

Midbrain Sonography in Parkinson's Disease: Further Evidence of a Different Etiopathogenesis of Alexithymia and Depression.

Roberta Di Giacomo ¹, M. De Angelis ¹, V. D'Agostino², F. Cerritelli ¹, I. Borrelli ¹, H. Zhuzhuni ¹, A. D'Amico ¹, V. Frazzini ¹, L. Marchionno ¹, A. Thomas ¹, M. Onofri ¹, L. Bonanni ¹

¹ Department of Neuroscience, Imaging and Medical Science - University G.d'Annunzio of Chieti-Pescara - Chieti

² Department of Human Sciences - University of L'Aquila - L'Aquila

Background and Objective: Parkinson's disease (PD) is often characterized by altered emotional processing, such as depression (prevalence of 30-35% in levodopa treated PD patients) and alexithymia (prevalence of 21% in PD patients).

Salient features of alexithymia are the inability to distinguish one's feelings from the accompanying bodily sensations with a tendency to amplify the somatic sensations accompanying emotional arousal, the inability to communicate feelings to others and an externally oriented cognitive style reflecting an absence of inner thoughts (1). Alexithymic and depressive symptoms may be partially overlapping and the relative independence of the these two disorders is strongly debated.

Reduced echogenicity of midbrain raphe, evaluated with transcranial sonography (TCS), is a characteristic finding in depression associated with Parkinson's disease (2).

No data are available on brainstem's echogenicity in alexithymic patients. We assessed, by means of transcranial sonography, possible differences between PD patient with or without alexithymia and/or depression.

Materials and methods: We recruited 22 PD patients among local cohort of 200 patients referred to our institution during 2014. All patients were treated with optimal dose of dopaminomimetic (L-DOPA EQ mg 499.7±256.3) and they underwent neuropsychological tests: Mini Mental State Examination (MMSE, exclusion criteria MMSE<25), Beck Depression Inventory (BDI), Toronto Alexithymia Scale-20 (TAS-20), Symptom Checklist 90-R (SCL-90-R). Motor symptoms were assessed with Unified Parkinson's Disease Rating Scale (UPDRS III) and modified Hoehn and Yahr scale (H&Y).

TCS was performed, through temporal window, using a color-coded phased-array ultrasound system (SONOS 7500), to evaluate midbrain raphe (0=absent, 1=discontinuous, 2=continuous) (examples of absent and continuous raphe Fig. A,B-C,D).

TAB 1) DEMOGRAPHIC CHARACTERISTICS.

Patient	Gender	Antipsychotic/ antidepressant drugs (Y/N)	H&Y	Age (years)	QUIP	Subtotal LED (mg)	education (years)	disease duration (years)	UPDRS (III)
1	male	NO	2,5	76		300	13	1	13
2	male	NO	2,5	78	NO	550	5	6	15
3	male	YES	2,5	57	1 YES	380	13	1	33
4	female	NO	1	56	NO	510	16	2	15
5	female	NO	2	58	NO	510	13	5	18
6	male	NO	1,5	66	NO	352	13	1	16
7	male	YES	2	80	NO	750	5	6	27
8	female	NO	1	52	NO	300	13	3	11
9	female	NO	3	76	NO	785	4	24	33
10	male	YES	2,5	48	NO	300	8	3	10
11	male	NO	2	62	NO	715	13	10	24
12	male	YES	2	68	NO	300	8	1	22
13	female	NO	2	58	NO	507	16	4	9
14	male	YES	2	70	NO	400	5	14	16
15	female	NO	1	64	NO	105	5	1	11
16	male	NO	2	69	NO	100	18	2	26
17	male	2,5	55	NO	415	18	4	47	
18	female	YES	2	61	NO	400	8	5	17
19	male	NO	2	58	NO	1180	8	9	23
20	male	NO	2	64	NO	885	13	14	13
21	female	NO	2	73	1 YES	675	5	5	19
22	female	NO	2,5	76	NO	575	4	5	31
COUNT+%		M 13:59.09% F 9:40.91%	YES 6:27.27% NO 16:72.73%	1:3(13.64) 1,5:1(4.55) 2: 11 (50%) 2,5:6(27.27%) 3:1 (4.55)					
MEAN±SD						499.7± 256.3	10.18± 4.757	5.727± 5.616	20.41± 9.45

TAB 2) NEUROPSYCHOLOGICAL TESTS.

Patient	Raphe	MMSE	BDI	TAS20	SCL90R (GS)	SOM	O-C	INT	DEP	ANK	HOS	PHOR	PAR	PSY	SLEEP
1	2	28,3	4	54	0,6	1,08	0,6	0,22	0,84	0,7	0,66	0	0,5	0	2
2	2	25,7	6	52	0,81	2	1,3	0,88	0,23	0,3	0,33	0,71	1	0,2	1,66
3	1	30	15	63	0,7	1,16	1	0,55	0,46	1,3	0,5	0,14	0,5	0,3	1,33
4	0	30	23	50	1,22	1,5	0,8	2	1,76	0,5	0,66	1,57	1	0,5	2,6
5	2	28	9	46	0,44	0,91	0,7	0,33	0,23	0,5	0,16	0,14	1	0,2	0,33
6	2	26,2	5	55	0,23	0,66	0	0,33	0,15	0,4	0,16	0	0,16	0	0,66
7	1	25,4	15	50	0,75	1,5	0,3	0,11	1,3	0,6	0,5	0,28	0,5	0,5	2,66
8	2	30	8	56	0,46	0,166	0,6	0,33	1,07	0,7	0,33	0	0,16	0,5	0,66
9	1	27	13	43	0,72	1,5	0,5	0,55	0,84	0,4	0,33	1,14	1	0,2	0,66
10	0	28	21	81	1,9	2,08	2,7	2	1,53	2	1,5	1,14	2,16	1,6	2,33
11	2	30	7	46	0,26	0,41	0,1	0,44	0,15	0,3	0,33	0	0,33	0,3	0,33
12	1	25	16	57	0,34	0,33	0,5	0,11	0,46	0,3	1	0,28	0	0	0
13	0	30	10	47	0,36	0,66	0,8	0,11	0,53	0,2	0,16	0,57	0,16	0	0,33
14	2	26,3	12	37	0,72	0,66	1,2	0,88	0,76	0,8	0,83	0,57	0,33	0,6	0
15	2	30	3	51	0,46	0,33	0,8	0,66	0,46	0,7	0,16	0,71	0,16	0,2	0,66
16	1	27,2	2	56	0,81	0,75	1	1,11	1	0,7	1,16	0,42	0,83	0,5	0,3
17	0	30	23	53	2,08	1,4	1,11	1,38	1,3	0,5	0,46	1	1,9	2,33	1,42
18	2	30	8	45	0,28	1,08	0,8	0	0,23	0	0	0	0	0,2	0
19	0	30	12	54	0,77	1,41	1,1	0,88	0,92	0,5	0,33	0,28	0,33	1	0,33
20	2	29	5	46	0,58	0,4	0,22	0,38	0,5	0	0,28	0,16	0,2	1,66	0,37
21	2	26,3	7	65	1,26	1,41	1	1,1	1,61	1,5	0,83	1,42	0,66	0,9	3
22	0	27,7	7	35	0,48	1,25	0,2	0,22	0,46	0,5	0,16	0,14	1	0,2	1
COUNT+%		2:11(50%) 1:5(22.73%) 0:6(27.27%)													
MEAN±SD		28.19±1.80	10.5±6.20	51.91±9.74	0.74± 0.49	1.03± 0.54	0.79± 0.56	0.66± 0.57	0.76± 0.49	0.60± 0.46	0.51± 0.38	0.48± 0.49	0.63± 0.57	0.54±0.61	1.0± 0.95

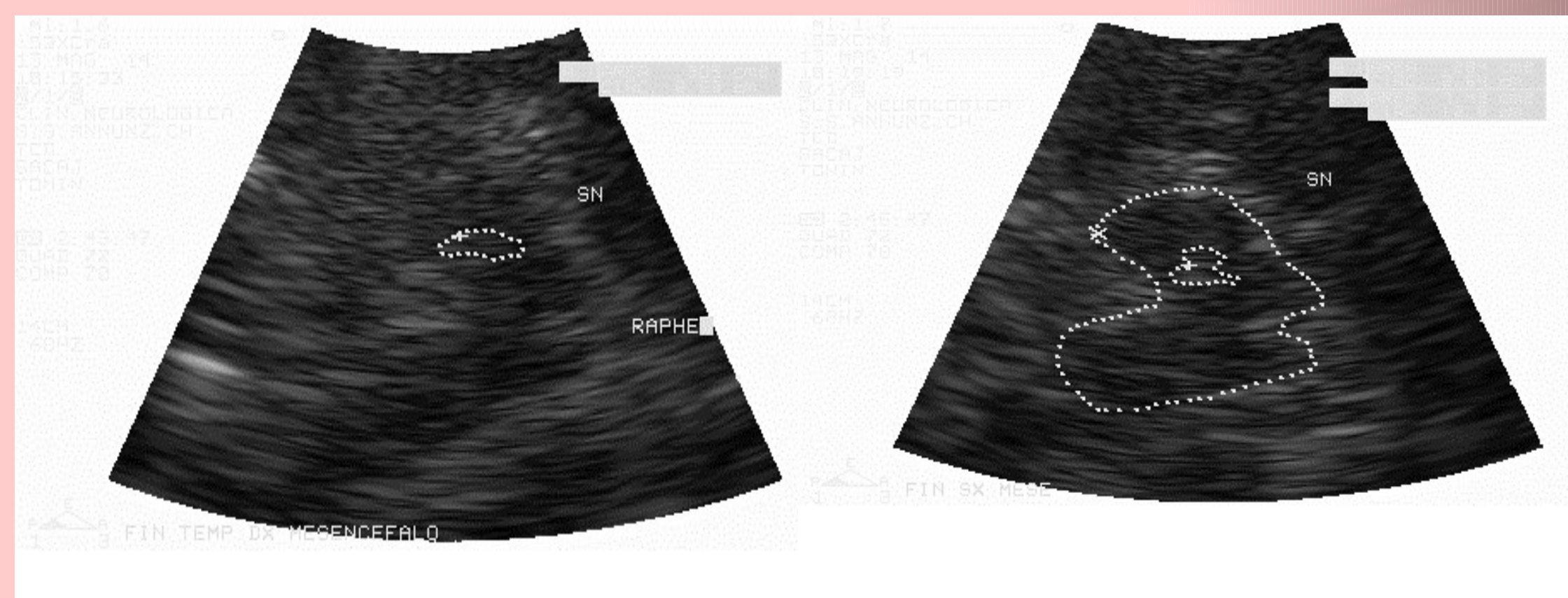


Fig A, B) RAPHÉ: 0=ABSENT. Pt 17; A right temporal window. B left temporal window.



Fig. C,D) RAPHÉ: 2=CONTINUOUS. C: pt 5 left temporal window, D: pt 8 left temporal window.

Results and Conclusions: This study evidenced the presence of hypoechogenicity in the midbrain raphe in PD patient with depression: hypoechogenicity correlated with BDI score ($r=-0.6227$, p -value=0.0019). No alteration of midbrain raphe was found in PD patient with alexithymia: TAS-20 did not correlate with hypoechogenicity of raphe ($r=-0.172$, p -value=0.4441) (Pearson's correlation) (tab. 1-2).

These findings may suggest that while depression in PD may involve central component of brainstem midline, constituting the basal limbic system, called meso-cortico-limbic pathway, alteration in alexithymia does not interest midbrain and it may involve cortical disfunction (3). This pilot study will be extended to a larger number of patients to produce further evidence that depression and alexithymia are independent affective disorder.

References:

- 1-Taylor GJ, Bagby RM, Parker JDA (1991) The alexithymia construct: a potential paradigm for psychosomatic medicine. *Psychosomatics* 32:153,164
- 2-Berg D et al. Depression in Parkinson's disease: brainstem midline alteration on transcranial sonography and magnetic resonance imaging. *J Neurol* 1999b;246:1186-93
- 3-H. Gundel et al. Alexithymia correlates with the size of the right anterior cingulate. *Psychosomatic Medicine* 66:132-140(2004).