

REACTIVE CHANGES IN THE PANCREAS IN HYPOTHYROIDISM

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Abstract

For the study, we used the offspring of rats born from control and experimental white laboratory rats - mothers under conditions of hypothyroidism. The results of the study showed that the introduction of Mercazolil into the pancreatic lobules of experimental rats led to changes associated with the normalization of the structural organization of the pancreatic cranium, interlobular connective tissue with the formation of fibrous tissue components, as well as the disappearance of choroid edema observed in the interlobular connective tissue.

Keywords: mercazolil, pancreas, pancreatic lobes.

Introduction

Relevance of the work. Thyroid hormones regulate basal metabolism, consumption of proteins, fats and carbohydrates, initiate phagocytosis of immunogenic processes, participate in thermoregulatory processes, stimulate the work of hematopoietic organs, increase oxygen consumption by cells and tissues, increase the use of glucose in gluconeogenic processes, promote physical adaptation, regulate adaptive reactions (2,3,4,10,13). Hypothyroidism is associated with a number of disorders in all organs and systems, caused by the varied effects of thyroid hormones. First of all, the circulatory system, digestive system (liver function), central nervous system, visual organs and reproductive system are affected (1,7,9,11,14). They noted that taking thyroid hormones restored enlargement of the pancreas (5,6,8,12).

Purpose:

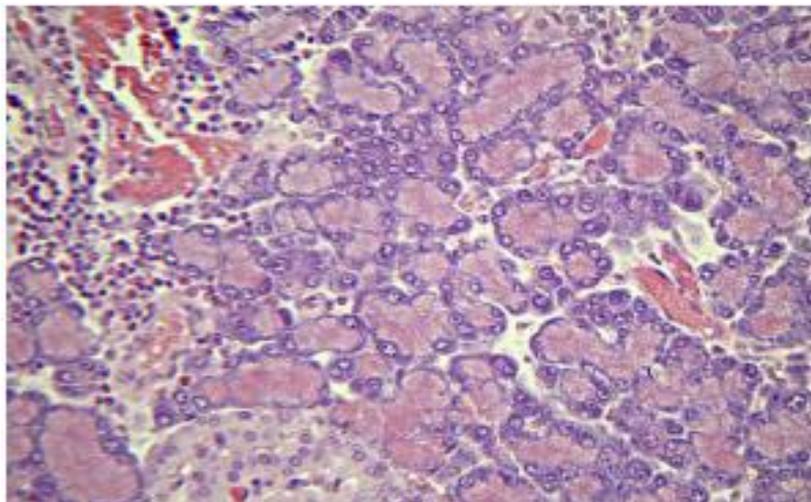
To determine the nature of morphological and morphometric changes in the pancreas in experimental hypothyroidism.

Materials and methods of research

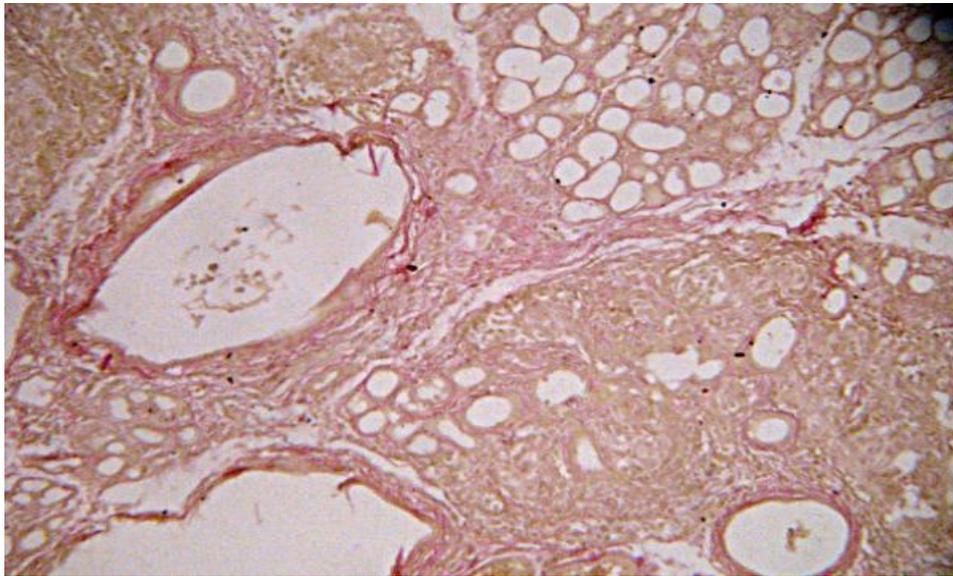
To achieve the goal of the study, laboratory rats from control and experimental white laboratory rats under conditions of hypothyroidism were used. The first group comprised a control group of healthy rats. Female rats in the control group were given 1.0 ml of distilled water and 1.0 ml of 1% starch suspension every morning to reduce the harmful effects of oral gavage on the rats' stomachs. Group 2 consisted of the experimental group, in this group 20 female white laboratory rats were given Mercazolil at a dose of 0.5 mg per 100 g of body weight for 14 days to induce experimental hypothyroidism. Then the rats were given Mercazolil at a dose of 0.25 mg per 100 g of body weight for 1 month. Female rats continued to be given Mercazolil at a dose of 0.25 mg per 100 g of body weight during lactation, both after pregnancy and after birth. A subcutaneous catheter was used as a probe.

Results and Discussion

The pancreas in control white rats is covered on the outside with a capsule. The capsule consists of dense fibers of connective tissue; connective tissue strands extend from the capsule into the parenchyma of the organ, with the help of which the parenchyma of the organ is divided into lobules of different sizes. The connective tissue cords dividing the pancreas into lobes had a weakly expressed fibrous component; in places they were thinned and swollen, as a result of which the lobulation in such areas was poorly expressed. In these layers of connective tissue you can see blood vessels, nerve fibers and excretory ducts. The blood vessels were characterized by plasmatic saturation of the walls, and the lumen of the venous vessels was filled with formed elements of blood; in some vessels the plethora was pronounced (Pic.1). In some rats, on sections of the gland in the arteries and veins passing through the interlobular connective tissue, blood cells were not detected or were observed in insignificant quantities. The interlobular excretory duct was formed by a single-layer prismatic epithelium and a lamina propria of connective tissue. The lumen of the excretory duct contained a small amount of the secreted substance.



Picture 1. Rat pancreas on day 10 of the experiment. Stasis of blood cells in the vessels and accumulation of leukocytes in the parenchyma of the gland. Hematoxylin-eosin staining.



Picture 2. Rat pancreas on day 16 of the experiment. Dilatation of the pancreatic ducts. Staining according to Van Gieson.

Control rats were characterized by the presence of mainly medium-sized lobules, in which the exocrine part in the form of acini and ducts of different diameters significantly predominated. The acini varied in size from $56.2 \pm 1.9 \mu\text{m}$, the smallest acini size was $37.3 \pm 1.4 \mu\text{m}$. Pancreatocytes in the apical part have narrowings, and the base is much wider. Secretion granules can be seen at the apical part and terminal part of the secretory tubules. In these cells you can see a round or oval shaped nucleus. These pancreocyte nuclei are located closer to the base of the cell. The main part of the chromatin of the pancreatic nucleus is located throughout the entire area, a small part of the chromatin is adjacent to the karyolemma. Pancreocytes, which are located in the walls of the acini, had an average size of 9.17 ± 0.52 . In the center of not many acini one can see flat cells; they were mainly located closer to the center of the cell, but in rare cases they were detected in the secretory section.

It was difficult to determine the boundaries between some pancreatic cells and acini; in some areas, it was possible to detect a structural disorder in the terminal part of the secretory sections (Pic. 2). These pancreatic cells had an average height of $12.9 \pm 1.1 \mu\text{m}$. Small punctate hemorrhages were detected within the parenchyma of the pancreas and the cells of the pancreatic islets. Between the terminal secretory sections of the exocrine part of the lobules, along with smaller intercalary excretory ducts, the wall of which was lined with squamous epithelium, larger interacinous and intralobular excretory ducts, the wall of which was formed by cuboidal epithelium, were also observed.

A study of pancreatic tissue samples from experimental rat groups showed that the interlobular connective tissue had a clearer fibrous pattern, the lobules were slightly enlarged and there was no accumulation of fat cells, which indicates normalization of the structure of the gland.

Conclusion

The results of the study showed that the introduction of Mercazolil into the pancreatic lobules of experimental rats led to changes associated with the normalization of the structural organization of the pancreatic cranium, interlobular connective tissue with the formation of fibrous tissue components, as well as the disappearance of choroidal edema observed in the interlobular connective tissue. In addition, the intensity of the symptoms of destruction of the terminal secretory section of the lobules decreased and at the same time the number and height of the pancreas in the lobules increased. This may be due to the intensification of the process of division of the pancreas and the activation of the secretory process. In the endocrine part of the gland lobules, a thickening of the arrangement of insulinocytes in the islets and a decrease in areas filled with a loose connective tissue layer were observed; in addition, the size of the islets increased and became larger than in control animals. This may indicate a general increase in the number of endocrine cells in the gland, and therefore an increase in hormone production.

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