POSSIBLE WAYS OF TRANSMISSION OF BOVINE LEUKEMIA VIRUS

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Abstract:
This article presents the results of an experimental study on the possible spread of the bovine leukemia virus from infected lymphocytes in both secretions and excreta of animals with leukemia, as well as in violation of the rules of asepsis and antisepsis during veterinary and zootechnical measures. An attempt has been made to establish additional ways and factors of transmission of the causative agent of the bovine leukemia virus.

Keywords: transmission pathways, amniotic fluid, leukocytes, urine, allantoic fluid, placenta cotyledon extract.

Introduction

To develop effective measures for the prevention and control of bovine leukemia, it is important to study the epizootic process: the source of the causative agent of infection, the ways and factors of its transmission. In this disease, there are two ways of transmitting the virus: vertical, from mother to fetus, and horizontal, from one animal to another.

The results of experimental and epizootological studies show that the vertical transmission route of the bovine leukemia virus plays an insignificant role (up to 10-18%) in the epizootic process of oncornavirus infection. Consequently, the spread of bovine leukemia virus (BLV) in natural conditions is carried out along the horizontal path by the transfer of infected lymphocytes with both secretions and excreta of animals with leukemia, as well as in violation of the rules of asepsis and antisepsis during veterinary and zootechnical measures.

Materials and methods

Given the prevailing opinion of researchers about the absence of the leukemia virus in the urine of animals with leukemia and different opinions about the presence of the leukemia virus in the amniotic fluid, it was considered necessary:

1. Determine the duration of inactivation of BLV in leukocytes in urine, which may be observed in pathological conditions.
2. To find out the presence of the leukemia virus in the amniotic fluid of a cow with leukemia and the pathways of transmission of the pathogen with the amniotic fluid.

In the first experiment, the donor was an experimentally infected sheep (inv. No. 6730), which reacted positively in the immunodiffusion reaction (TIR) with GP-51 and P-24 BLV antigens.

In order to determine the time of inactivation of BLV in leukocytes in urine, 24 heads of serotenegative lambs of the Karakul breed aged two months were infected subcutaneously 10, 20, 30 minutes, 1, 3, 6 and 12 hours after incubation of leukocytes in urine at a dose of. 1 million leukocytes per head. Experimental animals were examined 30, 60, 90, 120, 150 and 180 days after infection by serological (TIR) and hematological methods.

Results and discussions

During serological examination in TIR, one month after infection, two lambs from the first and one animal from the second group had virus-specific precipitating antibodies to BLV S in their blood sera, two months after infection, serological examination in TIR showed a positive result in all animals from the first, two from the second and one lamb from the third group (Table 1). During the entire experiment (6 months) a similar result was recorded.

The results of serological studies of experimental lambs in an experiment to determine the duration of inactivation of BLV in lymphocytes in urine.

Table 1

group	Type of animals	Number of animals	Name of the entered material	Method of administration	The dose	Incubation time	The number of seropositive animals after a day					
							30	60	90	120	150	180
1.	The lambs	3	Urine+native leukemia donor	n/a	3.0 urine + 1 million leuc.	10 minutes	3/2	3/3	3/3	3/3	3/3	3/3
2.	-"-	3	-"-	-"-	-"-	20 minutes	3/1	3/2	3/2	3/2	3/2	3/2
3.	-"-	3	-"-	-"-	-"-	30 minutes	3/0	3/1	3/1	3/1	3/1	3/1
4.	-"-	3	-"-	-"-	-"-	1 hour	3/0	3/0	3/0	3/0	3/0	3/0
5.	-"-	3	-"-	-"-	-"-	3 hours	3/0	3/0	3/0	3/0	3/0	3/0
6.	-"-	3	-"-	-"-	-"-	6 hours	3/0	3/0	3/0	3/0	3/0	3/0
7.	-"-	3	-"-	-"-	-"-	12 hours	3/0	3/0	3/0	3/0	3/0	3/0
8.	-"-	3	Urine+native leukemia of healthy animals	-"-	3.0 + 1 million leuc.	10 minutes	3/0	3/0	3/0	3/0	3/0	3/0

Note: the numerator is the number of animals studied, and the denominator is the number of seropositive animals.

In the remaining groups of animals, infection with BLV infection was not observed during this time. Hematological blood parameters during the experiment in all experimental animals were within the physiological norm.

Analysis of the research results shows that 10, 20 and 30 minutes after incubation of leukocytes infected with BLV, the virus retains its infectious activity, and 1 hour after incubation under the influence of an acidic environment, the bovine leukemia virus is completely inactivated. Consequently, lymphocytes infected with BLV in urine can be a factor in the transmission of oncornavirus infection for up to 30 minutes. In the second experiment, the donor was a red steppe cow with lymphocytic leukemia (inv. No. 3520), who reacted positively with GP-51 and P-24 oncornavirus antigens at the 7th month of pregnancy. The number of leukocytes on the day of slaughter in a cow was 43.6 thousand/ ml of blood with 96% of lymphocytes.

To determine the presence of the leukemia virus in the amniotic fluid of a cow with leukemia, 21 heads of two-month-old Karakul lambs were used. The animals were examined by the serological method in TIR before infection and no seropositive reaction with the HP-antigen of BLV was detected in any animal. There were no abnormalities in the hematological parameters of the blood.

The lambs were divided into 7 groups of 3 heads each.

Three lambs of the first group were injected with donor amniotic fluid in doses of 125 ml, 150 ml, 175 ml.

The second group of lambs received amniotic fluid subcutaneously in doses of 15, 20 and 30 ml.

The third group was injected with transudate of allantoic fluid in the same dose subcutaneously.

The fourth group of lambs was injected with amniotic fluid sediments in a dose of 10 ml subcutaneously.

The fifth group of lambs received placental cotyledon extract in a dose of 10 ml subcutaneously.

Three lambs of the 6th group were incubated subcutaneously with whole fetal blood in a dose of 3 ml.

As a control, three lambs (group 7) were injected with 3 ml of subcutaneous donor blood. Experimental animals were examined by serological and hematological methods monthly for up to 6 months. The results of serological studies of experimental lambs are presented in Table 2.

The results of a serological study of experimental lambs infected with amniotic fluid from a cow with leukemia.

Table 2

group	Type of animals	Number of animals (heads)	Name of the entered material	Method of administration	The dose ml	The number of seropositive animals after a day					
						30	60	90	120	150	180
1	The lambs	3	Amniotic fluid. liquids	Ext	125,0-175,0	3/0	3/0	3/0	3/0	3/0	3/0
2	-"-	3	Amniotic fluid. liquids	n/a	15,0-30,0	3/0	3/0	3/0	3/0	3/0	3/0
3	-"-	3	Trans.allan liquids	-"-	15,0-30,0	3/0	3/0	3/0	3/0	3/0	3/0
4	-"-	3	Precipitation of amniotic fluid	-"-	10,0	3/0	3/0	3/0	3/0	3/0	3/0
5	-"-	3	Extract of cotiledone.	-"-	10,0	3/2	3/3	3/3	3/3	3/3	3/3
6	-"-	3	Fetal blood	-"-	3,0	3/1	3/3	3/3	3/3	3/3	3/3
7	-"-	3	Donor blood	-"-	3,0	3/1	3/3	3/3	3/3	3/3	3/3

Note: in the numerator, the total number of animals studied
The denominator is the number of seropositive animals.

As can be seen from the table, one month after infection, two lambs from the fifth group and one head from the sixth and seventh (control) groups showed a positive reaction in the immunodiffusion reaction in agar gel with GP 51 BLV antigen. Two months after infection, a seropositive reaction was observed in all experimental lambs from the fifth and sixth groups and in all control animals. The seropositive result in these animals was consistently detected throughout the experiment. No changes characteristic of leukemia were observed in the hematological parameters of the blood of experimental animals during the experiment.

Conclusions

1. Thus, based on the conducted studies by bioassay on sheep, the bovine leukemia virus was not detected in the amniotic fluid of cows with leukemia.
2. Intrauterine transmission of BLV from mother to fetus was noted, i. e. all lambs infected with fetal blood (sixth pear) showed a seropositive result to GP-51 BLV antigen.
3. By means of a biopsy on lambs, the presence of leukemia virus in the cotyledons of the fetal part of the placenta of cows with lymphocytic leukemia was established. Consequently, the spread of oncornavirus infection through infected placentas of cows with leukemia may occur in violation of veterinary and sanitary rules during childbirth.

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