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Article

Clinical Signs of Pasteurellosis in Sheep

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Abstract: This article presents data on the clinical signs of pasteurellosis observed in small ruminants (sheep) under natural conditions across four districts of the Bukhara region, Uzbekistan. It details findings regarding the acute course of the disease—characterized by a sudden, sharp rise in body temperature and increased pulse and respiratory rates—as well as the subacute course, noting changes in rumination and the appearance and color of the mucous membranes at natural orifices. A comparative analysis was conducted on the clinical signs of sheep affected by spontaneous pasteurellosis in both private and commercial farms. The relationship between the observed clinical signs and morphological changes in internal organs—particularly the respiratory system—was scientifically substantiated using modern methods. The article also outlines modern clinical examination procedures and presents two scientific conclusions regarding the characteristic clinical signs of pasteurellosis in sheep.

Keywords: hyperemia, pasteurellosis, spontaneous, atrophy, anemia, acute, chronic, intoxication, conjunctiva, resistance, reproductive, anthropogenic, auscultation, atony, toxic, enzyme.

1. Introduction

Special attention is being paid globally to the development of sheep farming and the provision of food products derived from it to the population. Clinical signs play a crucial role in determining treatment measures and in the pathomorphological diagnosis of the disease. The rapid development of this sector based on innovative technologies is significantly hindered by the adverse effects of various infectious and non-infectious pathologies, as well as ecological and anthropogenic factors [1]. The widespread occurrence of certain infectious diseases among small ruminants—specifically pasteurellosis in sheep—leads to substantial economic losses due to sharply reduced productivity, stunted growth, or mortality. Therefore, it is essential to develop diagnostic and preventive methods based on a study of the clinical signs and progression characteristics of this disease [2].

Pasteurellosis is a bacterial disease causing economic losses in sheep; it manifests as respiratory disease, bronchopneumonia, and, in some cases, septicemia. Disease forms associated with Mannheimia haemolytica, Pasteurella multocida, and Bibersteinia trehalosi are of particular significance in sheep [3]. Modern literature notes the frequent occurrence of M. haemolytica and P. multocida in cases of bronchopneumonia among young and growing sheep, as well as the exacerbation of the disease by factors such as stress, transport, weaning, dietary changes, and the mixing of animals [4].

Veterinary research has also addressed the prevalence of pasteurellosis among sheep and lambs, along with its pathomorphological and clinical aspects, within the context of

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conditions in Uzbekistan. Usmanov and Elmurodov published a literature review dedicated to the clinical and pathomorphological diagnosis of dictyocaulosis and pasteurellosis in sheep [5].

Clinical signs vary in onset depending on the form of the disease and the causative agent. In post-stress respiratory pasteurellosis, symptoms sometimes appear very rapidly; in other instances, respiratory failure develops in older animals within a few days following the stress event. In acute outbreaks, the clinical course is brief, potentially resulting in either recovery or death. The disease generally follows a more severe course in young animals [6].

Respiratory distress may intensify following physical exertion. In some clinical observations, severe dyspnea has been noted to occur alongside expiratory grunting [7].

In this context, identifying ovine pasteurellosis, establishing an accurate diagnosis, and studying the clinical signs of naturally occurring disease—specifically distinguishing between the acute and subacute forms—are of significant scientific, theoretical, and practical importance.

2. Materials and Methods

Sheep suffering from pasteurellosis—both those kept by the local population and those in commercial farms across the Peshku, Shofirkon, Vobkent, and Rometan districts of the Bukhara region—were examined using modern clinical and statistical methods.

Functional analysis revealed specific changes in the respiratory rhythm, type, and breathing parameters of the sick sheep. The heartbeat was assessed at a 2–4 cm^2 site on the left side of the animal, corresponding to the fourth rib. The heartbeat was found to be diffuse—meaning the pulse center (*epicenter*) was indistinct, and the sound was audible across the entire heart area. This method also detected the presence of exudate in the pericardium and pleura; systole occurred against the accumulated exudate rather than directly against the heart wall. Percussion of the rumen from the right side, at the paralumbar fossa, yielded a dull sound. Auscultation revealed sharp noises and fluctuations (*rising and falling*) in the paralumbar fossa. The auscultation findings confirmed the rumen contractions previously detected via palpation. The intestines of the sick animals were also examined using palpation, percussion, and auscultation.

3. Results and Discussion

The clinical signs of ovine pasteurellosis have been insufficiently studied; specialized literature lacks adequate information on the subject, and no research has been conducted specifically on the acute and chronic forms of the disease [8].

In light of this, we conducted clinical observations on sheep infected with pasteurellosis, examining the general condition, body temperature, heart and respiratory rates, and various other clinical indicators in animals suffering from the acute and subacute forms of the disease [9].

Pasteurellosis is an infectious disease of sheep that manifests in acute and subacute forms. We studied the clinical signs of the disease in 32 sheep with the acute form and 26 with the subacute form—all naturally infected—across private and commercial farms in the following villages: Kalasang, Chuqurak, Chibog‘oni, and Chalmagadoy (*Peshko‘ district*); Bog‘iafzal, Denav, and Do‘rmon (*Shofirkon district*); Navbahor, Shirin, and Kosari (*Vobkent district*); and Piyozkor, Sho‘rcha, and Temirxo‘ja (*Rometan district*). Our studies revealed that the initial stage of the disease was characterized by partial clinical signs, including lethargy, loss of appetite, and emaciation. The acute phase of the disease lasted between 6 and 18 days. Depending on the pathogen's load and viability and the host's resistance, this acute form proved particularly dangerous, resulting in the death of many sheep [10].

The acute form of the disease is highly dangerous and causes significant mortality among sheep. Sheep that survive the acute phase progress to the subacute form. The subacute form is more prolonged and leads to reduced productivity, stunted growth and

development, impaired reproductive function, and, in some cases, abortion. In the acute form of the disease, the body temperature of the sheep averaged 39.5–41.5°C—that is, 1–1.5°C higher than in healthy sheep (*normal range: 38.5–40°C*)—while the pulse rate and respiratory rate were elevated. The mucous membranes of the eyes, mouth, and nose appeared whitish-gray; rumination frequency decreased to 2–4 contractions per 5 minutes (*compared to the norm of 8–12*); and the nasal cavity, nostrils, and surrounding wool were soiled with a mucous, frothy discharge. The sheep were severely emaciated and lacked appetite—refusing feed due to atony of the forestomachs—and mortality was observed among those exhibiting pronounced clinical signs [11].

In cases of spontaneous subacute pasteurellosis, the following clinical signs were identified: severe emaciation resulting from the atrophy of subcutaneous striated muscles and adipose tissue, anemia of the mucous membranes, bronchopneumonia, and—in some sheep—localized edema in the head and chest regions [12]. During the acute phase of pasteurellosis, the animals exhibited restlessness and became unresponsive or less sensitive to external stimuli; body temperature rose 0.5–1.5°C above normal, heart rate increased by 18–32 beats per minute, and the respiratory rate rose slightly—by 6–8 breaths—reaching 22–38 breaths per minute [13].

Three to four days after the onset of the disease, signs of respiratory system dysfunction became apparent: the sheep's appetite declined and eventually disappeared completely, and they would lie down instead of grazing. Labored breathing was observed, and in some cases, diarrhea caused soiling of the hindquarters—specifically the thighs, lower legs, and rump—with feces [14].

Due to the systemic intoxication occurring in the animals during this period, clinical signs such as extreme lethargy and hyperemia of the conjunctival mucous membranes were observed. During examinations in the Kalasang, Chuqurak, Chibog'oni, and Chalmagadoy villages of the Peshko' district, it was found that the body temperature of 2- and 4-year-old sheep was 1–1.5°C above the physiological norm, and the heart rate exceeded the average physiological norm by 11–18 beats per minute (*the norm being 70–80 beats per minute*). Correspondingly, the respiratory rate was 6–9 breaths higher (the norm being 16–30 breaths per minute). Rumen contractions were found to have decreased to 5–7 per 5 minutes, compared to the normal 8–12 [15].

In the Bog'iafzal, Denav, and Do'rmon villages of the Shofirkon district, observations of 2-, 3-, and 5-year-old sheep showed body temperatures 1.2–2°C above the physiological norm, heart rates exceeding the average norm by 10.4–17.4 beats per minute, and respiratory rates correspondingly higher by 5.2–9.3 breaths per minute. The number of rumen contractions per 5 minutes was found to have dropped to 5–8. In the Navbahor, Shirin, and Kosari villages of the Vobkent district, the body temperature of 2-, 3-, and 6-year-old sheep was 1.1–1.9°C above the physiological norm, and the heart rate per minute exceeded the average physiological norm by 10.3–14.4 beats [16].

Our examination results revealed clinical changes in the respiratory tract—specifically, the presence of frothy exudate in the upper trachea—resulting from the toxic and allergic effects of pasteurellosis on the body[17]. We found that in naturally infected sheep, these changes were closely linked to enzymatic secretory activity and were accompanied by clinical signs such as diarrhea, emaciation, edema, and other symptoms [18].

Table 1. Results of clinical examinations of sheep infected with pasteurellosis in the Peshku, Shofirkon, Vobkent, and Romitan districts of the Samarkand region.

Districts	Number of sheep	Age	Body temperature		Heart rate (pulse) per minute		Breathing rate Per minute		Large belly reduction in 5 minutes	
			standard	result	standard	result	standard	result	standard	result
Peshko'	3	2	38,5-40	41,5±0,5	70-80	95,5±10,4	16-30	36,5±4,5	8-12	6,5±1,5
	2	4	38,5-40	40,8±0,4	70-80	90,6±9,1	16-30	34,7±4,5	8-12	6,3±1,4
	2	4	38,5-40	40,7±0,5	70-80	89,7±8,7	16-30	34,2±4,5	8-12	6,7±1,2

Districts	Number of sheep	Age	Body temperature		Heart rate (pulse) per minute		Breathing rate Per minute		Large belly reduction in 5 minutes	
			standard	result	standard	result	standard	result	standard	result
Shofirkon	2	3	38,5-40	41,2±0,6	70-80	92,6±9,5	16-30	35,5±4,1	8-12	6,3±1,7
	3	2	38,5-40	41,6±0,5	70-80	96,4±10,5	16-30	37,3±5,4	8-12	6,8±1,4
	2	5	38,5-40	40,5±0,7	70-80	89,4±8,7	16-30	33,9±4,5	8-12	6,1±1,5
Vobkent	2	3	38,5-40	40,6±0,5	70-80	90,6±8,8	16-30	34,6±3,8	8-12	7,5±1,3
	1	2	38,5-40	41,3±0,5	70-80	93,4±8,4	16-30	35,2±4,1	8-12	7,4±1,3
	3	6	38,5-40	40,5±0,7	70-80	89,3±7,7	16-30	33,8±4,5	8-12	5,9±1,3
Romitan	2	4	38,5-40	40,9±0,6	70-80	91,4±8,8	16-30	35,9±4,5	8-12	6,2±1,5
	2	5	38,5-40	40,6±0,6	70-80	89,6±8,7	16-30	34,1±4,5	8-12	6,1±1,8
	3	3	38,5-40	41,1±0,5	70-80	93,2±8,8	16-30	35,1±4,4	8-12	6,2±1,7

4. Conclusions

In the acute form of ovine pasteurellosis, the following were observed: an increase in body temperature; a 6- to 8-fold increase in respiratory rate compared to normal; a reduction in rumen contractions to 2–4 times per 5 minutes; and visible mucous membranes showing initial hyperemia followed by anemia. In subacute pasteurellosis, clinical signs included rapid emaciation; soiling of the nasal cavity, nostrils, and surrounding wool with a mucous, frothy mass; and the development of edema in the head and sternal regions.In sheep aged 2–6 years, it was determined that body temperature exceeded the average physiological norm by 1.1–2°C, heart rate increased by 10.3–18 beats/minute, and respiratory rate increased by 4.8–9.3 breaths/minute, while rumen contractions decreased from the normal 8–12 times to 4–8 times. These changes indicate the presence of hyperthermia, increased cardiac and respiratory activity, and suppressed ruminal motility across sheep of various ages. Variations in clinical indicators across age groups demonstrate that the disease process manifests differently depending on the animal's age.

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