

PSYCHIATRICS & MEDICAL PSYCHOLOGY

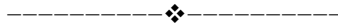
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CLINICAL-PSYCHOPATHOLOGICAL FEATURES OF PATIENTS WITH DEMENTIA IN ALZHEIMER'S DISEASE WITH HIGH RISK OF SUICIDE

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Abstract: The study involved comprehensive clinical-anamnestic, neuroimaging and pathopsychological examination of 75 patients with dementia in Alzheimer's disease. The patients were divided into main group with a high risk of suicide (36 patients), group without signs of suicidal behavior (SB) and control group (39 patients). Patients with SB were found to have the damage of basal nuclei and alba; expansion of the cerebral fissures; subcortical damage in insular, frontal, occipital, parietal regions; hippocampal atrophy. The following factors of suicide risk in patients with Alzheimer's disease were determined: psychic trauma (life-threatening condition, loss of work or money); communicative (lack of emotional, financial and communicative support); anamnestic (suicidal attempts and depressive episodes in past); personal (physical, verbal and indirect aggression, irritability, susceptibility, negativism, suspicion and feeling of guilt); clinical (hallucinatory-paranoid syndrome). Specified predictors serve as target symptoms for psychoprophylaxis.

KeyWords: dementia in Alzheimer's disease, suicidal risk, predictors of suicide, clinical and psychopathological peculiarities.



INTRODUCTION

The relevance of the study is stipulated by a significant increase in the level of dementia worldwide. Dementia is the main cause of disability after cancer and spinal cord injury. Main causes of dementia include neurodegenerative and cerebrovascular diseases [1-3]. Dementia in Alzheimer's disease is the most common among all types of dementia, amounting for about 60-80% [4-7]. Pathogenesis of Alzheimer's disease plays a leading role in the accumulation of beta amyloid in the thymus, occipital regions and around the vessels; cerebral cortex and hippocampal atrophy, axonal transport disorder and acetylcholine deficiency and as a consequence, a decrease in neuroplasticity. As early as at the initial stage of Alzheimer's disease patients are found to have congestive neurotic conditions, depressive episodes, chronic paranoids with ideas of jealousy and damage, transient psychoses [8,9,4,5].

It is known that mental diseases greatly increase the risk of suicidal behavior; moreover, pathoanatomical examination of persons, who committed suicide shows alterations similar to those of Alzheimer's disease [10-12]. We consider it reasonable to provide a comprehensive study of suicidal behavior in this type of dementia and its patterns of formation to determine the predictors and for further development of treatment methods and prevention techniques.

2 PURPOSES, SUBJECTS and METHODS:

2.1 Purpose of the study was the search of pathoanatomical, clinical-anamnestic, psychopathological predictors of suicidal behaviour in patients with dementia in Alzheimer's disease.

2.2 Subjects & Methods

The study involved examination of 75 patients with dementia in Alzheimer's disease; 36 of them had suicidal manifestations (antivital phrases, suicidal thoughts, intentions, attempts) and they comprised the basic group. The control group included 39 patients without signs of suicidal behavior (SB) during a clinical and anamnestic examination. All patients or their relatives gave informed consent

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to participate in the study. The average age of patients was 69.4 years. The interval between the onset of the disease and the examination was 6.2 years. The diagnosis was established according to ICD-10 criteria based on data of objective research methods. The following research methods were used: neuroimaging, clinical-anamnestic, psychodiagnostic: MMSE scale; Clinical Dementia Rating Scale (CDR), Suicidal Risk Assessment Scale, Death Self-Awareness Assessment Scale, Hamilton Depression Rating Scale, Barthel Index, Bass-Darky Questionnaire; method of statistical processing of results.

Conflict of interests

There is no conflict of interests.

3 RESULTS AND DISCUSSION

Structural and anatomical changes in the main group were characterized by atrophy of the convolutions of the brain and cerebellum in 71.4% of the examined, by expansion of the convexital surfaces of the cerebral hemispheres in 85.7%; with the same frequency there was expansion of the ventricular system of the brain, deepening of the fissures, periventricular leukoariosis, damage of basal nuclei and alba in 28.6%.

Patients without SB were found to have expansion of convexital surfaces of the cerebral hemispheres in 100% of cases, atrophy of the brain convolutions mainly in the projection of parietal and temporal areas in 88.8%; damage of basal nuclei and alba in 66.6%; expansion of fissures of the brain in 44% of patients; expansion of the brain ventricles in 22.3%; subcortical damage in insular, frontal, occipital, parietal regions in 22.3%.

Concomitant disorders were as follows: hypertonic disease was observed in 33.3% of patients, ischemic heart disease and diffuse atherosclerosis in 44.4%, 2nd-3rd degree DEP in 33%, chronic cerebrovascular disorder of the ischemic type in 11% of the examined, chronic obstructive pulmonary disease in 11%, type 2 diabetes mellitus, age-related cataracts, arthroses of large joints in 11% of patients.

Family history of alcohol addiction was found in 11% of patients; 22% of patients had relatives with moderate or severe cognitive impairment; 11% of patients had family history of schizophrenia. Suicidal history was observed in the families of 13.5% of patients.

Accompanying psychopathological symptoms included visual and auditory hallucinations in 66.2% of patients, 44% of patients had delusion of theft, self-abasement, persecution; 22% had comorbid depression; 55.6% of patients had volitional disorders in the form of apathy and inactivity; 30.7% of the examined felt fear, tension, irritability; 44.8% had sleep disorders.

Clinical presentation of SB was characterized by the predominance of external behavioral forms over ideational ones. Thus, the main group comprised 55.5% of patients, 22.3% of them had real suicidal intentions, showed antivital mood, 33.4% of them expressed and made suicidal attempts in the past.

The study implied the assessment of factors of suicidal behaviour, severity and specificity of cognitive impairment, social functioning, peculiarities of depressive symptomatology and manifestations of aggression.

Thus, all the patients of the main group with Alzheimer's disease had high SR (100%), there were no patients with low SR in the main group.

In the comparison group 83.33% of patients had low SR, and 16.67% had high SR. Statistical analysis of data showed the prevalence of SR in patients of the main group ($p \leq 0.0001$, $DK = 7.78$, $MI = 3.24$) and low SR among the patients in the comparison group ($p \leq 0.0001$).

The analysis of death self-awareness indices demonstrated that 77.78% of patients with AIDS had a low level of death awareness, and 22.22% had a high one.

Patients without SB were found to have a low level of death awareness ($91.67 \pm 7.56\%$). There were no probable differences in the death rate between the main and control groups.

It is known that a low level of death awareness indirectly indicates a tendency to commit autodestructive actions. So, the obtained data suggest that dementia in

Alzheimer's disease is a vulnerable form of dementia as to committing self-destructive actions.

A detailed analysis of the factors influencing the increase in SR among patients with dementia was performed to determine the factors causing the increase in SB. Thus, the total SR score in the main group was 101.67 points, which corresponded to the high level, while in the comparison group, the total SR score was 38.00 points, which corresponded to the average level (Table 1).

The study showed probable differences reflecting the prevalence of SR in the main group of patients ($t = 13.158$, $p < 0.0001$). The analysis of the factors influencing the increase in SR among patients with Alzheimer's disease demonstrated the predominance of depression symptoms (sleep disturbance, weight loss, depressed mood) (8.89 ± 0.32 points) in patients of the main group compared to the patients of the control group (6.00 ± 2.38 points), ($t = 7.207$, $p < 0.0001$).

Table 1.

Factors of suicidal risk in patients with Alzheimer's disease.

Indices	Main group	Comparison group	t-value	p
	m ± σ			
1	2	3	4	5
Symptoms				
Deep depression	8.89 ± 0.32	6.00 ± 2.38	7.207	0.000
Feeling of hopelessness, helplessness and exhaustion	5.00 ± 4.54	1.69 ± 2.96	3.769	0.000
Disorganization, disorientation, illusion, hallucinations	6.11 ± 3.40	5.08 ± 2.88	1.426	0.158
Alcoholism, drug use, homosexual relationships, participation in risky events	2.22 ± 3.37	0.31 ± 1.08	3.364	0.001
Excitement, tension, anxiety	3.33 ± 3.02	2.23 ± 2.11	1.843	0.069
Guilt	2.56 ± 2.91	0.69 ± 1.66	3.439	0.001
Feeling of hostility, annoyance, suspicion	4.56 ± 2.49	0.77 ± 1.87	7.484	0.000
Weak impulsive control, insufficient prudence	2.56 ± 2.91	1.92 ± 2.12	1.081	0.283
Chronic weakening illnesses	2.78 ± 3.27	1.92 ± 2.46	1.285	0.203
Repeated experiences of troubles associated with the treatment of doctors and psychotherapists	0.78 ± 1.90	0.31 ± 1.08	1.331	0.187
Stress				
Loss of a beloved person caused by death or breakup	3.89 ± 4.42	3.77 ± 3.79	0.126	0.900
Loss of work, money, status	3.67 ± 4.20	1.00 ± 2.38	3.418	0.001
A life-threatening disease	5.67 ± 4.17	1.85 ± 2.83	4.674	0.000
Threat of judicial implementation	1.00 ± 2.87	0	2.178	0.033
Changes in life or environment	1.67 ± 3.17	0.69 ± 1.75	1.664	0.100
Acute and accidental symptoms of stress	2.78 ± 3.99	1.15 ± 2.24	2.193	0.031
Occasionally recurring symptoms of stress	1.11 ± 2.85	0	2.439	0.017
Increase of stress symptoms	0.11 ± 1.47	0	2.178	0.033
Suicidal behaviour in the past and current plans				
Danger to life in previous suicidal attempts	2.89 ± 4.15	0	4.347	0.000
Repeated threats and depressions in the past	4.67 ± 4.28	0.38 ± 1.35	5.944	0.000
Peculiarities related to intentions, and mortal threat of planned methods	3.00 ± 4.21	0	4.357	0.000
Sufficiency of planned methods and features related to the choice of time	1.00 ± 2.87	0	2.178	0.033
Opportunities, communicative aspects and answers of the persons important for the patient				
Lack of financial support	4.67 ± 4.06	0.69 ± 1.66	5.633	0.000
Lack of emotional support from family and friends	5.67 ± 3.88	1.15 ± 2.81	5.801	0.000
Violation of relations accompanied by refusal from attempts to restore them	4.22 ± 4.22	0.77 ± 1.83	4.664	0.000
Relations have an internally directed goal	1.56 ± 3.24	0	3.133	0.002
Communicative relations have an interpersonal orientation	1.78 ± 3.41	0.46 ± 1.92	2.163	0.034
Reaction of persons important for the patient				
Denying the need for help	2.22 ± 3.34	0	4.159	0.000
Lack of care for the patient, lack of understanding	0.89 ± 2.55	0.31 ± 1.08	1.303	0.197
Indecisive or changing position	1.00 ± 2.87	0.38 ± 1.35	1.204	0.233
Total amount	101.67 ± 26.89	38.00 ± 13.27	13.158	0.000

Moreover, the patients had the feeling of hopelessness, helplessness and exhaustion (5.00 ± 4.54 points), symptoms of disorganization and disorientation (6.11 ± 3.40 points), feeling of hostility, irritation, suspicion ($4.56 \pm 2, 49$ points), anxiety (3.33 ± 3.02 points) and guilt (2.56 ± 2.91 points). Patients of the comparison group were also found to have symptoms of disorganization and disorientation (5.08 ± 2.88 points), as well as chronic weakening diseases (1.92 ± 2.46 points) and low prudence (1.92 ± 2.12 points). Such symptoms as the feeling of hopelessness ($t = 3.769$, $p \leq 0.0001$) and irritability ($t = 7.448$, $p \leq 0.0001$), excessive consumption of alcohol ($t = 3,364$, $p \leq 0,01$) and feelings of guilt ($t = 3,439$, $p \leq 0,001$) were shown to have a likely influence on the increase of SR in the main group. The study demonstrated a cause-effect relationship between the effect of stress factors and the increased risk of suicide in Alzheimer's disease.

In the main group stress factors predominantly included life-threatening diseases (5.67 ± 4.17 points), loss of a beloved person (3.89 ± 4.42 points), work and money (3.67 ± 4.20 points). Among the patients in the comparison group, the severity of the stress factors was lower, but the severity of feelings regarding the loss of a beloved person (3.77 ± 3.79 points) was higher. It should be noted that life-threatening diseases ($t = 4.674$, $p \leq 0.0001$), loss of work, money or status ($t = 3,418$, $p \leq 0,001$), the threat of judicial implementation ($t = 2.178$, $p \leq 0.05$) were typical for patients with high SR as compared to the patients of the comparison group. It also should be noted that the character of impact of a stressful event was of an essential significance. Thus, acute and sudden onset of stress factor (2.78 ± 3.99 points), its repetition and increase ($(1.11 \pm 2.85$ points) and (0.11 ± 1.47 points) respectively) likely increased the level of SR in the main group in Alzheimer's disease ($(t = 2.193$, $p \leq 0.05)$, ($t = 2.439$, $p \leq 0.01$) and ($t = 2.178$, $p \leq 0.05$) respectively).

The factor "Suicidal behaviour in the past and current plans" was a significant factor influencing the SR. Suicidal intentions (3.00 ± 4.21 points) and their seriousness (1.00 ± 2.87 points), as well as previous suicidal attempts ($2.89 \pm$

4.15 points), were typical for patients of the main group as compared to the patients of the comparison group, who did not have the abovementioned factors ($(t = -4.357$, $p \leq 0.0001)$, ($t = 2.178$, $p \leq 0.05$) and ($t = 4.347$, $p \leq 0.0001$) respectively). Also, patients of the main group had more depressive episodes in the past (4.67 ± 4.28 points), ($t = 5.944$, $p \leq 0.0001$).

Communicative impairments were also found to influence SR. Thus, assessment of factors "Opportunities, communicative aspects and responses of important people" and "Reaction of important people" showed that the lack of financial sources (4.67 ± 4.06 points), ($t = 5.633$, $p \leq 0.0001$), and emotional support (5.67 ± 3.88 points), ($t = 5.801$, $p \leq 0.0001$), absence of interpersonal relations (4.22 ± 4.22 points), ($t = 4.664$, $p \leq 0, 0001$), feelings of guilt, on the one hand, and hostility, on the other, ((1.56 ± 3.24) and (1.78 ± 3.41) points respectively), ($(t = 3.133$, $p \leq 0. 0025)$ and ($t = 2.163$, $p \leq 0.05$) respectively), as well as denial of need for help (2.22 ± 3.34 points), ($t = 4.159$, $p \leq 0.0001$) were more manifested among the patients with high SR.

Evaluation of clinical-psychopathological structure of depression in patients with dementia showed that patients with SR in the main group predominantly had "inhibitory depression" (43.18 ± 14.62)% manifested in inhibition, torpidity of mental processes and motor reactions, as well "agitated depression" (39.20 ± 15.28)%, manifested in anxiety and tension. Phobic (34.38 ± 15.95)% and somatized (31.25 ± 17.17)% forms of depression were less expressed.

In the group of patients without SB, the "inhibitory" (37.59 ± 8.60)% and "agitated depression" (32.69 ± 11.53)% were the predominant types of depressive disorder, but a statistical analysis of the results allowed to establish that these rates of depressive disorders were significantly higher in patients with high SR ($(t = 2.039$, $p \leq 0.05)$ and ($t = 2.091$, $p \leq 0.05$) respectively).

A more detailed analysis of depression symptoms in patients of the main and control group helped to understand the influence of depressive symptoms on SR. Thus,

the overall level of depression was higher in the main group (31.44 ± 9.83 points) than in the control group (26.77 ± 7.86 points), while the differences were at the level $t = 2.283$, $p \leq 0.025$, which indicates that depressive disorders in Alzheimer's disease are a factor resulting in an increase in SR (Table 2).

Table 2.

Depression Symptoms in Patients with Alzheimer's Disease (by the Hamilton scale)

Indices	Main group	Comparison group	t-value	P
	$m \pm \sigma$			
1	2	3	4	5
Depressive mood *	1.78 ± 1.24	1.15 ± 1.11	2.292	0.025
Feeling of guilt	1.33 ± 1.26	1.38 ± 1.71	-0.137	0.884
Suicide intentions *	2.56 ± 1.27	0.15 ± 0.37	11.279	0.000
Early insomnia	1.22 ± 0.80	1.00 ± 0.79	1.208	0.231
Moderate insomnia	1.22 ± 0.80	0.77 ± 0.81	2.439	0.017
Severe insomnia	1.00 ± 0.83	1.00 ± 0.69	0.000	1.000
Work and activities	3.67 ± 0.68	3.69 ± 0.61	-0.172	0.864
Inhibition	2.22 ± 1.15	2.46 ± 0.85	-1.029	0.307
Restlessness	2.33 ± 1.51	2.15 ± 1.31	0.551	0.583
Mental anxiety	1.89 ± 1.39	1.54 ± 1.17	1.186	0.239
Somatic anxiety	1.44 ± 1.18	1.62 ± 0.63	-0.789	0.433
Digestive somatic disorders *	1.00 ± 0.83	0.62 ± 0.63	2.270	0.026
General somatic symptoms *	1.33 ± 0.48	1.00 ± 0.56	2.755	0.007
Genital symptoms *	1.00 ± 0.96	0.31 ± 0.73	3.539	0.001
Hypochondria	0.89 ± 1.21	1.15 ± 1.53	-0.826	0.412
Weight loss	0.78 ± 0.93	1.00 ± 0.97	-1.009	0.316
Weight Loss (actual)	0.33 ± 0.68	0.54 ± 0.85	-1.147	0.255
Criticality *	1.00 ± 0.68	1.69 ± 0.61	-4.649	0.000
Daily fluctuations	0.78 ± 0.93	0.62 ± 0.75	0.837	0.405
Daily fluctuations (degree)	0.67 ± 0.83	0.69 ± 0.83	-0.134	0.894
Depersonalization/derealization	1.33 ± 1.43	0.77 ± 1.27	1.809	0.075
Paranoid symptoms	1.33 ± 1.35	1.23 ± 1.74	0.283	0.778
Obsessive and compulsive symptoms	0.33 ± 0.68	0.23 ± 0.58	0.705	0.483
Total score *	31.44 ± 9.83	26.77 ± 7.86	2,283	0,025

Symbols: * - the difference is probable at $p \leq 0.05$

As can be seen from the Table 2, patients of the main group with Alzheimer's disease were predominantly found to have a decrease in activity and work productivity (3.67 ± 0.68 points), suicidal intentions (2.56 ± 1.27 points), excitement ($2, 33 \pm 1.51$ points), inhibition (2.22 ± 1.15 points), mental and somatic anxiety ((1.89 ± 1.39) and (1.44 ± 1.18) points respectively), depressive mood (1.78 ± 1.24 points), feelings of guilt (1.33 ± 1.26 points), suspicion (1.33 ± 1.35 points), symptoms of derealization/ depersonalization (1.33 ± 1.43 points) and general somatic

symptoms (1.33 ± 0.48 points), and sleep disturbance (1.22 ± 0.80 points). Obsessive and compulsive symptoms (0.33 ± 0.68 points), weight loss (0.33 ± 0.68 points) and hypochondria (0.89 ± 1.21 points) were not typical for patients with SB.

Such depressive symptoms as decreased productivity in work and activity (3.69 ± 0.61 points), symptoms of excitement and inhibition ((2.15 ± 1.31) and (2.46 ± 0.85) points respectively), decrease in disease criticality (1.69 ± 0.61 points), somatic and mental anxiety ((1.62 ± 0.63) and (1.54 ± 1.17) points respectively), suspicion (1.23 ± 1.74) and hypochondria (1.15 ± 1.53 points) prevailed in the comparison group. Suicide intentions, obsessive-compulsive symptoms (0.23 ± 0.58 points), genital symptoms (0.31 ± 0.73 points) and digestive somatic disturbances (0.62 ± 0.63 points), actual weight loss (0.54 ± 0.85 points) and daily fluctuations (0.62 ± 0.75 points) were the least expressed in the comparison group (0.15 ± 0.37 points).

Comparison of the results between the main and comparison group showed that in Alzheimer's disease in patients with high SR the depressive mood ($t = 2.292$, $p \leq 0.025$), suicidal intentions ($t = 11.279$, $p \leq 0.0001$), frequent waking up in the middle of the night ($t = 2.439$, $p \leq 0.01$), digestive, general somatic and genital disturbances ($(t = 2.270$, $p \leq 0.025)$, $(t = 2.755$, $p \leq 0.01)$ and $(t = 3.539$, $p \leq 0.001)$ respectively) prevailed, and the patients had more conservative criticism as to their own illness ($t = -4.649$, $p \leq 0.0001$).

Cognitive impairments at different types of dementia and their impact on SR severity were evaluated with MMSE, CDR and Barthel Index. The assessment showed moderate ($33.33 \pm 7.77\%$) and mild ($33.33 \pm 7.77\%$) cognitive deficiency in the majority of patients of the main group, severe dementia in 22.22% of patients, and separate signs of a cognitive deficiency in 11.11%. In the comparison group, the majority of patients had a severe degree of dementia ($53.85 \pm 9.62\%$), 38.46% had moderate and 7.69% of patients had mild dementia.

Statistical analysis of the results allowed to determine that in patients with Alzheimer's disease, high SR prevailed in the groups with mild cognitive deficiency and its indi-

vidual characteristics ($p \leq 0.005$, $DK = 6.37$, $MI = 0.82$) and ($p \leq 0.05$) respectively), and low SR in the group with severe degree of dementia ($p \leq 0.005$, $DK = 3.84$, $MI = 0.61$).

Evaluation of character of separate cognitive functions showed the following features: patients with high SR were found to have a reduction in short-term memory ($14.66 \pm 0.04\%$), praxis ($22.00 \pm 0.06\%$) and time orientation violations ($33.40 \pm 0.09\%$), decreased concentration and ability to count ($37.80 \pm 0.10\%$) (Fig.3.24). These indicators had the lowest values and reflected the deficit specificity of this category of patients.

Patients in the comparison group had praxis ($8.00 \pm 0.02\%$), memorizing ($12.66 \pm 0.03\%$), concentration of attention ($7.60 \pm 0.01\%$), time and place orientation violations ($12.40 \pm 0.03\%$ and $35.40 \pm 0.09\%$) respectively).

The statistical analysis of data showed that patients with high SR in Alzheimer's disease had less severe speech disorders ($t = 3.893$, $p \leq 0.0001$), time and place orientation ($t = 3.718$, $p \leq 0.0001$) and ($t = 4.921$, $p \leq 0.0001$) respectively), concentration of attention ($t = 3.984$, $p \leq 0.0001$). For assessment of the specificity of cognitive impairments, the Clinical Dementia Rating (CDR) was used to determine the depth of dementia process, based on qualitative changes in such indices as the degree of memory impairment, orientation, thinking, qualitative disorders of social and household interaction and the degree of preservation of self-service skills.

Thus, the study showed that the patients of the main group typically had narrowing of interests (2.22 ± 0.86 points), moderate memory impairments (2.17 ± 0.89 points), moderate difficulties in solving problems (2.11 ± 0.89 points), loss of independence outside the home (2.22 ± 0.80 points), difficulties with self-service (2.00 ± 0.956 points) and disorientation (1.94 ± 0.91 points).

The comparison group was characterized by severe violations in intellectual and mnemonic spheres (2.11 ± 0.48 points) and (2.50 ± 0.65 points) respectively), narrowing the range of interests and communication (2.46 ± 0.86 points), moderate loss of self-dependence outside the home and when doing hygiene procedures (2.33 ± 0.76 points) and (2.08 ± 0.77 points) respectively), as well as

severe disorientation (2.58 ± 0.65 points).

Statistical analysis showed probable differences in patients with Alzheimer's disease in comparison group, who had more severe violations in the intellectual sphere and orientation process ($t = 3.307$, $p \leq 0.001$) and ($t = 3.433$, $p \leq 0.001$) respectively).

Moreover, the study implied evaluation of peculiarities of aggression (as a reaction developing as a result of negative feelings and negative assessments of people and events). Thus, in the main group there was a predominance of feelings of guilt ($77.78 \pm 22.53\%$), grievance ($58.33 \pm 22.92\%$), suspicion ($56.67 \pm 18.34\%$), negativism ($53.33 \pm 22.59\%$) and irritability ($51.52 \pm 16.67\%$), which was manifested in the remorse along with the feeling of hatred towards the others expressed in most cases by irritability.

In the comparison group, the level of aggression was significantly lower and was manifested in grievance ($48.44 \pm 9.97\%$), guilt ($48.61 \pm 7.90\%$) and indirect aggression ($30.56 \pm 15.80\%$). There were significant differences between the main group and the comparison group in all the indices of aggression: indices of physical, verbal and indirect aggression ($t = 2.6772$, $p \leq 0.01$), ($t = 3.674$, $p \leq 0.001$) and ($t = 2.155$, $p \leq 0.05$) respectively), irritation, grievance, negativism and suspicion ($t = 5.407$, $p \leq 0.0001$), ($t = 1.940$, $p \leq 0.05$), ($t = 4.165$, $p \leq 0.0001$) and ($t = 6.088$, $p \leq 0.0001$) respectively) were typical for patients with high SR and the feeling of guilt was significantly expressed ($t = 5.736$, $p \leq 0.0001$).

Correlation analysis showed that the intensity of cognitive deficit ($r = -0.542$), perception violation ($r = -0.542$), decrease in concentration of attention ($r = -0.589$), praxis violation ($r = -0.671$), linguistic functions ($r = -0.401$), reading ability ($r = -0.390$), and performing commands ($r = -0.592$) were associated with a low suicide rate, and decreased mnemonic functions ($r = 0.542$), feeling of decision-making difficulties ($r = 0.720$) and disorientation ($r = 0.311$) were associated with a high suicidal risk. In other words, the risk of suicide was less in the more severe cognitive impairments manifested in decreasing concentration of attention, praxis, linguistic functions, ability to read

and perform commands, but mnemonic violations, disability to make decisions and disorientation were a risk factor for suicidal behaviour in patients with Alzheimer's disease.

Thus, high suicide risk was associated with the severity of depression ($r = 0.505$), first of all of age-related type ($r = 0.664$), and depressive episodes in the past ($r = 0.605$); suicidal intentions ($r = 0.887$), feelings of guilt ($r = 0.694$) and sleep disturbances (early insomnia ($r = 0.659$), moderate insomnia ($r = 0.710$) or severe insomnia ($r = 0.586$)) and also apathy ($r = 0.598$), inhibition ($r = 0.492$), mental anxiety ($r = 0.321$) and symptoms of derealization ($r = 0.451$).

“Loss of work, money or status” ($r = 0.616$), life-threatening diseases ($r = 0.727$), acute and accidental onset of the stress factor ($r = 0.304$) and their occasional recurrence ($r = 0.539$) in patients with Alzheimer's disease were associated with a high risk of suicide among the factors of psychiatric traumatism.

Features of interpersonal communications also included the correlates of suicidal risk. Thus, in Alzheimer's disease, feelings of guilt, worthlessness and self-accusation ($r = 0.759$), as well as violations of interpersonal relations ($r = -0.326$) were associated with a high suicidal risk.

Assessment of personal features identified correlates of suicidal risk for different types of dementia. Thus, the severity of irritability ($r = 0.367$), grievance ($r = 0.452$) and feelings of guilt ($r = 0.438$) in Alzheimer's disease were associated with a high suicidal risk.

CONCLUSIONS

Thus, determinants of suicidal behaviour risk in dementia in Alzheimer's disease are as follows:

- Damage of basal nuclei and alba of the cerebral hemispheres; expansion of the cerebral fissures; subcortical damage in insular, frontal, occipital, parietal regions; hippocampal atrophy ($p \leq 0.05$). Leukoaraiosis is a factor of suicide anti-risk ($p \leq 0.001$)
- Visual and auditory hallucinations and delusions of theft, self-abasement, persecution ($p \leq 0.05$)
- Mild dementia ($p \leq 0.005$, $DK = 6.37$, $MI = 0.82$) and certain signs of cognitive deficiency ($p \leq 0.05$)
 - The prevalence of inhibitory (37.59%, $t = 2.039$,

$p \leq 0.05$) and agitated depression (32.69%, $t = 2.091$, $p \leq 0.05$)

- The severity of depression ($t = 2.283$, $p \leq 0.025$), feeling of hopelessness and helplessness ($t = 3.769$, $p \leq 0.0001$), irritability ($t = 7.484$, $p \leq 0.0001$) and guilt ($t = 3.439$, $p \leq 0.001$), suicidal intentions ($t = 11.279$, $p \leq 0.0001$); frequent waking up in the middle of the night ($t = 2.439$, $p \leq 0.01$), digestive, general somatic and genital disturbances ($t = 2.270$, $p \leq 0.025$), ($t = 2.755$, $p \leq 0.01$) and ($t = 3.539$, $p \leq 0.001$), respectively), and more conservative criticism of own illness ($t = 4.649$, $p \leq 0.0001$)
- Anamnestic data: previous suicidal attempts in the history ($t = 4.347$, $p \leq 0.0001$) and depressive episodes in the past ($t = 5.944$, $p \leq 0.0001$)
- Factors of mental traumatization: “life-threatening disease” ($t = 4.674$, $p \leq 0.0001$) and “loss of work, money or status” ($t = 3.418$, $p \leq 0.001$)
- Acute and accidental onset of the stress factor ($t = 2.193$, $p \leq 0.005$) and its recurrence ($t = 2.439$, $p \leq 0.01$)
- Lack of emotional ($t = 5.801$, $p \leq 0.0001$), financial ($t = 5.633$, $p \leq 0.0001$) and communicative ($t = 4.664$, $p \leq 0.0001$) support
- Peculiarities of social functioning: prevalence of little dependence on others ($p \leq 0.0005$, $DK = 7.27$, $MI = 1.31$) and complete dependence on others ($p \leq 0.025$)
- Personal features: predominance of physical, verbal and indirect aggression ($t = 2.6772$, $p \leq 0.01$), ($t = 3.6774$, $p \leq 0.001$) and ($t = 2.155$, $p \leq 0.05$) respectively), irritability, grievance, negativism and suspicion ($t = 5.407$, $p \leq 0.0001$), ($t = 1.940$, $p \leq 0.05$), ($t = 4.165$, $p \leq 0.0001$) and ($t = 6.088$, $p \leq 0.0001$) respectively), and the intensity of guilt ($t = 5.736$, $p \leq 0.0001$).

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