Il ruolo della valutazione neuropsicologica computerizzata nell'identificazione precoce di minimi deficit cognitivi in pazienti «not yet MCI»

Dott.ssa Elena Chipi

PSICOLOGA

Università degli Studi di Perugia

Clinica Neurologica

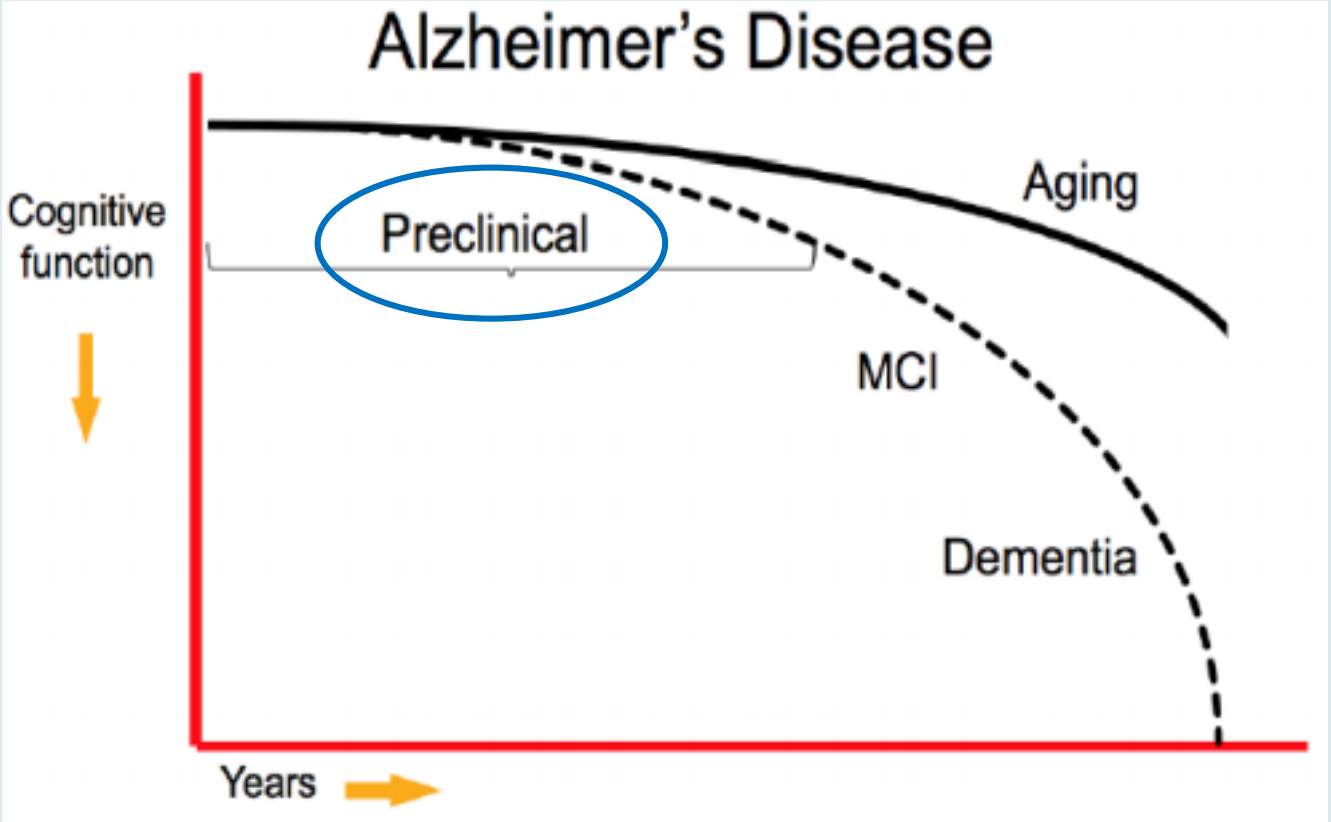
Centro per lo studio dei disturbi della memoria

Riunione annuale SIN Umbro-Marchigiana

Perugia
7 dicembre 2016

Sin
SOCIETÀ ITALIANA DI NEUROLOGIA

BACKGROUND



Sperling, R.A., et al Alzheimer's&Dementia (2011)

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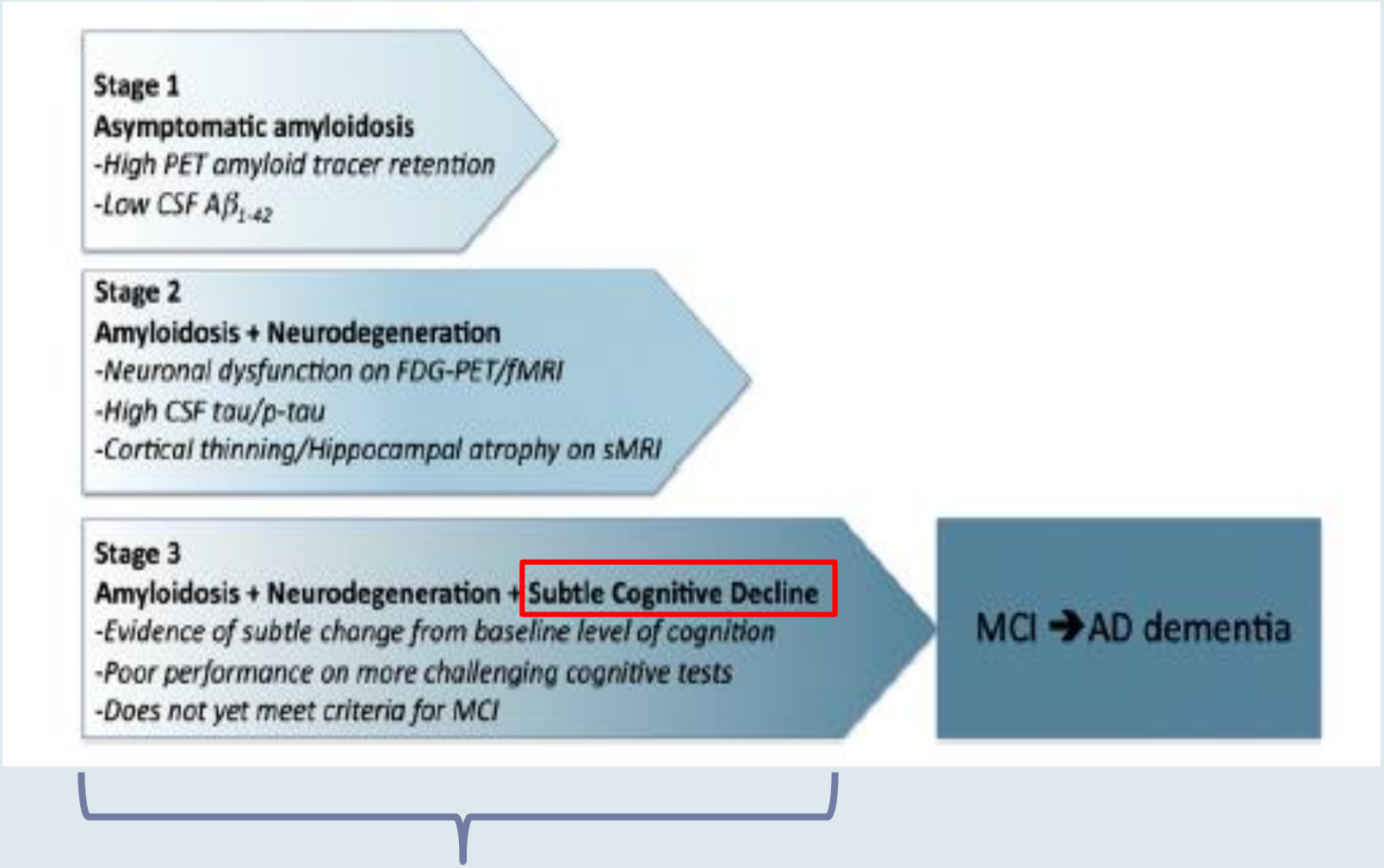


Pre – Mild Cognitive Impairment (Pre – MCI)

AIMS

1. To investigate the diagnostic and prognostic accuracy of the Cambridge Neuropsychological Test Automated Battery (CANTAB) in the early detection of AD

2. To evaluate the combination of unconventional neuropsychological assessment (CANTAB) with CSF AD biomarkers measurement

MATERIALS
Cambridge Neuropsychological Test Automated Battery (CANTAB)

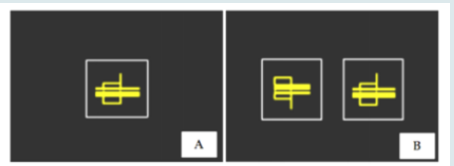
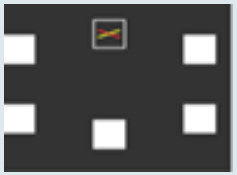
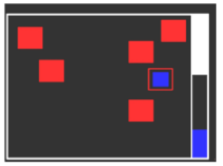
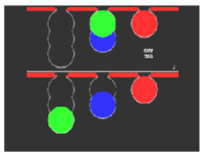
- Touch screen device
- Visual patterns
- Three macro-domains (Lowe & Rabbitt , 1998):
  - ✓ VISUAL MEMORY
  - ✓ ATTENTION and REACTION TIMES
  - ✓ PLANNING and WORKING MEMORY

ADVANTAGES:

- sensitive for detecting fronto-subcortical deficits;
- measuring sub-component of cognitive functions;
- customizable batteries;
- language independence («culture-free» tests).

METHODS

N = 20 patients (F= 13, M= 7, mean age = 72±7,6)

STANDARD NEUROPSYCHOLOGICAL TESTS	Mini mental State Examination (MMSE)	
	Rey Auditory Verbal Learning Test (RAVLT)	
CANTAB TESTS	**Visual memory:** ▪ Pattern Recognition Memory (PRM) ▪Paired Associates Learning (PAL) *Outcome measures:* *PAL-TE= PAL total error* *PAL-TE-6s= PAL total error 6 shapes*	 
	Planning and working memory: ▪ Spatial Working Memory (SWM) ▪ Stockings of Cambridge (SOC)	 

CSF PROFILE

	BIOMARKERS PATTERN	SCORE	INTERPRETATION
ERLANGEN SCORE	All CSF AD biomarkers normal	0	No evidence
	Only slightly altered results of either Aβ **OR** Tau/pTau, but not both	1	AD improbable
	Clearly pathologic results of either Aβ **OR** Tau/pTau, but not both	2	AD possible
	Slight alterations of both, Aβ **AND** Tau/pTau	2	AD possible
	Clearly pathologic results of either Aβ **OR** Tau/pTau accompanied by slight alterations of the biomarker(s) of the other group	3	AD possible
	Aβ **AND** Tau/pTau clearly pathologic	4	AD probable

Lewczuk, P. et al. Journal of Alzheimer's Disease. (2015)

STUDY DESIGN

COMPLAINTS OF COGNITIVE DISTURBANCES

NORMAL SCORES AT MMSE AND RAVLT

ALTERED SCORES (-1SD) IN AT LEAST ONE CANTAB SUBTEST

CSF ANALYSIS

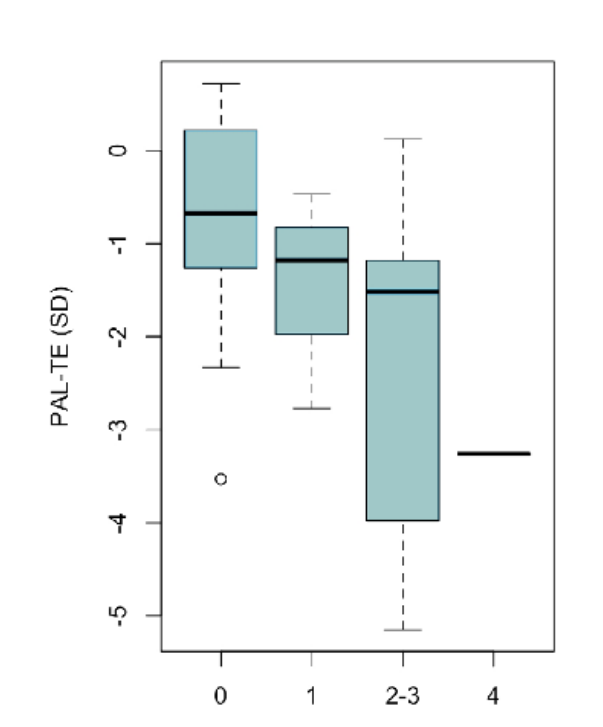
Follow-up with MMSE (mean = 1.5 year, range:1-4 years)

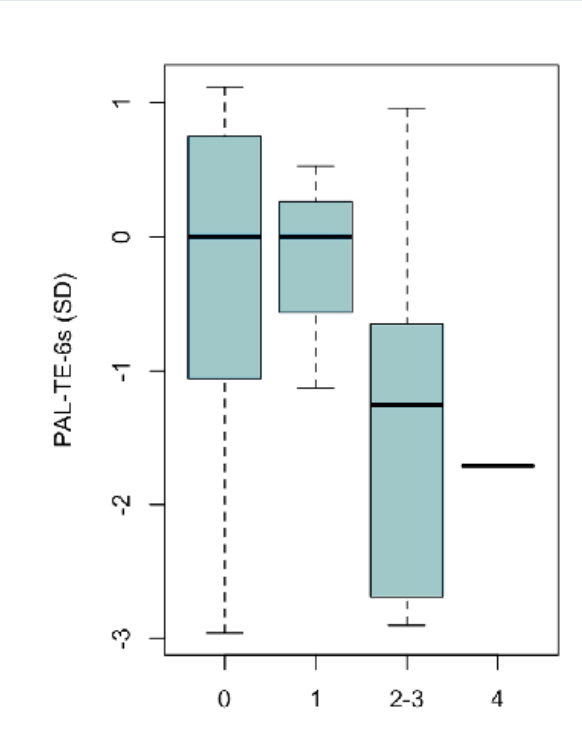
RESULTS

CANTAB TEST	- 1 SD in 3 subtests	2/20 pt
	- 1 SD in 2 subtests	11/20 pt
	- 1 SD in 1 subtests	7/20 pt

CSF ANALYSIS ERLANGEN SCORE	probable AD (score 4)	1/20 pt
	possible AD (score 3 and 2)	6/20 pt
	improbable AD (score 1)	3/20 pt
	no evidence (score 0)	10/20 pt

CORRELATION OF PAL-TE AND PAL-TE-6S PERFORMANCE (SD) WITH CSF PROFILE GROUPS ACCORDING TO THE ERLANGEN SCORE

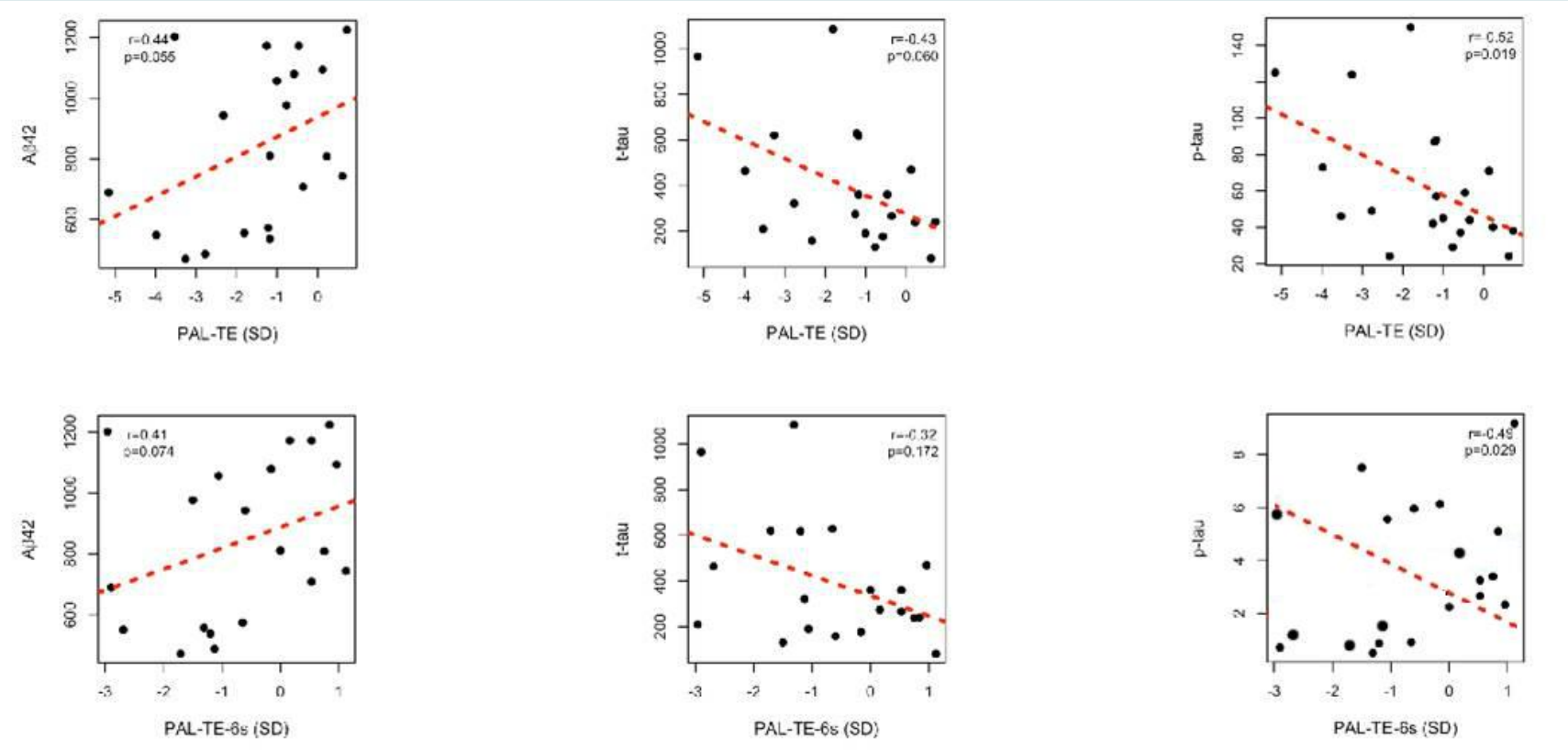




PAL-Total error (PAL-TE) performance was negatively correlated with the Erlangen score (r=-0.47, p=0.037)

PAL-TE-6s performance was negatively correlated with the Erlangen Score (r=-0.41, p= 0.072).

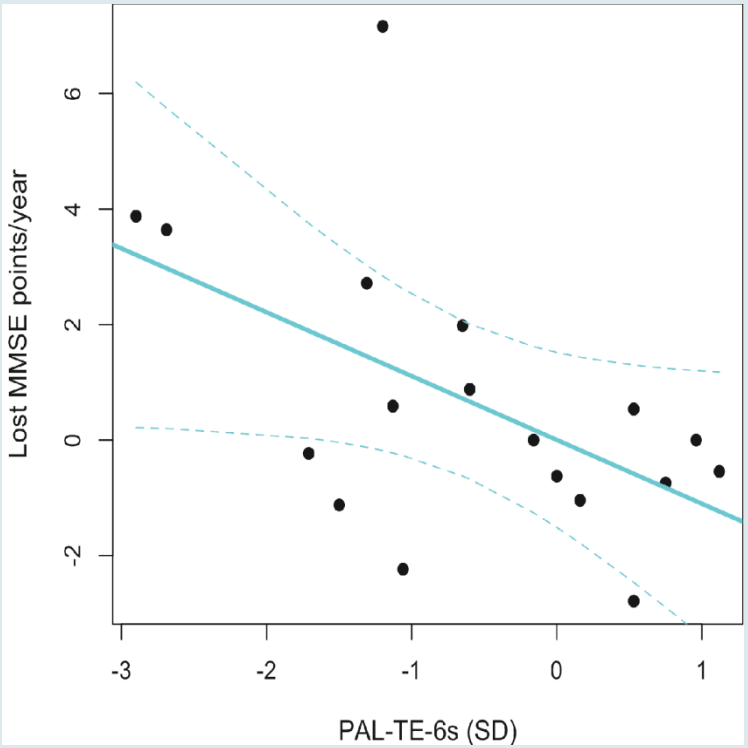
CORRELATION OF PAL PERFORMANCE (SD) WITH CSF CORE AD BIOMARKERS (PG/ML)



PAL-TE and PAL-Total error-6 shapes (PAL-TE-6s) performances were positively correlated with Aβ42 and negatively with tau species.

In particular, p-tau was significantly correlated with PAL-TE (r=-0.52, p<0.019) and PAL-TE-6s (r=-0.49, p<0.029).

CORRELATION OF PAL-TE-6S PERFORMANCE WITH LOST MMSE POINTS/YEAR



PAL-TE-6s was significantly associated with cognitive decline over time as measured by lost MMSE points/year (β=-1.2, p=0.016)

CONCLUSIONS

- Unconventional neuropsychological measures as computerized tests from CANTAB (especially PAL) may be useful to assess subtle cognitive decline not detectable by standard neuropsychological evaluation and to predict global cognitive functioning decline.
- Pre-MCI may be considered as the earliest clinical manifestation of AD. This not yet MCI entity could be detected by combining unconventional neuropsychological assessment (CANTAB) and CSF AD biomarkers measurement.
- In view of treating AD pathology with disease modifying agents, it's necessary focusing on this entity as it could be considerated, at most suitable, as inclusion criterion for early intervention