

UDC 616.857.2

DOI: 10.15587/2519-4798.2022.252260

THE INFLUENCE OF CONCOMITANT CERVICALGIA ON THE PSYCHO-EMOTIONAL AND AUTONOMIC STATE AND DAILY ACTIVITY IN PATIENTS WITH EPISODIC MIGRAINE

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The aim of the work is to study the occurrence of psycho-emotional and autonomic disturbance and the impact of headache on the daily activities of patients with episodic migraine, depending on the presence of concomitant cervicalgia.

Materials and methods: 77 patients with episodic migraine (17 with aura, 60 without aura, 28 men and 49 women, 18-58 years, mean 42.5±15.5 years) were included. 42 of them had concomitant cervicalgia. All patients were divided into 2 groups: I – episodic migraine with concomitant cervicalgia, II – episodic migraine without neck pain. The Spielberg-Hanin's anxiety scale, the Beck depression scale, Wayne questionnaire, Neck Disability Index and the MIDAS were used.

Results. The number of psycho-emotional disorders was higher in group patients with combined episodic migraine and cervicalgia ($p<0.05$). The indicators of autonomic disturbance were also higher in I group ($p<0.05$). The indicators depression correlated with autonomic status on subjective signs symptoms of ($r=0.380$) and objective signs ($r=0.554$). In I group the autonomic disturbance on subjective signs correlated with state anxiety ($r=0.312$), trait anxiety ($r=0.348$) and Beck scale ($r=0.351$). In group II autonomic objective signs correlated with the patient's self-assessment on the same scale ($r=0.919$). The level of neck disability on NDI correlated with autonomic dysfunction on objective signs ($r=0.338$) in I group. The decrease of daily activity was more significantly reduce on MIDAS in I group compare with II group.

Conclusion. The combination of episodic migraine and cervicalgia in patients significantly reduces the daily activity rate on the MIDAS. The concomitant cervicalgia in patients with episodic migraine to contribute increase rates of state and trait anxiety and mild depressive symptoms and autonomic disturbance

Keywords: episodic migraine, cervicalgia, psycho-emotional state, autonomic disturbance, neck pain

How to cite:

Dubenko, O., Chernenko, A. (2022). The influence of concomitant cervicalgia on the psycho-emotional and autonomic state and daily activity in patients with episodic migraine. ScienceRise: Medical Science, 1 (46), 16–20. doi: <http://doi.org/10.15587/2519-4798.2022.252260>

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1. Introduction

The migraine is the most common neurological disease, which is often accompanied by comorbidities and concomitant diseases, which increases the overall burden on migraine patients, reduces quality of life and adds economic costs. Most of them were identified as risk factors for the progression of episodic migraine [1]. Combination of comorbidities or “multimorbidity” is associated with the risk of chronic migraine [2, 3]. Depressive disorders and anxiety are the most common among migraine patients [4, 5]. The high comorbidity of migraine and chronic pain (up to 39.5 %) indicates a pathogenetic link between migraine and pain disorders [6].

There is a high frequency of myofascial pain syndrome of craniocervical localization in patients with verified migraine. Myofascial dysfunction of temporal, masticatory, occipital muscles, muscles of a back surface of a neck and muscles of upper arms is registered [7, 8].

The pericranial tension and pain are one of the reasons for reduced quality of life of patients with migraine in the period between attacks [1, 9].

The aim of the work is to study the occurrence of psycho-emotional and autonomic disturbance and the impact of headache on the daily activities of patients with episodic migraine, depending on the presence of concomitant cervicalgia.

2. Materials and methods of the research

The study was conducted at LLC “Doctor Alex LTD” on the basis of an agreement on scientific and practical cooperation between LLC “Doctor Alex LTD” and the Department of Neuropathology and Neurosurgery of the Kharkiv Medical Academy of Postgraduate Education from 01.11.2020 to 01.12.2021.

The work was carried out in accordance with the principles of the Helsinki Declaration of the World

Health Association “Ethical principles of medical research with human involvement as an object of study”. The Committee on Bioethics of the Kharkiv Medical Academy of Postgraduate Education took place on June 30, 2020 protocol No. 3. Prior to enrolment, patients and their relatives were informed of the study protocol and signed with informed consent.

The study involved 77 patients with episodic migraine (17 with aura, 60 without aura), including 28 men and 84 women aged from 18 to 58 years (mean 42.5 ± 15.5 years). 42 patients with episodic migraine had concomitant neck pain in the interictal period, a feeling of tightness in the neck and upper arms, limited active movements in the cervical spine (54.54 %), thoracic spine pain with a feeling of tightness – 21 (27.27 %). These complaints were exacerbated during movements in the neck, after prolonged static loads, hypothermia, changes in weather and after psycho-emotional stress. Neck pain was assessed for 3 months.

On this basis, all patients with episodic migraine were divided into two groups: group I – 42 patients (men / women 6/36) with concomitant cervicgia, group II – 35 patients (men / women 10/25) without neck pain.

The episodic migraine was diagnosed according to the International Classification of Headaches – 3rd Edition [10]. Neck pain was assessed for 3 months. None of the patients with migraine took drugs for prophylactic treatment.

Exclusion criteria were other primary or secondary headache, hypertension, coronary heart disease, history of stroke, diabetes, other pain syndromes, pregnancy. All patients underwent radiography of the cervical spine with functional load in order to exclude severe degenerative-dystrophic changes of the spine, spinal disc herniation and root compression.

A visual analogue scale (VAS) was used to evaluate the dynamics of the quantitative characteristics of the pain syndrome, according to which patients were assessing the intensity of the pain syndrome of a migraine attack in the range from 1 to 100 mm [11]. The Neck Disability Index (NDI) was used to assess the effect of neck pain on the patient's life limitations [12]. The mood disorder and depression was rated on the Beck Depression Scale (BDS) [13]. The Spilberg-Hanin's anxiety scale was used to assess the level of personal and reactive anxiety [14]. The scheme of the study of the peculi-

arities of autonomic regulation included the assessment of complaints in the patient's scores and objective autonomic symptoms detected by the doctor, using the Wayne questionnaire [15]. The MIDAS Scale was used to assess the impact of migraine on daily activity and performance for 3 months [16].

Statistical analysis was performed using the statistical package Statistica (version 10.0). Descriptive statistics for the studied parameters are given as the mean and standard error of the mean ($M \pm m$) and the median and the values of the lower and upper quartiles (Me [LQ; UQ]). Statistical analysis was performed with a confidence level of 95 %. Values of less than 0.05 were considered statistically significant. The Kolmogorov-Smirnov test was used to check the normality of the distribution of variables. The Kruskal-Wallis test and the Mann-Whitney test were used to compare the mean values. The difference between the mean values in the groups was confirmed by nonparametric analysis of variance ($p < 0.05$). The Sheffe test was used to pairwise compare groups. To determine the relationship between variables, a correlation analysis was carried out, non-parametric Spearman correlation coefficients were calculated.

3. Research results

The most frequent provoking factors of migraine attack in our patients were emotional stress (79.2 %), irregular diet (61.0 %), menstruation (60.6 %) and insufficient sleep (49.3 %). The duration of the disease for group I ranged from 11 to 44 years (16.4 ± 1.3), in group II the disease lasted from 1 to 23 years (9.3 ± 1.1).

Headache attacks were characterized by a pronounced intensity of 8 to 10 points on the VAS scale – 65 (84.42 %) or strong intensity, but not less than 7 points on the VAS scale – 12 (15.58 %). Headache lasted from 4 to 12 hours in 48 (62.34 %), prolonged attack from 12 to 72 hours was noted by 29 (37.66 %).

As could be seen from the Tab. 1, the number of days with headache for 3 months in patients of group I with concomitant migraine and cervicogenic headache and neck pain was significantly higher than in the group with migraine only (Table 1).

The intensity of pain during a migraine attack on the VAS scale was higher in patients of group I compared with group II (Table 1).

Table 1

The results of the assessment of the frequency and intensity of migraine attacks on the VAS scale in patients of the studied groups

Features	I group (n=42)		II group (n=35)		P value
Women / men	36/6		25/10		
Average age (years)	37.55 ± 1.48		33.57 ± 1.37		
	$M \pm m$	Me [LQ; UQ]	$M \pm m$	Me [LQ; UQ]	
Number of days with headache for 3 months	25.62 ± 1.54	25.50 [18.00; 32.00]	15.88 ± 1.46	15.00 [9.00; 21.00]	$p=0.001547$
VAS of headache attack	8.62 ± 0.15	8.50 [8.00; 9.00]	8.34 ± 0.15	8.00 [8.00; 9.00]	$p=0.000000$

Patients enrolled in the study had high or moderate levels of anxiety on the Spilberg-Hanin's scale. Most patients with episodic migraine and concomitant neck pain had a high level of state anxiety – 31 (73.81 %) and trait anxiety – 35 (83.33 %), and most patients with episodic migraine only had a moderate level of state anxiety – 26 (74.29 %) and trait anxiety – 20 (57.14 %).

A small number of patients with episodic migraine, mostly from group I, had depressive symptoms. 8 (19.05 %) patients of group I had mild depressive disorders, 1 (2.38 %) had moderate symptoms and 1 (2.38 %) had severe symptoms of depression. In group II, only 1 (2.86 %) patient had mild depressive symptoms and 1 (2.86 %) had moderate depressive symptoms.

It is known that prolonged exposure to pathological factors leads to stress, and then to the exhaustion of the nervous central and peripheral mechanisms of regulation and management, changes in the psychosomatic state of the individual, which causes a violation of autonomic balance. Most patients showed subjective and objective signs of autonomic disorders in the Wayne questionnaire of varying severity (Tab. 2). We can note that a larger number of patients evaluate their autonomic symptoms as pronounced in group I, and as moderate in group II.

A comparison of the average values of psycho-emotional status, indicators of subjective and objective characteristics in the questionnaire of autonomic disturbance of Wayne is shown in Table 3.

Table 2

The results of the assessment of autonomic disturbance using the Wayne questionnaire by subjective symptoms in patients of the study groups

Group	Absence of autonomic disorders (0–14 points)	Moderate autonomic disorders (15–19 points)	Pronounced autonomic disorders (30 or more points)
I group, n=42	1 (2.38 %)	6 (14.29 %)	35 (83.33 %)
II group, n=35	4 (11.43 %)	26 (74.29 %)	5 (14.29 %)

Table 3

Comparative characteristics of psycho-emotional and autonomic disturbance of patients in the study groups

Feature	I group (n=42)		II group (n=35)		P value
	M±m	Me [LQ; UQ]	M±m	Me [LQ; UQ]	
State anxiety of Spilberg-Hanin's scale	48.83±1.03	50.00 [45.00; 54.00]	42.31±1.02	43.00 [38.00; 46.00]	p=0.000001
Trait anxiety of Spilberg-Hanin's scale	50.86±0.78	52.00 [48.00; 55.00]	45.17±1.05	44.00 [40.00; 49.00]	p=0.000002
Beck's Depression scale	7.45±0.74	6.50 [5.00; 9.00]	4.97±0.49	4.00 [3.00; 6.00]	p=0.000001
Questionnaire of autonomic disorders of Wayne (subjective signs)	36.55±1.33	37.00 [31.00; 42.00]	21.83±1.42	22.00 [15.00; 25.00]	p=0.001547
Questionnaire of autonomic disorders of Wayne (objective signs)	30.79±0.90	31.50 [28.00; 35.00]	18.46±1.12	20.00 [13.00; 24.00]	p=0.000000

The highest rates of state and trait anxiety were in group I patients with episodic migraine and concomitant neck pain. The difference in anxiety between groups I and II was not statistically significant, but the mean values were lower in group II patients with episodic migraine without neck pain. The averages of Beck's Depression scale were lower than normal and in group II lower than in group I.

The rates of autonomic disorders on subjective and objective grounds were higher in patients of group I, the difference was statistically significant.

We can note a significantly lower number and severity of anxiety and depressive disorders in patients with episodic migraine without concomitant neck pain.

The highest rates of situational and personal anxiety were in group I patients with episodic migraine and concomitant neck pain. The difference in anxiety between groups I and II was not statistically significant, but the mean values were lower in group II patients

with episodic migraine without neck pain. Beck averages were lower than normal and in group II lower than in group I. The rates of autonomic disorders on subjective and objective grounds were higher in patients of group I, the difference was statistically significant.

We could note a significantly lower number and severity of anxiety and depressive disorders in patients with episodic migraine without concomitant neck pain.

The indicator of autonomic status by subjective signs correlated with depressive symptoms ($r=0.380$; $p<0.05$) and the indicator of the Wayne questionnaire by objective signs ($r=0.554$; $p<0.05$), and the indicator of autonomic disorders by objective signs of situational anxiety ($r=0.312$; $p<0.05$), personal anxiety ($r=0.348$; $p<0.05$), Beck scale indicators ($r=0.351$; $p<0.05$) in patients of group I with episodic migraine and concomitant neck pain.

The rate of autonomic disorders objectively correlates with the patient's self-esteem on the same scale

($r=0.919$; $p<0.05$) in group II with episodic migraine without neck pain. The level of neck disability NDI correlated with the rate of autonomic disorders, on objective signs ($r=0.338$; $p<0.05$) in group I.

Analysis of the impact of migraine on daily activities according to the MIDAS questionnaire revealed a more significant effect in patients of the first group with episodic migraine and concomitant cervicgia in comparison with the group without cervicgia (Table 4). Patients of the I group noted a greater number of days

when they were not engaged in work, household chores, had reduced working capacity, missed family or social events, active recreation.

The Mann-Whitney test was used to assess the significance of differences between groups. There was a significant statistical difference between the total number of points on the MIDAS scale, the number of missed training or working days due to headache and the number of days on which you did not do homework or homework due to headache.

Table 4
Analysis of the impact of migraine on daily activity in the last 3 months on the MIDAS scale in patients of groups I and II

Feature	I group, n=42		II group, n=35		P value
	M±m	Me [LQ; UQ]	M±m	Me [LQ; UQ]	
The number of missed school or workdays due to a headache	9.05±0.79	9.50 [6.00; 12.00]	7.23±0.93	6.00 [5.00; 9.00]	p=0.022529
Number of days with reduced working capacity at work or study due to headache	6.95±0.99	6.00 [3.00; 7.00]	5.34±0.53	6.00 [3.00; 8.00]	p=0.682387
Number of days not doing homework / homework due to headache	8.95±0.71	9.00 [6.00; 12.00]	7.08±0.91	6.00 [5.00; 8.00]	p=0.011678
Number of days with reduced productivity of homework due to headache	6.59±1.11	5.50 [3.00; 7.00]	4.74±0.48	5.00 [2.00; 7.00]	p=0.477085
The number of days when the headache prevented participation in family, social events, active recreation	6.26±0.69	6.00 [3.00; 8.00]	5.25±0.59	5.00 [2.00; 8.00]	p=0.32605
Total number of points on the MIDAS scale	38.36±2.27	36.00 [30.00; 45.00]	29.63±2.72	30.00 [19.00; 35.00]	p=0.004904

The distribution according to the degree of reduction of daily activity differed in groups I and II. Significant limitation due to migraine was experienced by 37 (48.05 %) patients of group I who had chronic pain – cervicgia, and only 25 (32.46 %) patients of group II.

4. Discussion

When analyzing the effect of migraine on daily activity on the MIDAS scale, it was found that patients with a combination of migraine and cervicgia had a statistically significantly greater impact compared with episodic migraine without cervicgia ($p=0.0049$), in this group there were more missed training or workdays ($p=0.0225$) and the number of days on which they did not do household chores due to headache ($p=0.0116$).

One possible explanation for the causal relationship is that severe headaches, such as migraines, combined with chronic cervical pain can significantly affect patients' daily activities, leading to depressive symptoms [17]. The predominance in group I of depressive disorders can be explained by chronic pain syndrome, which is caused by myofascial dysfunction of the neck muscles.

The presence of cervicocranialgia influenced the violation of autonomic balance in the Wayne question-

naire (in patients of group II only with episodic migraine, autonomic disorders were less pronounced).

In patients in group I with migraine and concomitant cervicgia NDI correlated with the rate of autonomic disorders.

Study limitations. The study included patients with heterogeneous types (with and without aura) of episodic migraine

Prospects for further research. The authors plan to include more patients with episodic migraine in the study to obtain more reliable results, to study the effect of neck pain on the prognosis of migraine.

5. Conclusions

Our study indicates that the combination of episodic migraine and cervicgia in patients significantly reduces the daily activity rate on the MIDAS scale ($p=0.0049$), increases the number of missed school or work days ($p=0.0225$) and the number of days they did not do homework due to headache compared to episodic migraine without neck pain ($p=0.0116$).

The concomitant cervicgia in patients with episodic migraine to contribute increase rates of state ($p=0,0000$) and trait anxiety ($p=0,0000$) and mild de-

pressive symptoms ($p=0,0000$) and autonomic disturbance ($p=0,0015$; $p=0,0000$) that correlated with neck disability.

Conflict of interests

The authors declare that they have no conflicts of interest.

Financing

The study was performed without financial support.

Acknowledgments

We express our gratitude to the patients who took part in the study, as well as the specialists who contribute to the investigation.

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Received date 16.11.2021

Accepted date 23.12.2021

Published date 30.01.2022

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