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THE STATUS OF EXTRAORGANIC BLOOD FLOW IN PINEAL GLAND OF RATS UNDER CONDITIONS OF ACUTE STRESS AND TWENTY-FOUR HOUR DARKNESS

Abstract. *Extraorganic blood flow in pineal gland of rats under acute stress and darknes is studied. The increasing functional activity of pineal gland is observed with predominance of plasma components of blood vessels.*

Key words: *acute stress, pineal gland, blood flow, pinealocytes.*

Introduction. The epiphysis is involved in the adaptation of the organism to the changing conditions of the external and internal environment, namely it is responsible for triggering stress reactions [1-3]. Morphological criteria for assessing the functional state of the epiphysis are: the quantitative ratio of active light and low active dark pinaelocytes, the location of the active cell type in relation to the blood vessels, the compactness of the arrangement of cellular elements in the parenchyma, the morphometric parameters of the pinaleocytes (cytoplasmic area, nuclei, nucleoli), the change in the amount of condensed chromatin in the nuclei of the pineal cells, vacuolation of the cytoplasm, the state of the vascular bed and the degree of filling it with blood [4]. However, the analysis of scientific works published in recent years shows that the issues of morphology of the epiphysis under the influence of stress factors that occur at the cellular level are more studied, and the state of the vascular bed remains outside the field of view of the researchers. This is due primarily to the localization of the epiphysis in the brain, as well as its small size.

Objective of the study was to investigate the state of the vascular bed of the epiphysis of rats under conditions of acute stress and round-the-clock darkness.

Material and methods: the study was carried out on 24 mature male rats of the Wistar line, weighing 220-240 g in the autumn-winter period. Animals were kept in the vivary in the conditions of round-the-clock darkness, within 30 days.

On the thirtieth day of the experiment, the animals were modeled acute stress, by holding them for 5 hours in plastic pencil-box-like cells, in order to limit the motor activity in all directions. At the end of the experiment, the experimental animals were euthanized in strict accordance with the requirements of the provisions of the European Convention for the Protection of Vertebrates used for experimental and other scientific purposes (Strasbourg, 1986), and the "Common Ethical Principles of Animal Experiments" adopted by the First National Congress On Bioethics (Kiev, 2001). The study took place under the permission of the Ethics and Bioethics Commission of the Mykolayiv National University named after V.A. Sukhomlinsky.

After the extraction of the epiphysis along with the adjacent blood vessels, the resulting complex was immersed in a fixing solution of 10% neutral formalin. Using standard methods, the material was encased in paraffin blocks, from which sections of 4 µm thick were made and stained with hematoxylin and eosin. The histological preparations obtained in this way were studied with various magnifications of the "PrimoStarZeiss" microscope followed by photography of the microscopic preparations with a digital SLR camera "Canon".

Results of the study and their discussion. According to the results of a histological study of preparations of the epiphysis of rats, it was revealed that in the relatively large veins, irrespective of their topographical position relative to the capsule, the stratification of blood

into blood corpuscles and plasma clearly manifests itself. Both longitudinal and transverse sections of these blood vessels show clusters of blood corpuscles in the central part of the lumen of the veins. Peripheral areas of the lumen, adjacent to the walls of the blood vessel, on the histological sections look empty. It was established that blood clusters consist mainly of erythrocytes, less common are other basophilic blood corpuscles. It is characteristic that such clusters are represented, as a rule, by annulocytes. In this case, all the clusters are clearly separated from one another (Fig. 1).

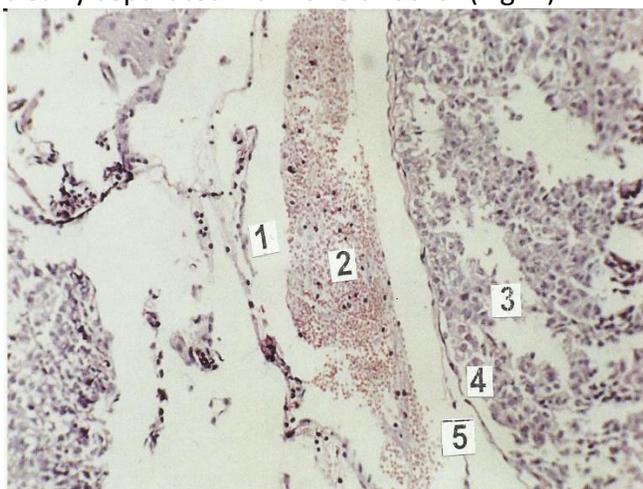


Fig. 1. Micrograph of an extraorganic vein adjacent to the epiphysis capsule of a rat, under conditions of acute stress and round-the-clock darkness. Zoom: approx. $\times 10$ vol. $\times 10$. Coloring of hematoxylin and eosin. 1 - lumen of the vein 2 – blood corpuscles 3 - parenchyma of the epiphysis; 4 - capsule of the epiphysis; 5 - vein wall.

It has been revealed that basophilic cellular elements of blood do not form clusters. They are placed between the erythrocytes chaotically, alone, almost uniformly. Throughout such venous vessels, it is sometimes possible to find focal extensions of their lumen. Basically these vessels have the same diameter. The endotheliocytes of the vascular lining are flattened and arranged in the form of a chain with identical intervals. Such morphological manifestations clearly indicate the absence of hypertension in the venous system.

It is established that in the extraorganic venous blood vessels of a smaller caliber, the morphological pattern differs from the above. It was revealed that in them the cellular elements of blood are distributed evenly in the lumen of the vessel. In this case, the basophilic cellular elements of the blood are distributed evenly in the erythrocyte mass. The latter is located

throughout the lumen of the vessel approximately uniformly, occupying both the central and peripheral zones. In the erythrocyte mass, both discocytes and annulocytes are clearly visible. Moreover, these forms of erythrocytes are distributed evenly in the lumen, which indicates that there is no adhesion between them.

In the extraorganic arterial link of the circulatory system, conglomerates of erythrocyte cells are most often observed, which form individual clusters of different sizes in the arterioles. Clear boundaries are visible between these clusters of adherent erythrocytes. It was revealed that in these conglomerates there are practically no boundaries between individual red blood cells, that is, they have the appearance of homogeneous structures.

It was revealed that the lumens of arterioles are almost completely filled with such clusters of blood cells. Along with the described character of the dislocation of blood elements, a change in the wall of these blood vessels was observed. In a significant number of cases, a marked hypertrophy of the cells of the inner wall of the vessel wall is observed. Endotheliocytes appear sharply thickened, which is manifested in the change in the contours of their nuclei. The latter sharply thicken and acquire on the histological sections the ovoid form (Fig. 2).

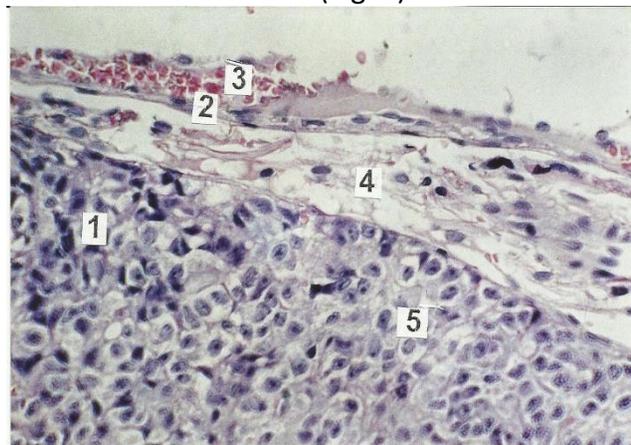


Fig. 2. Micrograph of an extra-vessel vessel of the arterial type of the rat pineal gland in conditions of acute stress and round-the-clock darkness. Zoom: approx. $\times 10$ vol. $\times 40$. Coloring of hematoxylin and eosin. 1 - dark pinealocytes; 2 - arteriolar wall; 3 - aggregates of erythrocytes in the arterioles lumen; 4 - subarachnoid space; 5 - light pinealocytes.

In venous microvessels of small caliber located in the immediate vicinity of the parenchyma of the epiphysis, or closely in contact with it, it is often possible to observe a slightly different

arrangement of blood elements. First of all, the prevalence of the liquid part of the blood, that is, the plasma, is characteristic. The dense parts, that is, the blood corpuscles, are represented in separate groups. These groups of cells are distributed unequally along the lumen of the vessels, but they occupy mainly the peripheral zones of the lumen of the corresponding vessel. It has been revealed that in places of cell clusters, isolated red blood cells are clearly identified because of the spacing between adjacent cells (Fig. 3).

It is established that in most veins of this caliber the plasma component of blood predominates, which is manifested in histological preparations in the form of voids (Fig. 3). Erythrocytic mass in the lumen of such venous vessels often occupies a parietal or axial position. In some small veins, the erythrocytic mass occupies the entire lumen.

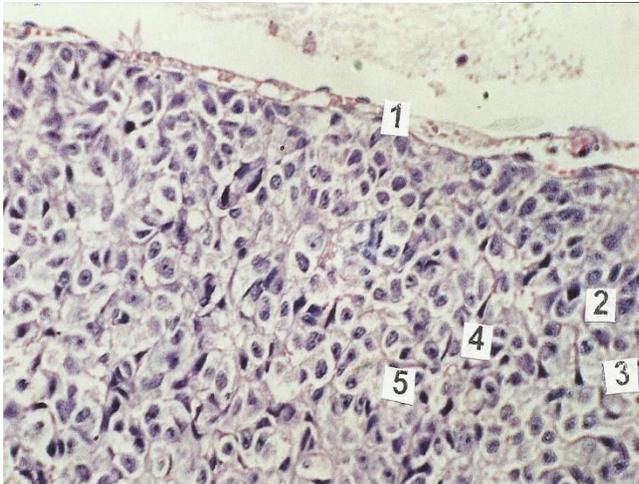


Fig. 3. Micrograph of pericapsular blood vessel of venous type of rat epiphysis, under conditions of acute stress and round-the-clock darkness. Zoom: approx. $\times 10$ vol. $\times 20$. Coloring of hematoxylin and eosin. 1 - pericapsular venule; 2 - group of dark pinealocytes; 3 - light pinealocytes; 4 - neuroglial cells; 5 - rames of neuroglial cells.

It has been revealed that in the subcapsular blood vessels that contact with active bright pineal cells, micropores appear through which the

cytoplasm enters the vascular bed. Confirmation of this assumption can be considered as a stratification of blood into blood corpuscles and plasma.

Conclusions. Based on the results of the morphological study of the state of the escaorganic vasculature in the epiphysis of rats under conditions of acute stress and round-the-clock darkness, an increase in the functional activity of the organ was revealed, which is manifested by the predominance of the plasma component of the blood in the vessels, as well as the appearance in the vascular walls of micropores, through which the cytoplasm of active light pineal cells enters vascular bed and blood is stratified into blood corpuscles and plasma.

Prospects for further research. In the future, it is planned to carry out a study of morphometric parameters of rat pinealocytes in conditions of acute stress and an altered photoperiod.

References:

1. Bejer JeV, Bulgakova AS, Skornjakov AA. Antistressovye vozmozhnosti jepifizarnogo gormona melatonina v zavisimosti ot jeksperimental'noj modeli i vyrashennosti stressa. *Medicinskij vestnik Severnogo Kavkaza*. 2010;(2):59-63.
2. Pishak V.P. Struktura i funkciï shishkopodibnoï zalozi u ptahiv. *Klinichna anatomija ta operativna hirurgija*. 2012;11(1):101-3.
3. Sibarov DA, Kovalenko RI, Nozdrachev AD. Osobennosti funkcionirovanija pinealocitov u krys pri stresse v svetloe vremja sutok. *Rossijskij fiziologicheskij zhurnal im. I.M. Sechenova*. 2000;86(8):1049-57.
4. Pshichenko VV. Zmini morfo-funkcional'nogo stanu shishkopodibnoï zalozi shhuriv pri riznih vidah stresu [dis. kand. biolog. Nauk]. Mikolaïv; 2015. 162 p.

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