Fedor N. Chekhodaridi et al /J. Pharm. Sci. & Res. Vol. 10(12), 2018, 3447-3451

ISSN:0975-1459
Journal of Pharmaceutical Sciences and Research
www.jpsr.pharmainfo.in

Etiopathogenetic therapy of purulent pododermatitis in the area of the hooves of cows

Fedor N. Chekhodaridi*, Chermen R. Persaev, Marina S. Gugkaeva, Konstantin Yu. Apostolidi, Dmitriy N. Bestaev, Tamerlan B. Bitsiev, Tatiana I. Agaeva

Faculty of veterinary medicine, Gorsky state agrarian university, Kirova Street 37, Vladikavkaz city, 362040, Russia

Abstract.

Scientific and production research was carried out in 2018 at the educational and experimental farm of Gorsky State Agrarian University and the organization "Raduga" in the Prigorodny district of North Ossetia-Alania. Cows with purulent pododermatitis in the area of the hooves formed the object of the study. A large number of methods and means of treatment of purulent-necrotic lesions in the area of the hooves in cattle had been proposed. However, there is no limit to improve the treatment of these diseases. With that in mind, the use of etiopathogenetic therapy of purulent pododermatitis of cows is an urgent problem. For this purpose, we formed 2 groups of cows with purulent pododermatitis in the area of the hooves' lower margin of the cows (control and experimental) with 8 animal units in each group. Cows of experimental group had several procedures: cleaning the hooves, general and local anesthesia, surgical treatment and foot disinfectant baths. After all these procedures during the hydration phase a mixture of powders was put on the hoof which consisted of smoke-tree, soumac, Japanese pagoda tree and during the dehydration phase benzyl ointment was used in addition to the immunomodulator "Azoksivet". Animals of the control group were subjected to the same treatment, but a mixture of powders applied to the hooves consisted of boric acid, potassium permanganate and streptocide in the hydration phase, and tetracycline ointment was used in the dehydration phase. It has been established that injection of smoke-tree, soumac and Japanese pagoda tree promotes an increase in the content of microelements in the blood, as well as keratinization of the hooves, which in turn prevents the development of purulent pododermatitis in cows of the experimental group. The use of complex therapy increases the nonspecific resistance of the organism in animals of the experimental group compared with the control group. Complete clinical recovery has happened by the 28.5 day, while in animals of the control group recovery has happened by the 34.4 day. With that, an increase in the immunobiological reactivity of the organism was noted in cows of the experimental group.

Key words: cows, smoke-tree, soumac, Japanese pagoda tree, benzyl ointment, boric acid, potassium permanganate, streptocide, purulent pododermatitis, blood examination, surgical debridement, complex therapy.

INTRODUCTION.

Scientific research has established that the main causes of early leaving of cows from the main herd are diseases of the distal limb, which cause great economic damage to livestock. The damage consists of the forced culling of animals, reduction in milk production and live weight, reduction in calves crop and lengthening the service period [1. 2, 3, 4, 5, 6].

A large number of methods and means of treatment of purulent-necrotic lesions of the fingers and hooves have been proposed, but the use of complex therapy to improve the treatment of these lesions is an urgent task [7, 8, 9, 10, 11. 12].

MATERIAL AND METHODS.

Scientific and production research was carried out in 2018 at the educational and experimental farm of Gorsky State Agrarian University and the organization "Raduga" in the Prigorodny district of North Ossetia-Alania.

220 heads of cattle were examined to determine the localization and nature of lesions in the hooves of cows in farms. 16 cows of these units were with purulent pododermatitis. Two experimental groups (control and experimental) of 8 heads in each were formed for treatment.

Before beginning the treatment of sick animals, we studied the clinical condition, nature, localization, stage of development of the pathological process. All experimental animals had blood tests before treatment and in the 3, 5, 10, 15, 20 and 25 days after the treatment started. Hematological studies were carried out on the automatic hematology analyzer "RSK-90-VET". Biochemical studies of blood serum were conducted on the semi-automatic biochemical analyzer "Biochek SA". The amount of lactate dehydrogenase, creatinine, alkaline phosphatase was examined on the biochemical analyzer using spectral analysis. Immunological studies of blood serum were carried out according to generally accepted methods (BSBA, BSLA, NPA and PN), and cellular and humoral immunity were determined. Planimetric studies of the area of the wound were conducted according to the method of L. N. Popova (1942).

The cows of the control group were treated as follows: isolation of sick animals, providing the rest, good care, keeping and feeding them. There were such procedures: cleaning the hooves, general and local anesthesia with 2% xylazine solution in a dose of 2 ml per head, novocaine blockade of interdigital nerves with a 0.5% novocaine solution in a dose of 50 ml , surgical removal of necrotic tissues, irrigation of the lower margin of hoof with furacilin 1: 5000. Wound was dried with sterile cotton-gauze swabs and a mixture of powders consisted of boric acid, potassium permanganate and streptocid (3: 2: 2) was applied to lower margin of hoof in the hydration phase, and 10% tetracycline ointment was used in the dehydration phase.

Experimental animals were treated the same way. However, in the hydration phase, sorbents, smoke-tree, soumac, Japanese pagoda tree mixed with powders of magnesium sulfate, zinc oxide and rivanol were applied to the lower margin of hoof along with a napkin (40: 20: 20: 10). Benzyl ointment consisting of smoke-tree and soumac, rosin, olive oil, wax, and benzyl alcohol was usedin the dehydration phase. Immunomodulator "Azoksivet" was injected intramuscularly at a dose of 24 ml once a day for 6 days.

All cows in the experimental groups were injected subcutaneously with the antibiotic cephalexin at a dose of 500 thousand units 2 times a day for 6 days.

Together with the concentrates, smoke-tree, soumac and Japanese pagoda tree were given inside at a dose of 2% of the basic diet 2 times a day for 20 days.

RESULTS AND DISCUSSION.

It has been established that the addition of 2% smoke-tree, soumac and Japanese pagoda tree to the basic diet contributes to the correction of vitamin and mineral metabolism in the body of cows of the experimental group, the keratinization of the hooves and the prevention of hoof diseases.

The content of microelements in the cows of the experimental groups was the following before the start of the experiment: zinc - 216.32 ± 5.25 μg%, copper - 85.12 ± 1.46 μg%, manganese - 6.00 ± 1.44 μg%, cobalt - 1.22 ± 0.04 μg%, sulfur - 0.118 μg%, ferrum - 11.00 ± 1.36 μg%.

After feeding smoke-tree, soumac and Japanese pagoda tree to animals, the content of microelements in the blood serum increased: zinc to 322.62 ± 5.12 μg%, copper - 98.00 ± 4.12 μg%,

manganese - 9.42 ± 1.18 μg %, cobalt - 1.68 ± 0.08 μg%, sulfur - 0.58 ± 0.02 μg%, ferrum - 18.92 ± 1.84 μg%.

Suppress of general condition, an increase in body temperature by 0.1-0.5 ° C, and an increase in pulse and respiration were observed in cows of the experimental groups before treatment. Inflammatory edema, an increase in the local temperature, and discharge of purulent exudate with a liquid consistency with an unpleasant odor were noted at the site of the pathological focus. Severe lameness was observed in animals.

The general condition was satisfactory in cows of the experimental group already by the 5 day after applying interdigital novocaine blockade, surgical treatment and application of sorbent with powders in the hydration phase and benzyl ointment in the dehydration phase whereas in animals of the control group these indicators returned to normal only by the 10 day. Moderate lameness was observed in animals of the experimental group, and severe lameness was in the control group.

In cows of the experimental group, milk production began to recover up to 60% or more, while in control animals - up to 40%.

The general condition of the cows in the experimental group was satisfactory by the 10th day of treatment, the inflammatory edema subsided, the discharge of purulent exudate from the pathological focus ceased. Moderate degree of lameness was observed when animals moved in comparison with cows of the control group.

The general condition of the animals of the experimental group was good by the 15th day of treatment. The inflammatory edema subsided, the wound was dry, benzyl ointment was applied to the wound to form granulation tissue. Tetracycline ointment was applied to the hooves of animals of the control group, and the symptoms described above appeared only by the 20 day after the start of treatment.

The general condition was good of the animals of the experimental group by the 25th day. Animals readily took food; the milk productivity was restored by 80%. Young granulation tissue appeared at the site of the pathological focus, while similar indicators appeared in control animals by the 30th day of treatment.

Complete clinical recovery with the healing of purulent pododermatitis and the recovery of milk productivity in cows of the experimental group happened on average by the 28 day, while in the control group it happened by the 35 day after the start of treatment.

Analysis of Table 1 shows that clinical signs, body temperature, pulse rate and respiration returned to normal by the 10 day in cows of the experimental group, whereas these indicators normalized by the 15 day after the start of treatment in control animals.

Table 1 - Clinical indicators of cows in experimental groups (X±Sx; n=8)

Indicators	Before treatment	Study period after the start of treatment, days		
		3	5	10
Control group				
Body temperature, ºC	39,6±1,12	39,7±0,98	39,6±0,64	39,0±0,84
Pulse, beats/min	68,0±2,18	66,0±2,14	64,0±1,18	62,0±1,12
Breath, move/min	24,2±0,92	23,8±0,48	23,0±0,58	22,0±0,44
Experimental group				
Body temperature, ºC	39,7±1,18	39,6±1,32	39,0±0,82	38,5±0,94
Pulse, beats/min	66,0±2,14	65,0±2,12	60,0±0,78*	60,0±0,42*
Breath, move/min	25,0±0,86	24,0±0,82	22,0±0,34*	18,0±0,28*

NB: * - p<0,05

Table 2 - Indicators dynamics of healing of purulent pododermatitis in cows (X±Sx; n=8)

Clinical signs	Control group	Experimental group
Cleansing the wound, day	6,40±0,26	3,50±0,38*
Exudation cessation, day	9,20±0,48	5,20±0,82*
Formation of granulation tissue, day	12,00±0,92	8,40±0,64*
Epithelial tissue occuring, day	14,20±0,84	10,50±0,64*
Lameness absence, day	16,80±1,12	12,60±0,96*
Complete clinical recovery, day	34,40±2,18	28,50±1,14**

NB: * - p<0,05; ** - p<0,01

Table 3 - Hematological indicators in cows of experimental groups (X±Sx; n=8)

Indicators	Before treatment	Study period after the start of treatment, day					
		3	10	15	20	25	30
Control group							
Erythrocytes, 10^{12}/l	5,46± 0,42	6,12± 0,24	6,58± 0,48	7,32± 0,64	7,84± 0,86	8,00± 0,42	8,00± 0,52
Hemoglobin, g/l	75,0± 2,34	78,4± 0,56	82,6± 0,44	88,6± 0,58	90,0± 0,86	96,5± 1,12	104,5± 0.96
Average erythrocytes volume, fL	42,5± 1,18	45,0± 0,98	48,6± 0,32	50,4± 0,92	52,0± 1,36	54,0± 1,28	54,0± 1,34
Average content of hemoglobin in erythrocytes, pg	15,6± 0,94	15,8± 0,28	16,0± 0,43	16,8± 0,36	17,0± 0,16	17,5± 0,12	17,0± 0,14
Average concentration of hemoglobin in erythrocytes, g/dL	34,8± 0,98	35,2± 0,24	36,0± 0,16	36,8± 0,14	37,8± 0,28	38,9± 0,24	38,0± 0,12
Experimental group							
Erythrocytes, 10^{12}/l	5,27± 0,44	6,50± 0,16	7,0± 0,82*	7,8± 0,44*	8,4± 0,92*	8,8± 0,84*	9,0± 0,32*
Hemoglobin, g/l	74,8± 2,12	80,6± 2,18	82,0± 2,14	98,8± 2,24**	102,4± 5,12**	110,4± 6,00**	112,6± 7,00**
Average erythrocytes volume, fL	41,0± 0,98	43,0± 1,24*	43,6± 1,12*	44,8± 0,98*	52,4± 0,92*	55,0± 3,00*	55,6± 2,38*
Average content of hemoglobin in erythrocytes, pg	16,0± 0,90	16,5± 0,68	16,8± 0,36	17,0± 0,44*	17,4± 0,64	17,6± 0,26	17,0± 0,34
Average concentration of hemoglobin in erythrocytes, g/dL	35,0± 0,86	35,8± 1,50	36,4± 0,93	37,6± 1,00*	37,0± 1,12*	38,4± 1,16*	38,2± 2,14*

NB: * - p<0,05; ** - p<0,01

Table 4 - Dynamics of the number of leukocytes in cows of experimental groups (X±Sx; n=8)

Group	Before treatment	Duration of study, days.				
		3	5	10	15	20
Healthy animals	6,15± 0,84					
Control	8,28± 1,42	8,00± 1,24	7,52± 0,84	7,12± 0,36	7,00± 0,48	6,52± 0,92
Experimental	8,36± 1,36	7,42± 0,96*	7,12± 0,68	6,84± 0,82**	6,20± 0,687**	6,00± 0,34*

NB: * - p<0,05; ** - p<0,01

Table 5 - Biochemical indicators of blood serum of cows in experimental groups (X±Sx; n=8)

Indicators	Duration of study, days							Healthy animals
	Before treatment	3	5	10	15	20	25	
Control group								
Total protein, g/l	65,12± 1,44	67,24± 3,82	70,16± 4,16	72,14± 2,16	7,42± 4,18	76,36± 4,14	76,88± 5,10	74,74± 4,89
Albumins, g/l	24,82± 0,96	28,18± 1,24	32,00± 1,44	32,86± 1,84	34,10± 1,46	35,24± 1,22	36,00± 1,44	32,82± 1,85
α- globulins, g/l	10,52± 0,84	11,42± 0,84	12,08± 0,46	12,84± 1,10	12,00± 1,12	12,12± 0,84	12,14± 0,46	12,2± 0,26
β- globulins, g/l	10,16± 0.26	10,05± 0,34	11,62± 1,12	12,00± 1,24	12,00± 0,44	12,00± 0,32	12,16± 0,48	11,0± 0,21
γ- globulins, g/l	26,00± 0,98	26,42± 1,54	26,84± 1,82	27,00± 1,64	27,82± 1,44	27,94± 1,32	28,00± 1,46	27,7± 1,08
Alkaline phosphatase, u/l	42,84± 2,46	40,52± 2,34	40,46± 2,18	48,00± 2,16	44,12± 3,10	46,18± 4,00	52,48± 3,12	58,83± 6,86
Creatinine, mol/l	62,64± 6,18	65,42± 6,24	72,12± 7,14	74,34± 7,36	82,34± 8,10	90,0± 8,16	120,52± 9,24	31,36± 4,82
LDH, μkat/L	2,01± 2,26	2,64± 0,32	2,58± 0,36	2,64± 00,42	2,48± 0,34	3,12± 0,64	3,29± 0,44	1,62± 0,19
Experimental group								
Total protein, g/l	62,34± 1,52	72,00± 2,86*	74,16± 3,18*	76,12± 4,10*	76,48± 3,10*	77,24± 4,32*	78,00± 5,10**	78,84± 4,18
Albumins, g/l	25,00± 0,86	26,04± 0,92*	28,06± 0,84*	28,92± 1,32*	30,04± 1,48*	32,12± 1,64	36,42± 1,64*	32,82± 1,85
α- globulins, g/l	12,24± 0,62	13,04± 0,44*	14,16± 0,36*	14,82± 0,94*	15,62± 1,12**	16,44± 1,36**	16,58± 1,24**	12,2± 0,26
β- globulins, g/l	10,12± 0,26	10,16± 0,42	12,00± 0,48	12,82± 1,00	14,00± 1,52*	15,11± 1,64**	15,46± 1,92**	11,0± 0,21
γ- globulins, g/l	26,32± 0,98	26,80± 1,48	27,42± 1,54*	28,10± 1,62*	30,00± 1,64**	32,10± 2,00**	34,00± 2,18**	27,7± 1,08
Alkaline phosphatase, u/l	42,10± 2,18	38,00± 2,24*	40,52± 2,26*	44,44± 2,18**	38,50± 2,44**	42,00± 3,18**	52,54± 3,26**	58,83± 6,36
Creatinine, mol/l	65,52± 4,12	58,18± 3,26**	54,16± 2,06**	50,00± 4,06**	48,92± 3,56**	46,12± 3,12**	32,18± 3,54**	31,36± 4,82
LDH, μkat/L	1,82± 0,01	1,86± 0,02*	1,80± 0,02*	1,76± 0,01**	1,70± 0,04**	1,68± 0,01**	1,64± 0,002**	1,62± 0,19

NB: * - p<0,05; ** - p<0,01

Table 6 - Indicators of nonspecific resistance of cows in experimental groups (X±Sx; n=8)

Indicators	Duration of study, days						Healthy animals
	Before treatment	3	5	10	15	20	
Control group							
Blood serum bactericidal activity, %	48,5± 1,14	49,0± 2,00	50,0± 3,05	52,5± 1,18	53,8± 2,12	55,5± 3,00	54,6± 0,21
Blood serum lysozyme activity, %	22,5± 1,00	22,8± 1,12	23,5± 1,16	24,8± 1,00	25,5± 0,92	27,5± 0,46	26,9± 0,13
Neutrophil phagocytic activity, %	78,2± 3,00	79,2± 4,00	80,0± 3,10	80,8± 4,00	85,0± 3,16	86,0± 4,00	86,4± 4,25
Phagocyte number, unit	1,5± 0,02	1,6± 0,04	1,7± 0,03	1,8± 0,02	1,8± 0,04	1,8± 0,02	1,8± 0,04
Experimental group							
BSBA, %	50,0± 2,16	52,5± 3,10*	54,5± 2,18*	56,0± 3,10**	58,5± 4,00**	60,0± 5,00**	54,6± 0,21
BSLA, %	22,6± 0,16	23,8± 0,90*	25,0± 1,00*	26,9± 0,92**	30,5± 0,86**	32,0± 1,00**	26,9± 0,13
NPA, %	78,0± 3,00	80,0± 3,12	82,5± 4,00*	86,0± 5,00**	88,0± 4,00**	88,0± 4,10*	86,4± 4,25
PN, unit	1,6± 0,02	1,8± 0,01*	1,9± 0,02*	1,9± 0,01*	1,8± 0,01	1,9± 0,02*	1,8± 0,21

NB: * - p<0,05; ** - p<0,01; *** - p<0,001

Planimetric study of the surface of the wound area revealed that the surface area of the wound was on average 242 cm^2 before the start of treatment of animals in experimental groups. By the 3rd day after treatment in the control group, the change in the surface area of the wound was 230 cm^2, by the 5 day – 225 cm^2, by the 10 day – 210 cm^2, by the 15 day – 188 cm^2, by the 20 day – 162 cm^2, by the 25 day – 80 cm^2, by the 30 day – 30 cm^2, by the 35 day – 0 cm^2. There was a complete healing of purulent pododermatitis of the lower margin of hooves of the cows.

Change in the surface area of purulent pododermatitis in cows of the experimental group was: by the 3 day – 230 cm^2, by the 5 day – 220 cm^2, by the 10 day – 202 cm^2, by the 15 day – 160 cm^2, by the 20 day – 810 cm^2, by the 25 day – 40 cm^2, by the 28 day – 0 cm^2. Consequently, wound healing occurred in control animals by the 35 day, whereas it happened by the 28 day after the start of treatment in experienced animals. The percentage reduction in the surface area of the ulcer was from 4% to 100%. L.N. Popova's index was less than 4.

The results of the research from cleansing the wound to complete clinical recovery are shown in Table 2.

Analysis of Table 2 shows that the use of complex therapy accelerates the healing of purulent pododermatitis by the 6 day compared with the cows in the control group. Hematological parameters of cows of experimental groups are given in table 3.

Analysis of table 3 shows that the number of erythrocytes increased from the 3 day till the end of the study by 30.8% and 73.0% in animals of the experimental group, whereas in the control group - by 12.0% and 46.0%. The hemoglobin content in cows of the experimental group increased by 7.8% and 50.5%, in the control group - by 4.5% and 34.0%. The average volume of erythrocytes in animals of the experimental group increased by 4.9% and 35.0%, in the control group - by 4.5% and 15.0%. The average hemoglobin content in erythrocytes in animals of the experimental group increased by 3.0% and 6.3%, in the control group - by 0.8% and 7.5%. The average concentration of hemoglobin in erythrocytes in cows of the experimental group increased by 2.3% and 9.0%, in the control group - by 1.2% and 8.0%.

Thus, it was found that erythrocyte indicies (average hemoglobin content in the erythrocyte, average erythrocyte volume, average hemoglobin concentration in the erythrocyte) increased in the course of treatment until the end of the study. However, the best indicators were observed in the experimental cows.

The dynamics of the number of leukocytes in cows of the experimental groups is given in Table 4.

The table shows that the number of leukocytes decreased by 11.25% and 28.22% in animals of the experimental group from 3 days until the end of the study, while in the control group it decreased by 3.38% and 24.15%, which is evidence of a decrease in the inflammatory process in animal experimental groups. Consequently, the use of complex therapy of purulent pododermatitis contributes to the acceleration of the correction of hematological indicators, as well as oxidation-reduction processes in the body of cows from the experimental group compared with control animals.

Analysis of biochemical indicators in the blood serum of cows in experimental groups is given in table 5.

Analysis of table 5 shows that the total protein content, albumin, α-globulin, β-globulin and γ-globulin in the cows of the experimental group increased during treatment from the 3 day until the end of the study by 15.50% and 25.12%; 4.00% and 45.68%; 7.69% and 34.72%; 2.37% and 49.40%; 1.54% and 30.76%, whereas in animals of the control group - by 3.26% and 16.92%; 1.66% and 44.00%; 1.08% and 15.40%; 1.10% and 19.68%; 1.61% and 7.69% respectively.

Starting from the 3 day and until the end of the research, alkaline phosphatase activity in the experimental group of cows decreased by 9.52% and 23.80%, the amount of creatinine - by 3.86% and 46.66%, the amount of LDH - by 21.97% and 98.98% , while in the control group they decreased by 5.41% and 19.04%; 4.83% and 93.54%; 15.0% and 90,000% respectively.

Therefore, the use of complex therapy accelerates the increase in nonspecific resistance in animals of the experimental group, compared with the control ones.

Indicators of nonspecific resistance of animals in experimental groups are shown in table 6.

The table shows that in animals of the control group the bactericidal activity of the blood serum increased by 2.4% and 14.0% from 3 days to the end of the study , the lysozyme activity of the blood serum increased by 1.3% and 22.5%, phagocytic neutrophil activity - by 1.2% and 9.9%, phagocytic number - by 6.6 units and 20 units. In animals of the experimental group they increased by 5.3% and 41.0%; 2.5% and 41.0%; 2.5% and 28.0%; 12.5 units and 22.5 units respectively.

Consequently, the use of etiopathogenetic therapy accelerates the increase in BSBA, BSLA and NPA compared with animals in the control group. Indicators of immune status are shown in table 7.

The table shows that the indicators of cellular immunity lymphocytes, T-common, T-helper cells and T-suppressors more quickly return to normal in cows of the experimental group compared with control animals. Indicators of humoral immunity are shown in Table 8.

Analysis of Table 8 shows that the content of B-lymphocytes, CIC, Ig G, Ig A and Ig M in the animals of the experimental group increased by the 15 day by 25%, and returns to normal by the 20 day after the start of treatment compared with the control group .

Consequently, the use of etiopathogenetic therapy accelerates the increase in humoral immunity in cows of the experimental group compared with control animals.

Table 7 - Indicators of cellular immunity of cows in experimental groups (X±Sx; n=8)

Indicators	Duration of study, days						Healthy animals
	Before treatment	3	5	10	15	20	
Control group							
lymphocytes, 10^9/l	6,0± 0,08	5,0± 0,06	5,0± 0,02	4,5± 0,01	3,2± 0,02	2,9± 0,04	2,9± 0,08
T-common, 10^9/l	4,0± 0,08	3,8± 0,04	3,6± 0,02	2,4± 0,01	2,0± 0,02	1,7± 0,01	1,6± 0,04
T-helpers, 10^9/l	2,5± 0,03	2,4± 0,04	2,0± 0,01	1,8± 0,01	1,6± 0,02	0,9± 0,01	0,9± 0,03
T-suppressors, 10^9/l	1,2± 0,02	1,0± 0,01	1,2± 0.02	1,1± 0,01	1,0± 0,01	0,7± 0,01	0,7± 0,07
Experimental group							
lymphocytes, 10^9/l	5,5± 0,12	5,4± 0,42	5,5± 0,48	6,0± 0,32*	4,5± 0,28**	3,8± 0,128**	2,9± 0,08
T-common, 10^9/l	3,4± 0,02	3,6± 0,04	3,8± 0,01	3,4± 0,01*	3,0± 0,01*	2,6± 0,02**	1,6± 0,04
T-helpers, 10^9/l	2,0± 0,01	1,8± 0,02	2,0± 0,01	1,8± 0,01	1,6± 0,02	1,49± 0,04*	0,9± 0,03
T-suppressors, 10^9/l	1,2± 0,11	1,0± 0,01	1,0± 0,02	1,5± 0,04*	1,0± 0.01	1,0± 0,01*	0,7± 0,07

NB: * - p<0,05; ** - p<0,01

Table 8 - Indicators of humoral immunity of cows in experimental groups (X±Sx; n=8)

Indicators	Duration of study, days						Healthy animals
	Before treatment	3	5	10	15	20	
Control group							
B- lymphocytes, 10^9/l	1,2± 0,02	1,2± 0,02	1,0± 0,01	0,8± 0,01	0,6± 0,02	0,4± 0,01	0,3± 0,06
CIC	215,0± 16,0	214,0± 25,0	210,0± 18,0	206,0± 24,0	200,0± 15.0	200,0± 18,0	187,6± 26,3
Ig G, g/l	16,0± 0,92	16,2± 0,42	18,8± 0,92	20,0± 0,15,0	20,0± 18,0	22,0± 0,64	23,6± 0,50
Ig A, g/l	0,3± 0,001	0,2± 0,001	0,2± 0,001	0,2± 0,002	0,3± 0,001	0,3± 0,001	0,4± 0,004
Ig M, g/l	2,0± 0,02	2,0± 0,02	2,3± 0,01	2,4± 0,02	2,6± 0,01	3,0± 0,04	3,8± 0,07
Experimental group							
B- lymphocytes, 10^9/l	1,2± 0,02	0,8± 0,01	0,8± 0,02	0,9± 0,04	1,0± 0,02*	0,4± 0,01	0,3± 0,06
CIC	215,0± 16,0	216,0± 12,0	215,0± 18,0	218,0± 10,0	220,0± 12,0	224,0± 16,0**	187,6± 26,3
Ig G, g/l	16,0± 0,92	18,0± 1,00	20,0± 1,12	21,6± 1,14	22,8± 1,14	24,0± 1,00**	23,6± 0,50
Ig A, g/l	0,3± 0,001	0,30± 0,001	0,35± 0,001	0,45± 0,001	0,56± 0,002	0,65± 0,002*	0,4± 0,004
Ig M, g/l	2,0± 0,02	2,2± 0,01	2,3± 0,02	2,8± 0,04	3,0± 0,06	3,6± 0,08*	3,8± 0,07

NB: * - p<0,05; ** - p<0,01

CONCLUSION.

1. Feeding herbal medicine such as smoke-tree, soumac and Japanese pagoda tree contributes to an increase in levels of zinc to 49%, copper to 15.3%, manganese to 57%, cobalt to 43.7%, sulfur to 22 %, iron - up to 44.5% in blood, compared with animals in the control group.
2. The use of complex therapy accelerates clinical status, cleansing the wound and accelerates the full clinical recovery by the 6 day compared with the cows in the control group.
3. Etiopathogenetic therapy helps to accelerate the normalization of hematological and biochemical parameters in cows of the experimental group compared with control animals.
4. The use of herbal medicine in a mixture with powders in addition to intramuscular injection of the immunomodulator “Azoksivet” increases the bactericidal activity of blood serum by 41.0%, lysozyme activity – by 41.0%, phagocytic activity of neutrophils – by 28.0%, phagocytic number – by 12.5 units, while in animals of the control group by 14.0%, 22.5%, 9.9%, and 22.5% respectively.
5. Etiopathogenetic therapy contributes to an increase in immunobiological reactivity in cows from the experimental group compared to the control group.

REFERENCES

[1] Becvar O., Illek J., Matejicek M. Vyskyt a zkusenosti s lecbou dermatitis digitalis u dojnic Veterinarstvi, 2000, 50, 140-142.
[2] Galindo F., Broom D.M. The relationships between social behavior of dairy cows and the occurrence of lameness in three herds Res in veter. Sc., 2000, 148 (25), 782-783.
[3] Laver R.A., Hunt H. Comparison of valnemulin and lincomcin in the treatment of digital dermatitis by individually applied topical spray Veter. Rec., 2001, 149 (10), 302-303.
[4] Kaltalioglu K., Coskun-Cevher S. A bioactive molecule in a complex wound healing process: platelet-derived growth factor Int J Dermatol 2015, 54 (8), 972-977
[5] Eliseev A.N., Blednev A.I., Suvorova V.I., Vanik S.V., Kolomijcev S.M. Complex treatment of purulent-necrotic lesions of the fingers in farm animals. Actual problems of veterinary surgery. Works of the International Scientific and Practical Conference. Troitsk, 2004, 55-56.
[6] Weiskopf S., Kruss G. Therapeutische Anwendung Von Terramycin Zabeim Panaritium des Rindes. – Tierazil. Umsch., 2002, 57 (8), 449-450.
[7] Sardari K., Kakhki E.G., Mohri M. Evaluation of wound contraction and epithelialization after subcutaneousadministration of Theranekron® in cows Comparative Clinical Pathology 2007, 16, 197-200.
[8] Chekhodaridi F.N., Persaev CH.R., Korotkov A.V., Gugkaeva M.S. Complex therapy of purulent-necrotic lesions of the limbs of cattle. News of Gorsky SAU., Vladikavkaz., 2012, 49 (4), 167-178.
[9] Ramos-Torrecillas J. [et al.] Clinical utility of growth factors and platelet-rich plasma in tissue regeneration: a review Wounds. 2014, 26(7), 207-213.
[10] Moustafa A., Marzok M. Equine wound menedgement Equine Veterinary J. 2015, 14(5), 699-706.
[11] Kon E., Filardo G., Di Martino A., Maracci M. Platelet-rich plasma (PRP) to treat sports injuries: evidence to support its use KneeSurgSportsTraumatolArthrosc 2011, 19, 516-527
[12] Lul Raka, Mulliqi-Osmani, Lule Berisha Bacteriology of wounds: spectrum of pathogens and sensivity pattern Surgical infections: prevention and managtment 2003, 39, 11-18.