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ANOMALIES OF THE CEREBRAL ARTERIES IN MILITARY SERVANTS - PARTICIPANTS OF ATO-OOS, WHO SUFFERED ISCHEMIC STROKES

Viktor Teshchuk, Nazarii Teshchuk, Oleksandr Ruskykh

Military-medical clinical centre of South region of Ukraine, Odesa, Ukraine

Teshchuk Viktor, Honored Doctor of Ukraine, MD, PhD, Associate Professor, Head of angioneurology Department of neurosurgery and neurology clinic of the Military-medical clinical centre of South region of Ukraine, Odesa, Ukraine
Teshchuk Nazarii, neurologist of the Military-medical clinical centre of South region of Ukraine, Odesa, Ukraine
Ruskykh Oleksandr, neurologist of the Military-medical clinical centre of South region of Ukraine, Odesa, Ukraine

Abstract

The analysis of medical histories of 129 patients aged 20 to 59 years, who suffered acute cerebrovascular disorders (ACVD) of the ischemic type (IT), and participated in ATO-JFO was carried out. Anomalies of cerebral arteries were found in all of them. A significant role of hypoplasia of the right posterior cerebral artery, aplasia of the posterior connective, left anterior cerebral and anterior connective, as well as pathological S-shaped tortuosity of the internal carotid artery, hypoplasia of the vertebral arteries and their combinations in the development of acute cerebrovascular disorders in ATO members was established.

Key words: acute cerebrovascular disorders; ischemic stroke; magnetic resonance angiography; intracerebral and extracerebral artery abnormalities

The Russian-Ukrainian war has been going on in Ukraine for eight years ... Tens of thousands of Ukrainian citizens who did not undergo a proper medical examination at military

enlistment offices were mobilized to join Ukrainian Armed Forces. A certain category of servicemen-participants of ATO-OOS had congenital anomalies of the brain vessels, which against the background of chronic stressful situations, acubarotrauma (ABT) and closed craniocerebral trauma (CCCT) led to the emergence of acute cerebrovascular disorders (ACVD). All of them underwent inpatient treatment in the angioneurological department (AND) of the Clinic of Neurosurgery and Neurology of the Military Medical Clinical Center (MMCC) of the Southern Region of Ukraine (SRU) in 2014-2021. In recent years, cerebrovascular disease (CVD) has remained the leading cause of hospitalization, disability and mortality worldwide. Among them, the main place is occupied by ACVD, which annually affects more than 17.0 million people and takes 6.7 million lives on the planet [1, 2]. In 2019, 140.000 people were registered in Ukraine with (ACVD), which led to severe neurological deficits and permanent disability [3]. The pathogenesis of ischemic type (IT) caused by anomalies in the development of cerebral arteries is based on hemodynamically significant disorders of the brain perfusion associated with various variants of the structure of the cerebral arterial network [5]. Introduction of clinical methods of neurosis in clinical magnetic -resonance tomography (MRT), magnetic resonance angiography (MR-AG)) in the diagnosis of vascular diseases (VD) of the brain allowed to detect abnormalities of intracerebral (ICA) and extracerebral arteries (ECA), which in recent years have been identified as one of the leading causes for IT in adults [6-8] and the main - in children [9-12]. It is of some interest to identify the features of ICA and ECA anomalies in servicemen participating in the ATO-JFO and to determine their role in the development of ACVD for IT.

The purpose of our study is to identify the main anomalies of ICA and ECA in servicemen taking part in the ATO-JFO and to assess their role in the development of ACVD for IT.

Materials and methods: We analyzed medical histories of 129 patients aged 20 to 59 years (mean age 42.1 ± 9.6 years) who suffered acute cerebrovascular disorders (ACVD) by ischemic type (IT), and participated in ATO -JFO, among which there were 121 (93.8%) men and 8 (6.2%) women, due to the specifics of the military medical treatment and prevention facility (TPF). All patients underwent clinical and neurological examinations, taking into account the submitted complaints, medical history, neurological status using the Glasgow Coma Scale (GCS) - GCS (G. Teasdale, B. Jennet, 1974) and the stroke scale of the National Institutes of Health Stroke Scale - NIH SS); clinical and laboratory (general clinical blood and urine tests, coagulogram, rheumatic tests) and clinical and instrumental: CT of the brain (for identification, verification and localization of the size, nature of the cell) on a 64-slice

computed tomography «SOMATOM go.Up (64-slice Configuration) », Siemens Healtheare GmbH (2020; Germany) and MRI of the brain at the Magni-Time Medical Center (for verification and localization of the size, nature of the cell, MRI and MR-AG of the brain) were performed on an MR tomograph 1.5 Background "MAGNETOM Espree", Siemens, Germany, 2011.;

- UZDG + TKDG (analysis of CGD using ultrasonic diagnostic device type "ACUSON S2000", Siemens Healtheare GmbH (2020); Linear systolic blood flow velocity (LBFV) and volumetric blood flow velocity (VBFV) were determined arteries (ICA), internal carotid artery (ICA), middle cerebral artery (MCA), anterior cerebral artery (ACA), vertebral artery (VA), basilar artery (BA));

- EEG (study of frequency-amplitude indicators of BA of the brain was carried out with the help of EEG computer complex "BRAINTEST", Ukraine, 2014).;

- programs "Microsoft® Excel 2006", "Statistica® for Windows 6.0" were used for analytical evaluation of the obtained results.

ICA and ECA abnormalities were found in all our patients.

Results and discussion

The analysis of patients' complaints revealed a predominance of cephalgia, which was localized in the right half of the head in 62 (48.1%), unsystematic dizziness in 83 (64.3%), shakiness in walking in 122 (94.6%) servicemen, numbness and weakness. in the right extremities in 67 (51.9%) subjects, weakness and limitation of movements in the left extremities in 62 (48.1%) patients. An increase in blood pressure (BP) was registered in 89 (69.0%) patients, of whom 37 (28.7%) had hypertension for the first time. The diagnosis of hypertension (HT) was made in 44 (34.1%) patients. Of these, the 1st degree severity - in 9 (20.5%) patients, 2nd degree. - in 21 (47.7%) patients and the 3rd degree. - in 14 (31.8%) subjects. In all subjects, the course of HT was complicated by hypertensive crises, which were frequent (up to 3-5 times a month). It should be noted that complaints of a cerebral nature (headache, dizziness) bothered 77 (59.7%) patients a few years before the development of a brain catastrophe. In addition, in the anamnesis of the disease in 69 (53.5%) patients there were transient ischemic attacks (TIA) in the carotid and vertebro-basilar basins for 6-8 years before the development of ACVD for IT, the frequency of TIA varied significantly: one attack in 19 (27.5%); two - in 24 (34.8%); three attacks were observed in 18 (26.1%) subjects; up to four or more TIAs in 8 (11.6%) cases. Different types of cardiac arrhythmias were detected in 22 (17.0%) patients, of which: atrial fibrillation (AF) - in 3 (13.6%), tachysystolic - in 12 (54.5%), bradysystolic - in 4 (18.3%), ventricular arrhythmia was noted in 3 (13.6%) patients.

In the analysis of clinical and neuroimaging data of the brain study, it was found that the clinical symptoms corresponded to the localization of the ischemic focus. The main neurological syndromes were revealed: central right hemiparesis - in 67 (51.9%), motor aphasia - in 43 (33.3%), central left hemiparesis - in 62 (48.1%), central prosoparesis on the right - in 8 (6.2%), central prosoparesis on the left in 11 (8.5%), alternating Miyar-Gubler syndrome in 4 (3.1%) ATO-JFO participants, Jackson syndrome in 4 (3.1%), Fovil's syndrome - in 5 (3.9%), Weber's syndrome - in 7 (5.4%) patients, vestibulo-atactic - in 47 (36.4%) servicemen, astheno-neurotic syndrome - in 31 (40.3) %) of the surveyed. When assessing the neurological status of patients on the NIH SS scale, the following was found: mild severity of ACVD - in 27 (20.9%) patients, moderate - in 65 (50.4%) and severe - in 37 (28.7%). When assessing the disturbance of the level of consciousness (on SCG) the following was established: 15 points in 12 (9.3%) servicemen; 14 points for 14 (10.8%) participants of ATO-JFO; 13 points in 24 (18.6%); 12 points in 39 (30.2%) patients; 11 points in 27 (20.9%) subjects; 10 points in 8 (6.2%) patients; 9 points in 5 (3.9%). Ischemic (hyperintensive) foci according to MRI of the brain in patients were localized in the left hemisphere in 48 (37.2%) cases, in the right hemisphere - in 43 (33.3%), in left frontal lobe - in 9 (7.0%), in the brain stem - in 17 (13.2%), in the cerebellum (in the right hemisphere) - in 8 (6.2%); in the left hemisphere of the cerebellum - in 4 (3.1%) cases.

Anomalies in the development of cerebral arteries were disclosed to some extent in all patients with ACVD we examined for IT. In 93 (72.1%) patients ICA anomalies (separation of the villous circle) of varying severity and localization were detected. Complete posterior trifurcation of the internal carotid artery (ICA) in 11 (8.5%) patients, complete posterior trifurcation of the left ICA in 9 (7.0%), and anterior trifurcation of the right ICA in 6 (4.65%). Hypoplasia of the right posterior cerebral artery (PCA) was observed in 17 (13.2%) patients, bilateral hypoplasia of the PCA - in 19 (14.7%). Aplasia of the posterior connecting artery (PCA) - in 8 (6.2%), aplasia of the left anterior cerebral artery - in 4 (3.1%), hypoplasia of the anterior connecting artery (ACA) - in 16 (12.4%), PCA aplasia - in 7 (5.4%) patients. ECA examination revealed their lesions in 94 (72.9%) patients. Pathological tortuosity (PT) of ICA was disclosed in 79 (61.2%) patients: unilateral - in 41 (31.8%), bilateral - in 38 (29.5%), S-shaped tortuosity was diagnosed in 53 (41.1) %) of patients, loop-like tortuosity - in 19 (14.7%). C-shaped tortuosity was observed in 7 (5.4%) patients. Hypoplasia of the vertebral artery (VA) was diagnosed in 47 (36.4%) patients: bilateral - in 16 (12.4%), unilateral - in 31 (24.03%) patients. Hypoplasia of the left VA occurred in 29 (22.5%) and right VA - in 18 (13.95%) cases; aplasia of the left VA - in 9 (7.0%), right VA - in 4 (3.1%) patients.

The combination of ICA and ECA abnormalities was found in 39 (30.2%) patients, where complete posterior trifurcation of the right ICA and S-shaped pathological tortuosity of the right ICA occurred in 16 (12.4%) cases, complete posterior trifurcation of the left ICA and hypoplasia of the ICA - at 9 (7.0%). Complete posterior trifurcation of the left ICA and hypoplasia of the left IA - in 7 (5.4%) patients, hypoplasia of the right IA and hypoplasia of the right IA was found in 7 (5.4%) patients.

Conclusions

As a result of a comprehensive clinical-neurological and clinical-instrumental examination of 129 servicemen - participants of the ATO-JFO with ACVD for IT revealed anomalies of ICA, ECA and their combinations. Cerebral symptoms in 77 (59.7%) patients preceded the manifestation of ACVD by IT. TIA for 6-8 years before the development of ACVD for IT was recorded in 69 (53.5%) patients. The clinical picture of ACVD by IT was characterized by polymorphism and corresponded to the localization of ischemic foci detected during ACVD and MRI of the brain. The expediency of conducting clinical and instrumental research methods (MRI-AG) with visualization of cerebral vessels for identification of anomalies and establishment of further tactics of conducting servicemen - participants of ATO-JFO is shown.

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