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The Debut of Schizophrenia in the Context of Entropy Neuron-Glial Network of the Brane

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Abstract

In article attempt of systematization of the neurophysiologic changes observed during the onset of schizophrenia using a new technique, the variance of the amplitude-frequency characteristics of the alpha rhythm for early detection of debut of schizophrenia, the identification of common regularities in the development of psychopathology, creating a natural-scientific systematization of mental illness on the basis of dimensioning neurophysiological methods.

Keywords: Debut of the schizophrenia; Entropy of the neuron-glial network of the brain; Dispersion of alpha-rhythm; Diagnosis of mental illness

Abbreviations: DSch: Debut of Paranoid Schizophrenia (F20.09x ICD-10); MMR: Mild Mental retardation(F70.x ICD-10); PD: Personality disorder (F60.x ICD-10); DAFCAR: Dispersion of Amplitude-Frequency Characteristics of the alpha rhythm EEG; NGNB: Neuron-Glial Network of the brain; HVT: Hyperventilation test; CDαl: Coefficient of Dispersion of alpha-Rhythm EEG-1(the quotient of the modal values of power of alpha rhythm to his total power in the range of 7-13 Hz); CDα2: Coefficient of Dispersion of the alpha-Rhythm EEG-2 (the quotient of the power of the alpha rhythm in the range of "a modal value ±0.5 Hz" to his total power in the range of 7-13 Hz);O Mo f: Value of the Modal Frequencies in Occipital Electrodes; F Mo f: Value of the Modal Frequencies in Frontal Electrodes; O Mo f - F Mo f : Value of the Difference of Modal Frequencies Between the Occipital and Frontal Electrodes; IIDA: Integral Index of Dispersion of the Alpha rhythm EEG(Value of the Kurtosis of the Normal Distribution CDαl in the Occipital Electrodes); ADA: Asymmetry Distribution of the Alpha rhythm EEG (Value of the Asymmetry Distribution CDαl in the Occipital Electrodes); IIH: Value of the Index Hypofrontality (Kurtosis of the Normal Distribution CDαl in the Frontal Electrodes); AH: Value of the Asymmetry of CDαlin the Frontal Electrodes; CV% - the coefficient of variation; CI: Confidence interval; c.u.: conditional unit

Introduction

In medical literature the problem of schizophrenia is so widely represented that there is no need for lengthy introduction in evidence the medico-social significance of timely diagnosis of schizophrenia [1,2]. Schizophrenia - the embodiment of the psychiatry in the diversity of symptoms and clinical manifestations of psychopathology. Not passed this disease and the main feature of psychiatry - despite the diversity of literature that the best minds of medicine pondered its problems, to date, no objective marker of schizophrenia. All diagnostics it is based on abstract subjective reasoning. This feature generates an extremely wide interpretation of the behavioral characteristics of people, every deviation from the accepted rules and traditions can be interpreted as a manifestation of schizophrenia. Even the fact of writing some alert psychiatrists can easily be regarded as a manifestation of schizophrenia, the author, as the desire for "the mad perfectionism" grandeur of conception and the desire to solve the world's problems included in the diagnostic criteria for this mental disorder.

However, I must reassure such critics in my plans do not include a search for markers of schizophrenia, since such complex processes in the brain cannot be described by several parameters, moreover, that physical and intellectual capabilities of a single researcher is unable to provide the identification of all parameters that occur in the brain changes in health and disease. Is no exception and systematization of schizophrenia in the framework of psychopathology [1,2]. Disputes about the ownership of schizophrenia among different groups of mental illnesses will cease only after the discovery of their natural-scientific reasons.

It should be said that very many of the effects from the EEG in schizophrenia has been repeatedly described in the literature [3-19]. However, they often wore a qualitative nature and was more of a retrospective statistical indicators, not suitable for the operational needs of the clinic [7]. The psychic activity of man has in common with the manifestations of social psychology society since the administrative mechanisms and human and

society are one. No wonder why there are concepts of "social schizophrenia", "social hysteria". Knowledge of the causes of psychopathology will help us, sooner or later, to understand the basic causes of social problems. The debut of schizophrenia is important because, for the most part, the manifestations of it are erased character, is indistinguishable from borderline psychopathology, which we wrote as part of a cycle of articles devoted to DAFCAR timely differential diagnosis with other forms of mental illness - an urgent problem of modern medicine.

a. **The purpose of the study:** To identify basic laws of entropy NGNB at the debut of schizophrenia using the method of determining the parameters DAFCAR.

Materials and methods

Table 1: The distribution of patients in the comparative experiment study on DAFCAR among certain types of psychopathology.

Nosological form	men	Age	women	Age	Total
DSch (F20.09x)	23	29.0±0.9	58	27.1±1.2	81
MMR (F70.x)	45	28.6±0,8	65	27.4±1,3	110
PD (F60.x)	40	22.7±1.1	98	22.9±0,5	138
Control	15	34.1±0,5	60	21.5±0,6	74
Total	**121**		**282**		**403**

Performed by standard procedure of the EEG electrodes according to international system "10-20%"and the ipsilateral ear referent electrodes [16] test with hyperventilation was performed by the standard method with the dispersion assessment of the changes of alpha-rhythm method S. V. Rosman (2017). Parameters D is calculated according to the method of S. V. Rosman (2013) using the programs Microsoft Excel and Statistica 10.0. For studies of selected young and middle-aged patients to exclude the effects of age-related changes, with minimal opportunity for comorbidity and minimize hazards, despite the fact that about 40% of patients with schizophrenia abuse alcohol and drugs. All patients the study was carried out during the therapy with psychotropic and sedative drugs the distribution of patients according to groups are presented in Table 1.

Results

According to the tradition adopted in this series of articles, assessment of results will start with the semi-subjective, semi-dimensioning method of dispersion mapping of the alpha rhythm.

Discussion

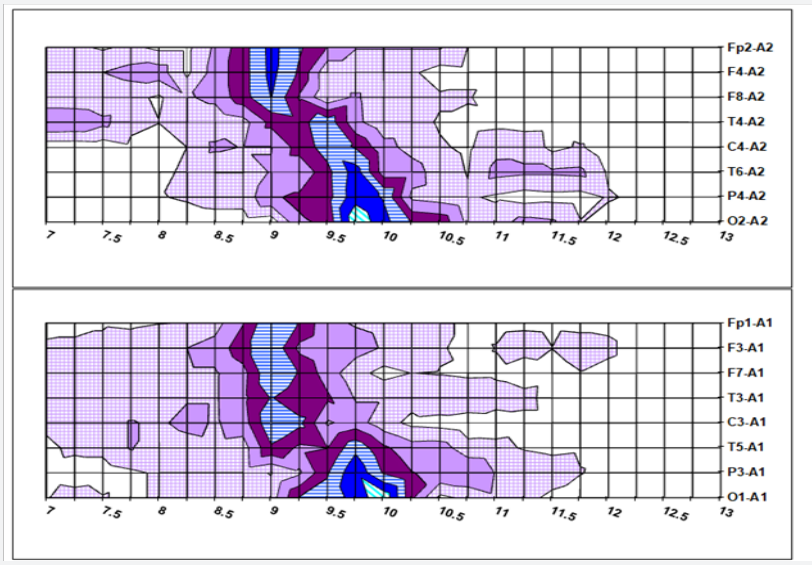

Figure 1: The average dispersion index of the alpha rhythm at the onset of schizophrenia in men. Here and further the upper cartograms - the left hemisphere, bottom - right hemisphere; on the horizontal axis is the frequency of the alpha rhythm, Hz; vertical axis - EEG. Explanation – in the section discussion of results.

The results obtained provide a wide field for discussion. Comparative analysis of dispersion maps at various psychopathology shows that the main feature of the debut of schizophrenia is a marked slowing of the alpha rhythm in the frontal lobes more than 0.5 Hz, often about 1 Hz (Figure 1). This confirms numerous observations on the emergence of a slow wave, usually in the range of theta oscillations activity. Here, however, it becomes obvious that this is not an isolated occurrence of some oscillations, namely, the total slowing of the alpha rhythm, in which there are intermediate frequency oscillations in the form of dispersion, the dispersion around the modal values with a shift in slow-wave region. The frequency of

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the alpha rhythm in the other parts of the brain in the normal range, although the dispersion around the modal frequency is there.

A feature of cartograms in women is somewhat smaller difference of modal frequencies between frontal and occipital derivations and more than men, a shift of modal frequencies in the slow-wave region in the other leads (temporal and Central) (Figure 2). The reason for this is difficult to explain may need a more extensive sample of observations in order to make valid conclusions. Comparative cartograms for individual nosological forms shows that there is a tendency to shift the frontal complex of the cartogram to the left, for slow values of the alpha rhythm in the range from normal to schizophrenia (Figure 3). Statistics indexes DAFCAR supported by the observations of detectable dispersion maps.

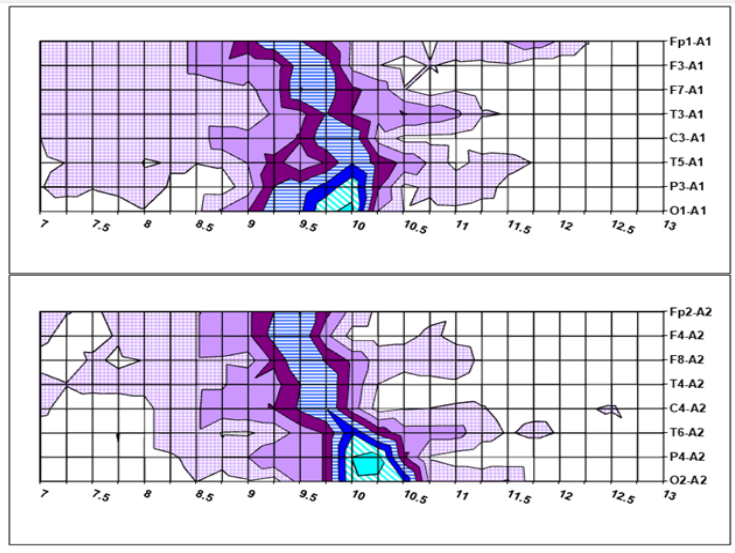

Figure 2: The average dispersion index of the alpha rhythm at the debut of schizophrenia in women.

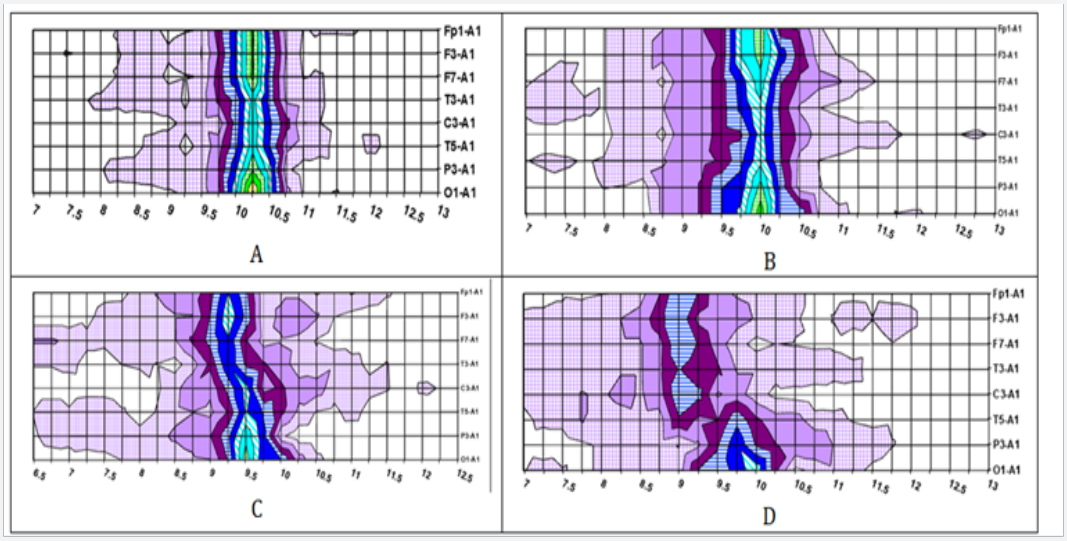

Figure 3: Comparative average dispersion cartograms in norm and in various forms of psychopathology (left hemisphere): A - normal, B - personality disorder, C - mild mental retardation, D is the debut of schizophrenia

In the comparative statistical tables are clearly visible differences in index values among the different nosological forms. But this is most clearly seen on the histograms (Figures 4 & 5). If there are no differences in the occipital leads of the modal frequencies (O Mo f) significant age-melts the distinction between frontal and occipital derivations (O Mo f - F Mo f), reaching 1 Hz, while for women this value is slightly lower, but above 0.5 Hz boundary values of the norm. Comparison of the average values of these coefficients by Student's criterion shows that these differences are statistically valid and significantly expressed (Tables 2-5). The General trend of all indexes in a number of pathologies, built along the "axis of dementia", which was discussed in previous publications, is to reduce them, starting with standards and ending with schizophrenia (Figure 6).

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Table 2: Summary comparative statistics indexes DAFCAR in norm and in some forms of psychopathology (frontal abduction).

Gender	Hemisphere	Index	DSch		Control		PD		MMR	
			Mean	CV%	Mean	CV%	Mean	CV%	Mean	CV%
			Confidence±95%		Confidence±95%		Confidence±95%		Confidence±95%	
men	Left	AH	1.299	61	2.575	14	1.998	43	1.743	52
			1.091-1.507		2.32-2.83		1.825-2.171		1.519-1.966	
		Age	27.1	28	20.3	16	22.9	29	27.4	39
			25-29.1		19.1-21.6		21.6-24.2		24.8-30.1	
		CDα1	0.127	43	0.224	23	0.19	45	0.165	44
			0.112-0.141		0.186-0.262		0.173-0.207		0.147-0.183	
		CDα1	0.389	33	0.588	18	0.529	28	0.486	30
			0.355-0.423		0.505-0.672		0.499-0.559		0.45-0.521	
		F Mo f	8.99	12	10.2	5	10	7	9.57	8
			8.71-9.28		9.89-10.51		9.85-10.14		9.36-9.77	
		O Mo f - F Mo f	0.91	128	0.05	1249	0.05	414	0.11	210
			0.6-1.21		-0.05-0.15		0.01-0.1		0.05-0.17	
		IIH	1.955	157	6.908	29	4.458	86	3.592	109
			1.146-2.764		5.509-8.307		3.693-5.224		2.624-4.561	
	Right	AH	1.162	74	2.542	14	2.024	41	1.741	48
			0.937-1.387		2.324-2.76		1.858-2.191		1.533-1.948	
		Age	27.1	28	20.3	16	22.9	29	27.4	39
			25-29.1		19.1-21.6		21.6-24.2		24.8-30.1	
		CDα1	0.121	43	0.221	19	0.191	44	0.164	44
			0.107-0.135		0.195-0.248		0.174-0.208		0.146-0.182	
		CDα1	0.377	33	0.589	18	0.535	27	0.48	30
			0.344-0.41		0.511-0.667		0.506-0.564		0.445-0.516	
		F Mo f	8.91	11	10.2	5	9.93	7	9.49	11
			8.64-9.17		9.89-10.5		9.79-10.08		9.23-9.75	
		O Mo f - F Mo f	0.89	131	0.03	0	0.08	391	0.18	646
			0.58-1.2		-0.06-0.11		0.02-0.15		-0.11-0.47	
		IIH	1.579	201	6.698	31	4.498	85	3.357	110
			0.746-2.412		5.299-8.097		3.729-5.266		2.446-4.269	
women	Left	AH	1.112	63	2.218	13	1.775	34	1.802	46
			0.811-1.412		2.195-2.575		1.462-2.089		1.554-2.05	
		Age	29	29	33.4	37	24.2	22	28.6	42
			25.4-32.5		26.4-42		21.2-27.3		24.9-32.2	
		CDα1	0.115	42	0.188	27	0.164	32	0.17	46
			0.094-0.135		0.173-0.243		0.138-0.19		0.147-0.193	
		CDα1	0.38	34	0.571	18	0.499	21	0.485	27
			0.325-0.436		0.53-0.667		0.446-0.552		0.447-0.524	
		F Mo f	9.41	13	10.37	5	10.01	6	9.51	9
			8.89-9.94		9.72-10.39		9.67-10.35		9.25-9.76	
		O Mo f - F Mo f	0.62	175	0.21	295	0.17	217	0.14	223
			0.15-1.09		-0.04-0.16		-0.06-0.39		0.05-0.24	
		IIH	1.002	228	4.641	28	3.328	93	3.76	108
			0.014-1.99		4.547-6.417		1.828-4.828		2.541-4.979	

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	Right	AH	1.226	69	2.177	21	1.536	35	1.826	47
			0.862-1.589		2.009-2.595		1.277-1.796		1.567-2.085	
		Age	29	29	33.4	37	24.2	22	28.6	42
			25.4-32.5		26.4-42		21.2-27.3		24.9-32.2	
		CDα1	0.125	39	0.191	26	0.153	32	0.175	45
			0.104-0.146		0.173-0.239		0.13-0.175		0.152-0.199	
		CDα1	0.393	33	0.566	19	0.469	24	0.492	27
			0.338-0.449		0.525-0.663		0.41-0.528		0.452-0.531	
		F Mo f	9.65	12	10.3	5	10.01	7	9.54	10
			9.14-10.17		9.74-10.4		9.65-10.38		9.25-9.84	
		O Mo f - F Mo f	0.37	211	0.04	308	0.05	-752	0.09	371
			0.03-0.71		-0.05-0.17		-0.31-0.42		-0.01-0.2	
		IIH	1.713	142	4.666	41	2.259	112	3.818	108
			0.663-2.763		3.89-6.507		1.168-3.35		2.576-5.06	

Table 3: Summary comparative statistics indexes DAFCAR in norm and in some forms of psychopathology (occipital abduction).

Gender	Hemisphere	Index	DSch		Control		PD		MMR	
			Mean	CV%	Mean	CV%	Mean	CV%	Mean	CV%
			Confidence±95%		Confidence±95%		Confidence±95%		Confidence±95%	
men	Left	ADA	1.746	44	2.711	12	2.29	27	2.101	35
			1.543-1.949		2.507-2.916		2.507-2.916		1.918-2.283	
		Age	27.1	28	20.8	19	22.9	29	27.4	39
			25-29.1		19.4-22.2		19.4-22.2		24.8-30.1	
		CDα1	0.169	46	0.284	13	0.237	34	0.212	39
			0.149-0.19		0.26-0.309		0.26-0.309		0.192-0.233	
		CDα1	0.509	31	0.744	10	0.66	20	0.596	27
			0.468-0.55		0.699-0.79		0.699-0.79		0.556-0.636	
		F Mo f	9.9	7	10.26	5	10.05	7	9.68	8
			9.71-10.1		9.96-10.55		9.96-10.55		9.47-9.88	
		IIDA	3.284	104	7.155	28	5.205	64	4.593	81
			2.388-4.181		5.933-8.377		5.933-8.377		3.675-5.51	
	Right	ADA	1.713	52	2.738	11	2.324	30	2.135	33
			1.481-1.945		2.662-2.814		2.662-2.814		1.96-2.31	
		Age	27.1	28	21.5	27	22.9	29	27.4	39
			25-29.1		20-23		20-23		24.8-30.1	
		CDα1	0.172	46	0.298	14	0.247	35	0.217	36
			0.151-0.193		0.287-0.308		0.287-0.308		0.198-0.236	
		CDα1	0.516	31	0.767	9	0.669	21	0.606	26
			0.474-0.558		0.75-0.784		0.75-0.784		0.567-0.644	
		F Mo f	9.8	8	10.25	5	10.02	7	9.67	9
			9.6-9.99		10.1-10.39		10.1-10.39		9.45-9.9	
		IIDA	3.254	113	7.325	27	5.502	62	4.682	70
			2.287-4.22		6.814-7.835		6.814-7.835		3.87-5.495	
		ADA	1.756	46	2.295	15	2.3	31	2.114	40
			1.406-2.105		2.377-2.856		2.377-2.856		1.861-2.367	
		Age	29	29	33.4	37	24.2	22	28.6	42
			25.4-32.5		26.4-42		26.4-42		24.9-32.2	

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women	Left	CDα1	0.176	44	0.246	19	0.233	36	0.218	43
			0.142-0.21		0.249-0.317		0.249-0.317		0.19-0.246	
		CDα1	0.548	28	0.715	9	0.641	23	0.61	26
			0.481-0.614		0.723-0.806		0.723-0.806		0.562-0.657	
		F Mo f	10.03	8	10.58	5	10.17	7	9.65	9
			9.69-10.37		9.8-10.43		9.8-10.43		9.4-9.9	
		IIDA	3.082	117	4.804	34	5.455	61	4.775	89
			1.527-4.638		5.061-7.787		5.061-7.787		3.492-6.059	
	Right	ADA	1.788	47	2.514	17	2.33	31	2.148	36
			1.427-2.148		2.257-2.77		2.257-2.77		1.916-2.381	
		Age	29	29	34.1	36	22.7	23	28.6	42
			25.4-32.5		26.6-41.5		26.6-41.5		24.9-32.2	
		CDα1	0.18	42	0.269	18	0.25	37	0.226	42
			0.147-0.212		0.24-0.298		0.24-0.298		0.198-0.254	
		CDα1	0.529	30	0.76	10	0.673	21	0.622	27
			0.461-0.597		0.714-0.806		0.714-0.806		0.572-0.672	
		F Mo f	10.02	11	10.15	5	10.07	7	9.64	9
			9.56-10.48		9.87-10.43		9.87-10.43		9.38-9.9	
		IIDA	3.444	112	5.862	37	5.676	65	4.896	76
			1.779-5.11		4.554-7.169		4.554-7.169		3.778-6.013	

Table 4: Comparative indicators of differences in the average values of certain parameters of the DSch compared with PD, MMR and normal by Student's test (t-value) - left hemisphere.

Index	Leading	Feel	RL	t-value	df	p
IIH	Frontal	1.68460	4.49157	-5.79328	217	0.000000
AH		1.24547	2.01208	-6.76473	217	0.000000
F Mo f		9.11111	9.99275	-7.06731	217	0.000000
CDα1		0.12339	0.19003	-6.47252	217	0.000000
CDα2		0.38662	0.53228	-7.50631	217	0.000000
O Mo f - F Mo f		0.82716	0.07971	7.42211	217	0.000000
Age		27.6	22.9	4.92390	217	0.000002
IIDA	Occipital	3.22706	5.30798	-4.29204	217	0.000027
ADA		1.74869	2.29505	-5.53995	217	0.000000
CDα1		0.17134	0.23852	-5.86781	217	0.000000
CDα2		0.52014	0.65839	-6.92032	217	0.000000
Age		27.6	22.9	4.92390	217	0.000002
		Feel	UO	t-value	df	p
IIH	Frontal	1.68460	3.66107	-3.80990	189	0.000188
AH		1.24547	1.76703	-4.31092	189	0.000026
CDα1		0.12339	0.16701	-4.49155	189	0.000012
CDα2		0.38662	0.48558	-5.04963	189	0.000001
O Mo f - F Mo f		0.82716	0.12500	6.22506	189	0.000000
IIDA	Occipital	3.22706	4.66725	-2.63676	189	0.009066
ADA		1.74869	2.10620	-3.14007	189	0.001961
Mo f		9.93827	9.43182	5.55900	189	0.000000
CDα1		0.17134	0.21488	-3.60239	189	0.000403
		Feel	HOPMA	t-value	df	p

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IIH	Frontal	1.68460	6.49708	-11.6109	153	0.000000
AH		1.24547	2.54202	-13.1455	153	0.000000
Mo f		9.11111	10.22635	-7.6721	153	0.000000
CDα1		0.12339	0.22716	-12.2568	153	0.000000
CDα2		0.38662	0.61661	-12.1750	153	0.000000
O Mo f - F Mo f		0.82716	0.01689	6.0788	153	0.000000
Age		27.6	23.76	2.9302	153	0.003907
IIDA	Occipital	3.22706	6.98157	-8.1989	153	0.000000
ADA		1.74869	2.68187	-9.6224	153	0.000000
Mo f		9.93827	10.24324	-2.8356	153	0.005192
CDα1		0.17134	0.28597	-11.4290	153	0.000000
CDα2		0.52014	0.74979	-11.6987	153	0.000000
Age		27.6	23.76	2.9302	153	0.003907

Table 5: Comparative indicators of differences in the average values of certain parameters of the DSch compared with PD, MMR and normal by Student's test (t-value) - right hemisphere.

Index	Electrodes	DSch	PD	t-value	df	p
IIH	Frontal	1.61701	4.22031	-5.23236	217	0.000000
AH		1.18011	1.96491	-6.67775	217	0.000000
F Mo f		9.11728	9.93297	-6.58731	217	0.000000
CDα1		0.12199	0.18684	-6.37945	217	0.000000
CDα2		0.38155	0.52572	-7.49374	217	0.000000
O Mo f - F Mo f		0.74383	0.09964	6.09897	217	0.000000
Age		27.6	22.9	4.92390	217	0.000002
IIDA	Occipital	3.30805	5.55234	-4.48994	217	0.000012
ADA		1.73416	2.32583	-5.52465	217	0.000000
CDα1		0.17413	0.24767	-6.26731	217	0.000000
CDα2		0.51987	0.67014	-7.32289	217	0.000000
Age		27.6	22.9	4.92390	217	0.000002
		DSch	**MMR**			
IIH	Frontal	1.61701	3.54592	-3.75640	189	0.000229
AH		1.18011	1.77561	-4.81181	189	0.000003
CDα1		0.12199	0.16870	-4.86349	189	0.000002
CDα2		0.38155	0.48503	-5.32562	189	0.000000
O-F		0.74383	0.14545	4.08642	189	0.000065
IIDA	Occipital	3.30805	4.76974	-2.80418	189	0.005571
ADA		1.73416	2.14052	-3.51133	189	0.000558
Mo f		9.86111	9.42955	4.30106	189	0.000027
CDα1		0.17413	0.22057	-3.87508	189	0.000147
		DSch	**Control**			
IIH	F4-A2	1.61701	6.17318	-10.5081	153	0.000000
AH	F4-A2	1.18011	2.47694	-11.7305	153	0.000000
F Mo f	F4-A2	9.11728	10.21959	-7.7643	153	0.000000
CDα1	F4-A2	0.12199	0.22614	-12.5076	153	0.000000
CDα2	F4-A2	0.38155	0.61728	-12.6341	153	0.000000
O Mo f - F Mo f	F4-A2	0.74383	0.01014	5.7213	153	0.000000
Age	F4-A2	27.6	23.76	2.9302	153	0.003907
IIDA	O2-A2	3.30805	7.06759	-7.6884	153	0.000000

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ADA	O2-A2	1.73416	2.69857	-9.0017	153	0.000000
Mo f	O2-A2	9.86111	10.22973	-3.2034	153	0.001653
CDα1	O2-A2	0.17413	0.29269	-11.5525	153	0.000000
CDα2	O2-A2	0.51987	0.76547	-12.4230	153	0.000000
Age	O2-A2	27.6	23.76	2.9302	153	0.003907

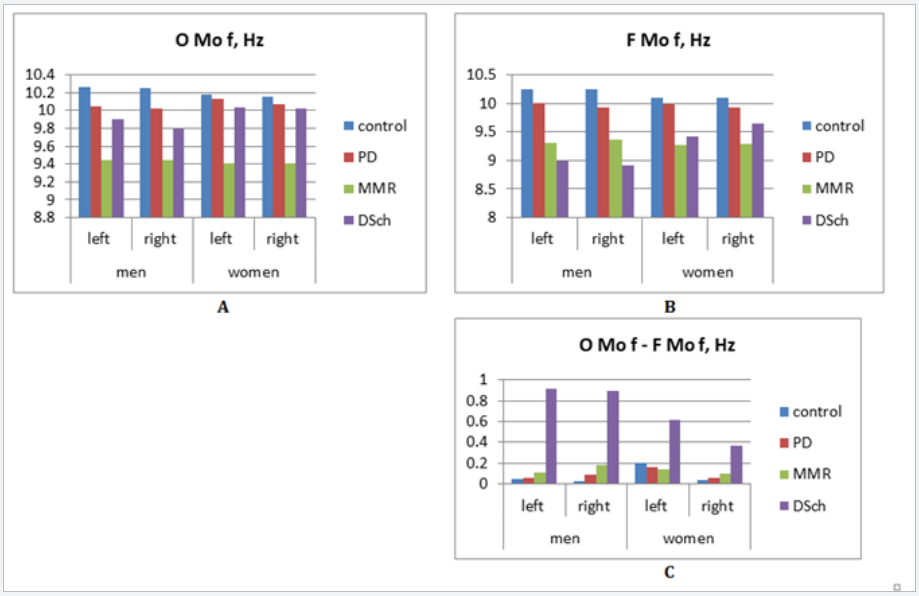

Figure 4: Comparative histogram of the average values of the modal frequency of the alpha rhythm at the debut of schizophrenia: A - in occipital leads, B - leads in the frontal, C - the difference between occipital and frontal derivations.

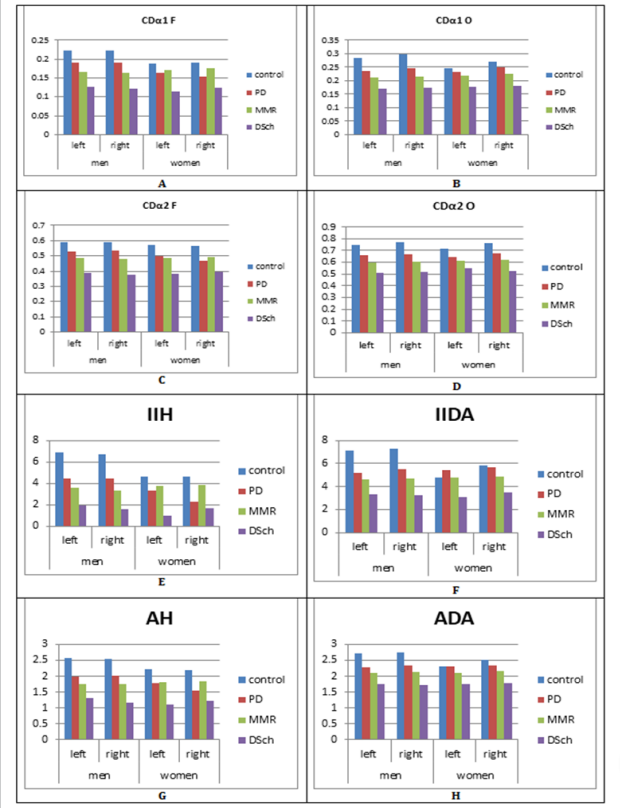

Figure 5: Comparative histograms of average values of indices DAFCAR at the debut of schizophrenia (explanation in the text discussion).

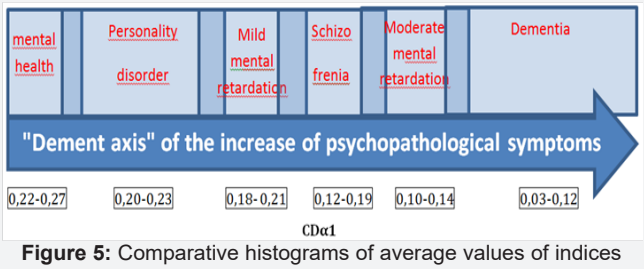

Figure 5: Comparative histograms of average values of indices DAFCAR at the debut of schizophrenia (explanation in the text discussion).

The only exception in this series - the difference between the values of modal frequencies in the frontal and occipital electrodes - it increases to schizophrenia. The differences in the personality disorder and slight mental retardation are insignificant and do not exceed the sensitivity threshold of the instrument (0.25 Hz), that is, they can be neglected and consider that in this pathology the synchronicity of the alpha rhythm is not broken. Despite the fact that the overall pattern of these indices is almost linear decline in the series from PD to DSch, the significance of them are different and they do not replace but complement each other.

CDα1 (Figure 5A - frontal electrodes, 5B - the occipital electrodes) is the main factor characterizing the qualitative characteristics of the spectrum of the alpha rhythm - the degree of split the lower the coefficient, the greater the degree of split. The disadvantage is a significant degree of scatter around the Central value (CV% of about 30% in various studies). CDα2 (Figure 5, C - frontal electrodes, D - occipital electrodes) reflects

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all the trends reflected by the coefficient CDα1 and more resistant to statistical noise, but unfortunately, it is impossible to make dispersion diagrams, which are constructed according CDα1.

IIG (Figure 5E) and IIDA (Figure 5F) reflect the overall "scatter" of the individual indicators around the Central value because it is one of the parameters of a normal distribution - kurtosis. It shows the degree of split of the alpha rhythm over the entire range of 7-13 Hz in the occipital (IIDA) and frontal (IIH) leads. Its main disadvantage is a very high range of observations around the Central value, so in statistical comparisons it is better to use not the average value, the median of this value in the sample.

More stable and a very important indicator, which is able in the early stages to indicate the beginning of the dispersion of violations of the alpha rhythm - the ratio AH (in the frontal leads) (Figure 5G), and ADA (in the occipital leads) (Figure 5H). He starts to decrease in pathology when the modal value is still in the normal range. This phenomenon is particularly pronounced when personality disorder and delayed physiological development first appears at the onset of schizophrenia. Unfortunately, due to the low familiarity of doctors with the methods DAFCAR to identify schizophrenia at this early stage is very difficult - none of the doctors assigns of such studies.

Thus, the leading of the mechanism of formation of mental disorders in schizophrenia should be considered functional asynchrony of activity of the frontal lobes relative to other parts of the brain. In the present study were considered in the frontal and occipital lobes. Consideration of other departments is difficult and exceeds the technical capabilities of the experimenter. This is manifested by slowing of the alpha rhythm in the frontal derivations of the EEG. Signs of slowing down are not only the decreasing values of modal frequency, but the increase in scatter of capacity fluctuations in the spectrum of the alpha rhythm, with the result that he becomes multimodal and violate the normality of the distribution of these values. On the map it shows the Central displacement of the frontal complex of the cartogram to the left relative to the Central occipital complex. This disturbed stratification cartogram - areas it is washed away, color them in the Central part passes from yellow-orange coloration in the blue-violet.

Parameters DAFCAR significantly change major indices decrease, indicating the increase of the split spectrum of the alpha rhythm, and, therefore, reduced functional ability NGNB, mainly in frontal departments. The modal frequency of the alpha rhythm in the frontal divisions is reduced, with the result that the difference between the frontal and occipital departments becomes more than 0.5 Hz, often more than 0.75 Hz. Such schizoid disorders in NGNB are observed not only in the context of schizophrenia. Of course, with the development of the methodology, it will be possible to differentiate certain clinical variants of such changes probably, it in the severity of dispersion and topical features of their location.

Currently found the following. Synchronization of activities of individual sections of the NGNB is a strictly controlled process, because it is impossible without an effective afferent synthesis [16]. At decrease in functional capacity of the frontal lobes, which is manifested by slowing of the alpha rhythm, the encoding process is so broken that it leads to adequacy efferent reactions and even psychosis. The brain counteracts this process, including the timing mechanism, the main element of which is a stress mechanism of sympathetic regulation. Therefore, in the early stages of the emergence of variance violations appears "supersynchronous" "disturbing" pattern of the EEG. It manifests itself spilled the alpha rhythm. The difference between conventional brain activation from compensatory elimination of variance is a reaction to hyperventilation - when masked variance of the alpha rhythm as the result of increase of entropy appears NGNB endogenous reaction, which increases the variance of the alpha rhythm [17-19].

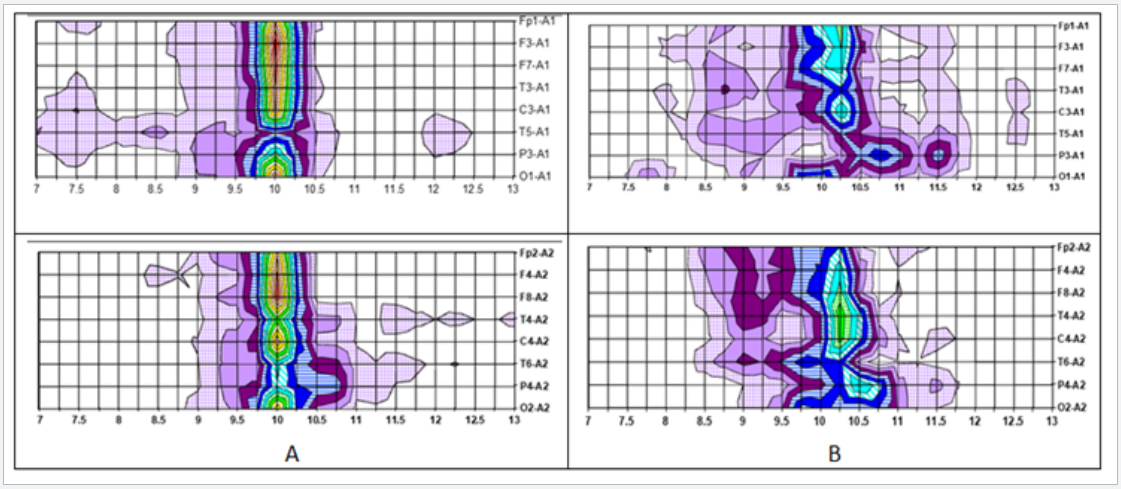

Figure 7: Identification of sub compensated endogenous adjustment of NGS GM at "super synchronous" alpha rhythm with the help of a HVT. A- Map in the background, B - after HVT.

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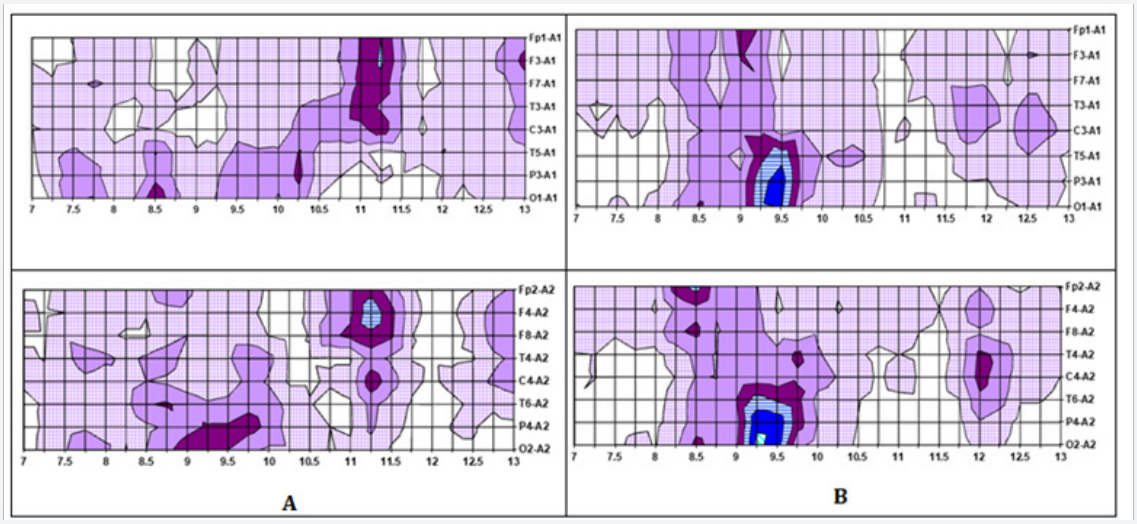

Figure 8: Accelerated disfrontality in the form of manic schizoaffective psychosis F25.0 A - study in background; B - after HVT.

Figure 7 shows such a masked dispersion of alpha rhythm in a patient who underwent forensic psychiatric examination of recurring deviant behavior and multiple thefts clinically established diagnosis: "Paranoid schizophrenia." Previous articles have already pointed to the importance of HVT for the diagnosis of borderline states [18] and the prevention of violent crimes [15]. It is possible, that because of certain circumstances schizoid restructuring NGNB may occasionally occur in individuals with latent pathology in NGNB, with the result that they can experience an attack of schizophrenia. Thus, the schizophrenic process may be transient or latent flowing, however, in all these cases - and in latent, and symptomatic clinical form, everywhere we see the typical neurophysiological changes, signs of increasing DAFCAR with the phenomena of severe hypofrontality. However, hypofrontality is not the only option changes in the frontal lobes, leading to mental illness in Figure 8 shows a so-called case of accelerated disfrontality (my term) the patient with manic variant of schizoaffective psychosis (F25.0 Schizoaffective disorder, manic type).

Thus, supersynchronous of the alpha rhythm and its accompanying anxiety-depression may be a signal of increasing entropy changes NGNB and sign of depletion of compensatory abilities of the brain to contain them. Of course, there is probably a number of other violations related to the entropy of the brain and schizophrenia, what causes the incredible variability of this disease. However, the technique DAFCAR allows you to look into the "kitchen" of these processes, identify their differences with the aim of studying the schizophrenia and the search for new methods of treatment of this disease. Of course, such studies and the detection of debut of schizophrenia in early stages can be greatly facilitated by applying the new device - "Detector of the neuropsychiatric disorders" produced by MCS (Zelenograd, Russia), which gives the dispersion diagrams and indexes DAFCAR in automatic mode and the application which does not require specially trained personnel to decrypt the data of a EEG study.

Conclusion

a. Schizophrenia - a mental illness, which is caused by entropy NBNB special type, in which prevails the defeat of the frontal lobes with a strong regional disorganization of the functions of the frontal lobes, pre evaluate significant slowing of alpha-rhythm with development of severe functional hypofrontality.

b. Using the method of identifying DAFCAR at the onset of schizophrenia is determined by a significant increase in the representation of the non-REM part of the alpha rhythm in the frontal divisions, resulting in a modal value of it in relation to the occipital derivations is reduced to 0.75 Hz or more, and the index of dispersion is moderately reduced, resulting in comes the functional hypofrontality.

c. Schizophrenic symptoms may occur in a latent form for some time under the guise of protective reactions of the brain. Such masked and clinically erased forms can be identified by hyperventilation test EEG.

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