Empathy changes and increase in personal distress along time: a new neuropsychological biomarker for Alzheimer's Disease?

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Background and Aim

Empathy is the ability to understand and to feel what others feel[1]. Empathy seems to be impaired since the first stages of Alzheimer's Disease (AD)[2].

The aims of our study were: to assess empathy changes along time in **preclinical and prodromal stages of AD**, thus in Subjective Cognitive Decline (SCD) and Mild Cognitive Impairment (MCI); to evaluate if empathy deficits may predict conversion to AD dementia.

Materials and Methods

We included 90 SCD, 147 MCI patients, and 76 healthy controls (HC).

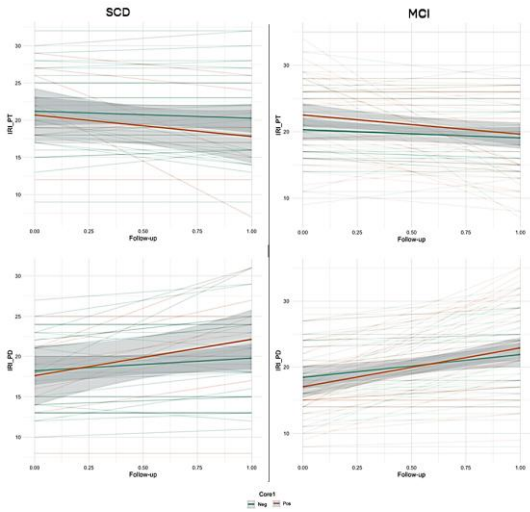
Informer-rated Interpersonal Reactivity Index (IRI) was used to explore cognitive and affective empathy before (T0) and after (T1) cognitive symptoms' onset. Forty-three SCD and 89 MCI patients underwent CSF biomarkers analysis, while 19 SCD and 30 MCI underwent amyloid PET. Patients were classified according to the Revised Criteria of the Alzheimer's Association Workgroup as **Core1+ or Core1–** (based on CSF Aβ42/40, p-tau181/Aβ42 and Amy-PET).

Results

Personal Distress (PD) scores were lower in HC than in SCD (Core1+ $p<0.001$; Core1- $p<0.001$) and in MCI (Core1+ $p<0.001$; Core1- $p<0.001$). A significant increase of PD scores from T0 to T1 was found in SCD Core1+ (T0 17±4.9, T1 21±6.3, $p<0.001$) and in SCD Core1- (T0 18±4.4, T1 20±5.7, $p=0.006$), but the entity of PD change (ΔPD_{T0-T1}) was significantly greater in SCD Core1+ than in SCD Core1- (-3.9±3.7 vs -1.8±3.1, $p=0.019$). Similarly, both MCI Core1+ (T0 17±4.4, T1 23±6.5, $p<0.001$) and MCI Core1- (T0 18±5.6, T1 22±6.4, $p<0.001$) showed an increase of PD scores, but ΔPD_{T0-T1} was greater in MCI Core1+ (-6.1±5.2 vs -3.4±4.4, $p=0.004$).

Moreover, a decrease of **perspective taking (PT)** scores from T0 to T1 was found in both SCD Core 1+ (20±5.5 vs 16±6.1, $p=0.008$) and MCI Core1+ (23±5.3 vs 20±6.1, $p<0.001$).

The multiple regression analysis demonstrated that ΔPD_{T0-T1} was influenced by Core1 status (B=-2.86, $p<0.001$) and by the clinical diagnosis (B=-2.03, $p=0.021$).



During a follow up time of 2.85±0.687, 13 SCD progressed to MCI (SCD-p), while 21 remained stable (SCD-s). SCD-p showed higher ΔPD_{T0-T1} than SCD-s (-4.1±3.7 vs -1.2±2.3, $p=0.036$). The logistic regression analysis demonstrated that ΔPD_{T0-T1} was significantly associated to the risk of progression to MCI (OR= 1.574, $p=0.035$).

During a follow up time of 4.52±1.21 years, 1 SCD and 16 MCI converted to AD dementia. Similarly, ΔPD_{T0-T1} was significantly associated to the risk of conversion to AD dementia (OR= 1.181, $p=0.019$).

		B	p	OR	95% C.I. lower	95% C.I. upper
Progression to MCI	Age at onset	0.080	0.185	0.923	0.805	1.029
	APOE genotype	1.734	0.152	0.177	0.011	1.608
	ΔPD	-0.454	0.035	**1.574**	1.110	2.708
		B	***p***	**OR**	**95% C.I. lower**	**95% C.I. upper**
Conversion to AD dementia	Age at onset	0.088	0.042	0.916	0.832	9.884
	APOE genotype	0.409	0.538	0.664	0.178	2.516
	ΔPD	-0.166	0.019	**1.181**	1.033	1.375

Discussion

Core1+ SCD and MCI showed a significant increase along time of PD, which can be considered as an indicator of emotional contagion[3]. The entity of this change along time **ΔPD_{T0-T1} seems to discriminate patients with Core1 positivity** and those who will progress to MCI and convert to AD-dementia.

Conclusions

The increase along time of **emotional contagion** may be a potential new neuropsychological **biomarker of AD since the preclinical stage.** Further studies are needed to clarify its predictive role to conversion to AD dementia.

Bibliography

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