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CHANGES IN THE MORPHOLOGY OF THE THYROID GLAND AFTER CORRECTION WITH POMEGRANATE OIL IN EXPERIMENTALLY CAUSED PEUMONOSCLEROSIS

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Abstract
In this article, the morphological changes in the thyroid gland after correction with pomegranate seed oil in pneumosclerosis induced by the experiment were studied. When studying the results obtained from white rats in the group with experimental pulmonary pneumosclerosis, it was found that the number of microcirculatory vessels in the thyroid gland increased, i.e. the addition of capillaries that do not function compensatorily, and the diameter of the vessels increased almost equally in the central and peripheral parts of the gland. Relatively positive results were obtained in the studied preparations of the morphological and histomorphometric parameters after treatment in experimentally induced pulmonary pneumosclerosis. Macroscopically, almost no change is detected. Microscopic examination revealed an increase in the number and fullness of MST, an increase in the size of follicles in the central and peripheral part, and an increase in the amount of colloid.

Keywords: lung, pneumosclerosis, thyroid gland, white rats.

Introduction

The relevance of Research

Thyroid hormones are essential for organ development and homeostasis. When pathogenic factors affect the thyroid gland, the structures of the tissue microregion are most damaged, reducing its role in ensuring morphological and metabolic changes in tissues and organs [Borodin Yu.I. et al., 2018].

It is difficult to overestimate the importance of the thyroid gland for the human body [Starkova I., 2012].

Since the end of 2019, global SARS-CoV-2, on the one hand, has caused mild flu-like or asymptomatic forms in most young patients, as well as multiple organ dysfunction in other patients (acute respiratory distress syndrome, septic shock, faced with the coronavirus pandemic associated with renal failure). It usually affects elderly patients, and the prognosis is especially unfavorable, depending on the degree of lung damage. The development of pulmonary fibrosis in patients with coronavirus has been confirmed in many cases. Extrapulmonary manifestations may include

endocrine forms affecting the pancreas, pituitary gland, sex glands and, finally, the thyroid gland. Although the diagnosis of autoimmune hyperthyroidism or Graves' disease is rare, more or less significant subacute or chronic thyroiditis has been reported in recent literature in patients with Covid-19 [4,6].Pneumosclerosis is caused by an inflammatory or dystrophic process, excessive overgrowth of connective tissue of the lungs, loss of elasticity and a decrease in the gas exchange function of the affected areas. It is traditionally believed that shortness of breath is a constant symptom of diffuse pneumosclerosis, often with a tendency to develop. Ventilation changes are characterized by restrictive respiratory disorders [8,7].
The connection of thyroid pathology with dysfunction of various organs and systems, as well as the imperfection of methods of solving the problem justify the interest of doctors of various specialties in this issue.

Materials and Methods of Research

4-month-old white mongrel male rats weighing 164-172 g were selected for the experimental study. All laboratory animals were performed on 4-month-old white mongrel rats from the same vivarium.
All laboratory animals are divided into two groups:
the first group is laboratory animals that received a standard vivarium diet (n=30), in which pneumosclerosis of the lungs was induced;
The second group - laboratory animals (n=30) received a standard vivarium diet, sick rats were treated with pomegranate oil for 4 weeks.
To study the morphological parameters (anatomical structure) of organs of laboratory animals, research methods widely used in experimental studies were used. All histological preparations were examined using a trinocular microscope HL-19 (China) with software. The main objects of the study were histological paraffin blocks prepared from rat thyroid tissue and tissues cut on a microtome. The preparation of histological preparations consisted of 4 stages and was carried out using traditional methods. A mechanical rotary microtome YD-315 (China) was used to prepare the preparations, the prepared sections were stained with hematoxylin and eosin and viewed under a trinocular microscope.Thyroid tissue of white mongrel rats with pneumosclerosis of the lungs was excised in laboratory conditions, the organ was fixed in a 10% neutral formalin solution, frozen for 72 hours, then washed in running water for 2 hours, then dehydrated with alcohols and poured into paraffin. Sections 5-8 microns thick were prepared through them and the general histological structure was studied by staining with hematoxylin-eosin dye. The sections were examined under a Leica light microscope and the desired areas were photographed.

The micro-preparations were photographed under a microscope in sizes 4x20, 10x20, 40x20, 100x20.

The Results of the Study

After decapitation of all studied white rats of both comparison groups, the thyroid gland of the rats was separated from the internal organs, cleaned and subjected to topographic and macroscopic examination. As a result of the study, visually significant changes in the external macroscopic appearance of thyroid tissues of white rats of the first main group were not revealed, morphological changes characteristic of neutrophilic inflammation appeared in the tissues of the thyroid gland during microscopic examination. (100%, n=30), most of the cells were changed and the tumor appeared in the surrounding tissues (80.4%, n=22). Since the two groups of laboratory animals received almost different results, we found it necessary to address them separately.

The first main group participating in the experiment, laboratory animals (n=30), were fed a standard vivarium diet and histological preparations prepared from thyroid tissues of laboratory animals were studied.

Histological preparations were prepared from thyroid tissues of all laboratory animals (n=30) belonging to the first main group and various morphological changes were observed under a microscope.On micro-preparations prepared from thyroid tissue of laboratory animals with pneumosclerosis of the lungs (Fig. 1-2), it is seen that thyroid tissue has morphological changes characteristic of inflammation (100%, n=30), changes in most cells and especially hyperplasia of C cells (parafollicular cells), thickening of spaces, fullness of small vessels, stagnation and edema in the perivascular zone, hydropic dystrophy of the thyroid epithelium (thyrocytic) (72.2%, n=20), follicular hyperfunction: an increase in thyrocyte nuclei and hyperchromic staining were observed. These symptoms are typical symptoms of hypothyroidism. It was found that the size of the follicles decreased, the amount of colloid in the follicle cavity decreased, and the consistency of the colloid thickened. It was noted that the glandular epithelium forming the follicle wall decreased in size due to the proliferation of stroma consisting of follicular and extrafollicular connective tissue (sclerosis, fibrous process).

The second main group participating in the experiment - laboratory animals (n=30) were on a standard vivarium diet and treated with pomegranate seed oil for 4 weeks. Relatively positive results were achieved in the studied drugs according to morphological and histomorphometric parameters after treatment of experimentally induced pneumosclerosis. Macroscopically, there are practically no changes

detected.When examined under a microscope, the number and completeness of microcirculation vessels (MCTs), an increase in the size of follicles in the central and peripheral parts, and an increase in the amount of colloid were determined.

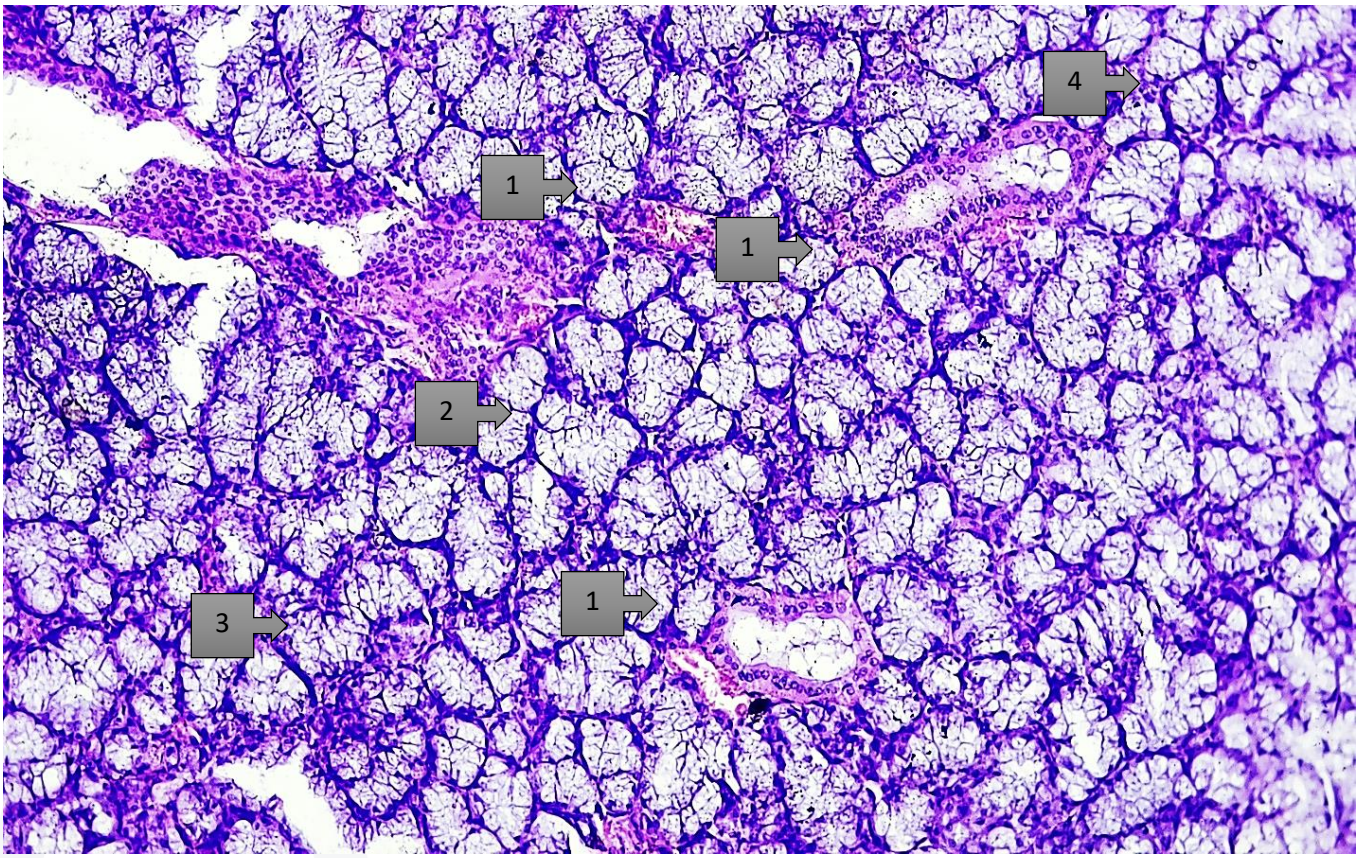

Figure No. 1. Microscopic picture of the thyroid gland of a white mongrel rat after treatment of experimentally induced pneumosclerosis of the lungs. Paint G-E. Uv 10x40 1. An increase in the cross-section and surface of capillary vessels 2. An increase in follicles in the central part of the gland 3. An increase in the amount of colloid in the center of the follicle 4. Medium and large follicles in the peripheral part of the gland.

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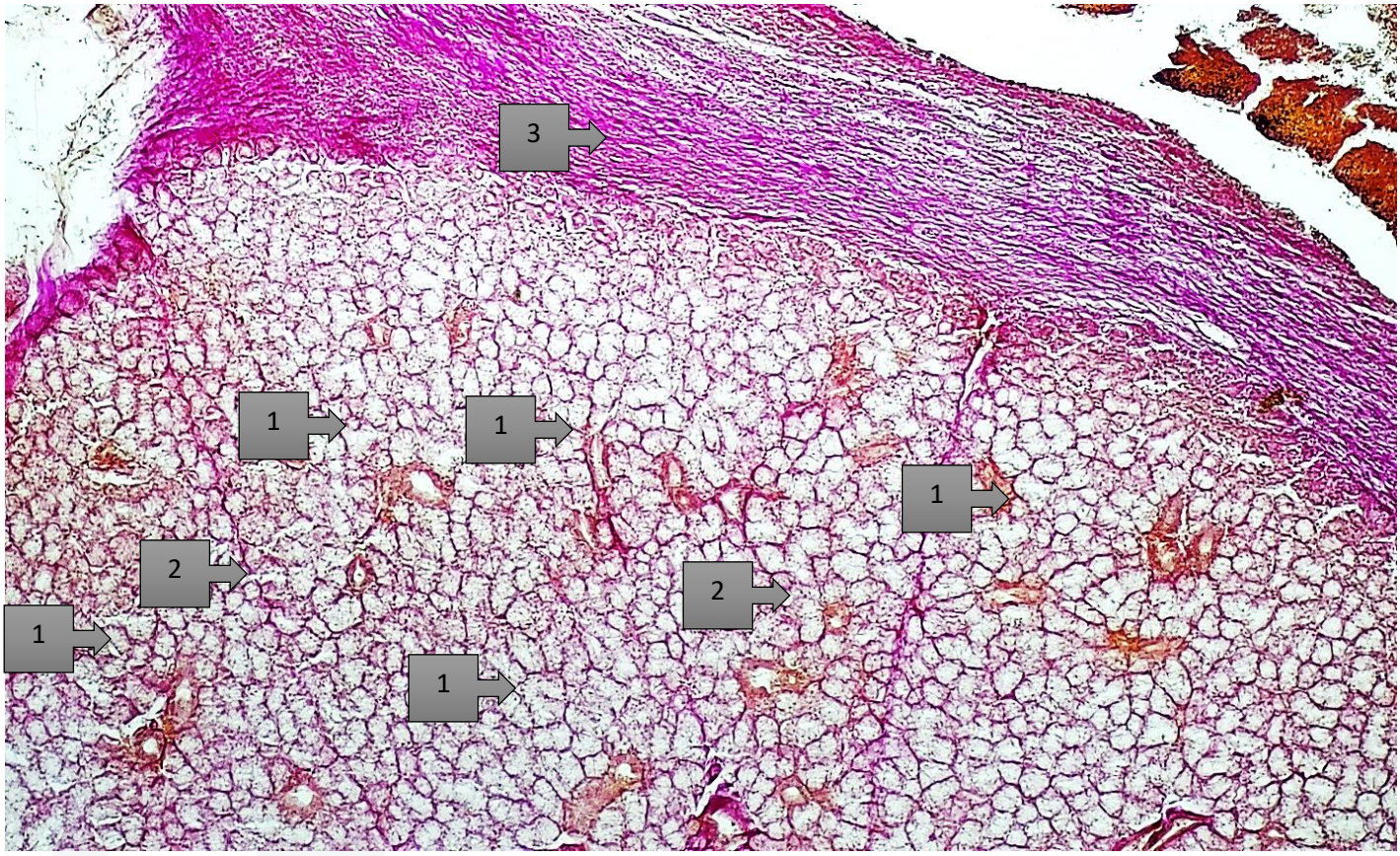

Рисунок № 1. Микроскопическое изображение щитовидной железы белой беспородной крысы после лечения экспериментально индуцированного пневмосклероза легких. Краска G-E. УФ 10х40 1. Увеличение поперечного сечения и поверхности капиллярных сосудов 2. Увеличение фолликулов в центральной части железы 3. Увеличение количества коллоида в центре фолликула 4. Средние и крупные фолликулы в периферической части железы.

The following results were obtained when studying the parameters of the thyroid gland of white mongrel rats after correction of experimentally induced pneumosclerosis of the lungs with pomegranate seed oil. The diameter of the capillaries was 11.98±0.16 microns in the central part and 11.90±0.20 microns in the peripheral part. The numerical density of capillaries is 175.06±1.93 in the central part and 169.87±6.04 in the peripheral part. The total surface of the capillaries in cross section x 10 3 microns 2 corresponds to 18.34 ± 0.14 in the central part and 16.96 ± 0.13 in the peripheral part. The relative surface area of the blood vessel in the central part is 12.98±0.9, in the peripheral part 12.98± 0.9, the height of the thyroid epithelium is 7.01±0.24, in the peripheral part 6.97±0.64. The diameter of the follicle is 38.07±0.21 microns in the central part and 36.54±0.32 in the peripheral part, the surface of the follicle is 1012.41±15.18 microns 2 in the peripheral part 1179.13±16.50.

With the mutual ratio of follicle components, the thyroid epithelium is 51.03± 0.08% in the central part and 48.6± 0.47% in the peripheral part. Colloid - 26.5 ± 0.7 in the central department, 25.8 ±0.4 in the peripheral department, stroma - 23.7± 0.9 in the peripheral department and 20.08±0.08 in the peripheral department.

Conclusion

When studying the results obtained on white mongrel rats in the group with experimental pneumosclerosis of the lungs, it was found that the number of microcirculatory vessels in the thyroid gland increased, that is, capillaries without compensatory activity were added, and the diameter of the vessels in the central and peripheral parts of the gland increased almost equally. Relatively positive results were achieved in the studied drugs according to morphological and histomorphometric parameters after treatment of experimentally induced pneumosclerosis. Macroscopically, there are practically no changes detected. Microscopic examination revealed the number and completeness of MCTs, an increase in follicles in the central and peripheral parts, and an increase in colloid content.

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