Гетерозиготных генотипов в группе больных животных почти в 2 раза меньше, чем в контрольной группе (28,0 по сравнению с 54,0%), а животных с генотипом *BLG*-HaeIII^{BB} среди маститных коров более чем в 2 раза больше по сравнению с контрольной группой (44,0 по сравнению с 17,0% соответственно). Сделанное наблюдение позволяет предположить, что генотип BLG-HaeIII^{AB} значимо ассоциирован с резистентностью к маститу у голштинских коров в то время как животных носителей генотипа BLG-HaeIII^{BB} можно отнести к группе повышенного риска.

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CLINICAL SIGNS AND PATHOLOGICAL CHANGES IN SAIGAS INFECTED WITH MONIESIOSIS

Annotaion

The necropsy findings on sick saiga antelopes reveal a complex array of pathological changes indicative of severe health deterioration. Afflicted with moniesiosis, these malnourished animals exhibit extensive abnormalities across various organ systems. Notably, subcutaneous mucus and pale mucous membranes are evident, alongside sacral congestion in the abdominal cavity. Peripheral lymph nodes are enlarged, squishy, and pale red, with reduced subcutaneous fat. Skeletal muscles display a pale pink color and soft texture, while the tongue appears softer with undefined fiber structure. Presence of blood in the larynx and tracheal cavity, along with frothy liquid in the lungs, indicates respiratory distress, compounded by emphysema affecting the upper lung lobes. Cardiac abnormalities include an enlarged heart with hemorrhage foci, stretched ventricles, and myocardium heterogeneity. Liver and gallbladder enlargement, coupled with renal abnormalities, further signify systemic compromise. The gastrointestinal tract manifests mucosal swelling, hemorrhages, and gas-filled distension, notably in the stomach and small intestine. Sebaceous lymph nodes exhibit enlargement and indistinct internal features. Conversely, the spleen displays minimal anomalies. Pancreatic edema, hemorrhage foci, and bladder hemorrhages are notable, alongside cerebral swelling and engorged blood vessels in the brain cortex. These findings collectively suggest a multi-systemic disease process, likely contributing to the animals' malnourishment and compromised health status. Further investigation into the etiology and management of this condition is imperative for wildlife conservation efforts and understanding ecosystem health dynamics.

Keywords: *saiga, Ural population, necropsy, monieziasis, organs, pathology*

Saiga antelopes are known to graze extensively on livestock pasture, potentially enabling the transmission of a wide range of parasitic helminths between saigas and domestic ruminants [1]. Post mortem examinations have revealed that the majority of helminths found in saiga antelopes in Kazakhstan are shared with livestock, indicating a potential for transmission between the two populations [2]. Furthermore, a study in West Kazakhstan found that nine species of helminths were found in cattle, and fourteen species were found in saigas of the Ural population, suggesting a significant overlap in helminth species between saigas and domestic livestock [3]. The diagnosis of saiga helminth infections was confirmed by well-grounded helminthological and pathological anatomical examinations of dead saigas, indicating a thorough understanding of the helminth fauna in saiga populations [4]. Additionally, previous studies have shown that of 38 helminth species found in saigas, 36 were also found in sympatric livestock, highlighting the potential for helminth transmission between saigas and domestic ruminants [5]. In data-limited situations, the use of social and ecological information has proven useful in indicating the transmission of disease between saiga antelope and livestock, suggesting that a holistic approach considering social and ecological factors is essential for understanding helminth transmission dynamics [6]. Furthermore, the risk of helminth transmission between saiga antelope and domestic ruminants in Kazakhstan can challenge both saiga conservation and livestock production, emphasizing the importance of addressing helminth transmission for the conservation of saiga populations [7].

Based on the provided references, it is evident that saiga antelopes are susceptible to a variety of parasitic helminths, some of which are shared with domestic livestock. Post mortem examinations have revealed that a significant number of nematode species found in saiga antelopes have also been found in domestic livestock, indicating the potential for transmission of helminths between these populations [8]. Furthermore, the presence of specific nematode species, such as Nematodirus gazellae, has been observed in saiga antelopes, highlighting the susceptibility of saigas to these parasites [9, 2]. Studies have also emphasized the potential for the transmission of a wide range of parasitic helminths between saigas and domestic ruminants, particularly due to the extensive grazing of saiga antelopes on livestock pasture [10]. The overlap in helminth species between saigas and domestic livestock underscores the importance of understanding and addressing helminth transmission dynamics for the conservation of saiga populations and the management of livestock production in shared habitats [8]. The presence of Moniezia expansa, a specific helminth, has been identified in saiga antelopes, further highlighting the susceptibility of saigas to parasitic infections and the potential for transmission between saigas and domestic ruminants [11].

Moniezia expansa is a cestode parasite that commonly affects ruminants such as sheep, goats, and cattle [12]. While the majority of the literature focuses on domestic livestock, there is evidence of Moniezia expansa infection in wild ruminants as well. A study on the gastrointestinal parasite infections in the Great Wildebeest Migration reported the presence of Moniezia expansa in wildebeests [13]. Additionally, a study on the prevalence of gastrointestinal parasitic helminths in Himalayan goral found a moderate prevalence of Moniezia expansa [14]. These findings suggest that Moniezia expansa can also impact wild ruminant populations. The prevalence and impact of Moniezia expansa in wild animals are important considerations for wildlife conservation and management. Understanding the epidemiology and potential effects of Moniezia expansa in wild ruminants is crucial for developing effective control and prevention strategies. Further research focusing on the prevalence, genetic characterization, and potential impact of Moniezia expansa in wild ruminant populations is warranted to better understand and mitigate the effects of this parasite on wildlife.It has been extensively studied in various contexts, including its prevalence in different regions and its genetic characterization [15-24]. Studies have also focused on the morphological and molecular characterization of Moniezia species, including Moniezia expansa, to distinguish them from other related species [25-27]. Furthermore, research has been conducted on the neuropeptides and regulatory peptides present in Moniezia expansa, shedding light on its physiological and biochemical aspects [28-30].

The prevalence of Moniezia expansa has been reported in various countries, including Egypt, Senegal, Ethiopia, Vietnam, and Myanmar, highlighting its wide distribution and impact on livestock [15-18]. Additionally, genetic markers have been utilized to distinguish Moniezia expansa from other related species, indicating the importance of accurate identification for effective control and management strategies [25].

Moreover, the ultrastructural and molecular studies have provided insights into the embryonic envelope formation and genetic relationships of Moniezia expansa, contributing to a better understanding of its developmental biology and evolutionary history [31,32]. Furthermore, the development of PCR methodology for the identification of Moniezia species has facilitated accurate and efficient species-level diagnosis, particularly in the context of mixed infections [15].

Overall, the extensive research on Moniezia expansa encompasses its prevalence, genetic characterization, neuropeptides, morphological and molecular identification, and embryonic development. These studies collectively contribute to a comprehensive understanding of the biology, epidemiology, and control of Moniezia expansa, a significant parasite of economic importance in livestock.

Materials and Methods.This paper describes the pathanatomical picture in the organs and tissues of emaciated saigacalves, whichalsodiedas a result of the mortality of saigas during the calving period. In areas of mass migration of saigas in the Janybek district of West Kazakhstan region.

The study was conducted in the pathology laboratory of the High School of Veterinary Clinical Sciences, Institute of Veterinary Medicine and Animal Husbandry, Zhangir Khan West Kazakhstan Agrarian and Technical University (Uralsk, Kazakhstan). A post-mortem examination of fallen saigas was carried out using the Shore method [33].

A pathological anatomical dissection was done on each saiga corpse, and protocols were created. The disease was difficult to diagnose because it took into account the epizootic situation, the clinical symptoms, and the findings of parasitological and necropsy research. The findings of pathological, anatomical, and parasitological investigations supported the diagnosis.

Results and discussion. Moniezia in festation causes serious functional and pathological changes insaigas. Monieziosis causes growth and develop mental retardationin saiga calves and, a thigh infestation rates, leads to their death. In lambs there is a different form of course of moniosiosis, which is associated with the fatness of animals, the intensity of infection. The acute form is characterized by lethargy, refusal to feed, thirst, severediarrhea, toxicosis and nervousness, weightloss, and high mortality of diseased saigas (Figure1).

Figure 1 – The death of sick saigas

In the mild form of the disease, saigas have a decreased appetite, thirst, poor mobility and lagging behind the herd. If appropriate measures are not taken, this form becomes toxic, with saigas refusing feed, losing weight, severediarrhea, frequent lying down, long periods ofstandingin one place, moaning, intensethirst, and circular movements. Liquid feces stains the lower part of the tail and hind limbs. Sick saigas can not get up without assistance and die of severe exhaustion and toxicosis.

Fragments of monisiosis were found during fecal sampling from the rectum (Figure 2).

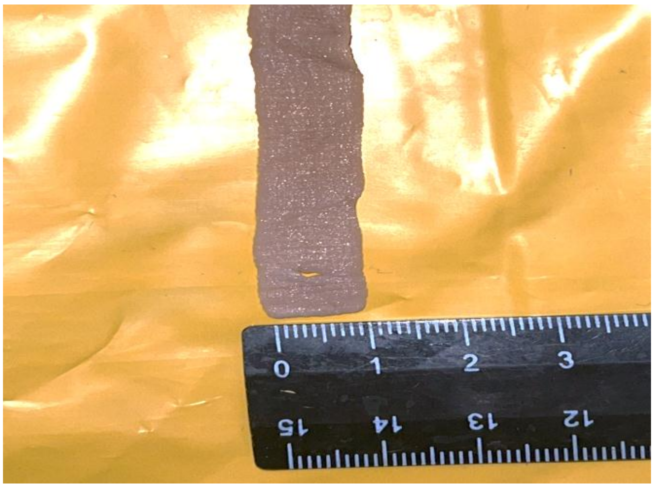

Figure 2 – Fragments of monisiosis

The necropsy of the sick saigas revealed that the animals were malnourished and afflicted with moniesiosis (Figure3).Visible manifestations included subcutaneous mucus and pale mucous membranes, along with sacral congestion in the abdominal cavity. Furthermore, mild reddening of the mouth and eye mucous membranes was observed.

Figure 3 – The necropsy of the sick saigas

Peripheral lymph nodes, including those beneath the jaw, anterior to the scapula, and inguinal lymph nodes, were slightly enlarged, squishy, and pale red, with reduced subcutaneous fat.

Skeletal muscles exhibited a pale pink color, soft texture, and intact fibrous structure, while the tongue appeared softer with a light pink color and indistinct fiber structure. Additionally, blood was present in the larynx's mucous membranes and the tracheal cavity contained a white clump of foamy liquid.

The lungs appeared larger in size, pink in color, with blood-filled blood vessels, dough-like consistency, and emphysema affecting the upper lobes.

The heart displayed enlargement, with tiny hemorrhage foci beneath the epicardium, stretched ventricles, heterogeneous myocardium, and cavities filled with liquid blood.

The liver and gallbladder were slightly enlarged, with freely flowing blood and bile, respectively.

Kidneys were larger, darker, and softer, with less accurate internal depiction.

The stomach contained minimal food and exhibited creased and enlarged mucosal membranes. The small intestine showed swollen mucous membranes with banded hemorrhages, while the large intestine displayed enlargement and reddening of the mucous membrane lining. Sebaceous lymph nodes were slightly larger and light gray in color, with a wet surface and indistinct internal picture.

The spleen was pink-brown in color, not enlarged, with a uniform internal pattern and minimal scraping.

The pancreas was slightly enlarged, edematous, and swollen, with blood present in blood vessels and banded hemorrhage foci beneath the capsule.

The bladder exhibited wrinkles and an absence of urine, along with spotted hemorrhage foci, while the brain's soft membrane was enlarged, with full blood vessels and a swollen cortex.

Infections with Moniezia expansa cause animal deaths, but they can cause economic losses in addition to other consequences, such as decreased growth rate [34, 35]. Infections are not unusual, and young animals are most vulnerable to infection and may also be the most affected by disease-related complications [36]. The creation of control mechanisms that might enable a decrease in these animals' infections could improve the herds' productivity indices.

Conclusion.The comprehensive necropsy findings on the sick saiga antelopes reveal a profound and systemic deterioration in health, primarily attributed to moniesiosis and malnutrition. These animals exhibited a myriad of pathological changes across various organ systems, indicative of severe physiological compromise. From the respiratory system to the gastrointestinal tract, cardiovascular system, renal system, and neurological system, no aspect of their physiology seemed unaffected. The presence of subcutaneous mucus, pale mucous membranes, sacral congestion, enlarged lymph nodes, and altered tissue textures underscore the extensive nature of the disease process. Additionally, findings such as blood in the larynx, enlarged heart with hemorrhage foci, swollen pancreas, and cerebral swelling further emphasize the severity of the condition. The combination of these abnormalities points towards a complex interplay of factors contributing to the decline in the saiga antelopes' health, likely involving both infectious and non-infectious agents. Furthermore, the observed alterations in organ morphology and function highlight the urgent need for comprehensive research and conservation efforts to better understand and mitigate the factors driving the decline of these vulnerable species. By elucidating the underlying mechanisms and risk factors associated with moniesiosis and its consequences, we can develop targeted interventions aimed at preserving the health and sustainability of saiga antelope populations and their ecosystems.

АННОТАЦИЯ

Результаты некропсии больных антилоп сайгака демонстрируют сложный набор патологических изменений, свидетельствующих о серьезном ухудшении здоровья. Пораженные мониезиозом, эти истощенные животные имеют обширные отклонения в различных системах органов. В частности, заметны подкожная слизь и бледные слизистые оболочки, а также застойные явления в брюшной полости. Периферические лимфатические узлы увеличены, сдавлены и бледно-красные, а подкожный жир уменьшен. Скелетные мышцы имеют бледно-розовый цвет и мягкую консистенцию, а язык выглядит более мягким с неопределенной структурой волокон. Наличие крови в гортани и полости трахеи, а также пенистой жидкости в легких свидетельствует о нарушении дыхания, осложненном эмфиземой, поражающей верхние доли легких. Сердечные аномалии включают увеличенное сердце с очагами кровоизлияний, растянутые желудочки и неоднородность миокарда. Увеличение печени и желчного пузыря в сочетании с почечными аномалиями еще больше указывают на системный компромисс. В желудочно-кишечном тракте наблюдаются отек слизистой, кровоизлияния и газонаполненная дистензия, особенно в желудке и тонком кишечнике. Сальные лимфатические узлы увеличены и имеют нечеткие внутренние признаки, а у селезенки наблюдаются минимальные аномалии. Отмечается отек поджелудочной железы, очаги кровоизлияний и кровотечения в мочевом пузыре, а также отек головного мозга и закупорка кровеносных сосудов в коре головного мозга. Эти данные свидетельствуют о мультисистемном заболевании, которое, вероятно, способствовало недоеданию и ухудшению состояния здоровья животных. Дальнейшее изучение этиологии и лечения этого заболевания необходимо для сохранения дикой природы и понимания динамики здоровья экосистемы.

ТҮЙІН

Ауру киіктердің некропсиясының нәтижелері денсаулықтың нашарлауын көрсететін патологиялық өзгерістердің күрделі жиынтығын көрсетеді. Мониезиозбен залалданған шбұл жануарлардың әртүрлі орган жүйелерінде айтарлықтай ауытқулары бар. Атап айтқанда, тері астындағы қабаттаржәне бозғылт шырышты қабаттар, сондай-ақ іштің тоқырауы байқалады. Перифериялық лимфа түйіндері үлкейген, қысылған және бозғылт қызыл, ал тері астындағы май азаяды. Қаңқа бұлшықеттері бозғылт қызғылт түсті және жұмсақ консистенцияға ие, ал тілі талшық құрылымымен жұмсақ көрінеді. Көмей мен трахея қуысында қанның, сондай-ақ өкпеде көбікті сұйықтықтың болуы өкпенің жоғарғы бөліктеріне әсер ететін эмфиземамен асқынған тыныс алудың бұзылуын көрсетеді. Жүрек ауытқуларына қан кету ошақтары бар көлемі үлкейген жүрек, созылған қарыншалар және миокард гетерогенділігі жатады. Бауыр мен өт қабының ұлғаюы бүйрек ауытқуларына әкеледі. Асқазан-ішек жолында шырышты қабықтың ісінуі, қан кетулер және газ толтырылған дистензия, әсіресе асқазан мен аш ішекте байқалады.Май лимфа түйіндері үлкейіп, ішкі белгілері анық емес, көкбауырда минималды ауытқулар бар. Ұйқы безінің ісінуі, қуықтағы қан кету және оның ошақтары, сондай-ақ мидың ісінуі және капилярлықан тамырларының бітелуі байқалады. Бұл деректер дұрыс тамақтанбауға және жануарлардың денсаулығының нашарлауына ықпал еткен көп жүйелі ауруды көрсетеді. Бұл аурудың этиологиясы мен емдеу, одан әрі зерттеу жабайы табиғатты сақтау және экожүйенің динамикасын түсіну үшін қажет.

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THE MORPHOLOGICAL AND BIOCHEMICAL BLOOD PARAMETERS OF SHEEP AFFECTED BY MASTITIS

Annotation

Mastitis in sheep causes significant harm both to animal health and to the sheep farming economy. Treatment and prevention of mastitis require substantial investment in acquiring medicinal products, antiseptics, veterinary services, and other necessary materials. Morphological and biochemical blood parameters can serve as important indicators for diagnosing mastitis in sheep. The article presents the results of a study on the morphological and biochemical blood parameters of sheep affected by various forms of mastitis. The investigation of morphological and biochemical blood parameters in acute catarrhal, serous, and subclinical forms of mastitis in sheep revealed characteristic changes in blood before and after treatment. In cases of acute catarrhal, serous, and subclinical mastitis, a decrease in the number of erythrocytes and hemoglobin levels, an increase in leukocyte count, a decrease in glucose levels, an increase in total protein, and a decrease in albumin levels were observed. For treatment, Kalankhin preparation was used, which was rubbed into the udder. Additionally, the intracisternal administration of a physiologic saline solution, preheated to 37°C, at a dose of 20 ml with a concentration of 600 mg/L, was performed for three days. After treatment, blood parameters returned to physiological norms, where an increase in the number of erythrocytes and hemoglobin levels, a decrease in leukocyte count, an increase in glucose levels, a decrease in total protein, and an increase in albumin levels were observed. These changes indicate the restoration of metabolism, a reduction in the inflammatory process, and an improvement in metabolic exchange after treatment. Thus, the conducted study showed that acute catarrhal, serous, and subclinical forms of mastitis in sheep lead to shifts in morphological and biochemical blood parameters. After treatment, changes in parameters indicate a positive trend in restoring homeostasis and animal health. The use of environmentally friendly and safe preparations helps increase the effectiveness of treatment and the organism's resistance to diseases.