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Fact Sheet

Fact Sheet 333

Bovine Leukosis

Bovine leukosis occurs in more than 20 percent of the dairy cows, approximately 60 percent of the dairy herds and 10 percent of beef herds surveyed in the United States. The number of infected cattle in infected herds may vary widely. This disease exists mainly in a sub-clinical state in cattle but can be detected by serologic testing or by the isolation of the specific virus that causes the disease. Only 4 to 5 percent of the infected cattle develop clinical leukosis (lymphosarcoma). All parts of the body may be affected with tumors, but the organs usually involved are lymph glands, heart, abomasum, intestines and the uterus. Dairy cattle show a higher incidence of the disease than beef cattle, but no breed is particularly resistant or susceptible. Bovine leukosis is a contagious disease. Insects may be involved in the transmission of the bovine leukosis virus (BLV).

In European countries, considerable economic loss has been caused by BLV. In the United States, the impact of BLV infection is difficult to evaluate since extensive testing has not been done. There is definite evidence of a slow increase of bovine leukosis in dairy cattle in the United States. Lymphosarcoma is infrequent in sheep and goats.

Forms of BLV

There are four different recognizable forms-adult, juvenile thymic and skin. The adult form is the more common and generally occurs in cattle from ages of 4 to 8 years. Affected animals lose weight, may show tumors and produce less milk. Most of these cases die from the disease. Neither BLV antibodies nor the virus can be shown in the other three forms.

The thymic form is relatively rare and is seen in cattle about 2 years of age with lymphosarcoma tumors extending from the throat area to the chest.

The juvenile form occurs in calves under 2 years of age, usually under 6 months, and even in some cases present at birth. This form resembles the adult form as a generalized disease with nearly all lymph glands and many internal organs being involved.

The cutaneous or skin form, although rare, generally occurs in cattle 1½ to 3 years of age. Cases have been reported in which the tumors in all forms have regressed or disappeared with no recurrence during the remaining life of the individual animal.

The mode of transmission or spread of the BLV has not been substantiated. Within herds, it appears that close contact is the principal mode of transmission. Blood sucking insects (such as the horse fly), blood transfusions, contaminated instruments and injection needles may be responsible for transfering BLV contaminated white blood cells (lymphocytes) from one animal to another. There appears to be a higher incidence of new cases during summer months, thus substantiating the theory that transmission may be

by biting insects.

Infection of the calf in the pregnant dam can occur as a result of a break in the placental barrier. Only a few calves seem to become infected in utero from BLV-infected dams. Calves nursing these BLV-infected cows will show maternal BLV antibodies. The BL virus is in milk of up to 50 percent of BLV-infected cattle. The ingestion of the virus shed in the milk may be partially or completely neutralized by the high concentration of colostral antibodies. Therefore, ingestion of infected milk is not an important natural route of transmission.

Calves over 6 months of age and heifers to parturition have a low incidence. This indicates that the spread is from animal to animal because the young cattle usually do not have direct contact with infected adult cows.

BLV has not been detected in saliva, urine or semen. There is substantial evidence that BLV is not transmitted by artificial insemination.

Since pasteurization of milk destroys the BLV in milk, a public health risk from bovine leukosis is doubtful.

Signs

Adult cows showing clinical signs of leukosis may exhibit emaciation and enlargement of superficial or palpable lymph glands. The enlargement of the glands may occur rapidly, often shortly before or after calving. Tumors may extend from the lymph glands into the surrounding tissues. Enlargement of the lymph gland behind the eyeball will force the eye to protrude from its socket. Usually only one eye is affected. The abomasum and intestines are commonly involved. Clinical signs such as poor appetite, abdominal distension and persistent diarrhea containing blood may occur. In cows with lymphosarcoma of the heart, distended jugular and mammary veins and swelling under the lower jaws may be evident. Once clinical signs appear, emaciation and death usually occur rather rapidly.

Diagnosis

While signs seen in the living animal and lesions found at postmortem examination may suggest bovine leukosis, a definite diagnosis requires laboratory assistance. Microscopic examination of biopsy tissues at necropsy may be used. Identification of the virus using an electron microscope or serologic testing for BLV antibodies in the blood of a suspected animal may also be used.

Control

Within herds, control can be accomplished by avoiding close contact between BLV-infected and noninfected cows. Reduce possibilities for blood transfer by controlling blood sucking insects and avoiding the use of blood contaminated instruments. Feed calves colostrum and/or milk from BLV-negative cows. Consider culling BLV-positive cows from the herd, especially if the numbers are few.

Prevent infection in a herd by introducing new cattle only from BLV-clean herds; have all herd replacements blood tested for BLV prior to purchase; and repeatedly test new cattle to be sure that an infection is not introduced into your herd.

BLV-infection that does not progress to lymphosarcoma seems to have no measurable effect upon either milk production or reproduction. Although the retroviruses, the viruses in which BLV is grouped, are known to cause immunosuppression, the approximate 2,167,000 dairy cattle that are BLV infected in the United States may be more susceptible to contact diseases other than BLV tumors due to this suppression of the animal's defense mechanism.

Although no vaccine is available today, there is available now an inexpensive, rapid and reliable diagnostic test. In the United States, there are no official regulatory policies or programs concerning the control of bovine leukosis. Today, it is recognized as having wide prevalence, high incidence and low mortality.

The economic impact of BLV infection in a herd is not well understood. Some speculate that BLV-infected cows showing no clinical signs of the disease are not economically affected. Others speculate that underlying immunosuppressive factors may be extremely costly and that the disease is far more costly to the dairy industry than is evident by the 108,000 cows manifesting clinical disease.

From a public health point of view, serological evidence of BLV transmission to man is negative. Farm families drinking raw milk from BLV-infected cows have shown no BLV antibodies when tested. If any virus appeared in the milk, it would be totally destroyed by pasteurization.

It has been estimated that in the United States, BLV infection is perhaps the greatest single threat to the large American cattle export business, with possible exception of bluetongue. Many European and Latin American countries do not allow the importation of BLV-infected cattle or of semen from infected bulls. Some countries even forbid importation of BLV-negative cows which originate from herds where any level of infection occurred. In 1978, a total of 56,156 dairy cattle were exported, and the estimated value of these sales was at least $145 million. West Germany, a country with an official BLV eradication program, is rapidly displacing the United States in the cattle export business.

Implementation of measures to prevent, control or eradicate BLV infection may be necessary economically for dairy producers who sell cattle for export.

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