



DOPPLER AND MRI PATTERNS IN PATIENTS WITH MIGRAINE

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Abstract: - An examination of 104 patients with migraine aged 16 to 45 years was carried out duplex scanning (DS) and magnetic resonance methods tomography (MRI). The composition was evaluated substances of the brain and cerebral hemodynamics in patients with migraine without aura (59 patients) and with migraine with aura (45 patients). Structural changes white substances of the brain in the form of hyperintense on T2VI and predominantly isointense on T1VI focus there were 3 to 12 mm revealed in 28.8% of patients with migraine without aura and 53.3% of patients with migraine with aura. The foci were localized mainly in the white matter of the superior lobes (35.2% of patients with migraine without aura and 41.6% of patients with migraine with aura). According to Doppler studies in patients with migraine without aura prevailed vasospastic reactions in the middle brain arteries With migraine with aura more often was noted difficult perfusion in the middle cerebral and vertebral artery.

Keywords: cerebral hemodynamics, duplex scanning, magnetic resonance imaging, migraine.



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Introduction

Migraine is one from the most common forms of the main pain [1]. Big prevalence, unyielding growth morbidity in young, able-bodied persons age, as well as difficulties diagnostics and therapy determine huge interest in this problem [2,3]. In connection with this, the question of the application of modern methods diagnostician acquires most important significance for the study of this pathology [4,5].

At the current level, the use of such highly informative methods as magnetic resonance imaging (MRI) and duplex scanning (DS) of the main arteries of the head in the diagnosis of various variants of migraine is relevant [6]. According to literary data, focal points changes on MRI with migraine are found statistically more often compared to people without head pain [7,8]. Hyperintense foci on T2-

weighted images are detected twice more often in patients with migraine with aura (40%) compared to migraine without aura (20%) [9,10]. Data [11] in women with migraine general volume hyperintense foci on T2-VI white substances of the brain was substantially more than healthy people volunteers. Focal points changes white substances of the brain in migraine were noted almost 4 times more often than in the control room group in the study [12].

The DS method of highways vessels heads for a long time and successfully used for diagnosis of extracranial and intracranial lesions departments main roads arteries [13]. In the end time published enough large quantity works dedicated to the study is disturbed by the cerebral hemodynamics in patients with migraine with aura and without aura, in the interictal period and in time attack [6]. Results their very contradictory. According to the data [14]

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in patients with migraine without aura is noted growth high-speed blood flow indicators and decrease index pulsations in the arteries foundations brain, and in the group persons with migraine with aura - decrease high-speed indicators and increase indexes peripheral resistance. Some the authors do not note changes indicators of cerebral blood flow at the time of an attack [15].

In the available publications are missing data on the results of the combined application of the DS and MR method in patients with various types of migraine paroxysms (migraine without aura and migraine with aura). All of the above does relevant conducting given research.

Purpose of study

Study conditions cerebral hemodynamics and substances of the brain with the help of methods of DS and MRI in patients with various types of migraine paroxysms.

Materials and Methods

A complex has been carried out examination of 104 patients aged 16 to 45 years (41 men and 63 women). The criteria of inclusions patients included in the study: migraine without aura (group 1 - 59 patients), migraine with aura (group 2 - 45 patients) in accordance with the criteria international classifications main more pain. To all patients underwent a clinical and neurological examination examination. Condition hemodynamics in extra- and intracranial arteries was studied with the help of ultrasound device "Ultima PA" (RADMYR, Ukraine). The timeaveraged maximum blood flow velocity (TAMX) was measured in the siphons of the ICA, and in the anterior (ACA), middle (MCA), and posterior (PCA) cerebral arteries, as well as in the VA (segment V4) and basilar (BA) arteries. MRI of the brain was performed on Magnetom machines Concerto » with tension magnetic field 0.2 T (Siemens, Germany) and Signa HD with tension magnetic field 1.5T (General Electric, USA). Used standard scanning

protocol, including next pulsed sequences: T1 FSE, T2 FSE, T2 FLAIR or TIRM in three projections.

Results research processed by the method of variational statistics on personal computer with use standard programs correlational analysis with calculation middle with the help of arithmetic quantities: M, m, sigma electronic tables "Exel - 5".

Results and discussion

Average duration diseases was 10.7 ± 6.8 years. The frequency of migraine attacks 4.8 ± 2.6 per month, duration - 13.4 ± 9.7 hours. In 15.7% at the time of the attack was noted very much high intensity main pain, in 61.1% - high, in 27.6% - moderate, in 2.2% - weak. Also in patients was noted the following symptoms: general weakness - 85%, nausea - 77%, photophobia - 61.5%, phonophobia - 50%, vomiting - 27%, vestibular violations - 11.5%. Average the score on the MIDAS scale was 25.7, that is corresponded significant decrease general work capacity and everyday life activities.

According to MRI, they are structural changes white substances of the brain were revealed in 17 (28.8%) patients of the 1st group and 24 (53.3%) patients of the 2nd group. These changes were characterized hyperintense on T2VI and predominantly isointense foci on T1VI, sizes which were not exceeded lacunar heart attack (no more than 15 mm) and fluctuated between 3 and 12 mm, that is correlated with literary ones data. Single foci were observed in 21.4% of cases (1st group - 17.2%, 2nd group - 4.2%), 2-3 foci - in 51.6% (1st group - 29.4%, 2nd group - 22.2%), more than 5 foci - in 27.2% (1st group - 25.6%, 2nd group 1.6%). Most often foci were localized in the superior (38.6%, including patients of the 1st group - 35.4%, 2nd group - 40.2%) and frontal (31.4%, including patients of the 1st group - 31.7%, 2nd group - 30.1%) lobes (Table 1). Extension Virchow-Robin spaces were found in 47.5% of patients (group 1 - 47.8%, group 2 - 29.7%).

Table 1: Frequency of localization hyperintense on T2-VI foci in patients with migraine

Localization	Clinical form of migraine (n=41)	
	Migraine without aura (n=17) abs (%)	Migraine with aura (n=24) abs (%)
White substance temporal lobe	6 (35.2%)	10 (41.6%)
White substance frontal lobe	5 (29.4%)	8 (33.3%)
White substance parietal lobe	3 (17.6%)	4 (16.6%)
White substance occipital lobe	2 (11.7%)	1 (4.1%)
Brain stem	1 (5.9%)	1 (4.1%)

Research high-speed indicators of TAMX in cerebral arteries revealed next regularities .

In patients both group indicators of TAMX and RI on the ICA did not differ from the normative ones indicators also did not differ from the norm indicators of RI on VA in both groups. There are several indicators of blood flow

along the MCA exceeded similar in the control room group, at the same time RI values were below normative. In patients of the 2nd group was noted decrease high-speed indicators in MCA, VA, with an increase in this group of values of RI according to the MCA, also in this one group in the majority patients (58.9%) were noted asymmetries speed flow (25-30%) in MCA and VA (table 2).

Table 2. Indicators of TAMX (cm/s) and RI in the main roads arteries in patients migraine

	ICA		MCA		VA	
	TAMX	RI	TAMX	RI	TAMX	RI
Control group	43.1 ± 3.2	0.61 ± 0.06	61.6 ± 5.1	0.60 ± 0.05	36.7 ± 3.3	0.67 ± 0.04
Migraine without aura	44.1 ± 4.4	0.62 ± 0.03	65.7 ± 3.5	0.62 ± 0.05	40.1 ± 4.1	0.68 ± 0.05
Migraine with aura	44.7 ± 4.3	0.61 ± 0.04	58.4 ± 4.3	0.84 ± 0.05*	29.8 ± 3.2*	0.69 ± 0.03

*p < 0.05

Conclusions

1. Cerebral hemodynamics in the middle brain arteries during a migraine attack is characterized pattern vasospasm in migraine without aura and pattern difficult perfusion in migraine with aura .

2. In patients with migraine with aura reliably more often during MRI examination were revealed hyperintense foci on T2VI mainly in the white matter temporal and frontal fate.

Conflict of interest

The authors of the manuscript consciously declare that there is no actual or potential conflict of interest regarding the results of this work with pharmaceutical companies, biomedical device manufacturers, other organizations whose products, services, financial support may be related to the subject of the materials provided, or who sponsored the research conducted.

Compliance with ethical standards

The authors of the manuscript consciously certify that the study was conducted using data from primary medical records and included clinical observations of patients. The study was conducted in accordance with the ethical standards of the Declaration of Helsinki of the World Medical Association on the ethical principles of conducting scientific medical research involving human subjects, the European Society Directive 86/609 on the participation of humans in biomedical research, as well as the Order of the Ministry of Health of Ukraine No 690 of September 23, 2009. Informed consent to participate in the study was obtained from all participants after providing them with clear, complete and accessible information about the

purpose, design and methodology of the study, its potential risks, expected benefits and possible alternatives. All participants confirmed their voluntary participation by signing an informed consent document . Participants had the right to refuse participation at any time without giving reasons. In accordance with confidentiality regulations, all data was collected anonymously and processed in compliance with applicable data protection legislation. All information was used exclusively for this study and was summarized for further analysis of the results.

Primary data and materials

The authors of the manuscript consciously declare that the work uses the results of their own clinical studies, which were systematized and analyzed by the authors. Primary data include generalized patient indicators, laboratory results, protocols and obtained quantitative characteristics. All materials are stored in the archive of the research group and can be provided upon reasonable request to the corresponding author, taking into account the requirements of confidentiality and ethical norms.

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