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EFFECT OF THE DRUG Miopets® ON THE PROCESS OF WOUND HEALING IN RABBITS

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ABSTRACT

This article describes the treatment of wounded rabbits with Levomekol ointment with the introduction of the first injection of the immunomodulator Miopets® at 1 ml, and then after 5 days at 1 ml intramuscularly, in rabbits by the 13-15th day of treatment the regeneration processes in the wounds improved, good changes were observed in their growth and development, and the body weight at the end of the experiment was 2.550±0.20 kg, which is on average 400 g more compared to the beginning of the experiment and on average 150 g more compared to the control group. The use of Miopets® intramuscularly in the treatment of wounds in rabbits led to a reduction in healing time by 4-6 days compared to the method in which only Levomekol ointment was used. Wound healing in rabbits of the experimental group was on days 13-15, in the control group on days 19-21.

Keywords. Miopets®, levomekol-symptomatic, drugs, mucous membranes, intoxication, respiratory and digestive systems, nervous system.

INTRODUCTION

At present, it is promising to study the possibility of using preparations containing humic substances to increase animal productivity (Berkovich A.M., 2003;). They, being high-molecular compounds, are formed in the process of decomposition of plant lignin in soils, peat and coals (Dobryakov Yu.I., 1996). These compounds are biologically active and exhibit antioxidant, immunostimulating, adaptogenic and detoxifying properties (Buzlama S.V., 2008, etc.). The means for increasing animal productivity include growth stimulants,

immunomodulators, adaptogens, vitamins, antioxidants and other drugs that have an anabolic effect, normalize metabolism and increase the general non-specific resistance of the body (Salomatin V.V., Ryadnov A.A., Shperov A.S., 2009, 2010, Zlepkin V.A., 2011; Ryadnov A.A., 2012; Kravchenko Yu.V., 2012, etc.). Many researchers (Ilchugulov A.V., 2010) have studied the issues of increasing the production of livestock products and improving their quality using growth-stimulating, anti-stress, adaptogenic drugs, minerals, amino acids and enzyme preparations in the form of injections or feed additives. In this regard, studies of adaptogens and immunomodulators that stimulate an increase in the overall resistance of the body, an increase in the rate of growth, productivity and an improvement in the quality of the products obtained seem relevant. When choosing such products, our attention was drawn to: natural immunomodulator Miopets®, used in the form of injections.

The aim of the study. The aim of the study is to determine the effect of the domestic immunomodulator Miopets® on the process of wound healing in rabbits, their body, body weight and clinical and physiological indicators.

OBJECT AND METHODS OF RESEARCH

Experiments to study the effect of the drug Miopets® on the process of wound healing in rabbits, their body, body weight and clinical and physiological indicators were carried out in the vivarium of the Department of Veterinary Surgery and Obstetrics of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology. For the experiments, six rabbits were taken aseptic laparotomy wounds on the abdominal cavity with an average body weight of 2.1-2.15 kg.

All rabbits in the experiment were given general and local anesthesia after preparing the surgical field in the abdominal cavity. The rabbits were infiltrated along the abdominal surface with 10-20 ml of a 3% solution of novocaine in each layer separately. After dissecting the skin, subcutaneous layer and abdominal muscles along the surface of the abdomen, the abdominal cavity was opened, the bleeding was stopped and stitches were applied.

All rabbits that underwent surgical interventions during the experiment were divided into two groups of 3 heads in each group according to the principle of analogues.

The rabbits of the first experimental group were given Levomekol ointment on the wounds, and the immunomodulator Miopets® was administered intramuscularly for the first time at 1 ml, and after 5 days, again intramuscularly at 1 ml. The rabbits of the second control group were given Levomekol ointment.

During the study of experimental rabbits, the characteristics of wound healing in rabbits, body weight, nutrition, condition of the mucous membranes, skin and fur, intoxication, respiration, heart rate, body temperature, state of the nervous system and coordination of movements were studied. In addition, the results of laboratory tests of the animals' blood before and during the experiment were studied. Each group was kept in separate cages. Animals in all groups were weighed in the morning on an empty stomach at the same time before and every 5 days of the experiment. Before and during the experiment, blood was taken for the study of morphological and biochemical parameters of blood using a hematological analyzer ("BC-2300" Mindray Co., Ltd) at the Samarkand Regional Children's Multidisciplinary Medical Center.

ANALYSIS OF THE OBTAINED RESULTS

Immediately after the wounds were applied, the rabbits began to bleed, which was stopped with a tampon, pressing it to the wound surface for the required amount of time, after which the bleeding was stopped and the skin, subcutaneous layer and abdominal muscles were sutured.

After removing the blood clots, the wound surface was dry and shiny in both groups of rabbits. One hour after the operation, the experimental rabbits were injected with the immunomodulator Miopets® intramuscularly at one point in a volume of 1 ml.

24 hours after the first injection of Miopets® (Figure 1), the wounds were covered with a scab in both groups of animals. However, in the control group of rabbits, the scab was thinner, adhered evenly over the entire wound surface, was brown, shiny, and pain and slight swelling were noted upon palpation of the wound surface. The scab does not peel off along the edges of the wound surface. In the experimental group of rabbits, a slight decrease in the wound area was noticeable, the scab was denser compared to the control group of animals, unevenly thickened, red. The scab fits tightly over the entire wound surface. A slight edema is noted around the wound surface. The rabbits reacted painfully to palpation around the wound surface. When examining the clinical parameters of the rabbits of the first experimental group, it was noted that the average body temperature was 40.4 ± 0.24 ℃, the average heart rate was 136 ± 1.36 beats per minute, the average respiratory rate was 35 ± 0.38 times per minute, and body weight was 2.150 ± 0.10 kg. When examining the clinical parameters of the second control group of rabbits, it was noted that their body temperature averaged 40.2±0.21 ℃, their heart rate averaged 159±1.35 beats per minute, their respiratory rate averaged 39±0.36 times per minute, and their body weight was 2.100±0.20 kg.

A B

Figure 1. The wounds of rabbits were sutured on the skin, subcutaneous layer and abdominal muscles. (A - experiment No. 1; B - control)

On the 5th day of treatment, the scab in the control group of rabbits began to melt, serous exudate was visible under the scab, edema around the wound surface remained, pain was detected.

Wounds in rabbits on the 5th day of treatment, the second administration of Miopets®, the scab fits tightly along the edges of the wound surface. In the experimental group of rabbits, the scab is still dense, dry, unevenly thickened. More dense compared to the control group, fits

along the entire wound surface, does not peel off along the periphery. Pain and edema around the wound surface were not detected.

24 hours after the second injection, the second administration of the immunomodulator Miopets®, the 6th day of treatment (Figure 2) in the control group of animals, melting of the scab is noted, the scab is brittle, dry, crumbling in the center of the wound surface. Along the periphery of the wound surface, the scab is adjacent to it. The scab is unevenly moistened. In the experimental group of rabbits, the appearance of the hydration stage is noted: the scab is uniformly moistened over the entire wound surface. Tightly adjacent to the wound surface both in the center and along the periphery, unevenly thickened. Edema and soreness are absent (Figure 2). When examining the clinical parameters of the rabbits of the first experimental group, it was noted that the average body temperature was 39.2±0.25 ℃, the average heart rate was 145±1.42 beats per minute, the average respiratory rate was 37±0.40 times per minute, and body weight was 2.210±0.12 kg. When examining the clinical parameters of the second control group of rabbits, it was noted that their average body temperature was 39.6±0.20 ℃, the average heart rate was 148±1.38 beats per minute, the average respiratory rate was 37±0.37 times per minute, and body weight was 2.140±0.22 kg.

A B

Figure 2. Wounds of rabbits on the 5th day of treatment, 24 hours after the 2nd injection of the Miopets® preparation. (A – experiment No. 1, B – control)

On the 10th day, in the control group, under the scab, serous exudate is visible when its fragments are peeled off. The scab fits tightly along the periphery and peels off in the center. Pain and swelling are noted on palpation. In the experimental group, the scab is dense, dry, fits tightly over the entire wound surface, burgundy in color. Pain and swelling are absent. The stage of marginal epithelialization and scarring is expressed significantly in comparison with the control group.

When examining the clinical parameters of rabbits of the first experimental group, it was noted that the average body temperature was 38.8 ± 0.20 ℃, the average heart rate was 148 ± 1.48 beats per minute, the average respiratory rate was 38 ± 0.41 times per minute, body weight was 2.300 ± 0.13 kg. When examining the clinical parameters of the second control group of rabbits, it was noted that their body temperature averaged 39.5±0.23℃, heart rate

averaged 146±1.40 beats per minute, respiratory rate averaged 35±0.34 times per minute, and body weight was 2.200±0.25 kg.

On the 15th day, the area of the exfoliated scab in the control group became larger. There was serous exudate under the scab. The scab crumbled and easily peeled off from the wound surface. It adhered tightly along the periphery. The scab was burgundy in color. The appearance of marginal epithelialization and scarring was noted. In the experimental group, the stage of epithelialization and scarring was complete, and hair growth began. The hair coat removed during preparation of the surgical field was restored faster and was more abundant in the rabbits in the experimental groups compared to the control group (Figure 3).

When examining the clinical parameters of the rabbits of the first experimental group, it was noted that the average body temperature was 38.6±0.22 ℃, the average heart rate was 152±1.49 beats per minute, the average respiratory rate was 42±0.43 times per minute, and body weight was 2.410±0.15 kg. When examining the clinical parameters of the second control group of rabbits, it was noted that their average body temperature was 39.3±0.24 ℃, the average heart rate was 145±1.41 beats per minute, the average respiratory rate was 36±0.45 times per minute, and body weight was 2.270±0.27 kg.

A B

Figure 3. Rabbit wounds on the 15th day of treatment (A – experiment No. 1, B – control)

Clinical indices of rabbits of the first experimental group.

Days of the experiment	Statistical indicators	Temperature (℃)	Pulse (1 minute)	Respiration (1 minute)	Live weight (gr)
Norms		**38,5-40**	**130-325**	**30-60**	**2-4,5**
Before treatment	M ±m %	40,4±0,24 100	136±1,36 100	35±0,38 100	2,150±0,10 100
Day 5	M ± m %	39,2±0,25 97	145±1,42 106,6	37±0,40 105,7	2,210±0,12 102,7
Day 10	M ±m %	38,8±0,20 96	148±1,48 108,8	38±0,41 108,5	2,300±0,13 107
Day 15	M ± m %	38,6±0,22 95,5	152±1,49 111,7	42±0,43 120	2,410±0,15 112
Day 25	M ± m %	38,5±0,21 95,3	144±1,40 105,8	43±0,44 122,8	2,550±0,20 118,6

Clinical indices of rabbits of the second control group.

Days of the experiment	Statistical indicators	Temperature (℃)	Pulse (1 minute)	Respiration (1 minute)	Live weight (gr)
Norms		**38,5-40**	**130-325**	**30-60**	**2-4,5**
Before treatment	M ±m %	40,2±0,21 100	159±1,35 100	39±0,36 100	2,100±0,20 100
Day 5	M ± m %	39,6±0,20 98,5	148±1,38 93	37±0,37 94,8	2,140±0,22 101,9
Day 10	M ±m %	39,5±0,23 98,2	146±1,40 91,8	35±0,34 89,7	2,200±0,25 104,7
Day 15	M ± m %	39,3±0,24 97,8	145±1,41 91,2	36±0,45 92,3	2,270±0,27 108
Day 25	M ± m %	38,6±0,20 96	144±1,39 905	37±0,43 94,9	2,350±0,33 111,9

Wounds in rabbits on the 21st day of treatment, in the control group there is no pain or swelling. In the experimental group, the stage of epithelialization and scarring is complete, hair growth has begun.

When examining the clinical indicators of rabbits on the 25th day of treatment of the first experimental group, it was noted that the average body temperature was 38.5 ± 0.21 ℃, the average heart rate was 144 ± 1.40 beats per minute, the average respiratory rate was 43 ± 0.44 times per minute, body weight was 2.550 ± 0.20 kg. When examining the clinical parameters of the rabbits on the 25th day of the second control group, it was noted that their body temperature averaged 38.6±0.20 ℃, heart rate averaged 144±1.39 beats per minute, respiratory rate averaged 37±0.43 times per minute, and body weight was 2.350±0.33 kg. Thus, the greatest changes under the influence of stimulants, as a rule, are growth and high-speed transformations in tissues and organs. Biostimulants act as powerful stimulants on the vital processes of the body, namely, they increase the overall strength of the animal, activate the activity of its most important physiological systems, improve metabolism, increase resistance to adverse factors, have a stimulating effect on the productivity of animals, improve the absorption of feed through enzyme systems and the central nervous system. The combined use of Levomekol ointment and Miopets® in the treatment of wounded rabbits not only accelerates the regeneration processes in wounds, but also has a significant positive effect on their productivity, growth, body weight, clinical and physiological indicators, and it is noted that under the influence of Miopets®, blood and lymph circulation increases, tissue metabolism accelerates, dull hair falls out, and the renewed one becomes smooth and shiny.

CONCLUSIONS

1. When treating wounded rabbits with Levomekol ointment with the first injection of the immunomodulator Miopets® at 1 ml, and then after 5 days at 1 ml intramuscularly, the rabbits showed improved regeneration processes in the wounds by the 13-15th day of treatment, good changes were observed in their growth and development, and the body weight at the end of the experiment was 2.550±0.20 kg, which is on average 400 g more than at the beginning of the experiment and on average 150 g more than the control group.

2. The use of the immunomodulator Miopets® intramuscularly in the treatment of wounds in rabbits led to a reduction in healing time by 4-6 days compared to the method using only Levomekol ointment. Wound healing in rabbits of the experimental group was on days 13-15, in the control group on days 19-21.

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