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VIRAL PERSISTENCE IN ATHEROSCLEROTIC PLAQUES AND ITS PREVENTION IN ISCHEMIC STROKE/TIA PATIENTS WHO UNDERWENT CAROTID ENDARTERECTOMY

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Introduction. Approximately 20-25% of ischemic strokes (IS) originate as a result of atherosclerosis (AS) of large arteries, among which a significant proportion belongs to extracranial carotid stenoses. The frequency of artery plaques increases with age [2, 3]. The changes in the thickness intima-media (IMT) complex: density, rarefaction, irregular borders, heterogeneity of the structure are initial signs of an AS lesion. Direct manifestations of the AS process are atherosclerotic plaques (APs), which can cause stenosis and occlusion of vessels [1].

Keywords: stroke, transient ischemic attack, atherosclerotic plaque, intima-media thickness, internal carotid artery, carotid endarterectomy, viral infection.

Objective. To evaluate the frequency of embolic and non-embolic APs, stenoses of medium (50-69%) and severe (79-99%) degree detection in patients with IS/TIA, with the progression of AS and the presence of herpes infection in the anamnesis who underwent carotid endarterectomy.

Material and methods. In total 103 patients with IS/TIA who underwent carotid endarterectomy were examined: 67 males of mean age $66,1 \pm 1,4$ (42-82 y/o) and 36 females of mean age $63,0 \pm 1,3$ (44-81y/o). The medium age was $65,1 \pm 0,9$ years. We studied the thickness of the intima-media complex, the presence of APs,

their consistency (hypoechoic, echoic), structure, location, distribution, and shape. The diagnosis of IS/TIA in a patient that occurred before carotid endarterectomy was confirmed using an MRI examination. An ultrasound examination was performed to determine the stenotic lesion of the internal carotid artery (ICA) and the degree of severity of the stenosis was revealed by this method.

Among patients with diagnosed acute cerebrovascular diseases (ACVD) were the following: TIA of atherothrombotic (AT) subtype, n=38, and IS AT subtype, n=65. All patients had ICA stenosis of 50% or more. Thus, APs were found in the patients, which contributed to the development of varying degrees of stenosis. Stenosis from 50 to 69% was diagnosed in 36 (35.0%) patients, 70 - 90% - in 67 (65.0%) patients. In 59 (57.3%) patients, the development of stenosis was accompanied by the detection of embolic, hypoechoic, and in 44 (42.7%) - non-embolic, echoic APs.

Results. Clinical signs of IS/TIA preceding carotid endarterectomy and existing stenotic lesions on the contralateral side developed in all cases (table 1).

Table 1

Clinical symptoms in patients with IS/TIA and stenosis in anamnesis who underwent carotid endarterectomy

Diagnosis	IS (n=65) %	TIA (n=38) %
Pathology of cranial nerves	76,6%	35%
central and peripheral paresis of mimic muscles and tongue muscles	46,4%	27%
Sensitivity disorders by conductive type	88,9%	45,1%
Subcortical reflexes: several	37,3%	78,8%
All other kinds	65,6%	21,2%
Limbs' paresis	68,3%	
Pyramidal insufficiency		76,5%
Pathological feet reflexes: Babinski	79,7%	55,5%
All other kinds	23,3%	
The function of coordination: ataxia	70,6%	66,7%

The assessment of ultrasound characteristics showed that before carotid endarterectomy performing, in patients with stenosis of 70-99% echoic, non-embolic (hard, less dangerous for thrombus formation) to a greater extent stable APs were

dominated, and in those, with stenosis of 50-69%, were hypoechoic, embolic (soft, more dangerous for thrombus formation), to a greater extent unstable APs were prevalent (fig.1).

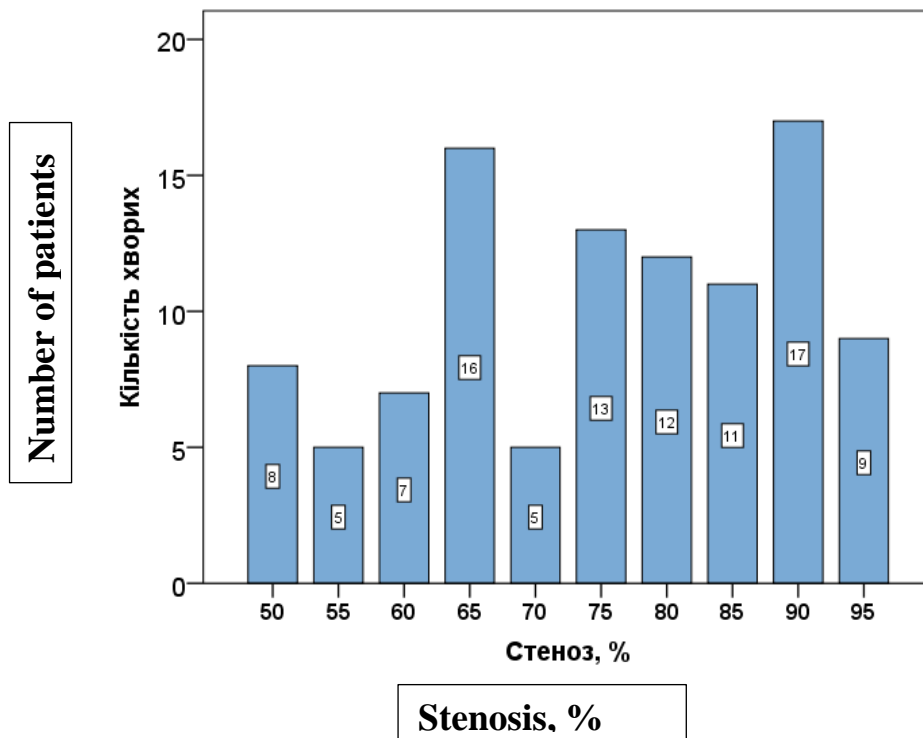


Fig 1. Distribution of patients, depending on the degree of the ICA stenosis severity

According to the structure of APs, among embolic, hypoechoic (n=59), and non-embolic, echoic (n=44), both homogeneous - without calcinosis and heterogeneous - with calcinosis were found. Among hypoechoic plaques, homogeneous - 80%, heterogeneous - 20% of cases; in the presence of echogenicity, homogeneous - 28% of cases, and heterogeneous - 72% of cases were determined. By location, circular APs were observed in 56% of hypoechoic cases, and 44% of echoic cases. By distribution: prolonged plaques (>1.5 cm) among hypoechoic plaques were found in 36%, and among echoic plaques - in 64% of cases. An irregular surface was observed in 36% of hypoechoic cases, and in 64% of echoic APs. According to complications, in the group with hypoechoic APs, the ulcerated surface occurred in 25% of patients, and in the group with echoic - in 22% of cases.

Using ultrasound examination of the vessels IMT was examined. Thus, in the

case of non-embolic APs with stenosis of 70-99%, the IMT of the ICA was equal to 1.5 ± 0.2 mm, in the case of embolic ones, with a stenosis of 50-69%, the IMT of the ICA was equal to 1.2 ± 0.2 mm.

We identified some certain features and differences in the influence of isolated viruses and their associations on the development of embolism of APs, and the development of moderate and severe stenosis of the ICA.

Among all viruses, HSV1,2, EBV, CMV, and HHV6, which we investigated by using transfection and PCR in APs and blood of patients after carotid endarterectomy, CMV and its viral associations CMV/HSV1, CMV/ HSV2 prevailed in 32 (n=32) patients, and in 23 (n=23) patients - HHV6 was isolated and in the HSV1/HHV6 association; HHV6/HSV1/HSV2 were found.

Based on the above, we prepared recommendations for prophylactic treatment of patients with a detected viral infection after undergoing of carotid endarterectomy. Anticoagulants, neuroprotectors - citicoline, and statins were prescribed for the therapy, which began in the hospital and continued after discharge; if necessary, antihypertensive drugs were prescribed, and acyclovir was added to the protocol-recommended therapy in a dose of 200 mg (1 tablet) 5 times a day for 5 - 10 days during inpatient treatment before discharge and every 6 months on an outpatient basis - on the eve of a seasonal exacerbation of a viral infection.

Conclusion:

1. Presentation of CMV and association of CMV/HSV1, CMV/HSV2 increases the risk of the hypoechoic embolic atherosclerotic plaques of the internal carotid arteries occurrence.

2. Presentation of HHV6, and association of HSV1/HHV6, HSV1/2/HHV6 in the atherosclerotic plaques of the internal carotid arteries increases the relative risk of severe stenosis development in patients with symptomatic stenosis, which is an indicator for the carotid endarterectomy administration.

3. The study approves the necessity of periodical ultrasound examination of vessels that supply the brain aiming for ICA stenosis exclusion and antiviral treatment administration in patients with confirmed viral infection.

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