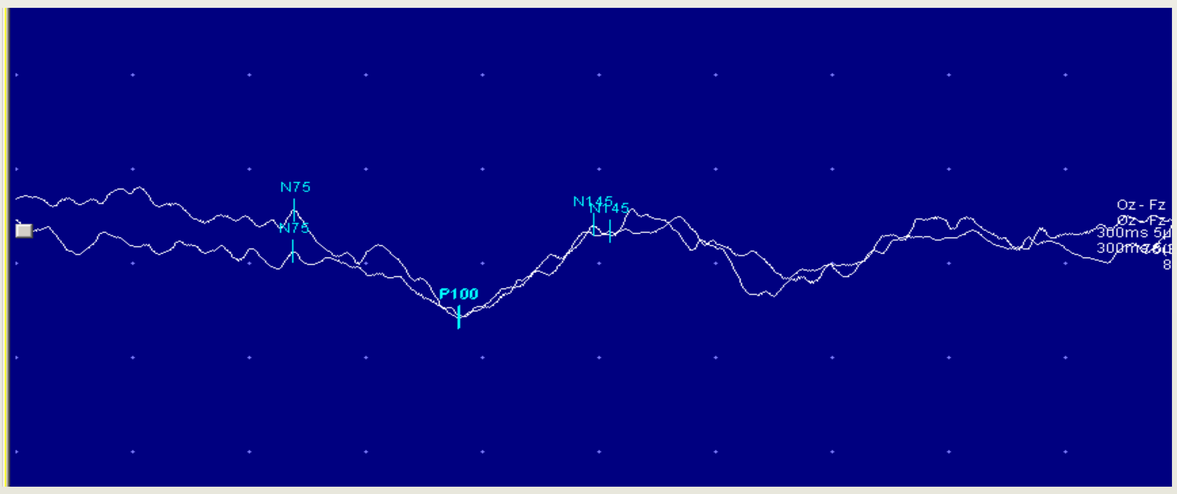


Fig. 2 Visual Evoked Potentials

Methods

All patients and CS were undergo to detailed clinical, neuropsychological tests such as Mini Mental State Examination, Montreal Cognitive Assessment and neurophysiological evaluations by using Brainstem Auditory Evoked Potentials (BAEPs) (Fig.1), Visual Evoked Potentials (VEPs) (Fig.2), Olfactory event-related potentials (OERP) (Fig.3) and Somatosensory evoked potentials (SEPs).

Materials

Twenty AD patients(8 males and 12 females) with mean age of 72.81 and twenty health control subjects (CS),paired for sex and age were enrolled.

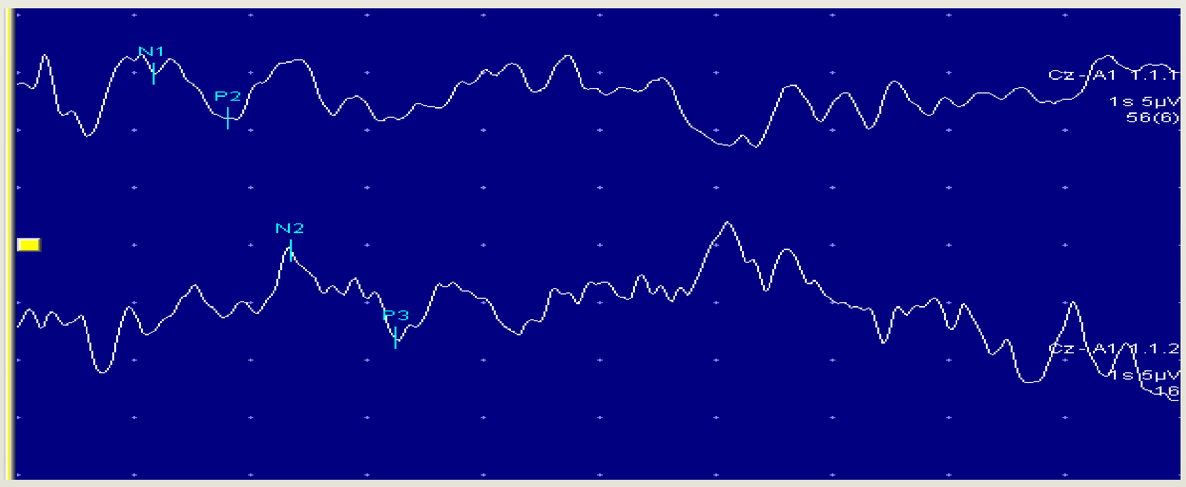


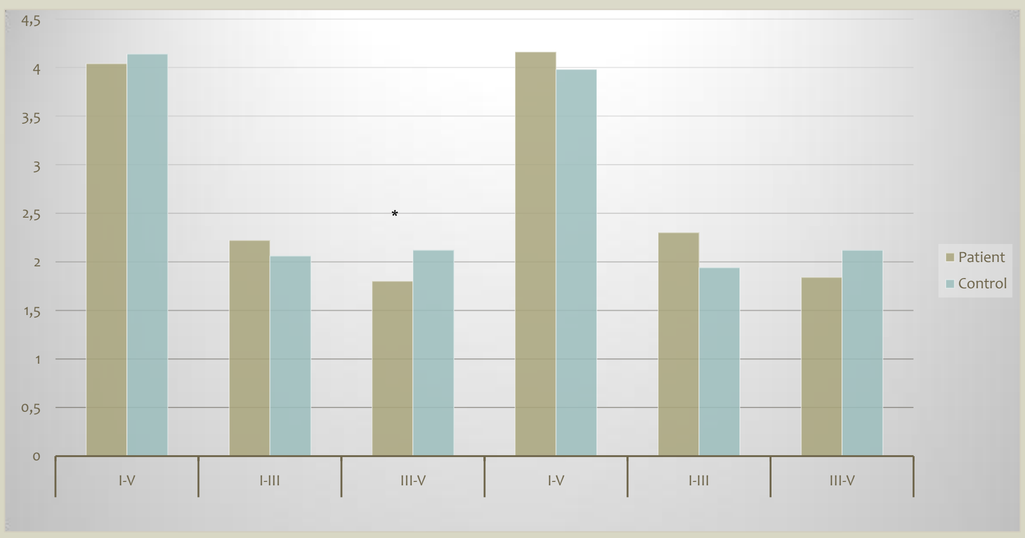
Fig. 3 Event-Related Potentials

Results

We observed statistical significant differences in BAEPs parameters, in particular in I-III, III-V, I-V inter-peaks of AD patients respect CS (Table 2). A reduced amplitude and an increased latency of P100 wave was found to VEP examination in AD patients; moreover, the patients have shown an alteration of N1-P1 complex in OERPs and the P40 in the SEPs respect to CS (Table 1).

		Patients		Controls		
		Mean	SD	Mean	SD	p-value
P100 Right	Latence	119.8	9.96	105.28	4.30	**0.02**
	Amplitude	4.96	1.18	9.73	1.15	**<0.001**
P100 Left	Latence	123.2	8.29	106.85	2.33	**0.003**
	Amplitude	5.54	1.86	10.43	1.11	**0.001**
P300	Latence	326.2	18.54	314.00	4.74	0.19
	Amplitude	12.68	6.55	6.04	0.48	**0.05**
	SST	22.75	5.68	30.00	0.00	**0.02**

Table 1. Statistical Analisys of AD Patients and Controls



Tabe 2. Statistical Analisys of BAEP in AD Patient and Controls

Discussion

These findings suggest an damage to the fibers that regulating the five senses and could be also explain how and why the perceptions of these patients are diverted not only cognitive impairment (1), but also to a functional damage..

Conclusion

These results suggest that cerebral cortex is affected early in the progression of AD and may have some consequence on behavioral and functional measures (1,3). We hypothesize that these results may play a major role as predictive markers in the early diagnosis of AD. This study could be useful to the implementation of markers in clinical routine for early and differential diagnosis.

Reference

1. Considering the senses in the diagnosis and management of dementia. Sophie Behrman, Leonidas Chouliaras, Klaus P. Ebmeier. 2014 Maturitas 77(2014)305–310
2. Olfactory event-related potentials in Alzheimer's disease. Morgan CD, Murfhy C. J IntNeuropsychol Soc. 2002 Sep;8(6):753-63
3. Somatosensory resposes in normal aging, mild cognitive impairment, and Alzheimer's disease. Stephen JM[1], Montaño R, Donahue CH, Adair JC, Knoefel J, Qualls C, Hart B, Ranken D, Aine CJ.J NeuralTransm (Vienna). 2010 Feb;117(2):217-25. doi: 10.1007/s00702-009-0343-5. Epub 2009 Dec 15.

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