

Dopplerometry of the cerebral main arteries

Abdullayev, R.Ya.¹, Dudnik, T.A.¹, Tovajnyanskaya, Ye.L.¹, Markovskaya, Ye.V.¹, Jukova, T.A.¹

Institute of Neurology, Psychiatry and Narcology of the National Academy of Medical Sciences of Ukraine, Ukraine¹



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ABSTRACT

Migraine is a common disabling brain disorder. Approximately 1% of the world's population may have chronic migraine. Cerebral hemodynamics during different phases of the migraine attack demonstrate alterations in cerebral blood flow and perfusion, vessel caliber, cortical and sub-cortical function, underscoring that migraine pathophysiology is highly complex. Transcranial dopplerography assessment of blood flow parameters in patients with migraine. A retrospective analysis of the results of TransCranial Dopplerography (TCD) of the middle cerebral artery and main cerebral veins was performed in 117 patients with migraine-54 with aura and 63 without aura. The age of the subjects was 18-43 years, among them 53 (45.3%) men and 64 (54.7%) women. The maximum Systolic Velocity (Vs), the Resistance and Pulsativity Indexes (RI, PI) in Middle Cerebral Artery (MCA) the maximum systolic velocity in Basal Vein of Rosenthal (BVR) and in the Direct Sinus (DS) were determined. According to MRI data, structural changes in white matter of the brain were detected in 19 (30.2%) patients with migraine without aura (1st group) and 28 (51.9%) patients with migraine with aura (2nd group). The Vs in MCA among patients of 1st group averaged 127.9±6.8cm/c, in the patients of 2nd group - 61.7±5.7cm/c, in the control group - 108.4±6.1cm/c respectively. The Vs in a patient of 1st group were significantly higher than in patients of 2nd group and control group (P1-2<0.001, P1-2<0.001). The value of Vs was significantly lower than in the control group (P2-3 <0.001). In the first group, the value of RI was significantly (P1-2<0.05) less than in the second group. The value of PI in patients with migraine with aura was significantly higher (P<0.05) than in the group with migraine without an aura and a control group. The highest systolic blood flow velocity and asymmetry in the basal vein of Rosenthal was noted in patients of 1st group and amounted to 46.4±5.7cm/s, in the 2nd group - 27.8±4.6cm/s, in the control group - 21.4±3.8cm/c, respectively. The value of Vs among patients of 2nd group with high reliability (P 2-1<0.01, P 2-3<0.001) exceeded the rate in patients of 1st group and control group. In patients with migraine without an aura in the fetal period, the systolic blood flow velocity in the middle cerebral artery increases, the resistance index decreases. In patients with migraine with aura, the greatest increase in systolic blood flow velocity in the direct sinus is observed.



1. Introduction

Migraine is a common disabling brain disorder. Chronic migraine is the term that the International Classification of Headache Disorders (ICHD) uses to describe patients with frequent headaches, believed to be biologically migrainous [1]. In the classical sense, migraine implies a chronic headache without certain primary causes [2]. The name ‘migraine’ originally comes from the Greek word hemicrania, meaning ‘half of the head’, representing one of the most striking features of the condition: that in many cases pain only affects one half of the head. Equally commonly, however, pain is felt bilaterally, at the front or the back of the head, more rarely in the face, and rarer still in the body (‘migrainous corpalgia’). The pain is generally throbbing in nature, and typically made worse by any form of movement or even modest exertion. The majority of migraine attacks are severe or at least moderately so [3]. According to [3], complaints of chronic headache account for about 20% of patients in neurological outpatient consultations [4]. Global studies suggest that approximately 1% of the world’s population may have chronic migraine [5]. Chronic migraine imposes a substantial economic burden on society [6]. Despite the fact that for most people migraine is more a certain inconvenience than some dangerous condition, it is one of 40 risk factors that lead to disability all over the world. According to the World Health Organization for 2012, migraine ranks fourth among neurological disorders after a stroke, meningitis and epilepsy. In the United Kingdom, it ranks third after stroke and dementia, resulting in 230,000 DALY (a year with disability disability) being lost every year [7]. The effectiveness of migraine treatment depends on the accuracy of the diagnosis and the peculiarities of its manifestation. Management of chronic migraine is complex, and many patients are less susceptible to therapy [8].

2. Methods

A retrospective analysis of the results of Transcranial Dopplerography (TCD) of the middle cerebral artery and main cerebral veins was performed in 117 patients with migraine - 54 with aura and 63 without aura. The age of the subjects was 18-43 years, among them 53 (45.3%) men and 64 (54.7%) women. All patients underwent clinical neurological examination. The intensity of cephalic syndrome was assessed using a visual analog scale and a headache diary filled out by the patient himself. To determine the severity of the condition at the time of attack we used the MIDAS scale that describes the degree of decrease in the functional activity of the patient with migraine. The maximum Systolic Velocity (Vs), the end Diastolic Velocity (Vd), average systolic velocity (TAMX), the Resistance and Pulsativity indexes (RI, PI) in Middle Cerebral Artery (MCA); the maximum systolic velocity in Basal Vein of Rosenthal (BVR) and in the Direct Sinus (DS) were determined. The control group was composed of 47 patients with unchanged carotid arteries, normal blood pressure, without a cardiovascular disease and chronic headache. The age of the subjects was 21-39years, among them 21men and 26women.

3. Discussion

In the work of Weatherall MW [4] analyzed clinical symptoms and methods of treatment of chronic migraine. Based on the studies carried out, the author draws conclusions that new acute and preventive options should become available over the next 3-6 years, including Calcitonin Gene-Related Peptide (CGRP) antagonists and antibodies, and drugs targeted at other serotonin receptor subtypes.

4. Conclusions

In patients with migraine without an aura in the fetal period, the systolic blood flow velocity in the middle cerebral artery increases, the resistance index decreases. In patients with migraine with aura, the greatest

increase in systolic blood flow velocity in the direct sinus is observed.

5. References

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