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MORPHOLOGY OF ADENOHYPHYSIS IN IONIZING EXPOSURE IN EXPERIMENT

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Introduction. At present, one of the urgent problems of medicine is the study of the effects of ionizing radiation on biosystems and protection from it. This is due to the development of industry, including defense, as well as medical equipment for radiation diagnosis and therapy. The development of a stress response, adaptation in response to various stimuli of different quality, underlies many pathological processes [3]. The dynamism of the structures and functions of the adenohiphysis, the wide possibilities of organ variability, testify to its direct participation in their regulation [4].

Purpose of the study. To study the dynamics of morphological changes in adenocytes and microcirculatory bed of the pituitary gland during irradiation in dynamics for 14 days from the moment of irradiation.

Materials and methods. The experiment was performed on 36 laboratory white Wistar rats. The rats were divided into two equal groups: 1) control, 2) experimental (animals were exposed to ionizing radiation). Radiation damage was simulated on the linear accelerator Clinac 2100. The working energy of the linear accelerator is 6 MeV, the exposure time is 50 sec, the single dose is 500 rad (5 Gray), the field size is 40 cm x 40 cm, the depth is 2.5 cm. The recommendations "On legal, legislative, ethical norms and requirements in the implementation of scientific morphological studies" were implemented. Animals were removed from the experiment under ether anesthesia. The conclusion of the Committee of Bioethics No. 3 of 19.10.2015. The pituitary gland was removed from the

Turkish saddle, then 1) for light microscopy was encased in paraffin, serial sections were made, stained with hematoxylin and eosin; 2) for the study of the ultrastructure, the organ was enclosed in epoxy resins, made semi-thin sections stained with toluidine blue and ultra-thin sections contrasted with uranyl acetate and lead citrate. Identification of adenocytes was carried out according to the arrangement of granules in the cytoplasm, their structural features and dimensions [1, 2].

Results of the research. In early terms, up to 3 days of the experiment, the adenohipophysis is dominated by destructive-alterative processes: signs of granular dystrophy, edema of the stroma. On the 7th day, the basal membrane thickens and loosens in the hemocapillaries, the endotheliocytes undergo swelling, and the erythrocyte sludges are noted. The number of basophils increases, the size of their cells and nuclei is sharply increased. They are looks like castration cells and thyroidectomy cells. Among adenocytes, pronounced changes are noted in corticotrophs, which are subject not only to significant dystrophic changes, but also to necrosis. Cells and their nuclei abruptly swell and enlighten. The main part of the mitochondria is broken, participating in the formation of vacuoles. Hormone-containing granules are few and singly distributed throughout the cytoplasm. Endoplasmic reticulum unevenly expand, tear, forming vacuoles. Corticotrophs are a component of the main link of the stress-realizing system of the body, providing a high level of synthesis of adaptive hormones, therefore, the most significantly damaged as a result of severe functional activation. Light gonadotrophs have signs of castration cells: the dictyosomes of the Golgi complex are transformed into large vacuoles, most of the mitochondria are destroyed, their remains are formed by merging vacuoles of irregular shape. In dark gonadotrophs, organelle destruction is less pronounced. Mitochondria are more conserved both in number and in structure. The number of hormone-containing granules is greater than in light cells.

On the 14th day of the experiment, the vessels of the microcirculatory bed have a thin wall. Ultrastructure of endotheliocytes is better preserved, their luminal surface is even, with small microvilli. Endocrinocytes are arranged in groups, closely adjacent to each other, the cell borders are clearly contoured. The degree of vacuolization of cells is much less than on day 7. Among the gonadotrophs, dark and light cells are detected, which differ in the electron density of the nuclei, in the cytoplasm, and in the degree of preservation of the organelles. Dark gonadotrophs have a high content of polyribosomes, ribosomes.

Mitochondria have a dark matrix, many cristae. Cell nuclei often have an irregular rounded shape with slight invaginations of the karyolemma. The cytoplasm of light gonadotrophs contains a significant number of small vacuoles.

Corticotrophs have an irregular, elongated shape, clear contours of the plasmolemma. Their nuclei are large and round, with slight invaginations. The nucleoli adhere to the nuclear membrane, the perinuclear space is narrow and uniform, and the outer nuclear membrane contains more ribosomes.

Conclusions.

1. In the early stages after irradiation in adenohipophysis, destructive-alterative processes predominate: signs of granular dystrophy, stromal edema, and vasodilation.

2. On the 7th day, the number of basophils increases, the size of their cells and nuclei increases. Corticotrophs undergo dystrophic changes and necrosis, cells of castration and thyroidectomy appear. In the hemocapillaries, the basal membrane thickens, and erythrocytes sludge is observed.

3. At 14 days endotheliocytes have a preserved ultrastructure, vacuolation of endocrinocytes is much less than on day 7.

4. Corticotrophs, providing a high level of synthesis of adaptive hormones, are most significantly damaged as a result of a sharp functional activation, clearly expressed at the ultrastructural level on the 7th day of the experiment.

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