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MORFOLOGICAL CHARACTERISTICS OF CEREBRAL BLOOD VESSEL ANEURYSMS

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Abstract.

The brain undergoes various secondary changes against the background of chronic damage of arterial blood vessels, atherosclerosis and hypertension. Histochemical staining methods provide reliable information when studying the development of destruction and defragmentation of fibrous structures, which are components of vascular components. In this study, cerebral blood vessels were studied using the Schiff and Van Gieson method. Based on the analysis of the obtained results, it was found that most of the destruction and defragmentation process continues with the accumulation of acidic mucopolysaccharides between the walls of the vessels and sharp swellings between the layers and the decrease of the high pressure tolerance of the vessel wall. As a result, angiosclerosis and angiofibrosis continue with the development of foci.

Key words: aneurysm, histochemical method, cerebrovascular disease, angiosclerosis, atherosclerosis, brain, morphology.

BOSH MIYA QON TOMIRLARI ANEVRIZMALARNING MORFOLOGIK XUSUSIYATLARI

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Annotasiya.

Bosh miya arterial qon tomirlarining surunkali zararlanishi, ateroskleroz va gipertoniya kasalligi fonida xar xil ikkilamchi o'zgarishlarga uchraydi. Aynan tomir komponenetlari tarkibiy qismlari bo'lgan tolali tuzilmalarning destruksiyasi va defragmentasiyasini rivojlanishini o'rganishda gistokimyoviy bo'yash usullari ishonarli ma'lumotlarni beradi. Ayni tadqiqot ishmizda, Shiff va Van Gizon usulida bosh miya qon tomirlarini o'rganildi. Olingan natijalar taxlili bo'yicha aksariyat destruksiya va defgragmentasiya jarayoni tomirlar devorining oralig'ida nordon mukopolisaxaridlarning to'planishi va qavatlar oralig'ida keskin shishlar va tomir devorining yuqori bosimga bardoshlilik xususiyatni pasayishi bilan davom etishi aniqlandi. Oqibatda, angioskleroz va angiofibroz o'choqlarining takomil topishi bilan davom etadi.

*Kalit so'zlar***:** *anevrizma, gistokimyoviy usul, serebravaskulyar kasallik, angioskleroz, ateroskleroz, bosh miya, morfologiya.*

МОРФОЛОГИЧЕСКАЯ ХАРАКТЕРИСТИКА АНЕВРИЗМ СОСУДОВ ГОЛОВНОГО МОЗГА

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Аннотация.
Головной мозг претерпевает различные вторичные изменения на фоне хронического поражения артериальных сосудов, атеросклероза и гипертонической болезни. Методы гистохимического окрашивания дают достоверную информацию при изучении развития деструкции и дефрагментации фиброзных структур, входящих в состав сосудистых компонентов. В данном исследовании кровеносные сосуды головного мозга изучались по методу Шиффа и Ван Гизона. На основании анализа полученных результатов установлено, что в большинстве случаев процесс деструкции и дефрагментации продолжается с накоплением кислых мукополисахаридов между стенками сосудов и резкими вздутиями между слоями и снижением толерантности сосуда к высокому давлению. стена. В результате ангиосклероз и ангиофиброз продолжаются с развитием очагов.

Ключевые слова: аневризма, гистохимический метод, цереброваскулярное заболевание, ангиосклероз, атеросклероз, головной мозг, морфология.

Relevance of the topic: 12.6% of all vascular diseases in the world are cerebrovascular diseases, of which 40% are intracranial aneurysms of the internal carotid arteries, 25% are branches of the posterior lateral artery and 20% are the middle cerebral artery, and 20% are the vertebral basilar artery. and it is 5%, and it has not yet been studied whether pathological expansions in the arteries depend on a specific cause. According to the teaching of English scientists, the main factors of aneurysm of cerebral blood vessels are caused by abnormalities of vascular walls during embryonic development, hypertension, and separation and expansion of the vascular wall after atherosclerosis.

Morphological changes in the intracranial arteries of the brain continue with various changes mainly against the background of hypertension and atherosclerosis [4, 6]. In particular, at the age of 55-59, atherosclerotic changes occur in the blood vessel wall, narrowing of the vessel diameter, or dystrophic and sclerotic changes occur in the vessel wall in bifurcated or branched branches close to this branch [1]. When most of the patients with cerebrovascular diseases were studied, the most important of the changes that can occur in their vessels [9] are compression crushing of private blood

vessels feeding the vessel walls, accumulation of sour mucopolysaccharides between elastic and collagen fibers, mucoid thickening and fibrinoid structures in the vessel wall in atherosclerosis and hypertension. It is considered a chain of the problem that continues with improvement [3, 5, 7]. According to our scientists, most of the organic changes that occur in the blood vessels of our body are thinning of the vessel walls, separation into layers as a result of a sharp increase of the acidic structures that break the interrelationship of the layers between them, and they noted that it occurs in the form of an aneurysm [8, 11]. This, in turn, requires the morphological identification of the above processes, the use of special histochemical methods in the examination, and the preliminary assessment of possible changes.

The walls of blood vessels stained with Altzian blue and Van Gien methods, which are staining methods that provide accurate information for the assessment of morphological changes occurring in cerebral blood vessels, show the structures of rough fiber chaotic arrangement in the wall of vessels [10].

Purpose: To clarify the occurrence rate, risk factors, morphogenesis and pathomorphological changes of brain aneurysm.

Materials and methods: in 26 cases of acute blood circulation in the brain, the blood vessels of the artery were removed from the surgical practice and in total 21 cases of the autopsies of the dead patients, the autopsy materials of the blood vessels of the base of the brain and aneurysmal ruptured arteries were obtained. In the patients, the aneurysmal enlarged focus isolated from the branch of the brain base of the middle artery was fixed in a 10% formalin solution for 72 hours, and then placed in 96% alcohol for dehydration. Then the tissue pieces were embedded in Histamix brand paraffin and left in a thermostat at 57C for 72 hours. The tissues were then placed in cassettes in the form of paraffin blocks. Using a microtome, micropreparations cut with a thickness of 4-8 μm were immersed in xylene and 70, 80, 90, 100% alcohols and stained with Alcian blue and Van Gison dye. Acidic and neutral mucopolysaccharides are stained blue with the help of Altzian blue dye, which gives information about Schiff's positive structure in this area. By Van Gison staining, collagen fibers are colored red, giving information on the analysis of the changes in different levels of collagen fibers developed and destroyed in the vessel wall.

Research results and their discussion: According to the data studied in our research work, the main morphological substrate of the changes in

cerebral blood vessels after atherosclerosis and hypertension is elastolysis of fibrous structures, which is manifested by the occurrence of various degrees of swelling. In particular, mucoid thickening of the arterial intima in hypertension causes a sharp accumulation of sour mucopolysaccharides in the vessels of this area, which leads to the hydrolysis of fibers and destroys the integrity of the vessel. Alcian blue, a histochemical staining method, was used to detect these changes.

This dye clearly delineates foci by staining acidic mucopolysaccharides in a mauve blue color. At the same time, Schiff's positive (sour mucopolysaccharide) causes swelling of the fibrous structures in the collected branches, mutual inteposition of consecutive layers in the artery wall. And this can continue with the occurrence of pseudo-aneurysmal expansions in the aorta and cerebral blood vessels in the young contingent. In this study, the following morphological changes were identified in cases of aneurysms and pre-aneurysms in cerebral blood vessels.

For example, according to the analysis of the data studied with the help of altzian dye, it was found that the different intensity of sour mucopolysaccharides accumulated in the space between the blood vessels increases the hydrophilic property between the collagen and elastic fiber structures, which leads to the sharp development of interstitial swelling and the violation of nutrition of the vessel wall. This leads to the destruction of most of the fibrous structures in the vessel wall.

As a result, the formation of destroyed fibrous structures in different layers leads to a sharp decrease in the trajectory of the vessel wall and the surface tension and resistance properties and deformation of the wall.

At the same time, due to the development of small sparse fibrous structures around the centers of mucoid swelling and fibrinoid swelling in different projections, the contractility of the vessel is severely disrupted from a morphofunctional point of view, and it continues with the formation of microbumps (aneurysmal elevations). As a result, interstitial swellings developed in the space between the vessel wall can lead to deformation of the vessel wall and even rupture. (Figure 1).

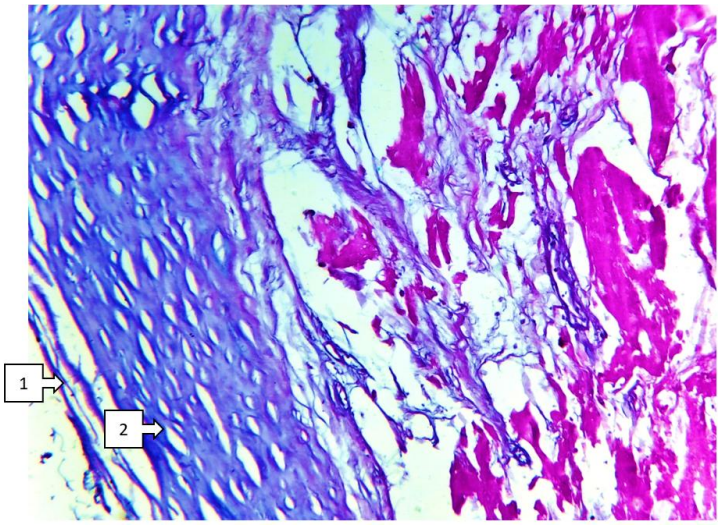

Figure 1. The tissue of the branch of the left lateral artery of the middle brain. Artery wall has different thickness (1). Blue-blue layer saturated with acidic mucopolysaccharides Schiff positive structure this view shows the process of elastolysis in fibrous structures (2) Stain Altzian blue. The size is 40x10.

Macrophages and fibroblasts are concentrated at different levels between most vascular walls.

At the same time, the proliferation of fibroblasts and the location of similar foci along the blood vessel perimeter confirm the development of angiosclerotic process and rapid synthesis of tropocollagen fibers. This leads to the development of centers of chaotic arrangement of collagen fibers of various degrees along the perimeter and wall of normal vessels and the violation of the integrity of the vessel wall. (See Figure 2).

A similar situation occurs after atherosclerosis, as a result of sudden accumulation of foamy cells located in the subendothelial layer, bulging of the endothelium into the vessel cavity, disruption of the interconnected set of fibrous structures, and displacement of the muscle and adventitia layers, the vessel wall causes a violation of the surface tension force, resulting in a turbulent flow. under its influence causes the vessel wall to bulge at different levels.

Therefore, in the tests with Alcian blue dye, between different layers of the vascular wall, it is possible to determine the sharp accumulation of Schiff positive structures, destruction and elastolysis in fibers. At the same time, the intensity of the Schiff positive interruptions in the vessels stained with Altian blue allows for the rapid development of the process, its localization and prospective prognosis.

Our next method of examination, Van Gison staining with acidic picrofuscin stain, allows to identify and study collagen and procollagen fibers developed or pathologically synthesized in the vessel wall, showing the position of the fibers in a specific projection. In this research work, it was found

that in diseases of cerebral blood vessels with atherosclerosis and hypertension, collagen fibers along the vessel wall are painted in red color and most of them are chaotically located, which leads to violation of the histioarchitectonics of the vessel.

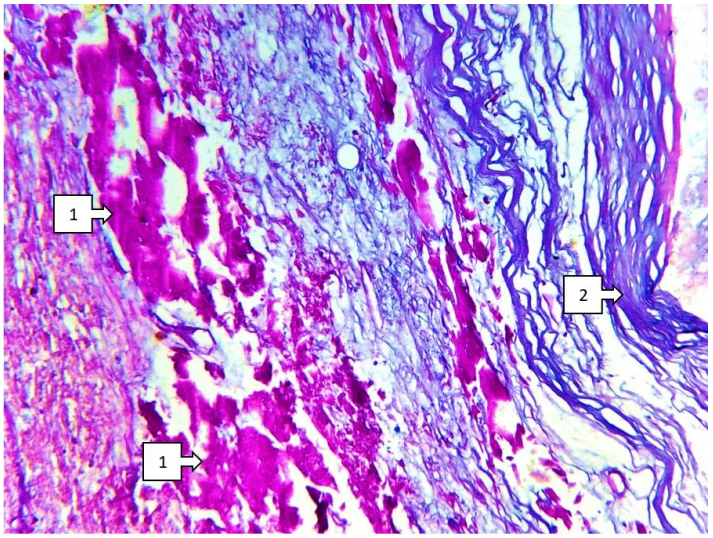

Figure 2. Collapsing aneurysm of the left side of the middle cerebral artery. It is fibrinoid necrosis and interstitial swelling of the middle layer and the intima area (1), foci of sour mucopolysaccharides absorbed into fibers and elastolysis (2). Paint Altsian blue. The size is 40x10.

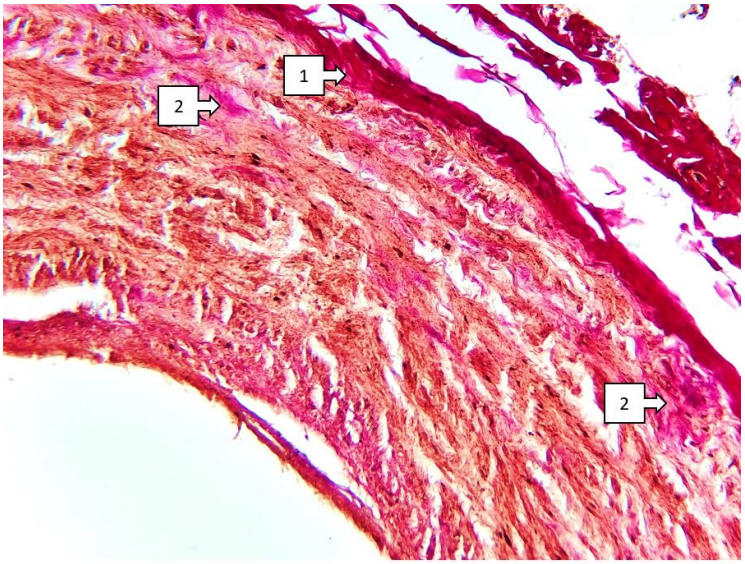

Figure 3. The tissue of the branch of the left lateral artery of the middle brain. The wall of the artery has different thickness (1). Between the thickened branches, chaotically located bundles of red collagen fibers are identified (2), destruction and defragmentation foci are identified (3). Paint Van Gison Size 20x10.

In hypertension, it was found that the collagen fibers were surrounded by yellow sparse fibrous structures around the procollagen stage and lost their clear relief appearance, the anastamosed borders of most collagen fibers were sharply expanded, and the interstitial swellings developed sharply in the

interval. This mechanism is considered the main pathogenetic link that leads to a sharp loss of the strength of the vessel wall and bulging of the wall under the influence of turbulent flow inside the vessel (see Fig. 3).

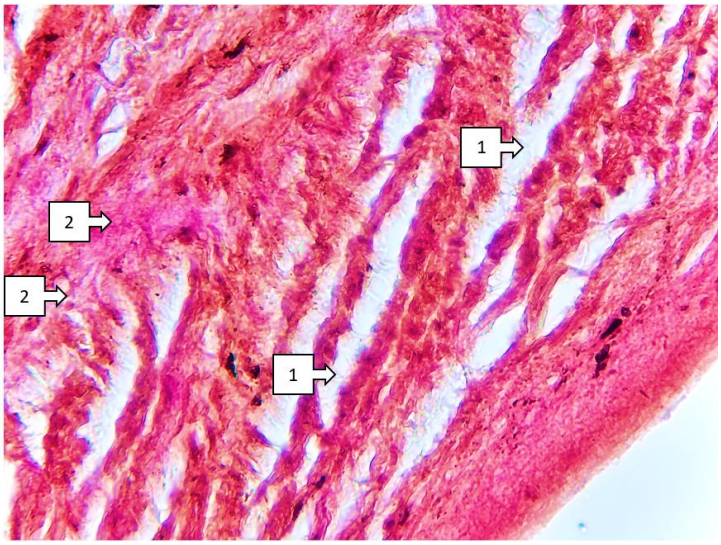

Figure 4. The tissue of the branch of the left lateral artery of the middle brain. Interstitial swelling between the fibrous structures of the intima layer of the artery (1). Foci of coarse sclerosis of collagen fibers are identified in thickened branches (2). Paint Van Gieson. The size is 40x10.

Arterial aneurysm is characterized by sudden changes between the middle layer of the vessel and the tuams of the muscle layer, mainly by the hypertrophy of muscle cells, the development of atrophic and sclerotic changes in the muscle tufts in the affected areas. These changes are based on the macroscopically sharp deformation of the vessel wall and the appearance of the morphological signs of the collapsing aneurysm. It is interstitial edema around the hypertrophied foci of the muscle layer, interstitial cysts between all layers of the atrophic and sclerotized branches, sharp separation of the borders of the layers of the vascular wall, destruction and elatolysis in the fibrous structures, almost no detection of vascular vessels (vasa vasorum) in the adventitial branches, the gap in this area a large accumulation of products is characterized by the formation of dystrophic and necrotic foci.

Violation of the sequence of mutual anastamotic connections of different fractions of collagen fibers, causing uneven appearance on the vessel wall, distribution of surface tension force at various levels, and sharp pressure on functional stress points play an important role in the occurrence of aneurysmal dilatations in these areas.

Conclusions.

Therefore, according to the analysis of the results obtained by histochemical tests, the focal increase of fibrous structures from the

qualitative changes in the blood vessel wall, the large accumulation of acidic Schiff positive structures in the space, causes the appearance of foci of disorganization in the wall, and the deformation of the vessel wall in various ways. At the same time, it was found that the pathological fibrous structures restored in place of the morphologically lost or damaged fibrous structures form surfaces that lead to a sharp change in the relief of the vessel wall and hemodynamic resistance from the morphofunctional point of view. These changes are studied in advance and serve as a source for the production of instructions to eliminate the foci of pathological disorganization expected through appropriate recommendations. In order to prevent these changes in the 45-55-year-old contingent, it is first necessary to eliminate the pathogenetic links of hypertension and atherosclerosis diseases, and to prevent the disproportionate location of coarse fibrous structures developing in the vascular wall.

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