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THE IMPACT FEATURES OF THE DRUG «VETMYCODERM» ON SOME MORPHOLOGICAL, BIOCHEMICAL AND IMMUNOLOGICAL BLOOD PARAMETERS IN DOGS WITH DERMATOMYCOSIS

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INTRODUCTION

Among the derivatives of 1,2,4-triazole, many compounds exhibit biological activity[1, 2], and some of them are active ingredients in well-known drugs.[3] In 2022, a veterinary drug in the form of a liniment, «Vetmycoderm», was registered, and its active substance belongs to the derivatives of 1,2,4-triazole. The drug is recommended for dermatological conditions in domestic animals.[4]

The problem of dermatomycoses in dogs is quite widespread. This disease can be accompanied by hematopoietic, allergic disorders, as well as suppression of autoimmune reactions. Under the influence of the vital products of microorganisms and fungi, toxic manifestations in the morphological indicators of animal blood can be observed.[8]

At a certain point, research on this issue was conducted by domestic researchers from Zaporizhzhia State Medical University (Knysh Y. H., Panasenko O. I., Parchenko V. V., Bushueva I. V., Bigdan O. A., and others)[5-7, 9], Lviv National Stepan Gzhytsky University of Veterinary Medicine and Biotechnology (Hunchak V. M., Hutyi B. V., Stefanyshyn V. V., Martynyshyn V. P.)[13, 14] and others.

Our **objective** was to examine how the morphological, biochemical, and immunological blood parameters in dogs change when exhibiting typical clinical signs of skin pathology while being treated with the drug «Vetmycoderm».

MATERIALS AND METHODS

Clinical trials to assess the impact of the drug «Vetmycoderm» on the specified parameters were conducted at the veterinary clinic «BEST» in Zaporizhzhia. The study group consisted of dogs gradually recruited through owner referrals to the clinic. The control group of animals (24 individuals) was clinically healthy, showing no visible signs of skin pathology, with dense and shiny fur.[10-12] The experimental group of dogs (24 individuals) exhibited characteristic and visually similar symptoms of skin and its derivatives. Blood sampling for analysis was performed following standard procedures.

RESULTS AND DISCUSSION

It was found that the number of red blood cells, hemoglobin content, and hematocrit values in the blood of sick dogs did not show significant deviations compared to the control group (Table 1). However, a tendency to change individual blood indices in dogs treated with «Vetmycoderm» was noted. For instance, the mean corpuscular hemoglobin concentration (MCHC) in the experimental group animals was higher compared to clinically healthy dogs.

Table 1: The Effect of the Drug «Vetmycoderm» on Morphological Blood Parameters in Dogs with Dermatomycosis (M±m, n=24).

Indicator	Groups of Animals		
	Control Group	Experimental Animals	
		Upon Admission to the Clinic	After Complete Recovery (after 14-24 days of treatment)
Red Blood Cells, T/L	6,1±0,41	6,2±0,54	6,0±0,33
Hemoglobin, g/L	118,2±1,9	110,3±2,8	121,6±3,0
Hematocrit, %	41,7±1,7	40,4±1,5	41,9±1,6
MCV	67,3±2,3	66,8±3,5	67,4±4,2
MCH	19,1±1,2	18,7±1,7	19,3±1,1
MCHC	27,5±1,6	26,8±1,4	28,8±1,3

White blood cells circulating in peripheral blood contribute to the nonspecific resistance of the organism to infection. The number of white blood cells often reflects the level of resistance and the degree of development of the inflammatory process. We observed that the total number of leukocytes in the blood of dogs in the experimental group remained within

physiological ranges, although it showed a tendency to increase compared to clinically healthy animals (Table 2).

Table 2: Leukogram of Dogs with Skin Pathology under the Influence of the Liniment «Vetmycoderm» (M±m, n=24)

Indicator	Groups of Animals		
	Control Group	Experimental Animals	
		Upon Admission to the Clinic	After Complete Recovery (after 14-24 days of treatment)
White Blood Cells, G/L	14,7±0,95	15,4±0,63	15,2±0,48
Leukogram, %			
Basophils	1,0±0,07	0,8±0,11**	1,1±0,21
Eosinophils	5,8±0,43	7,3±0,34*	6,5±0,33
Neutrophils: - Young - Band neutrophils - Segmented neutrophils	 – 5,6±0,82 48,9±1,04	 – 3,4±0,43* 54,3±2,05*	 – 5,5±0,62 51,6±4,11
Lymphocytes	32,8±1,02	31,7±1,15	33,2±1,09
Monocytes	4,6±0,19	3,7±0,32**	4,8±0,42
Erythrocyte Sedimentation Rate (ESR)	0,681	0,575	0,677

In 7 animals with extensive fungal skin lesions, the number of leukocytes was 18.2-21.2% higher than in the control group. The leukogram of the sick animals underwent significant changes. Against the background of neutrophil leukocytosis, there was an increase in the percentage of segmented granulocytes and eosinophils. As for band neutrophils and basophils, their content was lower than in clinically healthy animals. It was also characteristic of a tendency to decrease lymphocytes in the blood. The dynamics of blood parameters in dogs during the period of complete recovery, i.e., after 2-3 weeks of therapeutic use of the «Vetmycoderm» drug, did not significantly change. However, we observed that the number of the most functionally active segmented neutrophils in the blood of these animals decreased compared to the indicator at the time of admission to the clinic, although it was still slightly higher than in the control group.

The observed decrease in the percentage of segmented neutrophils and eosinophils in the blood of dogs with microsporosis, treated with the new drug “Vetmycoderm,” against the background of an increase in the level of lymphocytes is evidently the result of a reduction in allergenic and sensitizing processes on the skin. It characterizes the predominant role of these forms of leukocytes in providing adaptive-adaptive reactions of the body to the action of exo-

and endogenous factors. Confirmation of this is likely the increase in the ratio of lymphocytes to segmented neutrophils (L/SN). Changes in the hepatoprotective system with dermatomycosis are not always characteristic, and the degree of their expression depends on the extent of fungal infection, the severity of the pathological process, the acuteness of the inflammatory process, the degree of sensitization, secondary colonization by microflora, and so on.

Through the study of certain biochemical indicators of blood serum (Table 3), we found that in dogs of the experimental group, the activity of ALT and AST enzymes increased. At the same time, the concentration of urea was lower than in the animals of the control group. Meanwhile, the levels of glucose and creatinine in the blood serum of dogs with pronounced dermatomycosis did not significantly differ from the indicators of the animals in the control group.

Table 3: Dynamics of blood biochemical parameters in dogs treated with «Vetmycoderm» for dermatophytosis (M±m, n=24)

Indicator	Groups of Animals		
	Control Group	Experimental Animals	
		Upon Admission to the Clinic	After Complete Recovery (after 14-24 days of treatment)
ALT (Alanine Aminotransferase), U/l	39,2±1,4	49,8±3,5**	42,2±2,7
AST (Aspartate Aminotransferase), U/l	18,7±1,2	19,8±2,05	17,8±1,7
De Ritis Ratio (AST/ALT)	0,46	0,41	0,43
ALP (Alkaline Phosphatase), U/l	95,7±3,5	109,8±3,9*	102,1±3,6
Glucose, mmol/l	5,2±0,7	4,6±0,4	4,8±0,77
Creatinine, µmol/l	127,2±5,3	137,3±6,3	132,3±5,4
Urea, mmol/l	7,2±0,21	6,08±0,44*	7,0±0,4

At the same time, we note that in some animals, especially those with extensive skin inflammation (2 dogs) and one animal with severe wounds, accompanied by itching and scratching, the dynamics of the investigated biochemical indicators were even more characteristic. In these cases, the activity of AST increased, the De Ritis ratio decreased, and the blood urea level was half as much as in clinically healthy dogs.

The experimental data we obtained provide grounds for asserting that, against the background of skin pathology in dogs, systemic changes, mostly functional, occur throughout the entire body. The application of the «Vetmycoderm» drug during the course of treatment, to some extent, amid the suppression of inflammatory processes, relief of itching, and gradual restoration of the epidermis and fur, contributed to the activation of the liver's functional state.

The obtained results of biochemical serum blood tests in dogs after their complete recovery characterize the effective hepatoprotective action of "Vetmycoderm." However, even with complete wound healing and restoration of the fur coat, most of the investigated blood parameters in dogs still differed slightly from those in the control group, which is evidently a result of characteristic changes not only in the skin and its derivatives but also of more profound disturbances in the organism.

An important factor in the epizootiology of dermatomycoses caused by zoophilic fungi is the saprophytic existence of a whole range of fungi in the soil, on the skin of animals, etc. Their pathogenicity varies and depends on the nature and properties of the fungus on the one hand and the resistance of the animal organism on the other. Therefore, in our opinion, it was important to clarify the state of the immune system in sick dogs at the beginning and end of their treatment (Table 4).

Table 4: Effect of the «Vetmikoderm» preparation on the immunological indicators of blood in dogs with dermatophyte infections (M±m, n=24)

Indicator	Groups of Animals		
	Control Group	Experimental Animals	
		Upon Admission to the Clinic	After Complete Recovery (after 14-24 days of treatment)
PHA, %	35,9±1,5	31,1±2,2*	36,2±1,2
PHI, μm/μl	6,3±0,6	6,2±0,1	6,4±0,44
PHI, %	29,8±1,2	26,5±2,2	27,2±0,7
T-lymphocytes, %	36,6±2,3	37,7±1,5	37,9±1,3
T-helpers, %	23,1±1,1	19,9±1,3	23,8±1,4
T-suppressors, %	13,7±0,7	16,9±1,2	14,0±1,3
B-lymphocytes	8,0±0,5	10,8±0,7**	8,9±0,5
Immunoglobulins, mg%	518,8±10,4	554,3±11,7*	557,6±7,4*

In the course of our research, we found that in dogs presenting with signs of dermatomycosis, there was likely a decrease in the phagocytic activity of neutrophils, and the percentage of B-lymphocytes and the total content of immunoglobulins were higher compared to the indicators in clinically healthy dogs. This, in our opinion, is a result of the humoral response to the action of allergens in fungal and bacterial skin infections.

CONCLUSION

The use of the «Vetmycoderm» drug involved the analysis of the dynamics of morphological, biochemical, and immunological blood parameters in dogs with existing skin pathology. Changes in the indicators, characterizing the treatment process, were found to be satisfactory and can serve as an argument for prescribing the «Vetmycoderm» drug for the treatment of dermatomycoses in dogs.

REFERENCES

1. A. S. Gotsulya, O. M. Kamyshnyi, N. M. Polishchuk, O. I. Panasenko, Ye. G. Knysh. Research of the antimicrobial and antifungal activity of 7-((3-thio-4-R-4H-1,2,4-triazole-3-yl)methyl)theophylline S-derivatives. Zaporizhia Medical Journal, 2015; 4(91): C. 95-100. https://doi.org/10.14739/2310-1210.2015.4.50302.
2. Yevhen Karpun, Volodymyr Parchenko, Volodymyr Nahornyi, Natalia Nahorna. The investigation of antimicrobial activity of some s-substituted bis-1,2,4-triazole-3-thiones, 2021; Pharmacia 68(4): 797–804. doi.org/10.3897/pharmacia.68.e65761.
3. Zazharskyi V, Bigdan O, Parchenko V, Parchenko M, Fotina T, Davydenko P, et al. Antimicrobial Activity of Some Furans Containing 1,2,4- Triazoles. Arch Pharm Pract, 2021; 12(2): 60-65. https://doi.org/10.51847/RbJb3waUBB.
4. Impact of 1,2,4-thio-triazole derivative-based liniment on morphological and immunological blood parameters of dogs suffering from dermatomycoses / V. M. Hunchak, V. P. Martynyshyn, B. V., Gutyj, A. V. Hunchak, O. M. Stefanyshyn, V. V. Parchenko. Regul. Mech. Biosyst., 2020; 11(2): 294-298. https://doi.org/10.15421/022044.
5. Bigdan, O. A., Parchenko, V. V., Kyrychko, B. P., Zvenigorodska, T. V., Gutyj, B. V., Gunchak, A. V., Slivinska, L. G., Savchuk, L. B., Nazaruk, N. V., Kit, L. P., Dashkovskyy, O. O., Guta, Z. A. (2020). Test of antimicrobial activity of morpholine 2-(5-(3-fluorophenyl) -4- amino-1,2,4-triazol-3-ilthio) acetate (BKP-115) by experimental

model of pancreatitis in rats. Ukrainian Journal of Ecology, 10(3): 201-207. https://doi.org/10.15421/2020_155.

6. Bihdan O., Gotsulya A., Parchenko V. et al. Influence of different determination of 1,2,4-triazols on the growth, development and yield of grain Sorghum. Res. J. Pharmac. Biol. Chem. Sci, 2019; 10(2): 1156–1160.
7. Parchenko V.V. Synthesis, physico-chemical and biological properties of the 1,2,4-triazole-3-thione 5-furilderivatives: Dis .... Dr. of Pharm. Sciences. Zaporizhya, 2014; P. 361. [in Ukrainian].
8. Bushueva I. V., Parkhomenko L. I., Knish Ye. H., Panasenko O. I. Application of morpholine 2-[5-(pyridin-4-yl)-1,2,4-triazol-3-ylthio]acetate for the treatment and prevention of certain diseases. Zaporizhzhia Medical Journal, 2014; 2(83): P. 97–99. doi: https://doi.org/10.14739/2310-1210.2014.2.25443. [in Ukrainian].
9. Bushueva I. V., Berezovskij A. V., Knysh Ye. H., Panasenko O. I. (2014). Use of the drug «Avesstym» to improve vaccination and effects on the resistance of chickens. Science Rise, 2014; 1(4): 94-97. [in Ukrainian]. https://doi.org/10.15587/2313-8416.2014.29279
10. I. V. Bushueva, B. P. Kirichko, E. G. Knish, O. I. Panasenko, V. I. Izdepskiy. Study of the impact of morpholine 2-[5- (pyridin-4-yl)-1,2,4-triazol-3-ylthio]acetate on the prevention of stress conditions. Actual Issues of Pharmaceutical and Medical Science and Practice, 2014; 2(15): P. 64-66. [in Ukrainian]. https://doi.org/10.14739/2409-2932.2014.2.26167.
11. Bushuyeva I. V., Knysh YE. H., Panasenko O. I. Research on the therapeutic efficacy of morpholinium 2-[5-pyridin-4-yl)-1,2,4-triazol-3-ylthio]acetate in diseases of some animal species, 2014; Science Rise, 3(1): C.100-104. [in Ukrainian]. https://doi.org/10.15587/2313-8416.2014.27998.
12. Ohloblina M. V., Bushueva I. V., Parchenko V. V. Results of determining the indicators of the morphological composition of animal blood and certain biochemical parameters during the use of a potential drug with a mixture of two active compounds (4-((5-(decylthio)-4-methyl-4H-1,2,4-triazol-3-yl)methyl)morpholine and 5-(2-fluorophenyl)-4-((4-bromophenyl)imino)-1,2,4-triazole-3-thiol) in milk thistle seed oil. Actual Issues of Pharmaceutical and Medical Science and Practice, 2022; 15, 3(40): 283-287. https://doi.org/10.14739/2409-2932.2022.3.263015.
13. Martynyshyn V. P., Hunchak V. M, Gutiy B.V., Glukh O. S. To the method of preparation of liniment based on thioderivative triazole and its evaluation by physical

properties and effect on certain microorganisms and fungi. Scientific Bulletin of S. Z. Gzhitsky, 2017; 19(82): P. 36–40. https://doi.org/10.15421/nvlvet8208.

14. Martynyshyn V. P., Hunchak V. M., Yaroshenko A. I., Parchenco V. V., Shcherbyna R. O., Panacenco V. V., Hunchak A. V. Chromagraphic Research of Liniment which Active Substance Belongs To New Detivaties of 1,2,4-Triazole. Research Journal of Pharmaceutical, Biological and Chemical Sciences, 2019; RJPBCS. 10(1): P. 806-811.