NOTE

A Survey for Maternal Antibodies to Bovine Leukemia Virus (BLV) in Calves Born to Cows Infected with BLV

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ABSTRACT. Seventy calves born to the cows infected with bovine leukemia virus (BLV) were examined periodically for the maternal antibodies to BLV. Antibodies to BLV were negative in all of 22 except one calves examined at precolostrum stage, but they converted into positive 24hrs postcolostrum. Most of the 70 calves being positive in the antibodies to BLV at the postcolostrum stage converted into negative within 2 to 6 months of age, and only in five (7.1%) remained positive after 6 months of age.—*Key words:* BLV, maternal antibody.

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Hirozontal [3, 7, 10] and vertical modes of transmission [8, 9] are known of bovine leukemia virus (BLV), the causative agent of enzootic bovine leukemia (EBL). The former mode of transmission is likely to be more important under field conditions. Although it had been considered before that the latter also plays an important role in infection of BLV, the accumulated information recently published [5, 8, 11, 13] revealed rather rare occurrence of vertical transmission in herds. This survey was performed to find how many calves born to the cows infected with BLV possess acquired or maternal antibodies to BLV to help to establish a reasonable and effective eradication program of EBL.

Seventy Holstein-Friesian calves born to the cows infected with BLV were examined from June, 1979 through January, 1982 in two dairy herds, each consisting of 324 and 33 cattle at the beginning of this survey. Among them, 117 and 32 were positive for BLV antibodies, respectively. All of the newborn calves postcolostrum (pc) were cur-

sorily segregated from their dams 24hrs after their birth in independent pens with open windows until they were weaned. Weanling calves were kept in a group of 5 to 6.

The serum samples were examined for the antibodies to BLV glycoprotein (gp) and protein (P) antigens periodically from the precolostrum (prec) stage for several or 25 months in the longest by the agar-gel immunodiffusion test [7].

The calves to be examined were divided into two groups. The serum samples from group A, but not from group B at prec stage were examined. Results with 22 of group A and 48 calves of group B are shown in Figs. 1 and 2. Although antibodies to BLV were negative in all except one calves (No. A-22) at prec stage in group A, they converted into positive 24hrs pc. The antibody positive calves converted negative 2 to 5 months pc in more than 80% of cases (Nos. A-1~18), and 2 animals were confirmed negative on the 326th (No. A-19) and 338th day pc (No. A-20), respectively. Two animals (Nos. A-

Fig. 1. Maternal antibodies to BLV in calves from BLV-infected cows with precolostrum examination.

Fig. 2. Maternal antibodies to BLV in calves from BLV-infected cows without precolostrum examination.

21 and 22) maintained the antibody for 9 months of the observation period. In these animals, the serum P-antibody to BLV became positive from the 1st and the 88th days pc. BLV infection was strongly suggested for the 2 of the 22 (9.1%) calves, for no P-antibody

to BLV was detected in either of their dams. In group B, positive gp-antibody to BLV was detected at their first examination performed during the 1st and 156th days pc in all of the 48 calves. It disappeared 2 to 6 months pc in most of the animals (Nos. B-1~42).

Three other animals (Nos. B-43~45) were confirmed to have converted into negative on the 201st, 207th and 247th days pc, respectively. P-antibody to BLV was also detected in two other animals (Nos. B-37 and 41) at the 1st examination, but it disappeared one month later in both. It was suggested that P-antibody was the maternal one. One animal (No. B-46) temporarily converted into negative in the serum antibody to BLV on the 123rd day pc, but P- and gp-antibodies were recognized again from the 151st day pc and persisted until the 173th day pc of the observation period. The gp-antibody to BLV was positive in the serum of two animals (Nos. B-47 and 48) during the period from the 134th to 263rd and from the 156th to 390th day pc, respectively. Accordingly, acquired antibodies were confirmed only in three of 48 (6.3%) calves in this group.

The findings described above showed that the serum antibodies to BLV in most calves born to the cows infected with BLV were maternal ones and disappeared within 6 months pc. In other words, only five of 70 (7.1%) calves possessed the acquired antibodies due to BLV infection.

This figure well corresponds to our previous data [8] and recent publications [2, 5]. The serum antibodies to BLV of five animals (Nos. A-19, 20, B-43~45), which were confirmed to be negative between the 201st and 338th day pc could have converted into negative at earlier stages, if their sera had been examined successively. Accordingly, it is recommended to examine serum samples of calves born to the cows infected with BLV for as long as by 12 months from 6 months of age to determine if vertical transmission has occurred or not.

The positive serum antibody to BLV from the prec stage in one (A-22) of the five calves may have been acquired one resulting from prenatal infection. Regarding the other four animals, transplacental [8, 9], birth canal,

milk-borne [1, 4, 6], or contact infection [5] may be suggested tentatively.

Among them, one animal (No. B-46) showed negative serum antibodies to BLV for a while, then converted into positive from the 151st day pc. It may have possibly been infected with BLV horizontally after birth, because positive conversion of antibodies to BLV has been recognized usually within one or 2 months after experimental inoculation of BLV [7, 12]. Although milk-borne infection could not be denied [1, 4, 6], another mode of transmission should be in mind. It is known that very few calves fed colostrum and kept far from their dams being infected with BLV were infected [5], that the serum antibodies to BLV would resist infection with BLV [3, 10], and that occurrence of oral infection was rather difficult under experimental conditions [12]. The calves examined were cursorily segregated from their dams, and kept in pens with open windows. We could not rule out the possibility that the blood-sucking insects had played a role in transmission in some cases [5, 7].

The present authors [8] reported that one-third of the fetuses of the pregnant cows affected with EBL were infected with BLV. Regarding the sera of calves from cows infected with BLV, positive rates of antibodies to BLV were reported to be 18% in leukosis herds [11], or 13.3% [14] at prec stage. In the case with such high positive rate, it may be possible that some of the sera might have been obtained from the cows not only infected but also affected with neoplastic lesions. Anyhow, the transplacental infection from the cows infected with BLV does not seem so common as was feared. It is strongly suggested that approximately 90% of the calves born to the cows infected with BLV but not diseased could maintain themselves free from BLV infection if careful management is given.

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要 約

ウシ白血病ウイルス感染牛の新生子牛における移行抗体の消長（短報）： 大島寛一・森本直子・香川裕一・沼宮内茂・平野輝雄¹⁾・萱野裕是²⁾（岩手県盛岡市岩手大学農学部家畜病理学教室，¹⁾実験農場，²⁾岩手県雫石町小岩井技術研究センター）——ウシ白血病ウイルス感染母ウシから生まれた子ウシ70頭について，移行抗体の消長を検索した。A群22頭中21頭は初乳摂取以前に BLV 抗体は検出できず，初乳摂取後24時間ですべてに BLV 抗体を認めた。初乳摂取前に抗体を検査しなかったB群では，摂取後 BLV 抗体は何れも陽性であった。両群とも抗体の多くは 2-6 か月の間に消失し，75頭中5頭（7.1%）が自家抗体を産生しているに過ぎないことが明らかになった。