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Characteristics of morphological changes of the teeth-containing tissues at the workers of poultry farms

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Abstract

In the process of intensive development of modern agriculture a study of the influence of harmful and associated with health risk factors of production environment is a timely and very important. Specific working conditions contribute to the formation of various pathological processes in the human body. However, as shown by previous research work on poultry farms is still tied to the influence of adverse factors of production environment. So, in the poultry industry, a high proportion of manual work, some of which are associated with significant physical stress. All these factors adversely affect the condition of periodontal tissues working on poultry farms. The significant influence of adverse environmental factors on the condition of the organs and systems of person confirms trend of the increase of frequency of periodontal disease in industrial developed countries, which in different age groups ranges from 80 % to 100 %. This article presents a study of morphological changes of periodontal tissues in workers of poultry factories, which demonstrated that daily contact with the poultry products reduces the immune resistance, thereby creating a favorable breeding ground for anaerobic, fungal and chlamydial infection, which is a leading cause of periodontal disease.

Keywords: periodontal disease, the workers of poultry farms, the morphological changes, periodontal tissues

1. Introduction

In the process of intensive development of modern agriculture, the study of the impact of hazardous and health-related factors on the environment is timely and very important. Specific conditions of labor contribute to the formation of various pathological processes in the human body. One of the most actively developing agricultural sectors is poultry farming. High concentration of bird's population and their maintenance without walking, dustiness, gas pollution (ammonia, hydrogen sulfide, high concentrations of carbon dioxide, formaldehyde), bacterial and fungal air pollution of the working zone, production noise, high humidity lead to the emergence of occupational diseases among poultry workers, in particular periodontal disease [1, 2, 5, 6].

2. The purpose of our study was to study the morphological changes of periodontal tissues in poultry workers.

3. Materials and methods

Materials of the study were biopsy of the gum mucosa, and the tissue was obtained during the curettage of periodontal pockets of 70 poultry workers: 24 patients with primary and I^G degree, 26 patients with GP II degree and 20 patients with GP of the III degree. The material was fixed in 10% neutral formalin solution for 24-48 hours. Dehydrated in alcohol, after which they were placed in paraffin blocks. From paraffin blocks, with the help of microtome MPS-2, slices were made in the thickness of 5-6 microns.

General histomorphology was studied on preparations painted with hematoxylin Ehrlich-eosin and by van Gison method. Elastic fibers were detected by resorcinum-fuchsin Weigert, argiophilic, or reticulin-impregnated with nitric oxide silver. For glycogen were CHIC-positive substances that were fermentated with saliva amylase. Acid mucopolysaccharides were painted altian-blue, while they were painted blue-green. To detect microorganisms, the technique of painting by Gram and Romanovsky was used. The intensity of the histochemical reactions in all investigated cases was evaluated visually, using a semi-quantitative evaluation method. Applied a descriptive method for analyzing the detected changes [3, 4, 7, 8, 9].

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The drugs were examined using a microscope "Ergaval" with an increase of x100, x400, x500, x640. The gum preparations were photographed using the Olympus Camedia C-480 ZOOM ("Olympus", Japan) digital camera.

Results and their discussion.

The results can be distributed as follows:

In patients with GP I degree: minor changes in periodontium, in which the macroscopic lesions were not detected during the examination. Histologic changes in this category were as follows: vacuolation, colloid cystic fibrosis, irregular paraekaratosis; In subordinate connective tissue stroma, surface layers - not sharply expressed infiltration by neutrophilic granulocytes, which was associated with changes in metabolism of investigated periodontal tissues (Figure 1, 2, 3).



Fig 1: Biopsy gums.

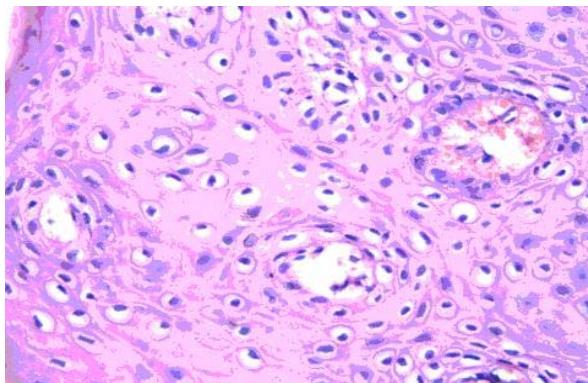


Fig 2: Kylocytosis of a multilayered flat epithelium. Increase x400.

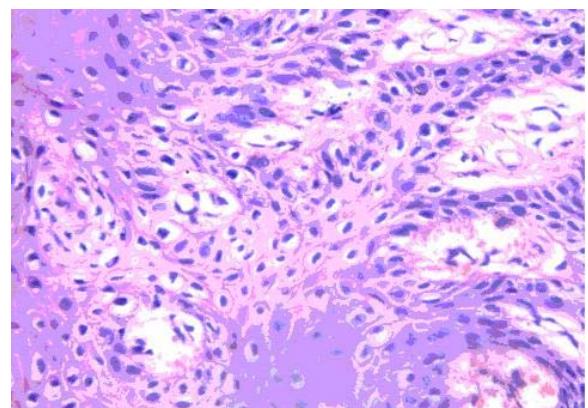


Fig 3: Kylocytosis and acanthous growth of a multilayered flat epithelium. Increase x400.

Patients with GP II degree: inflammatory and dystrophic changes in all structural elements of periodontal disease. In the epithelium: the flattening of the epithelial cells with the refinement of its structure. Gialinovo-droplets, sometimes - hydroperic dystrophy of epithelial cells with focal necrosis. In separate layers of the epithelium, the processes of damage or degeneration predominate, in particular: a spiky layer: carioresix, carriolysis with formation of cellular detritus in the studded layer; cell proliferation, mitosis, acanthosis and neoangiogenesis in the basal layer (Figure 4, 5, 6).

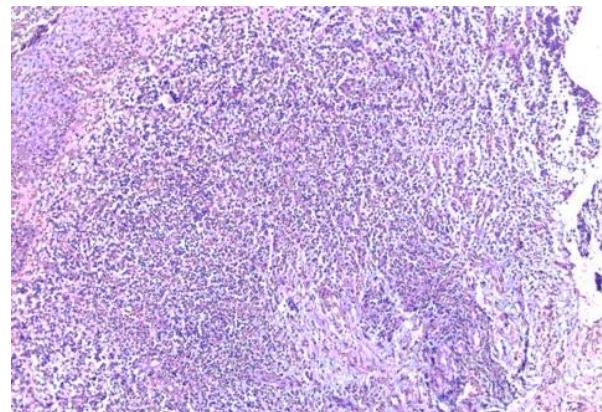


Fig 4: Expressed thick chronic lymphocytic infiltration in the stroma gum. Increase x100.

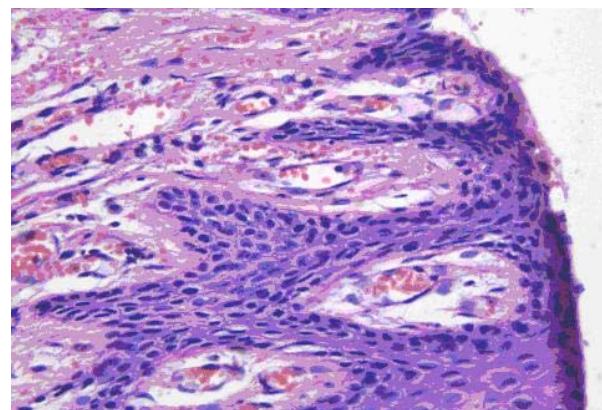


Fig 5: Atrophy of a multilayered flat epithelium, which borders on acanthus epithelial growth. Increase x400.

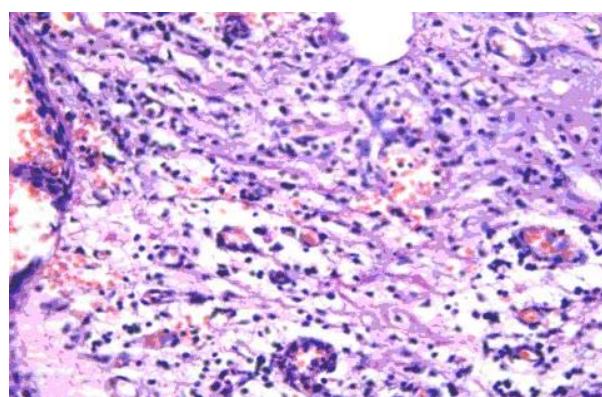


Fig 6: Exacerbation of chronic inflammation with pronounced changes in vessels of the microcirculatory bed (capillary, proliferation of vascular endothelium, single fibrin microthrombia in lumen). Increase x400.

Patients with GP of grade III with expressed as macroscopic and microstructural signs of periodontal lesions were ulceration of the epithelial layer, coagulation necrosis, cell detritus and leukocyte infiltrates of varying severity were detected at the defect. At the edges of defects - the growth of a young or ripening granulation tissue. In its own plate of the mucosa: thick chronic lymphatic leukocytic inflammatory infiltrate with an admixture of eosinophils and single plasma cells, proliferation of young cambial elements. In vessels of the microcirculatory bed: swelling and homogenization of the endothelium, focal fibrinoid necrosis, hyalinosis of the arterioles. Activation of the inflammatory process was accompanied by the effects of hyperemia, exudation, interstitial edema, and microtrombemosis of arterioles (Figure 7, 8).

Using histochemical techniques, we were able to detect damage to collagen and elastic fibers of periodontitis of varying degrees. The severity of the disorganization of the collagen framework correlated with the intensity and timing of the pathological process: swelling and homogenization of collagen fibers, fibrinoidal necrosis, sclerosis, hyalinosis. In zones of pronounced alterative changes (dystrophy, necrosis), colonies of bacteria: cocci, chlamydia were detected. (Figure 9, 10).

The activity of the reaction to glycogen indicated the dependence of the content of glycogen on its degree of damage and the intensity of regenerative changes. The most active depot of the glycogen was the superficial and middle layers of the epithelial cells. The redistribution of acidic and neutral mucopolysaccharides in its own plate of the mucosa indicates the depth and degree of reconstitution of the connective tissue periodontium, which leads to a decrease in its function.

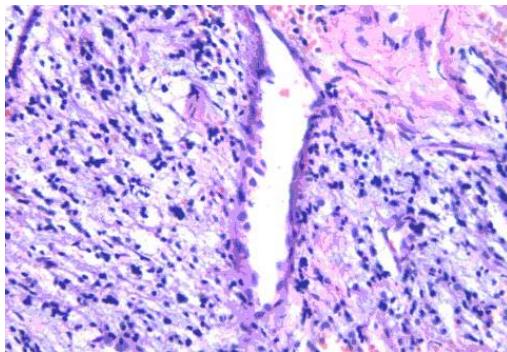


Fig 7: Homogenization of the endothelium of the vessels of the myocirculatory bed. Gialinosis of the walls of small arterioles. Increase x400.

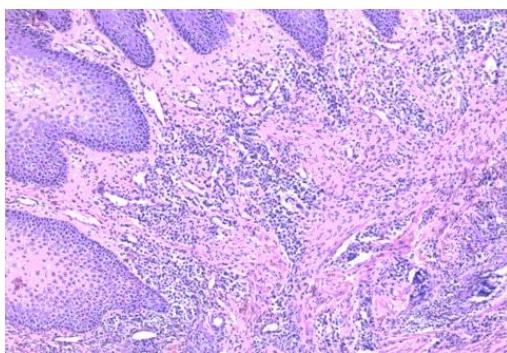


Fig 8: Chronic inflammatory infiltrates with disorganization of collagen carcass and sclerosis of stroma. Increase x100.

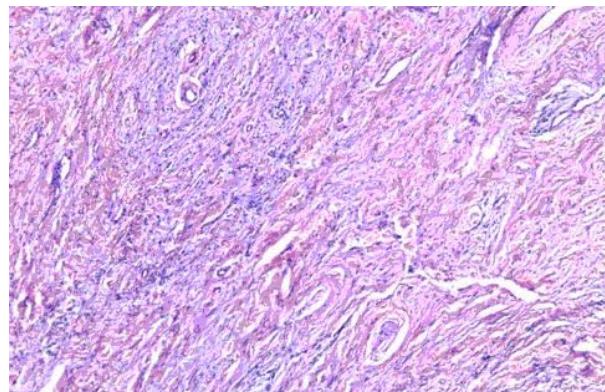


Fig 9: Deep disorganization of connective tissue: swelling and homogenizati on of bundles of collagen fibers, centers of fibrinoidal necrosis. Increase x100.

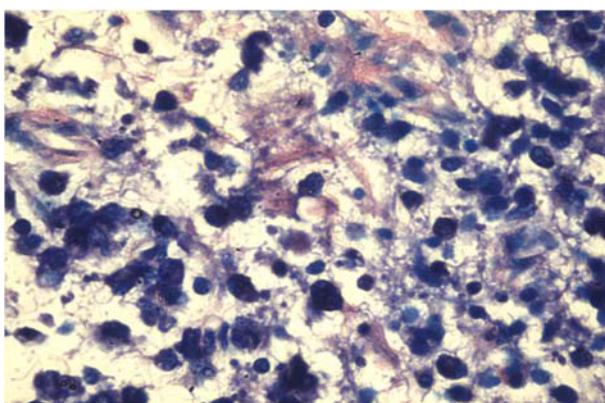


Fig 10: In the area of macrophage-monocytic infiltration, external and intracellular bodies, like chlamydia, are determined. Increase x 500.

4. Conclusions

Daily contact with poultry products reduces immunological resistance, resulting in a favorable environment for the reproduction of anaerobic, fungal and chlamydial infection, which is the leading factor in the occurrence of periodontal diseases. Accumulation of reagents on the mucous membrane of the mouth, nasal deposits complicate inflammatory and dystrophic changes in periodontium, suppressing compensatory processes in it. The destruction of the connective frame of the periodontal period leads to a violation of its function.

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