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Cognitive aspects of patients with episodic migraine and medication overuse headache: a preliminary study

E Chipi, A Verzina, C Bedetti , I. Corbelli, E.K Brahimi, L Bernetti, V Lisetti, P Eusebi , P Calabresi, L Parnetti, P Sarchielli

Clinica Neurologica, Università degli Studi di Perugia

Background and aims

Few and controversial studies have focused on cognitive aspects of patients with episodic migraine without aura (migraine SA) and medication overuse headache (MOH).
To verify cognitive aspects in these patients out a neuropsychological assessment of migraine SA and MOH was carried out comparing results with those of healthy controls (HC).

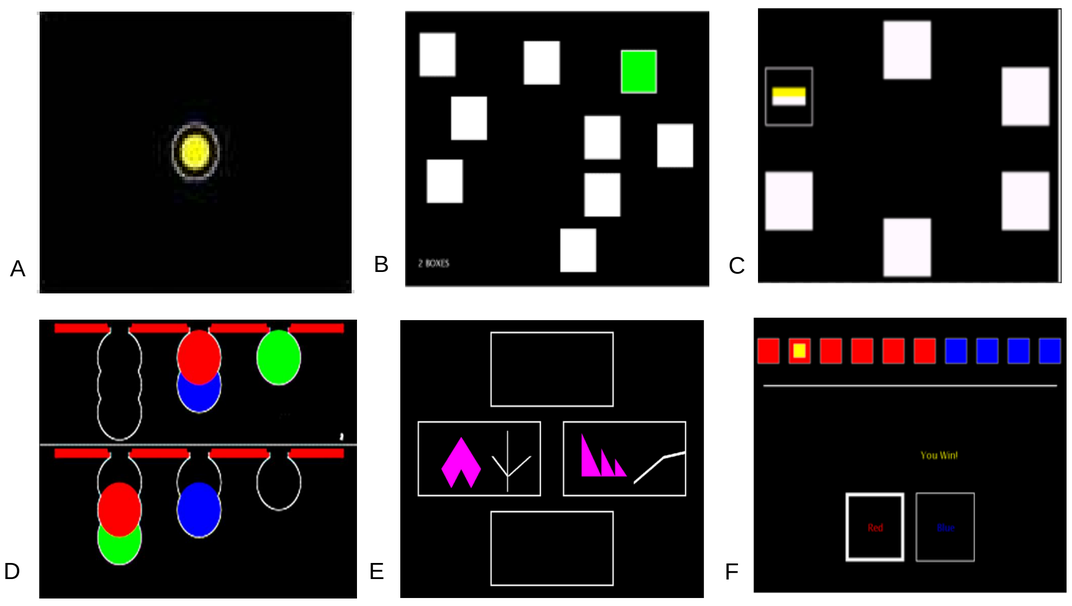
Materials and method

Seventeen patients affected by migraine without aura and eleven patients with MOH attending our Out Patient Clinic were enrolled. All of them were not affected by clinically relevant comorbidities. Sixteen healthy volunteer, recruited among hospital staff, were also included as controls.
We administered a battery of neuropsychological tests composed by Mini-Mental State Examination (MMSE), letter fluency (FAS), semantic fluency (SF) and 8 subtests from the Cambridge Neuropsychological Test Automated Battery (CANTAB) (induction tests: Motor Screening Task (MOT), Big/Little Circle (BLC); attention and processing speed: Reaction time (RTI); visual-spatial memory tests: Paired Associates Learning (PAL), Spatial Span (SSP), forward and backward; executive function tests: Stockings of Cambridge (SOC), Intra-Extra Dimensional Set Shift (IED); decision making: Cambridge Gambling Task (CGT). Level of disability due to migraine was assessed by means of the Migraine Disability Assessment (MIDAS) test. Finally, the 36-item Short Form Health Survey (SF-36) was used to evaluate quality of life.
One-way ANOVA and Dunnett's post-hoc procedure were used for comparing patients with controls in term of scores in neuropsychological tests. P≤.05 was considered as the level of statistical significance.

Table 1: Details of participants (n or mean±SD)

	Controlli	Episodic Migraine SA	MOH
N	16	17	11
Gender (M/F)	2/14	0/17	5/6
Age	41.3 ± 16.0	41.9 ± 7.5	49.2 ± 16.3

Figure 1. A. Reaction time (RTI), B. Spatial Span (SSP), C. Paired Associates Learning (PAL); D. Stockings of Cambridge (SOC); E. Intra-Extra Dimensional Set Shift (IED); F. Cambridge Gambling Task (CGT)



Results

Groups were matched in terms of age, education and MMSE scores. SF-36 scores were significantly reduced in MOH (-16.60, p<0.001) and Migraine SA patients (-8.12, p=0.042) as compared to HC. In MOH patients MIDAS scores were significantly higher than Controls (+84.63, p=0.003). Compared to controls, FAS scores were significantly lower in MOH (-9.95, p=0.05). A similar trend was found for SSP reverse in MOH (-0.96, p= 0,087) compared to controls. Most of the neuropsychological scores showed a poorer profile in Migraine SA and MOH groups compared to controls. Specifically CGT deliberation time measure evidence an interesting trend toward a lower performance in MOH then controls (-0.88, p=0,5). A similar trend was observed for MMSE score (-0.85, p= 0.35).

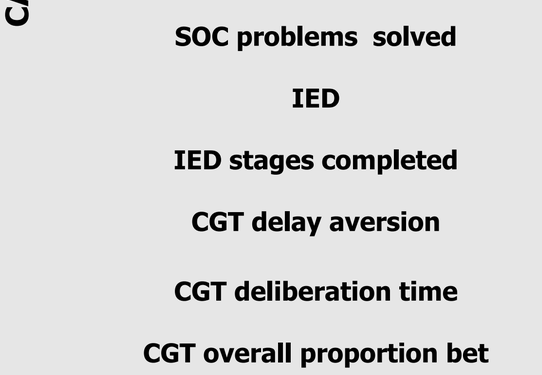
Conclusions

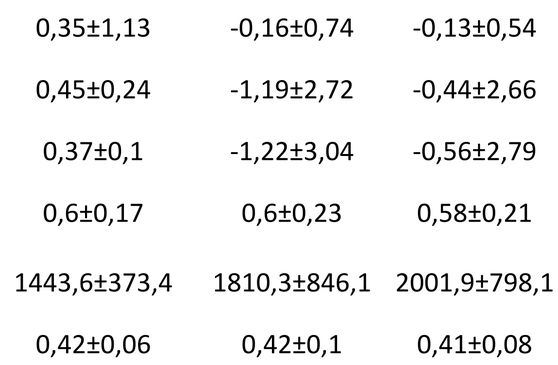
These preliminary findings support the evidence of cognitive alterations in Migraine SA and MOH patients. Particularly in MOH patients, cognitive performance was impaired in several domains explored, such as verbal tests performance and working memory.
These preliminary results seem to provide further evidence of cognitive alterations in migraineurs and should be further confirmed in larger longitudinal cohorts. The relationship between cognitive and psychopathological profiles in Migraine SA and MOH patients and healthy controls also need to be better investigated.

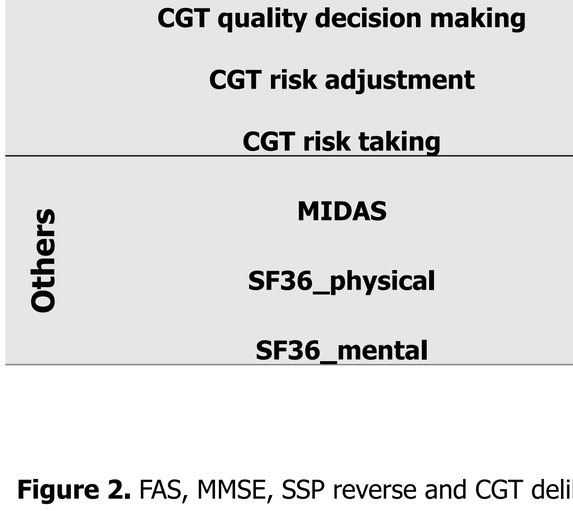
Table 2: Neuropsychological measurements across diagnostic groups (mean±SD)

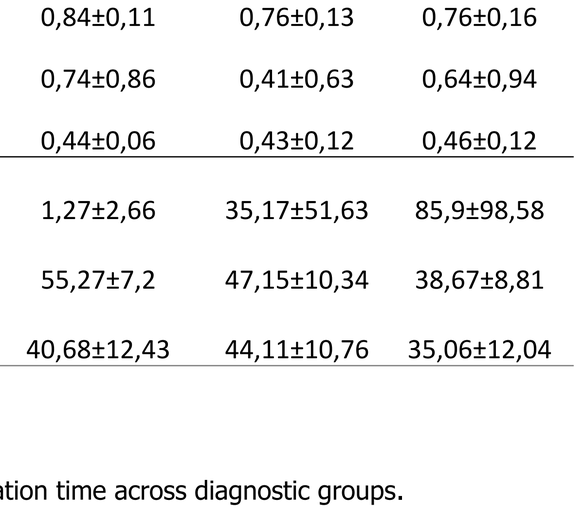
		Controlli	Episodic migraine SA	MOH
Standard	**MMSE**	29,31±0,95	29,12±1,17	28,73±1,1
	FAS	39,58±10,86	31,89±11,25	29,63±8,53
	SF	46,63±11,76	35,35±7,96	40,18±8,94
CANTAB	**MOT mean latency**	1,34±0,32	1,12±0,54	0,77±0,75
	MOT mean error	0,33±0,12	0,58±0,45	0,33±0,38
	RTI movement time	0,78±0,85	0,51±0,84	0,07±2,1
	RTI reaction time	0,48±0,92	0,01±1,72	-0,37±2,57
	PAL total errors	0,05±0,77	-1,15±2,18	-0,44±0,65
	PAL te 6 shapes	0,11±0,69	-1,12±2,95	-0,37±0,72
	SSP	0,31±0,71	-0,23±1,18	-0,05±1,26
	SSP reverse	0,17±0,81	-0,6±0,9	-0,8±1,39
	SOC mean initial thinking time	-0,52±2,58	0,18±1,35	-0,13±1,15
	SOC mean subsequent thinking time	0,47±0,63	0,21±0,69	-0,19±1,15
	SOC problems solved	0,35±1,13	-0,16±0,74	-0,13±0,54
	IED	0,45±0,24	-1,19±2,72	-0,44±2,66
	IED stages completed	0,37±0,1	-1,22±3,04	-0,56±2,79
	CGT delay aversion	0,6±0,17	0,6±0,23	0,58±0,21
	CGT deliberation time	1443,6±373,4	1810,3±846,1	2001,9±798,1
	CGT overall proportion bet	0,42±0,06	0,42±0,1	0,41±0,08
	CGT quality decision making	0,84±0,11	0,76±0,13	0,76±0,16
	CGT risk adjustment	0,74±0,86	0,41±0,63	0,64±0,94
	CGT risk taking	0,44±0,06	0,43±0,12	0,46±0,12
Others	**MIDAS**	1,27±2,66	35,17±51,63	85,9±98,58
	SF36_physical	55,27±7,2	47,15±10,34	38,67±8,81
	SF36_mental	40,68±12,43	44,11±10,76	35,06±12,04

Figure 2. FAS, MMSE, SSP reverse and CGT deliberation time across diagnostic groups.









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Contacts:

elena.chipi@outlook.com