

# The Role Of Coccal Microflora In The Etiology And Pathogenesis Of Respiratory Diseases In Lambs Of The Karakul Breed Of Uzbekistan.

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## 1. INTRODUCTION

The article studies the role and pathogenesis of staphylococci and streptococci in the etiology of respiratory diseases in Karakul lambs in Uzbekistan. The pathomorphological changes in bronchopneumonia in the lungs and other organs of Karakul lambs during experimental infection with staphylococci and streptococci, as well as differential diagnostics in the etiology and pathogenesis of bronchopneumonia in Karakul lambs are highlighted. Keywords. Hyperemia, desquamation, dystrophy, fibrosis, carnification, fibroblasts, acinus, necrosis, neutrophils, catarrhal. Relevance of the topic. Potentially pathogenic microflora has recently been given great importance in the etiology of respiratory diseases in young animals. During passivation through the organism of susceptible animals, the virulence of pathogenic microorganisms increases and a rapid accumulation in the environment occurs. Cases that have arisen with this disease can be epizootic in nature. Thus, staphylococci and streptococci play an important role in the occurrence and development of diseases in animals and humans, and, in particular, respiratory diseases. As for the role of coccal microflora in the etiology and pathogenesis of pneumonia in lambs, this issue has not been adequately studied. The purpose of this research is to study the role of coccal microflora in the etiology of Karakul lambs. To achieve this goal, the following tasks were set. To study the pathological and morphological changes in the lungs and other organs of Karakul lambs during experimental infection with staphylococci and streptococci. To study the features of the course of pneumonia of coccal etiology in the body of experimentally infected lambs of 4-5 months of age. Materials and research methods. The experiment involved 4 groups of animals, the fourth group was a control one. Lambs of group 1 were injected intramuscularly with corticosteroids for 3 days to reduce natural resistance. A day later, using a sterile syringe with a needle, 1 ml of the pathogen was injected into the trachea. Lambs of groups 2 and 3 were also injected intramuscularly with corticosteroids for 3 days to reduce natural resistance. Simultaneously, the animals of the 2nd and 3rd groups were washed with a daily agar culture of staphylococcus and streptococcus (4 ml) on the mucous membrane of the nasal cavity, and on the 4th day the bacterial culture was injected intratracheally at the same dose. The lambs of the 4th (control) group were not injected with the culture of pathogenic bacteria, and the level of their natural resistance was not reduced. Slaughter of lambs in the first group - after 9, 18, 30; the second - 5, 12, 14, 18, 30 and the third - 6, 13, 22 days after infection. The lungs, heart, liver, kidneys, spleen, regional respiratory

organs and lymph nodes (bronchial and mediastinal) were taken for histological examination. The pathological material was fixed in a 12% solution of neutral formalin, liquids of Carnoy, Shabadash, and alcohol. To obtain histological sections, we used paraffin and celloidin filling, as well as the method of freezing pathological material. Sections were stained with hematoxylin-eosin, for mucus with Mayer's mucicarmine, for fibrin and collagen fibers according to Mallory, for elastic and reticular fibers according to Hard, for mucopolysaccharides and glycogen according to McManus, for RNA according to Brachet, for polysaccharides in the epithelium, of the bronchi Schick - reaction for microbes according to Gram. Pathological changes in lambs infected with staphylococci and streptococci.

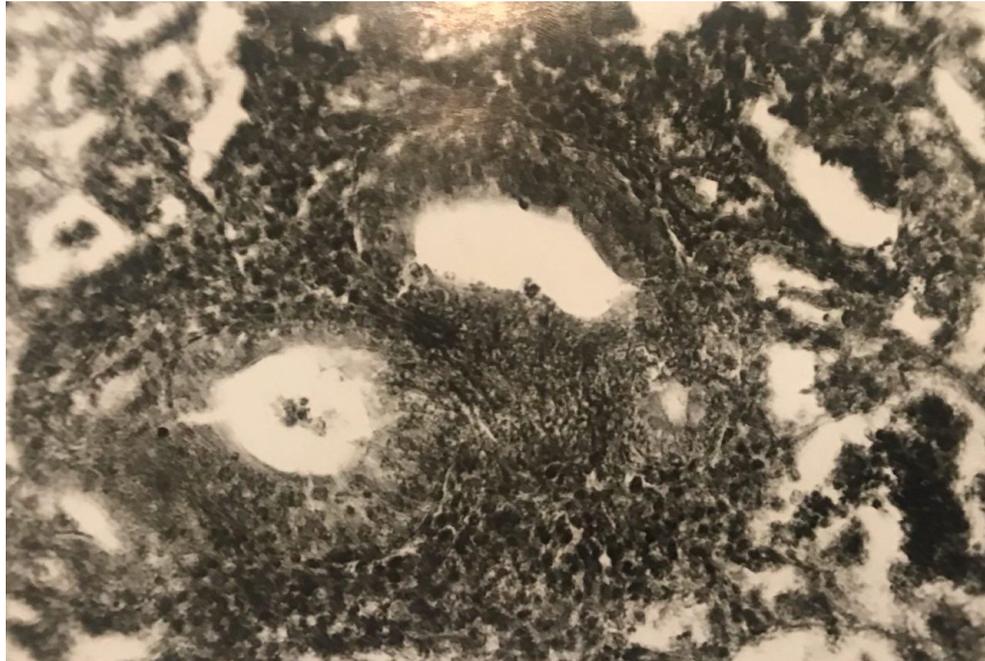
We dissected the bodies of 6 slaughtered lambs after experimental infection with streptococci and staphylococci. The lambs were slaughtered after 6, 13 and 22 days after infection. At postmortem autopsy of lambs killed on the 6th day after intratracheal injection of *Staphylococcus aureus* and *Streptococcus*, pathological changes were noted mainly in the right apical, cardiac and cranio-lateral parts of the diaphragmatic lobe of the lungs (replacement foci). The affected areas are red, the incision surface is juicy, in the affected lobes of the lungs there are mucopurulent foci up to 0.5 cm in diameter, synechia between the right cardiac and diaphragmatic lobes of the lungs. In the organs of experimental animals (killed on day 13), the following changes were found, the right heart lobe of the lungs was enlarged and compacted, reddish-gray in color, there is a focus in the tissue of the lobes, more dense, a greasy one can be traced on a cut up to 3 cm in diameter, purulent foci ... When pressed from the cut surface of the affected lobe, pus is released from the bronchioles. In the left cardiac and right diaphragmatic lobes of the lungs, there were small (up to 1.5-2 cm in diameter) seals of a reddish-gray color, juicy in the section. Adhesions were noted between the right cardiac and diaphragmatic, as well as between the right and left cardiac lobes of the lungs and the pericardium. In lambs killed on the 22nd day after intratracheal injection of *staphylococcus* and *streptococcus*, the right, left cardiac and accessory lobes are increased in volume, reddish-gray, there is compaction, juicy on the cut, pus is released when pressed. In the right apical and cardiac, left apical and cardiac and cranio-lateral parts of the right diaphragmatic lobe, there were multiple purulent foci up to 0.5-1 cm in diameter, synechia between the cardiac and diaphragmatic lobes, the right cardiac lobe of the lungs and the pericardium, and also between the lungs were noted and costal pleura. When the lungs were separated from the ribs, the lung tissue was disturbed. In the section, the surface of the lung tissue is granular, juicy, there are single round-shaped foci the size of a millet grain, whitish-yellow in color (Figure 1).



Fig. 1. Lungs of a lamb infected with streptococci and staphylococci. Croupous pneumonia.

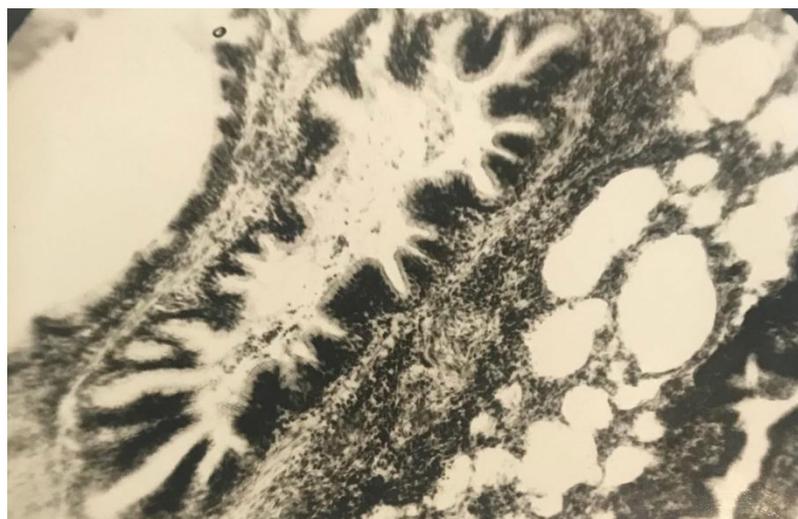
In a bacteriological study, the original culture of staphylococcus and streptococcus was isolated from the lungs of lambs killed on days 6 and 13. On the cut, a translucent, frothy, whitish-yellow mass stands out from the bronchi. The interlobular connective tissue is sharply distinguished in the form of yellowish-white strands. Bronchial and mediastinal lymph nodes 13 days after infection are enlarged, reaching a diameter of 2.5 cm of grayish-yellow color, moderately dense consistency, grayish-yellow on the cut, the pattern of the layers is preserved. In lambs killed 6, 13 and 22 days after infection: The nasal cavity. The mucous membrane of the nasal cavity is hyperemic, edematous; Trachea. Discovered a yellowish foamy mass, the mucous membrane is diffusely reddened; Larynx. The larynx contains a small amount of yellowish cloudy mucus, the mucous membrane is bluish-pink; Spleen. It is not increased in volume, the edges are pointed, the capsule is wrinkled, of moderately dense consistency, the pulp is brownish-red, the trabecular pattern is sharply distinguished; Heart. Subepicardial fat is gelatinous infiltrated. No characteristic changes; Liver. It is reduced in volume, has a compacted consistency, dark brown in color with a yellowish tinge. The parenchyma is brownish-red in the section; Kidneys. Moderately dense, brown-yellow color. The capsule can be removed easily. The parenchyma is brown-yellow in section. The drawing of the organ is saved.

Pathological and histological changes. During the pathological and histological examination of lambs experimentally infected with staphylococci and streptococci, the main changes were revealed in the respiratory organs and regional lymph nodes. In the respiratory organs, in terms of the frequency and severity of the lesion, the lungs were in the first place. Lungs. Histological examination 6 days after infection in the lumens of large and medium bronchi of the lungs found mucus mixed with a large number of neutrophilic leukocytes and single cells of desquamated epithelium. In this part of the bronchi, the lumens are narrowed in the form of cracks, contain a small amount of mucopurulent exudate. The walls are significantly thickened and necrotic (Figure 2).



Rice. 2. Lungs of a lamb infected with streptococci and staphylococci. Thickening and necrosis of the bronchial wall. Coloring - G.E. Uv. 10x40.

The multi-row ciliated epithelium undergoes significant changes such as anaplasia of epithelial cells, layer discomplexation; in some places it is flattened, elongated in a cylindrical shape with a large number of juicy, round, oval-shaped nuclei, in some of them single figures of mitosis are found. Among the cells of the ciliated epithelium, single swollen goblet cells filled with secretion are visible. In many areas, the epithelial lining is sparse, infiltrated by lymphocytes and single plasma cells. The own layer of the mucous membrane is thickened, infiltrated with a large number of cellular elements, consisting mainly of plasma cells and a small number of lymphocytes. (Figure 3)



Rice. 3. Lungs of a lamb infected with staphylococci and streptococci. Proliferation of the respiratory epithelium of the bronchus and alveoli. Coloring - G.E. Uv. 10x40.

The peribronchial and perivascular connective tissues are thickened and, their fibers are mucoid-swollen, homogenized in places, when stained according to Mallory it stands out in the form of a wide thickened network. In the proper layer of the mucous membrane and peribronchial connective tissue of most of the bronchi, lymphoid accumulations are expressed in the form of round or oval follicles. 13 days after infection, changes were found, characteristic of catarrhal-purulent bronchopneumonia. Small bronchi and bronchioles are filled with mucus and a thick mass of neutrophilic leukocytes, the epithelium of the bronchi is greatly altered, the peribronchial connective tissue is thickened. The alveolar parenchyma was altered in all areas under study. The parenchyma, located between the affected bronchi, is sharply atelectatic. The pattern of the alveoli is smoothed, their lumens are slit-like, the respiratory capillaries are dilated, overflowing with blood. In the narrowed lumens of single alveoli, an accumulation of swollen cells of the alveolar epithelium is observed. In other areas of the pulmonary parenchyma, in some of the lobules, the lumens of the alveoli are stretched, filled with serous exudate with an admixture of cells of the multiplying alveolar epithelium. In lambs killed 22 days after infection, fibrotic inflammation was found, in some places assuming a purulent-necrotic character. There are areas in which the lumen of the alveoli is filled with serous-fibrinous exudate with an admixture of cells of the alveolar epithelium and neutrophilic leukocytes. Part of the alveoli is observed an increase in fibroblasts and the formation of thin collagen fibers - organization of fibrin - carnification. In areas of purulent-necrotic pneumonia, foci of necrosis of various sizes were noted, localized within several alveoli, less often acinus or several adjacent acini. In the bronchial and mediastinal lymph nodes, 13 and 22 days after infection, the follicles were enlarged, the centers of reproduction accounted for most of them, along the periphery, the series were surrounded by a rim of dense accumulation of lymphocytes. The peripheral sinuses are dilated, filled with a dense accumulation of cellular elements, consisting of plasma cells, histiocytes. The cerebral sinuses are dilated, filled with large cells such as histiocytes and a large number of neutrophilic leukocytes. Trabeculae are thickened, edematous. The perivascular connective tissue is edematous. Spleen. 13-22 days after infection, a sharp depletion of lymphoid tissue was detected: there are no lymphatic follicles, the red pulp contains reticular cells and a small number of lymphocytes. The number of red blood cells is increased. Liver. In lambs killed 22 days after infection, granular and fatty degeneration expressed in varying degrees was found. An increased number of neutrophils was detected in the liver sinusoids (Figure 4).



Rice. 4. Liver of a lamb infected with streptococci and staphylococci. Granular and fatty degeneration. Coloring - G.E. Uv. G.E. Uv. 10x40.

### **Kidneys.**

Changes in the kidneys were poorly expressed. They were characterized by not sharp granular degeneration of the epithelium of the convoluted tubules and a slight effusion of transudate under the capsule of the glomeruli. With intranasal and intratracheal administration of cultures of staphylococcus and streptococcus to lambs against the background of reduced body resistance, purulent-catarrhal pneumonia was reproduced, complicated by adhesive pleurisy. The experimental results indicate not only the participation of the studied microorganisms in the etiology and pathogenesis of bronchopneumonia, but also the specificity and severity of the pathological processes caused by them in the respiratory tract and in the body of animals. In lambs infected with staphylococcus streptococci, the main changes developed in the respiratory organs and regional lymph nodes. In the respiratory organs, in terms of the frequency and severity of the lesion, the lungs were in the first place. Conclusion. 1. In the conditions of Uzbekistan, the main causative agents of pneumonia in lambs of the Karakul breed are bacteria: staphylococcus aureus; staphylococcus epidermidis; streptococcus dysgalactiae; streptococcus faecalis. These microorganisms have a sufficient set of pathogenicity factors, they are capable of independently or associatively causing a severe pathological process in the lungs of Karakul lambs. 2. Inflammation in the lungs of staphylococcal and streptococcal etiology has a catarrhal-purulent character with a fibrous shade of pneumonia with a tendency to develop necrosis and necrotizing pneumonia. 3. In lambs infected with streptococci and staphylococci, the main changes developed in the respiratory organs and regional lymph nodes. In the respiratory organs, in terms of the frequency and severity of the lesion, the lungs were in the first place. According to our data, in lambs of the Karakul breed, infected with streptococci and staphylococci, fibrinous inflammation of the lungs was noted, in some places assuming a purulent-necrotic character.

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