EVIDENCE OF PRACTICE EFFECT IN CANTAB SPATIAL WORKING MEMORY SUBTEST IN A COHORT OF MCI PATIENTS

N Salvadori, L Farotti, V Lisetti, M Turco, P Eusebi, P Calabresi, L Parnetti

Clinica Neurologica, Università degli Studi di Perugia

Aims
To investigate the performance of a visual working memory sub-test from the Cambridge Neuropsychological Test Automated Battery (CANTAB) in a cohort of patients with mild cognitive impairment (MCI) assessed at baseline (T0), after 6 months (T6) and after 12 months (T12).

Patients
25 patients (15 F, 10 M, mean age: 68 years) diagnosed as MCI (10 pure amnestic MCI and 15 amnestic multiple-domain MCI) according to Petersen criteria (Petersen 2004) underwent classical neuropsychological tests, CANTAB, and lumbar puncture for diagnostic typization; accordingly, they were classified as MCI-MCI (13 subjects) and MCI-AD (12 subjects).

Methods
According to the original classification by Lowe&Rabbit (1998) relative to CANTAB subtests, in order to comprehend multiple cognitive domains we administered: Visual Memory Battery (DMS - Delayed Matching to Sample, PAL - Paired Associate Learning, PRM - Pattern Recognition Memory, SRM - Spatial Recognition Memory), Working Memory and Planning Battery (SWM - Spatial Working Memory, RVP -Rapid Visual Processing). Of them, “visual episodic memory tests” - PRM, PAL and DMS - are considered to be very sensitive for detecting pure amnestic MCI (a-MCI) (Juncos-Rabadán et al., 2013). For the T6 and T12 re-assessment, parallel forms of the computerized subtests were used.

Results
Different from any other CANTAB subtest used in this study, SWM scores showed a significant improvement at T6, remaining then stable at T12. The same trend was observed in both sub-components of the SWM subtest (Between Errors and Strategy) (Fig. 1).

Discussion
In our series we could show a significant practice effect in the spatial working memory test in all MCI subjects assessed. These results may represent a further extension of previous studies showing a practice effect for several CANTAB subtests after a 4 months follow-up (Lowe&Rabbit, 1998). A suggestive interpretation of such evidence may stand in the hybrid nature of the “working memory” construct as being simultaneously a memory and a frontal test. Evidences suggested that practice effect works better in the so-called “frontal test” in which the ability to learn a new strategy in order to solve a problem is determinant for the outcome - that means, the cognitive performance. Therefore, those tests are recommended to only be used once (Lowe&Rabbit, 1998). The neural basis of such plasticity underlying the ability to learn flexible strategy seems to lie on different dynamic brain changes having a regional specificity, so that practice effect can have an effect only in particular neural circuits (multimodal top-down areas), while in others (primary sensorimotor areas) can not (Landau et al., 2007).

Conclusions
Further studies are needed to investigate and evaluate the test-retest reliability of some computerized subtests (such as SWM) as tools for longitudinal assessment of cognitive performance in patients with mild cognitive impairment. This issue might have special relevance in clinical trials because of the need to carry out repeated measurements over time. Practice effect seemed to show no further significance up to 6 months re-test, probably due to a sort of balancing once a specific strategy was learned.

References
2) Lowe C., Rabbit P. (1198), Test/ Re-test reliability of the CANTAB and ISPOCD neuropsychological batteries: theoretical and practical issues, Neuropsychologia, 36 (9), 915-23