



ANALYSIS OF NEUROPSYCHOLOGICAL POTENTIAL EXAMINATION RESULT IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Abstract:

Episodes of back pain occur during life in 50-99% of the population; the peak of prevalence and morbidity is in the working age. The lumbosacral spine is affected up to 60-80%, which is due to the peculiarities of biomechanics and increased load on this spine. Currently, not enough is known about the different trajectories and exact timing of the onset or development of chronic pain. This is in stark contrast to earlier traditional beliefs that back pain will spontaneously decrease over time. Many authors have shown that degenerative changes in the lumbar spine detected by magnetic resonance imaging (MRI) do not correlate with pain intensity and do not predict the neuropathic component of back pain, necessitating the search for new diagnostic approaches to this problem.

Keywords: neuropsychological potential, patients, chronic pain, back pain

INTRODUCTION. The prevalence of low back pain is high among young adults (graded by WHO, 18 to 44 years of age), the prevalence of low back pain during the year in the adult population ranges from 22 to 65%, with a 1.5-fold increase in the absolute number of individuals with BSNS over the past 27 years. The maximum frequency of cases occurs in the second half of life, starting from 40 years of age, with no significant difference among genders. The question of searching for predictors of back pain development and predicting its chronic course in different groups of young able-bodied population seeking therapeutic help is topical. The role of various factors of transformation of acute BNS into chronic BNS is discussed in the literature. To date, there is debate about the relationship of anatomical structures of the spine and surrounding soft tissues to the clinical symptomatology of back pain, which may influence the choice of patient management tactics by various specialists. Among the known structures of the spine (vertebral bodies, intervertebral disc (IVD), facet joints (FJ)), the leading role in the pathophysiology of BSNS in recent years has been given to the condition of the IVD. The MPD performs structural, motor, and shock-absorbing functions similar to the cartilaginous structures of peripheral joints. The obvious association of back pain with degenerative spinal lesions, especially degeneration of the MPD, signs of cartilage matrix degradation, loss of the pulposus nucleus, and disc deformity are combined under the term "degenerative disc disease." In recent years, the phenomenon of DDD has been reinterpreted and can be regarded as the root cause of degeneration of the entire

motor vertebral segment, with subsequent damage to the facet joints, which perform a supporting and stabilizing function along with the intervertebral cartilage. There are also few studies of risk factors of MPD degeneration in young and old age, chronicization of back pain, pathophysiological mechanisms of MPD progression in young people, structural and anatomical interrelationships have not been definitively determined, and criteria for distinguishing MPD from age-dependent tissue aging have not been developed. According to the WHO Bulletin (1999) definition, low back pain is pain, muscle tension or stiffness localized in the dorsal region between the XII pair of ribs and the lower gluteal folds, with or without irradiation to the lower extremities. The syndrome is not a nosological unit, but due to its high prevalence, social and economic importance it has a separate classification in ICD-10 (M 54.5). Different structures can be the source of TMJ: intervertebral discs, facet and sacroiliac joints, muscles, ligaments, tendons, fascia, spinal cord and its roots, peripheral nerves and others. Depending on which structure is the source of pain, the character of pain may be nociceptive, neuropathic or mixed, which affects the tactics of patient management. The variety of clinical manifestations of TMJ causes certain difficulties in the process of diagnosis and may lead to the prescription of inadequate treatment methods. However, despite the acuteness of the problem and a large number of scientific studies, the causes and mechanisms of MPD occurrence are insufficiently studied. Due to the variety of applied radial methods of lumbosacral examination, there is a need to clarify their



diagnostic value, to develop unified protocols of research, and to analyze diagnostic errors. Motor activity, in norm provides with itself a sequence of tonic functions, as walking, posture, plasticity, having individual hereditary-predisposition peculiarities. In his time, physiologist Beristain N.A. said: "Movement exists in a slender and coordinated ensemble, where each instrument leads its part", hence, the violation or failure of one of the structures (reflex arc, spinal segment, etc.) leads to the launch of a violation of the entire organization of movement, reaching the level of the CNS of the brain, leading to anxiety-depressive, emotional-labile dysfunctions.

It should be noted that there is a great variety of factors (natural or accidental) that form motor peculiarities, such as incorrect posture in adolescence and young adulthood during study (triggering the purpose of posture disorders), irrational working posture in adulthood, acquired problems due to hard work or awkward motor skills, which contributes to dynamic movement. For early and rational diagnosis of these changes, it is necessary to develop an optimal algorithm of radial diagnosis, which will improve the quality and reduce the number of studies. In turn, the maximum possible early detection of degenerative disorders will contribute to the timely initiation of treatment and improve its outcomes. All of the above stated indicated the relevance of this work and determined the purpose of the study.

PURPOSE OF THE STUDY, To investigate and analyze the result of examination of neuropsychological potential in patients with chronic low back pain syndrome.

MATERIAL AND METHODS OF RESEARCH The study was conducted on the basis of MC SamSMU (multidisciplinary clinic of Samarkand State Medical University), for the period of 2022-2024, in the department of X-ray radiology, neurology, neurosurgery. Patients were selected according to the main inclusion criteria: patients with a complaint of pain in the lower back, exceptions were signs of severe somatic diseases (renal and hepatic pathology in particular, cardiovascular pathology, suspected cancer, patients with diabetes mellitus, patients with signs and polyneuropathy and hereditary predisposed diseases, psychosomatic diseases). It is important to note that the selection of patients for the study was carried out in the department of X-ray radiology, where patients applied for diagnostic examination (MRI/MSCT) of the

lumbosacral region (by referral of doctors of various specialties), the number of patients who applied for neuroimaging diagnostics during the period of examination was more than 2 thousand, from this number of patients identical in age and sex (169 people) were selected, which made up the main group (MG).

In turn, the main group was divided into three subgroups depending on the age trend: the first subgroup (1PG) (54 people) of young age (according to WHO indicators); the second subgroup (2PG) (115 people of middle age); the third subgroup (3PG) (12 people) of old age. All patients who applied for MRI/MSCT diagnostics underwent questionnaire, the questionnaire was made on the basis of the basic protocol of examination of this category of patients, besides all patients were made a card "International Standards of Neurological Classification of Spinal Cord Injury (ASIA/ISNCSCI scale, revision 2015)", where the emphasis was made by "International Medical Society of Paraplegia (IMSOP)", and Frenkel's Scale. For purity of the study, patients were additionally offered laboratory examination (blood - biochemistry), ultrasound duplex scanning of leg vessels (USDSC). It should be noted that taking into account the set target tasks, the patients were examined in the form of questionnaires and scales to study neuropsychological potentials (anxiety level, Spielberg-Hanin questionnaire scale; "quality of life" level, EQ - SD questionnaire scale); at the time of admission the patients were interviewed on the level of pain sensitivity (VAS and MRQ scales). Statistical processing of the data was performed on an individual computer with the availability of standard packages, and the traditional use of the Student's criterion reliability assessment method.

RESULT OF THE STUDY. The patients' anamnesis according to the questionnaire showed that in the majority of patients the overload of the musculoskeletal system was revealed, which played a role in the formation of complications, degenerative-dystrophic process in the lumbosacral spine, complications caused an unfavorable type of the disease course: chronic-recurrent, chronic-progressive, mainly concerning the 2nd and 3rd subgroups of patients in 63% of cases. In all cases of the main cohort of patients there were periods of pain relief (during treatment), but with a slight disturbance of the mode of motor activity (awkward turning, physical load, hypothermia), the pain syndrome and clinical and neurological symptoms resumed, in 50.7% of cases patients noted a combination of provocative factors (weight lifting, hypothermia, stress, awkward movement) (Table 1).

Table 1
Analysis of the outcome of the study patients by the nature of clinical complications (n=169)



signs		%
Frequency of exacerbations	> 3 times a year	34
	< 1 time per year	29
	For the first time.	53,9
Duration of disease	> 42 days	100
	< 38 days (comparison group)	
Complications		100
Type of disease course	Chronic	51,9
	Residivizing	19,5
	Chronic-residual	25,6
Severity of clinical manifestation	Low	6,66
	Expressed	49,3
	Cutting-high	44,1
Aggravation provocateurs	Heavy labor (lifting weights)	47,1
	Sedentary work	29,1
	hypothermia	7,3
	Other factors	16,5

In addition, patients noted the frequency of exacerbations up to 3 times a year (34% of the total number of 169 patients), in 29% of cases we note their exacerbation at the time of examination (the last attacks of pain were the last 2-3 years ago). Analysis of the result of the duration of exacerbation (at the current moment), was calculated from the moment of appearance of pain and clinical signs, patients' application to the hospital, outpatient follow-up until the period of symptomatology decline. On average, all patients in the main cohort had a mean of 42 days, while patients in the comparison group (previously treated in hospital) had a mean of 38.8 days, respectively. In addition, the primary exacerbation, this applied only to patients of group 1, was detected in 53.9% of cases, where complications were defined as sacroiliac disorder (spondyloarthrosis) in 10% of cases; sacral neurotrophs in 6% of cases. In the 2nd and 3rd subgroups, the nature of complications was secondary disorder, in the form of neuropathies: sedamiz nerve in 16%, lower gluteal nerve in 11%, locking nerve in 10% of cases. at the same time, despite the fact that all patients had pain syndromes, patients of the 1st group (regardless of the factors of disease onset), and patients of the 2nd and 3rd subgroups had different clinical and neurological character in terms of severity of course and recovery. So in patients of the 1st subgroup compression syndrome with changes (pain) in the lower part of the back, faster succumbed to regression $p=0,001$, and in the 2nd group the process of dystrophic changes progressed, and treatment worsened the condition of patients.

Thus, it is necessary to take into account the degree of compensation (adaptation), depending on the length of disease, age, sex, level of quality of living,

labor activity, hereditary and genetic predisposition, social status. It should be noted, on a number of clinical and neurological (focal) syndromes, the level of pain perception, the patient's behavior in conditions of pain chronification is of great importance. As shown in the literature, recent years, investigated the psychological state of the level of anxiety, only the Spielberg-Hanin scale-questionnaire, gives the opportunity to study and evaluate personal and situational anxiety, where personal anxiety - speaks of an individual stable process, situational shows the susceptibility of a person to the disease (Podchufarova E.V. et al. 2015). The analysis of the results of the anxiety level assessment on the C-X questionnaire scale was almost identical in all three groups in the main cohort (169), slightly lower indicators for the level of situational anxiety (ST) in the 1st subgroup. So in the 1st subgroup ST differed within slightly above the norm (30 points), in 50% of cases 32.9 ± 1.5 points were noted, in 50% 31.5 ± 0.5 points averaged 33.8 ± 2.0 points; in the 2nd subgroup reactivity anxiety had high changes, averaged 38.9 ± 6.5 points, where 64% were 35.1 ± 1.0 points, the remaining percentage of 45 ± 2.0 points. In the 3rd subgroup 3 patients revealed a sharply high level of situational anxiety 47.1 ± 1.0 points, the rest had 41.1 ± 3.5 points, which averaged 45.5 ± 2.5 points; that is reactive situational anxiety was within moderately expressed in all patients, in the 1st subgroup it was relatively low, where $p=0,05$ between groups, it is connected with the peculiarity of age potential of disease perception, where in elderly contingent anxiety and depression by age has its increase, and in the situation of pain factor gives strengthening. Indicators of personal anxiety, such had limits of moderate and high limit. So in the 1st subgroup, the average was $40,5 \pm 2,0$ points, where



17% of patients had $33,0 \pm 0,5$ points, the highest percentage of 74% - limit $36,0 \pm 1$ points, 9% of patients $41 \pm 3,0$ points. In the 2nd subgroup the mean scores were within $43,3 \pm 3,5$ points where 83.5% had $42,5 \pm 2,5$ points, the rest had an elevated level of

anxiety $45,7 \pm 1,7$ points, as seen in this group there were no indicators of low level of anxiety, $p=0,05$ between groups, where the whole group revealed the level of personality anxiety extended to the 2nd subgroup $4,1 \pm 3,0$ points (Table 2).

Table 2
Analysis of outcome measures on anxiety level in patients of the main cohort (n=169)

Indicators		1 subgroup (n=54)	2 subgroup (n=115)	3 subgroup (n=12)
1	Anxiety			
	- situational)	$33,8 \pm 2,0$	$38,9 \pm 6,5$	$45,5 \pm 2,5$
	- personal	$40,5 \pm 2,0$	$43,3 \pm 3,5$	$43,1 \pm 3,0$

No less important emphasis, is the subject of study psychosocial state of patients who have restriction of daily movement stereotype. In this regard, it was appropriate to study the level of "quality of life", for this purpose, taking into account the numerous clinical results discussed in the literature, the scale-questionnaire EQ - SD. The EQ - SD questionnaire scale, convenient to use, within a short period of time can provide information on psycho-emotional, physical parameters of the patient, determining the level of "quality of life" at the time of examination. The analysis of the result of the examination of the patients of the main cohort according to the sections of the EQ - SD scale, showed that in all three groups there is a moderate or pronounced change in the level of mobility (demobilization), if in the 1st group the percentage of moderate (average) change was 93%, in the 2nd and 3rd subgroups had values of 80% and 69%, respectively, at the same time pronounced (high) violations in the 1st group 7%, in the 2nd and 3rd subgroups 20% and 31%, respectively, where $p = 0,05$. Showing the level of self-care, most of the indicators differed moderate changes, in the 1st group 96%, in the 2nd and 3rd subgroups 73% and 50%, pronounced changes, while in the 1st subgroup 4%, in the 2nd and 3rd subgroups 27% and 50%, where the elderly assessed their condition worse, seeking external help. Identical indicators were the level of daily (everyday) activity (work), where patients in group 1 resisted the disease, trying to continue to work (study), but their condition was assessed as a medium-moderate impairment. Accordingly, in group 1, this level amounted to 95%, and pronounced impairment,

consequently, 5% of cases. In the 2nd subgroup, many patients were unable to continue working, so the moderate variant was in a lower percentage of 43%, and the pronounced impairment was noted as 57%; in the 3rd subgroup daily activities were not related to work activities, and carefully limited mobility by age, increased impairment due to lower back pain, respectively, the moderate rate was low 30%, pronounced age up to 70%.

It should be noted that the index of pain sensitivity level in patients coincided with the previously conducted research on VAS and MRQ scale; regarding the issue of depression, patients, though not many, but noted their condition as the absence of depression, explaining their situation as a level of anxiety, anxiety (concern about the further outcome of the disease). Therefore, in this category appeared the indicator of absence of depression.

Thus in the 1st subgroup, young patients noted the absence of depression in 17% of cases, where the moderate indicator of depression amounted to 80% and pronounced 3% of cases. In the 2nd subgroup, the absence of depression was noted by 6% of patients, but expressed depression was noted by 30%, thus moderate depression amounted to 64%. At the same time, patients of the 3rd subgroup all 100% tend to the position of pronounced depression. As a result, the totality of all indicators on the EQ - SD scale determined the level of health quotient (by qualitative component), where in the 1st group this indicator is equal to $51,3 \pm 0,9$; in the 2nd and 3rd subgroups $78,0 \pm 1,9$ and $40,2 \pm 0,5$ points (where the best score - 100, the worst - 0 points) (tab. 3).

Table 3
Analysis of outcome measures on anxiety level in patients of the main cohort (n=169)

Indicators		1 subgroup (n=54)	2 subgroup (n=115)	3 subgroup (n=12)	P
1	Demobilization rate				$>0,05$
	Moderate	93	80	69	
	pronounced	7	20	31	



2	Self-service				>0,05
	Moderate	96	73	50	
	pronounced	4	27	50	
3	Daily labor activity				>0,05
	Moderate	95	43	30	
	pronounced	5	57	70	
4	Discomfort (pain in the lower back)				>0,05
	Moderate	83,5	84,1	86,7	
	pronounced	16,5	15,9	13,3	
5	Depression level				>0,05
	No change.	17	6	0	
	Moderate	80	64	0	
6	pronounced	3	30	100	>0,05
	Health factor (quantitative indicator) (norm 100 points)	58,3±0,9	48,0±1,9	40±0,5	

CONCLUSIONS: Thus, the result of the study of the patients of the main cohort on the subject of psycho-emotional state showed homogeneity in important parameters: anxiety, depression, decreased level of health quality (life activity), for the period of examination of patients, where the statistical validity of the results had relative uniformity, by groups, and insignificant differences by age factors. But it should be noted that the main focus of the study confirmed the prevalence of maladaptation symptoms in all patients.

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