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PATHOMORPHOLOGICAL CHANGES IN ABORTED BOVINE FETUSES CAUSED BY CHLAMYDIOSIS

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Abstract: The results of serological and immunological analyses of chlamydiosis in several cattle farms were determined. Based on rapid diagnostic methods, including the hem agglutination reaction and enzyme-linked immunosorbent assay (ELISA), information was obtained on path morphological changes in aborted bovine fetuses infected with *Chlamydia abortus*, particularly in the lung tissue, kidneys, spleen, liver, and heart muscles.

Keywords: chlamydiosis, microorganism, infection, bovine fetus, placental pathology, pathological process, path morphological changes, internal organs, aborted fetus, ovine chlamydiosis, *Chlamydia abortus*, enzootic abortion.

Relevance of the Topic. Extensive measures are being implemented in our republic to ensure the stable growth of livestock numbers, strengthen veterinary control, improve the quality of veterinary services, effectively organize animal health protection, and ensure epizootic stability and food safety. In particular, according to the Resolution No. PQ-179 of the President of the Republic of Uzbekistan dated May 12, 2026, “On Measures for the Development of the Livestock and Pasture Sector Based on Modern Management Systems and Innovative Approaches,” it is required to implement comprehensive measures aimed at improving livestock breeding, expanding the feed base, supporting breeding-oriented livestock farms, and increasing the number

of large business entities engaged in livestock production through state support. Infectious diseases of agricultural animals, especially bacterial and viral infections, pose a serious threat to livestock farming.

Chlamydiosis occurring in sheep farms is considered a major problem due to the significant economic losses it causes. Therefore, the prevention of this enzootic abortion disease is highly important for preserving livestock populations and increasing their productivity.

The lack of biological and chemical preparations for the prevention and treatment of diseases in agricultural animals in the veterinary field, as well as the inability to establish diagnoses using rapid diagnostic methods, further complicates the problem and contributes to the wider spread of infectious diseases. In recent years, considerable attention has been paid to the development of livestock farming in private farms. This is because increasing the population of imported pedigree large and small ruminants of various productive directions, obtaining healthy offspring from them, and producing livestock products remain among the urgent issues of today.

In livestock farming, particularly in sheep and cattle, chlamydiosis frequently occurs during the late stages of pregnancy, leading to an increase in abortions, the birth of weak lambs and calves, and a rise in enzootic abortion cases associated with the epizootic situation of this disease. Therefore, it remains one of the pressing problems facing veterinary science and practice.

Chlamydiosis is a contagious enzootic infectious disease characterized by inflammation of the fetal membranes, especially the cotyledons, and in many cases by abortion during the second half of pregnancy or the birth of weak and nonviable lambs and calves, often accompanied by signs of pneumonia. The causative agent is *Chlamydia abortus*, which belongs to the family *Chlamydiaceae* and the genus *Chlamydia psittaci*.

ANALYSIS OF THE OBTAINED RESULTS

Studies were conducted in the microbiology laboratory using blood samples taken from two cattle that had undergone premature abortion and from one fully developed calf fetus (7–10 days before birth) obtained from the private farm “Alijon” located in the Jomboy district of Samarkand region. During the examination of these samples, IgM and IgG indicators were determined by enzyme-linked immunosorbent assay (ELISA), as well as by the hemagglutination reaction. After confirmation of the latent clinical form of *Chlamydia abortus*, one bovine fetus was subjected to pathological and anatomical examination, and the pathomorphology of the parenchymal organs, uterus, and surrounding caruncles and cotyledons was investigated. In our experiments, particular attention was paid to the external appearance, general condition, and especially the pathological and anatomical changes of the aborted fetuses. Pathomorphological alterations in bovine fetuses infected with *Chlamydia abortus* were examined by dissection of the aborted fetus and investigation of changes in the parenchymal organs using pathomorphological methods (according to G.A. Merkulov, 1969). As a result of the reaction, specific antibodies against hemagglutinins were detected in the blood serum of aborted cows.

Skin tissue and samples of internal parenchymal organs (liver, lungs, spleen, lymph nodes, heart, and kidneys) obtained from bovine fetuses infected with chlamydiosis were examined by dissection to identify pathological and anatomical changes in the internal organs (Figure 6).

Pathological and anatomical examinations of bovine fetuses infected with chlamydiosis and aborted 7–10 days before parturition revealed atelectasis, air accumulation, and blood stasis in the lungs. In addition, hyperemia and congestion developed in the lungs, leading to a congestive condition. The lung tissue acquired a reddish-black color and became heavier than normal. Due to tissue compaction,

consolidation developed, and reduced air content in the tissue resulted in hepatization of the lungs (Figure 3).

Figure 1. External structural appearance of the kidney infected with *Chlamydia abortus*.

Figure 2. Enlargement of the liver tissue.

In some farms (the “M. Ibragimov” Karakul breeding cooperative farm located in Dehqonobod district), the lung tissue of sheep fetuses aborted due to *Chlamydia abortus* infection was found to be swollen 1.5–2 times larger than normal, and when incised, a foamy fluid mass was released. In addition, up to 100–130 ml of fibrinous exudate in the form of serous fluid accumulation was detected in these animals (Figure 3).

This indicates that the pathogenic effect of this microorganism on lung tissue differs between large and small ruminants. The heart muscles were flaccid, with petechial and spotted hemorrhages observed in the atria, while only a very small amount of blood was present in the heart chambers. Dystrophic changes were observed in the myocardium, including hydropic (watery) degeneration. Cardiomyocytes of the myocardium were swollen, and vacuoles appeared in the cytoplasm (Figure 4). These alterations indicate cardiac insufficiency, which also affected other internal organs.

In bovine fetuses infected with *Chlamydia abortus*, the liver consistency became denser and enlarged up to 1.05 times compared to normal. Abscesses and necrotic foci of various sizes were observed. Venous hyperemia of the liver developed, resulting in blood engorgement and discoloration ranging from reddish-brown to dark brown. In addition, spotted hemorrhages were observed in the central parts of the hepatic lobules, and deformation of the hepatic trabeculae was identified (Figure 2).

In bovine fetuses infected with *Chlamydia abortus*, the kidney capsule became tense, enlarged by 1.2–1.8 times compared to normal, and slightly swollen. Circulatory disturbances in the renal parenchyma resulted in reddish-brown or gray discoloration.

Indistinct boundaries between the cortical and medullary layers of the kidneys were observed, along with multiple pinpoint hemorrhages (parenchymal hemorrhages).

Dystrophic and necrotic lesions developed in the primary epithelium of the renal tubules. Interstitial serous infiltration and inflammatory changes were observed in the renal pelvis tissue. In addition, lymphocytic infiltration characteristic of nephritis was identified in the kidney tissue. Hyperemia and degenerative changes were observed in the renal glomeruli. On sectioning, the kidney tissue appeared soft, friable, and showed patchy hemorrhages (Figure 1).

The spleen of bovine fetuses infected with *Chlamydia abortus* was flaccid, with swelling and pinpoint hemorrhages on certain areas of the surface. Enlargement of the spleen (splenomegaly) and tension of the capsule were also observed.

The splenic tissue became soft and loosened, and upon sectioning, accumulation of bloody masses and hemorrhagic lesions of dark red or blackish-red color were noted. In addition, loosening of the splenic pulp resulted in a mucous-like consistency (Figure 5).

Figure 3. Atelectasis and blood stasis in the lung tissue.

Figure 3. Acute petechial hemorrhage in the atria of the heart.

In some cases, partial necrosis was observed in the cotyledons of aborted bovine fetuses aged 260–262 days. The placenta became dark red in color and its consistency was hardened.

The inflamed part of the uterus was thickened and covered with a grayish-yellow mucous membrane. In many cases, edema was observed in the umbilical cord, occipital region, nose, and lumbar areas of the aborted fetuses.

Figure 5. Splenomegaly of the spleen.

Figure 6. Accumulation of transudate beneath the skin.

Conclusions:

It was determined that *Chlamydia abortus* infection in calves acts not only as an abortifacient factor, but also causes a systemic infection characterized by severe exudative-fibrinous pneumonia, consolidation, and hepatization of the lungs. In the heart muscles of calves infected with *Chlamydia abortus*, coagulative necrosis of cardiomyocytes, as well as nuclear pyknosis, karyorrhexis, and karyolysis, were identified.

In the kidneys of bovine fetuses infected with *Chlamydia abortus*, dystrophic-necrotic, hemodynamic, and inflammatory pathomorphological changes were observed, including enlargement and swelling of the kidneys, hyperemia and petechial hemorrhages in the parenchyma, alterations at the boundary between the cortical and medullary layers, dystrophy and necrosis of the renal tubular epithelium, interstitial serous infiltration, lymphocytic nephritis, glomerular degenerative changes, softening of renal tissue, and patchy hemorrhages. These lesions were interpreted as morphological manifestations of toxic-septic processes and circulatory disorders developing under the influence of infection.

Pathological and anatomical examination of fetuses aborted 7–10 days before birth revealed atelectasis, air accumulation, and blood stasis in the lungs. The heart muscles were flaccid, petechial and spotted hemorrhages were present in the atria, only a small amount of blood was detected in the heart chambers, and the amount of transudative fluid in the thoracic cavity was found to be 100–130 ml.

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