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Employment of Veriben for treatment of bovine babesiosis caused by *Babesia bovis* Применение Верибена для лечения бабезиоза крупного рогатого скота, вызываемого *Babesia bovis*

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РЕЗЮМЕ / SUMMARY

An experience of specific and symptomatic treatment of cattle natural infected by *Babesia bovis* using Veriben have been described in the article. Double intramuscular injection of Veriben at a dose of 1 ml per 20 kg of body weight with an interval of 24 hours provide effective treatment of bovine babesiosis. The lower doses did not show a good treatment effect. Symptomatic treatment provided more rapid recovery of the sick animals. In the animals of the group I after 1st injection of Veriben a sharp decline in parasitemia was observed. The parasites in the blood after the 2nd injection were not detected. There was also a drop of body temperature to normal. Clinical signs of babesiosis disappeared. At the same time, in the animals of the II and III experimental groups *Babesia bovis* remained in the blood, despite the reduction of parasitemia. And the body temperature remained elevated. Clinical signs of disease did not disappear.

Keywords: bovine babesiosis, *Babesia bovis*, tick-born diseases, anti-babesia drugs, Veriben.

В статье приведены сведения об эффективности противопаразитарного препарата Верибена для специфической терапии крупного рогатого скота, естественно зараженного *Babesia bovis*. Двукратная внутримышечная инъекция Верибена в дозе 1 см³ на 20 кг массы тела с интервалом 24 часа обеспечила эффективное лечение больного бабезиозом крупного рогатого скота. Более низкие дозы не показали хороший эффект лечения. Симптоматическое лечение при условии более быстрого выздоровления больных животных.

У животных группы I после первой инъекции Верибена

наблюдалось резкое снижение паразитемии. Паразиты в крови после второй инъекции не были обнаружены. Также отмечалось снижение температуры тела до нормальной. Клинические признаки бабезиоза исчезли.

В то же время у животных II и III опытных групп паразиты оставались в крови, несмотря на снижение паразитемии. Температура тела оставалась повышенной. Клинические признаки болезни не исчезали.

Ключевые слова: бабезиоз, *Babesia bovis*, кровепаразитарные болезни, трансмиссивные болезни, противобабезийные препараты.

Introduction

Babesiosis is a tick-transmitted disease caused by protozoans of the genus *Babesia* and it is characterized by hemolytic anemia and fever, with occasional hemoglobinuria and death. The major impact occurs in the cattle industry where bovine babesiosis has had a huge economic effect due to loss of meat and beef production of infected animals and death. Nowadays, to those costs there must be added the high cost of tick control, disease detection, prevention and treatment (5).

Most of the regions of the Republic of Tadjikistan are endemic areas of bovine babesiosis and there are many cases of disease are detected every year. The most important causative agent in Tadjikistan is *Babesia bovis* (1).

Control of bovine babesiosis can be achieved either by tick management and anti-babesia drugs or by a combination of these approaches. Chemotherapy of bovine babesiosis is important for controlling the disease either to treat field cases or to control artificially induced infections (4, 5).

Chemotherapy is important to control and prevent babesiosis in some areas of the world. In endemic areas, sick animals should be treated as soon as possible with an anti-parasitic drug. The success of the treatment depends on early diagnosis and prompt administration of effective drugs.

Diminazene aceturate is the most used drug for the treatment of bovine babesiosis. Diminazene binds irreversibly to double-stranded DNA, in the groove between complementary strands, via specific interaction with sites rich in adenine-thymine base pairs. The type of binding between diminazene and DNA is non-intercalative and has high affinity for kinetoplast DNA (kDNA), which impairs kinetoplast replication and function. Moreover, diminazene inhibits the mitochondrial topoisomerase II (4).

Diminazene aceturate is effective against *B. bovis* (5...6).

The aim of this study is to exam the efficacy of application of different doses of Veriben (drug based on Diminazene aceturate) in specific and symptomatic treatment of cattle naturally infected with *Babesia bovis*.

Materials & Methods

Surveys were carried out in cattle naturally infected with *Babesia bovis* in 2012-13. Animals belonged to the public and private (Dekhan) farms from Kumsangir and Faizabad districts of Tadjikistan. Both regions are endemic for to blood parasite diseases.

Total number of sick animals was 22, including three in the control group. Animals were divided into 4 groups: 3 tested (n1=9, n2=5, n3=5) and 1 control (n=3). Ages of animals were

from 3 months to 6 years. All animals had strong clinical signs of babesiosis. Parasitemia in sick animals was 4...5%.

The diagnosis was based on the results of the microscopic examination of blood smears stained with Giemsa, clinical signs and epizootological data. Sera from animals were also examined with serological tests (2, 3).

In experiments Veriben (France) was used. A solution for injection was prepared immediately before use by dissolving 2.36 g of Veriben in 15 cm³ of distilled water or sterile saline.

Symptomatic treatment depended on the condition of animal and was performed with different drugs according to instructions. Duration of treatment course depended on the severity of the disease and lasted from 3 to 7 days.

During the experiment animals were daily tested for body temperature and level of parasitemia.

Results

Animals were treated on 2nd and 3rd days after the clinical signs of disease. Monitoring of the treatment was carried out by analysis of parasitemia. Levels of parasitemia of sick cattle under treatment are shown in Table 1.

The drug was injected intramuscularly in doses of 1 cm³ per 20, 30 and 40 kg of BW. The interval between the injections of the drug was 24 hours. Animals of the control group were untreated.

There was a sharp decline in parasitemia in the animals of group I after 1st injection of Veriben. And parasites were not detected in blood smears after the 2nd injection. There was also a downward trend in body temperature in sick cattle from 40,00C/103°F (on average) to normal throughout 15...24 hours after beginning of treatment. It was observed in older animals. There was improving the overall condition of the animals/

At the same time, in the II and III experimental groups, despite the reduction in parasitemia, parasites remained in the blood, the body temperature remained elevated, and clinical signs of babesiosis did not disappear. But in 3 animals of IIIrd group the high body temperature was observed within 72 after 1st injection.

During the experiment three animals of control group demonstrated clinical signs and an increase of level of parasitemia. And they died within 5 days.

We also used some supportive drugs for treatment after 2nd injection of Veriben. The aim of symptomatic therapy is to reduce clinical signs of disease, to improve the therapeutic effect and to avoid side effects. We used cardiac and anti-inflammatory drugs, multivitamins, antioxidants and corticosteroids and also intravenous infusion therapy.

Discussion

It was determined that double intramuscular injection of Veriben to cattle in the dose of 1 ml per 20 kg of body weight with an interval of 24 hours provides an effective treatment of babesiosis in cattle.

The lower doses did not show a good efficacy. Symptomatic treatment provides more rapid recovery of sick animals.

A sharp decrease of parasitemia in the animals of the 1st group after the 1st injection of Veriben was observed. And after the 2nd injection parasites in blood were not detected.

Drop of body temperature to normal and improvement of health of animals were also observed.

At the same time, in the animals of the 2nd and 3rd experimental groups despite the reduced parasitemia, parasites remained in the blood. The body temperature was still increased, and the clinical signs of babesiosis did not disappear.

Conclusion

According to our results double application of veriben in the dose of 1 ml per 20 kg of body weight with an interval of 24 hours provides an effective treatment of cattle babesiosis caused by *Babesia bovis*. Application of low doses of the drug does not provide a high efficiency of causal treatment, and parasites remain in the blood.

The use of symptomatic therapy drugs helps to improve the therapeutic effect and to avoid side effects.

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1. Levels of parasitemia of sick cattle within treatment (P < 0,05)

1. Уровни паразитемии у больного скота во время лечения (P < 0,05)

Group Группа	Doses Дозы	Parasitemia (%) before treatment Паразитемия перед началом лечения	Parasitemia (%) within treatment Паразитемия (%) во время лечения			
			2-е	3-е	5-е	7-е
I	1 cm ³ / 20 kg MT	4,9±1,9	2,9±0,8	1,9±0,2	-	-
II	1 cm ³ / 30 kg MT	4,2±1,0	3,4±1,4	1,2±0,6	0,1±0,03	Ед
III	1 cm ³ / 40 kg MT	4,2±1,4	3,7±1,0	1,5±0,8	1,25±0,05	0,6±0,03
IV	-	4,4±0,5	4,9±1,1	5,1±0,6	5,5±0,6	-