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COMPARATIVE ASSESSMENT OF HEMATOLOGIC INDICATORS AT SHEEP DURING FOOTROT TREATMENT

Annotation

The results of comparative research of blood hematologic indicators at sheep at treatment by different schemes to various stages of pathological process development of footrot. The conducted researches demonstrate that analyzing distinctions between groups on morpho-biochemical situation of blood the best indicators were in the second experimental group where sick sheep in the initial and average stage were treated intra-arterial by penicillin in a dose of 200 thousand units.

Keywords: treatment of footrot at sheep, comparative assessment of footrot treatment, blood hematologic indicators at footrot treatment, sheep breeding.

Introduction

The feature of pathological process course at footrot which is characterized by affection of epidermis facial layer also causes treatment principles of this infectious disease at sheep. Conservative schemes of treatment at footrot were consolidated to the application of antibacterial, disinfecting and reparative means by direct contact of medicamentous means with damage areas [1,2].

Main issue before application of antibacterial and disinfectants and treatment methods at footrot is careful surgical processing of the struck hooves that promotes the best penetration of medicines and direct influence on the infectious agent topically. Thus according to foreign and domestic authors, the basis of footrot treatment is made by careful surgical processing which is reduced to removal of exfoliated horn, excision of necrotic sites of hoof skin basis and imposing of unpadded plaster casts which are changed in a week before recovery [3,4,5,6].

In recent years new theoretical and clinical data on pathogenetic therapy of animals were saved up in veterinary science and practice. Pathogenetic therapy in a complex with other types of therapy of footrot treatment, especially with etiotherapy, began to be applied widely in clinical practice as very effective method of treatment and prevention of not only noncontagious, but also some infectious diseases of animals [7].

Blood composition is one of the most important biological features of animal's organism reflecting biological and chemical processes happening in it, its physiological state, health and interrelation with productivity [8].

The purpose of our research was a comparative assessment of some hematologic indicators at sheep at footrot treatment in different stages of pathological process development.

Hematologic monitoring of sick animals in the period of having footrot naturally in various farms have shown that symptom complex at animals is not identical and inconstant.

Experimental tests, depending on hooves prevalence degree at sheep were carried out by us for the determination of comparative efficiency of various schemes of footrot treatment at various degree of prevalence.

Materials and methods

The material for carrying out the first experimental test on treatment was 15 sheep diseased with footrot in the initial stage of disease development taken from "Izdenis" LLP from Taskalinsky district. Animals were conditionally divided into three groups up to 5 heads.

When carrying out tests, antibiotic NITOX-200 in a dose of 1 ml/10 kg of animal's mass was injected to the sick animal of the first group with the medical purpose. Active ingredient

(component) of NITOX-200 is oxytetracycline, produced by *Streptomyces rimosus*. Intra-arterial injection of 5-8 ml of 0,5% novocaine solution in the mix with benzylpenicillin sodium salt of 200000 units was applied to the sick animals of the second group on the basis of studying projective anatomy of main arteries. Intra-arterial injection on a thoracic limb was carried out to the area of average third on a medial surface of metacarpus (superficial medio-palmarny metacarpal artery); needle injection point on a hind limb was in an average third on metatarsus dorsal area (dorsal metatarsal artery). At the treatment of footrot in the third group of sick animal, bicillin-3 antibiotic, in a dose of 10 thousand units/1 kg with of 3 days interval was applied. The drug was injected intramuscularly in the area of hip internal surface. Mechanical processing of hooves and washing of the affected area was carried out at the same time by 10% of formalin solution before treatment in all groups of sick animals; animals were in inclose keeping.

Morphological composition of blood was examined by hematologic VS-2800Vet analyzer; biochemical researches of blood sera of test and control sheep were carried out by "Chem Well" biochemical analyzer in biotechnology laboratory of scientific research institute of biotechnology and environmental management of Zhangir khan WKATU.

Research results

Analyzing some indicators of hematologic composition of blood at sheep at footrot treatment in the initial extent of development of pathological process, it is possible to note that animals in 5 days after application of medicines in tests had a relative reduction of leucocytes in all studied groups $15,80 \pm 0,07 \cdot 10^9$ l, $14,55 \pm 0,08 \cdot 10^9$ l and $17,65 \pm 0,09 \cdot 10^9$ l that demonstrates strengthened increase of organism resistance which is clinically followed by temperature decrease, etc. At the same time, in the blood of these groups' animal we noted insignificant increase in amount of hemoglobin and erythrocytes, $96,7 \pm 0,22$ g/l, $112,6 \pm 0,37$ g/l, $82,48 \pm 0,40$ g/l and $7,24 \pm 0,06 \cdot 10^{12}$ l, $8,12 \pm 0,06 \cdot 10^{12}$ l, $5,42 \pm 0,05 \cdot 10^{12}$ l respectively that indicates increased organism resilience, caused by action of probationary medicines in the test (table-1). At the treatment in the initial degree of sheep footrot, the highest concentration of hemoglobin and erythrocytes content in blood serum was observed at animals of the second group $112,6 \pm 0,37$ g/l and $16,32 \pm 0,14 \cdot 10^{12}$ l respectively where sick animals were treated intra-arterial by benzylpenicillin in a dose of 200 thousand units per one injection.

From table 1 it is visible that biochemical indicators in animals' blood at treatment in the initial stage of footrot pathological process development have also some differences. In particular, there is an increase in general protein and iron level in blood serum in all groups of sick animals that demonstrates improvement of sick animals' condition and reduction of alpha-amylase, bilirubin and calcium level in blood serum. In a percentage ratio the level of general protein at animals in the second group was higher than in other groups for 2,31% and 6,20% respectively and the content of alpha-amylase and bilirubin was lower than in the first group for 2% and 2,63% respectively and in comparison with the third group for 6,19% and 3,91%.

Table 1 – Comparative assessment of hematologic blood test in 5 days at treatment of sheep in the initial stage of footrot, (n=5)

Parameters	Ways and application means at treatment		
	intra-muscular injection of NITOX-200 in a dose 1 ml/10 kg per one injection	intra-arterial injection of penicillin in a dose of 200 thousand units per one injection	intra-muscular injection of bicillin-3 in a dose of 10 thousand units/1 kg
Leucocytes, 10^9 l	$15,80 \pm 0,07$	$14,55 \pm 0,08$	$17,65 \pm 0,09$
Erythrocytes, 10^{12} l	$7,24 \pm 0,06$	$8,12 \pm 0,06$	$5,42 \pm 0,05$

Hemoglobin concentration, g/l	96,7±0,22	112,6±0,37	82,48±0,40
Thrombocytes, 10 ⁹ l	203,8±0,60	245,0±1,40	188,4±1,50
Alpha-amilase, mg/l	2,63±0,01	2,58±0,02	2,75±0,01
Total protein, g/l	80,4±0,35	82,3±0,20	77,2±0,40
Total bilirubin, mg/%	0,61±0,02	0,45±0,01	0,74±0,01
Ferrum, mcg/%	79,2±0,60	81,5±0,30	69,5±0,20
Calcium, mg/%	13,22±0,55	11,26±0,20	14,46±0,30

Further for the 10th day of footrot treatment at sheep during the research of blood serum there was noted some increase in amount of hemoglobin and erythrocytes in blood, 106,3±0,30 g/l, 118,1±0,35 g/l, 88,0±0,60 g/l and 8,38±0,21 10¹² l, 9,10±0,20 10¹² l, 7,10±0,13 10¹² l respectively, and reduction of leucocytes quantity 14,46±0,10 10⁹ l, 13,46±0,10 10⁹ l and 15,06±0,20 10⁹ l respectively, which occurred owing to the recovery of sick animals.. We didn't observe essential changes in biochemical indicators, and only ferrum indicators have slightly raised in all groups, which were 79,2±0,60 mg/%, 81,5±0,30 mg/% and 14,46±0,30 mg/% respectively (table - 2).

Table 2 – Comparative assessment of hematologic blood test in 10 days at treatment of sheep in the initial stage of footrot, (n=5)

Parameters	Ways and application means at treatment		
	intra-muscular injection of NITOX-200 in a dose 1 ml/10 kg per one injection	intra-arterial injection of penicillin in a dose of 200 thousand units per one injection	intra-muscular injection of bicillin-3 in a dose of 10 thousand units/1 kg
Leucocytes, 10 ⁹ l	14,46±0,10	13,46±0,10	15,06±0,20
Erythrocytes, 10 ¹² l	8,38±0,21	9,10±0,20	7,10±0,13
Hemoglobin concentration, g/l	106,3±0,30	118,1±0,35	88,0±0,60
Thrombocytes, 10 ⁹ l	224,6±3,00	246,2±1,00	203,6±0,70
Alpha-amilase, mg/l	2,44±0,01	2,33±0,006	2,67±0,005
Total protein, g/l	81,0±0,50	83,3±0,50	78,5±0,10
Total bilirubin, mg/%	0,53±0,005	0,43±0,003	0,69±0,006
Ferrum, mcg/%	86,3±0,30	90,0±0,60	77,0±0,40
Calcium, mg/%	12,58±0,16	10,14±0,21	13,12±0,11

In a percentage ratio the level of total protein at animals in the second group was higher than in other groups for 2,31% and 6,20% respectively and the content of alpha-amilase and bilirubin was lower than in the first group for 2% and 2,63% respectively, and in comparison with the third group for 6,19% and 3,91%.

Eventually, for the 15th day of researches in morpho-biochemical indicators of blood serum in the initial stage at sick animals we didn't note change between groups which generally was within physiological norm or slightly higher (table 3).

Table 3 – Comparative assessment of hematologic blood test in 15 days at treatment of sheep in the initial stage of footrot, (n=5)

Parameters	Ways and application means at treatment		
	intra-muscular injection of NITOX-200 in a dose 1 ml/10 kg per one injection	intra-arterial injection of penicillin in a dose of 200 thousand units per one injection	intra-muscular injection of bicillin-3 in a dose of 10 thousand units/1 kg
Leucocytes, $10^9/l$	12,84±0,07	12,24±0,10	13,66±0,10
Erythrocytes, $10^{12}/l$	10,30±0,10	12,56±0,30	10,0±0,30
Hemoglobin concentration, g/l	118,8±1,00	129,8±1,00	107,6±1,50
Thrombocytes, $10^9/l$	237,3±1,50	249,0±2,00	219,6±1,80
Alpha-amylase, mg/l	2,38±0,06	2,29±0,07	2,55±0,08
Total protein, g/l	80,3±0,10	83,6±0,15	78,7±0,15
Total bilirubin, mg/%	0,47±0,003	0,41±0,002	0,53±0,005
Ferrum, mcg/%	88,16±0,20	91,6±0,30	82,8±0,60
Calcium, mg/%	10,42±0,22	8,30±0,18	11,84±0,15

Analyzing indicators of hematologic composition of blood at sheep at footrot treatment in an average stage of pathological process development it is possible to note that in 5 days after intra-arterial injection of penicillin in a dose of 200 thousand units per one injection there was a considerable reduction of leukocytes in the second group in blood serum on the average of $14,62 \pm 0,15 \cdot 10^9/l$ that demonstrates effective local effect of the medicine. At the same time, in blood of this group animals we also noted significant increase in amount of hemoglobin and erythrocytes in blood, $111,6 \pm 0,30$ g/l and $12,56 \pm 0,30 \cdot 10^{12}/l$ respectively, that gives evidence of sharp increase of organism resistance at sick animals. During the treatment in an average stage of footrot at sheep the highest concentration of platelets content in blood serum was observed at animals of the second group, $249,0 \pm 2,00 \cdot 10^9/l$ respectively, where sick animals were treated intra-arterial by benzylpenicillin in a dose of 200 thousand units per one injection. In a percentage ratio the level of platelets in blood at animals in the second group was higher than in other groups for 12,8% and 23,3% respectively and the content of hemoglobin and erythrocytes was also higher than in the first group for 16,9% and 19,9% respectively, and in comparison with the third group for 27,2% and 26,6% (table - 4).

From table 4 it is visible that biochemical indicators in blood of animals in 5 days after treatment of average stage of footrot pathological process development have essential differences as well. In particular in blood serum in all groups of sick animals there is an increase in the level of total protein and ferrum, what demonstrates condition improvement of sick animals and strong reduction of alpha-amylase level, bilirubin and calcium in blood serum.

Table 4 – Comparative assessment of hematologic blood test in 5 days at treatment of sheep in an average stage of footrot, (n=5)

Parameters	Ways and application means at treatment		
	intra-muscular injection of NITOX-200 in a dose 1 ml/10 kg per one injection	intra-arterial injection of penicillin in a dose of 200 thousand units per one injection	intra-muscular injection of bicillin-3 in a dose of 10 thousand units/1 kg
Leucocytes, $10^9/l$	15,26±0,25	14,62±0,15	15,70±0,20
Erythrocytes, $10^{12}/l$	8,64±0,12	10,60±0,18	7,84±0,15
Hemoglobin concentration, g/l	92,7±0,50	111,6±0,30	81,30±0,30
Thrombocytes, $10^9/l$	199,0±2,00	228,0±1,50	175,0±1,80
Alpha-amylase, mg/l	5,76±0,15	4,96±0,10	6,56±0,10
Total protein, g/l	79,8±0,30	81,2±0,20	75,9±0,20
Total bilirubin, mg/%	0,75±1,10	0,64±1,00	0,76±1,00
Ferrum, mcg/%	88,6±2,00	97,0±2,50	80,2±0,80
Calcium, mg/%	16,0±0,20	13,0±0,20	14,4±0,20

Thus, the content of total protein has increased in the second experimental group after intra-arterial application of penicillin in a dose of 200 thousand units for 27,78 g/l (34,22%), ferrum – for 32,93 mcg/% (33,95%). The reduction of alpha-amylase was equal in the second group for – 3,10 mg/l (39,47%), bilirubin for – 0,99 mg/% (59,74%) and calcium for – 9,15 mg/% (41,31%).

The data obtained by us and its analysis confirm the influence of tested medicines on a biochemical condition of blood. At the same time comparing distinctions between groups on a biochemical condition of blood, the best indicators were in the second experimental group where sick sheep in an average stage were treated intra-arterial by penicillin in a dose of 200 thousand units.

Table 5 – Comparative assessment of hematologic blood test in 10 days at treatment of sheep in an average stage of footrot, (n=5)

Parameters	Ways and application means at treatment		
	intra-muscular injection of NITOX-200 in a dose 1 ml/10 kg per one injection	intra-arterial injection of penicillin in a dose of 200 thousand units per one injection	intra-muscular injection of bicillin-3 in a dose of 10 thousand units/1 kg
Leucocytes, $10^9/l$	13,68±0,13	13,20±0,15	14,1±0,18
Erythrocytes, $10^{12}/l$	8,30±0,15	11,20±0,25	8,18±0,08
Hemoglobin concentration, g/l	103,6±1,50	114,0±2,00	96,6±1,00
Thrombocytes, $10^9/l$	220,0±5,00	270,0±7,00	212,0±7,00
Alpha-amylase, mg/l	4,02±0,15	3,24±0,20	4,76±0,15
Total protein, g/l	80,4±0,30	81,6±0,10	76,8±0,20
Total bilirubin, mg/%	0,51±0,02	0,34±0,01	0,54±0,02
Ferrum, mcg/%	91,8±0,50	104,4±1,00	88,2±0,70
Calcium, mg/%	13,4±0,30	11,0±0,20	11,8±0,20

Analyzing intergroup features of morphological composition of blood in 10 days after treatment at an average stage of footrot pathological process development at sheep we note that hemoglobin, erythrocytes and platelets content in blood was higher in the second experimental group $114,0 \pm 2,00$ g/l, $11,20 \pm 0,25 \cdot 10^{12}$ l, $270,0 \pm 7,00 \cdot 10^9$ l (table - 5) respectively. Content of hemoglobin, erythrocytes and platelets in the first group was less than in the second experimental group for 10,4 g/l (9,13%), $2,90 \cdot 10^{12}$ l (26,97%), $50,00 \cdot 10^9$ l (18,52%) respectively and in the third group it was less than in the second one for 17,4 g/l (15,3%), $3,02 \cdot 10^{12}$ l (25,90%), $58,00 \cdot 10^9$ l (27,49%) respectively. Analyzing indicators of blood biochemical composition at sheep's treatment after footrot of average stage of pathological process development by different methods, it is possible to note that animals for the tenth day of treatment supervision had also an increase in the level of total protein and ferrum. On the average it was on the first group $80,4 \pm 0,30$ g/l and $91,8 \pm 0,50$ mkg/%, in the second group - $81,6 \pm 0,10$ g/l and $104,4 \pm 1,00$ mkg/% and in the third group $76,8 \pm 0,20$ g/l and $88,2 \pm 0,70$ mkg/% respectively; these indicators give evidence of organism resistance increase at animals after ten-day application of the tested medicine. In general, eventually, for the 15th day of researches in the dynamics of morpho-biochemical indicators of blood serum at average degree at sick animals we didn't observed essential distinctions between groups which generally were within physiological norm or slightly higher in the second experimental group.

Discussion of results

Discussing hematologic data obtained by us at the treatment of different degree footrot and its analysis confirm the influence of tested medicine on morpho-biochemical condition of blood. In particular in the initial stage of footrot pathological process development, there is an increase in total protein and ferrum level in blood serum in all groups of sick animals that demonstrates improvement of sick animals' condition and reduction of alpha-amylase, bilirubin and calcium level in blood serum. In a percentage ratio, the level of total protein at animals in the second group was higher than in other groups for 2,31% and 6,20% respectively, and the content of alpha-amylase and bilirubin was lower than in the first group for 2% and 2,63% respectively, and in comparison with the third group - for 6,19% and 3,91%. The increase in amount of hemoglobin and erythrocytes in blood is observed for the tenth day; essential changes are not observed in biochemical indicators, only ferrum indicators slightly increased in all groups. In a percentage ratio, the level of total protein at animals in the second group was higher than in other groups for 2,31% and 6,20% respectively, and the content of alpha-amylase and bilirubin was lower than in the first group for 2% and 2,63% respectively, and in comparison with the third group - for 6,19% and 3,91%. For the 15th day of researches in morpho-biochemical indicators of blood serum in the initial stage at sick animals we didn't observed change between groups which generally was within physiological norm or slightly higher.

At the treatment of footrot in the average stage of pathological process development it is possible to note that considerable reduction of leucocytes occurred in blood serum starting from the beginning of treatment after the application of penicillin intra-arterial injection in the second group in a dose of 200 thousand units that demonstrates effective local effect of the medicine. At the same time, in blood of animals of this group we also mentioned significant increase in amount of hemoglobin and erythrocytes in blood that give evidence of sharp increase of sick animals' organism resistance. Biochemical indicators in blood of animals in the beginning of treatment of the average stage of footrot pathological process development in all groups of sick animals there is an increase in the level of total protein and ferrum what demonstrates improvement of sick animals' condition and strong reduction of alpha-amylase, bilirubin and calcium level in blood serum.

In conclusion it is possible to state that for footrot treatment the increase in amount of hemoglobin, erythrocytes and platelets was mentioned at sheep at different stage of pathological process development that demonstrates substantial increase of organism resistance. At the same

time, we mentioned the decrease in amount of leucocytes in blood; all this give evidence of immune system increase at animals at medicine application. At the same time comparing distinctions between groups on morpho-biochemical condition of blood, the best indicators were in the second experimental group where sick sheep in the initial and average stage were treated intra-arterial by penicillin in a dose of 200 thousand units.

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ҚОЙЛАРДЫҢ ТҰЯҚ ШІРІГІН ЕМДЕУ КЕЗІНДЕГІ ГЕМАТОЛОГИЯЛЫҚ КӨРСЕТКІШТЕРГЕ САЛЫСТЫРМАЛЫ БАҒА БЕРУ

Аңдатпа

Мақалада қойлардың тұяқ шірігінің патологиялық үрдісінің дамуының әртүрлі сатыларында түрлі жобалармен емдеу кезіндегі қанның гематологиялық көрсеткіштеріне салыстырмалы баға беру нәтижелері берілген. Жүргізілген зерттеу жұмыстары қан көрсеткіштерінің түрлі морфо-биохимиялық көрінісі бойынша топтарға бөліп, айырмашылықтарын талдау кезінде, аурудың бастапқы және ортаңғы сатыларындағы тұяқ шірігімен ауыратын қойлардың артерия ішіне 200мың ӘБ мөлшеріндегі пенициллинмен емдеу жүргізілген екінші тәжірибелік тобында қан көрсеткіштері жақсы болғанын байқатады.

Кілт сөздер: қойлардың тұяқ шірігін емдеу, тұяқ шірігін емдеуге салыстырмалы баға беру, қойларда тұяқ шірігін емдеу кезіндегі қанның гематологиялық көрсеткіштері, қой шаруашылығы.

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СРАВНИТЕЛЬНАЯ ОЦЕНКА ГЕМАТОЛОГИЧЕСКИХ ПОКАЗАТЕЛЕЙ У ОВЕЦ ПРИ ЛЕЧЕНИИ КОПЫТНОЙ ГНИЛИ

Аннотация

В статье приведены результаты сравнительного исследования гематологических показателей крови у овец при лечении разными схемами в различные стадии развития патологического процесса копытной гнили. Проведенные исследования свидетельствуют, что, анализируя различия между группами по морфо-биохимической картине крови лучшие показатели были во второй экспериментальной группе, где больных овец копытной гнилью в начальной и средней стадии лечили внутриартериально пенициллином в дозе 200тыс. ЕД.

Ключевые слова: лечение копытной гнили у овец, сравнительная оценка лечения копытной гнили, гематологические показатели крови при лечении копытной гнили, овцеводство.

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ЕДІЛБАЙ, ГИССАР ЖӘНЕ ҚАЗАҚТЫҢ БИАЗЫ ЖҮНДІ ҚОЙЛАРЫНЫҢ БУДАНДАРЫНЫҢ ЖҮН ӨНІМДІЛІГІ

Андатпа

Мақалада ет алу үшін өсіретін қойлардың жүнін жақсарту мақсатында еділбай, гиссар тұқымының қошқарларымен еділбай, қазақтың биязы жүнді тұқымдарының саулықтарын будандастырып, алынған будандардың жүн өнімділігінің негізгі белгілерін зерттеу нәтижелері берілген. Нәтижесінде еділбай қошқарлары мен қазақтың биязы жүнді саулықтарынан алынған будандардың қырқылған жүн түсімі мен жүн талшықтарының жіңішкелігі басқа генотипті будандардан молырақ әрі сапалырақ болатыны анықталған.

Кілт сөздер: қой, тұқым, желі, ет, жүн, іріктеу, етті тұқым, қозы.

Кіріспе

Қой жүні – қой терісінде өсетін түк, түбіт, қылшық. Қой жүнінен киіздің, текеметтің, сырмақтың небір түрлері басылады, одан иірілген жіптерінен киім тігіліп, кілем, бау-басқұр тоқылады, өте берік әрі тозбайтын арқан-жіп есіледі және басқа да көптеген тұрмыстық, шаруашылық бұйымдар жасалады. Қойдан басқа да жүн, түбіт, қылшық беретін мал түрлері болғанымен, олардан алынатын өнім қойдан алынатын өніммен салыстырғанда бірнеше есе аз болады. Төрт түліктен алынатын барлық жүн мөлшерін салыстыра қарағанда аталған өнімнің 80-90 пайызы қойдан алады, яғни өндірілетін барлық жүн өнімінің 10-15 пайызы ғана түйе, ешкі, тағы басқа мал үлесіне тиеді. Сондықтан қой өсірудің қазақ жерінде көне замандардан-ақ маңызы үлкен болған [1].

Қой жүні басқа мал түрлерінің жүнінен өзінің мынадай қасиеттерімен ерекшеленеді:

- мейлінше мықты. Оның мықтылығын өзінің жіңішкелігіндей сымтемірдің беріктігімен салыстыруға болады;

- жіңішкелігі дәл өзіндей заттардың бәрінен жеңіл;

- жылуды жақсы сақтайды;

- созылғыш, сол себепті су мен дымқылдан иленбейді;