



The Veterinary Link

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Blackleg and other clostridial diseases

A family of bacteria (called Clostridia) can cause a number of diseases in cattle. This group of bacteria is very common in the intestinal tract of cattle and can survive for many years in soil. Some of the earliest cattle vaccines developed were for this family of bacteria.

Different species of clostridial bacteria tend to cause disease in cattle of different ages. The most common clostridial diseases of cattle are blackleg (*C. chauvoei*), malignant edema (*C. septicum* most commonly), bacillary hemoglobinuria (*C. haemolyticum*), black disease (*C. novyi*), and clostridial enterotoxemia (*C. perfringens*). Occasionally, tetanus (*C. tetani*) or botulism (*C. botulinum*) is diagnosed in cattle.

Blackleg

Blackleg is caused by the bacterial organism *C. chauvoei*. The bacteria live in the soil where they can survive for many years. It is assumed that the bacteria enter cattle through the digestive tract and can be found in many tissues of healthy animals. The disease is created when the bacteria multiply rapidly in muscle tissue and release large quantities of a fatal toxin. Muscle trauma or bruising from handling, trucking or normal animal interactions may be required for the bacteria to have a suitable environment for proliferation, but the exact requirements for disease onset are not known.

Blackleg is a highly fatal disease. The disease is most common in calves between 6 and 12 months (mo.) of age, with animals more than 1 to 2 years of age rarely being affected. The disease attacks very rapidly, and in many cases a dead calf is the first indication of a problem. If detected early enough, the signs of blackleg disease are:

- depression;
- lack of interest in eating;
- reluctance to move because of lameness (muscle soreness); and
- muscle swelling in the affected area.

The most commonly affected muscles are those of the legs, tongue, brisket and udder.

Blackleg (like other clostridial diseases) is not considered a contagious disease, in that the primary mode of transmission is not from one animal to another — instead, it is from soil to an animal. An outbreak may appear contagious in that a number of animals can be affected in a short period of time, usually following a soil disturbance. Although the blackleg

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organism is widespread in distribution and most likely present on most farms, some pastures have a much higher incidence than others. Any event that disturbs the soil, such as flooding, pond repair, bulldozer work or laying water pipe, can initiate an outbreak of blackleg disease.

Malignant edema

Malignant edema is most commonly due to an infection of a wound with *C. septicum*, but it can be due to infection with other clostridial organisms. The disease and the damage it causes look very similar to blackleg.

Bacillary hemoglobinuria

Bacillary hemoglobinuria

(*C. haemolyticum*) is more commonly seen in cattle grazing poorly drained pastures with alkaline soil. It is typically seen in adult animals in good body condition. The bacteria enter the body and are transported to the liver. It is believed that some type of liver damage (such as liver flukes or other clostridial disease) is necessary to trigger the disease. Most animals showing symptoms will die within

36 hours; therefore, the affected animals are often found dead.

Black disease

Black disease is caused by *C. novyi* and follows infestation with liver flukes. Like other clostridial diseases, affected animals tend to die quickly, and recovery is rare.

Enterotoxemia

C. perfringens, or enterotoxemia, is typically a disease of young calves. Most commonly, death following the onset of disease is so rapid that the first sign of a problem is to find a dead calf. Occasionally, calves may show signs of diarrhea, abdominal pain and possibly seizures, but affected calves almost always proceed to death. Affected calves are almost always the offspring of mothers with high milk production and are typically the healthiest, fastest-growing calves.

There are five known types of *C. perfringens* (A, B, C, D and E). Type C seriously affects calves in North America. Type C bacteria are commonplace in the gut of calves and adult cattle and are present in calf intestines shortly after birth. This organism secretes a toxin that can cause a rapid death if present in large amounts. The disease is most frequently observed in calves one week of age or less.

Because the bacterium is a normal gut inhabitant, two things must happen for the organism to multiply rapidly and produce large amounts of toxin. First, the bacteria need an abundance of carbohydrates, which is present in milk. Second, intestinal tract motility must be at least partially slowed, which occurs following a large meal. Following a large milk meal, high levels of toxin can be produced, and death can occur rapidly.

An enzyme produced by the pancreas is able to break down the toxin; however, this enzyme (trypsin) is only present in small amounts the first few days of life and then increases to protective levels by 2 weeks of age.

Prevention and treatment

Vaccines that provide fairly good protection against clostridial disease are available. Older animals respond best to vaccination by building a protective immune response. Young animals that have been vaccinated may or may not have developed protection, so deaths from blackleg can occur in vaccinated herds. Because the vaccine is fairly effective, a program where calves are initially vaccinated at 2-3 mo. of age with subsequent revaccination is recommended. During an outbreak of enterotoxemia, antitoxins and antibiotics should be administered to calves that do not show signs of disease and that are less than 2 weeks of age.

Treatment is not likely to be rewarding. Treatment with antibiotics and supportive treatment (keeping cattle dry, comfortable and hydrated) have been used with minimal success.