

Vet Call

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Clostridial diseases of calves

The final diseases that I will write about in this series covering common diseases of young, nursing calves are two diseases caused by the *Clostridium* family of bacteria (enterotoxemia and blackleg).

Enterotoxemia

Even though *Clostridium perfringens*, or enterotoxemia, is often included in discussions of diarrhea-causing diseases of young calves, it rarely is accompanied by diarrhea. Usually death following onset of disease is so rapid that the first sign of a problem is a dead calf, not a calf with diarrhea.

Occasionally calves may be found that have diarrhea and abdominal pain, and possibly seizures, but affected calves almost always die. Those few animals that survive are usually unthrifty and stunted. Affected calves are almost always the offspring of mothers with high milk production and are typically the healthiest, fastest-growing calves otherwise.

There are five known types of *C. perfringens* (A, B, C, D and E). Type C is the one that seriously affects calves in North America. It is a normal bacteria of calves' and adult cattle's guts and is present in calf intestines shortly after birth. This organism secretes a toxin that can cause rapid death if present in large amounts. The disease is not considered contagious and is most frequently observed in calves 1 week of age or younger.

Because the bacterium is a normal gut inhabitant, two things must happen for the organism to multiply rapidly and to produce large amounts of the toxin that causes disease. First, the bacteria need an abundance of carbohydrates (which are 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, but this enzyme (trypsin) is only present in small amounts the first few days of life, then increases to protective levels by a couple of weeks of age.

Diagnosis is based on lesions seen in tissues of calves examined after death. The disease causes bleeding in the small intestine and lymph nodes. Small areas of bleeding may be noted in abdominal organs, and lesions may occur in the brain.

Treatment is of little benefit if animals show clinical signs. During a herd outbreak, antitoxins and antimicrobial treatment should be administered to calves that do not show signs of disease and that are less than 2 weeks of age (at-risk animals). The antitoxin should provide about three weeks of passive protection.

Protection in herds that have a high incidence of the disease (usually high-milking herds) is attempted by vaccinating pregnant cows late in gestation with a *C. perfringens* Type C toxoid to stimulate the dam's production of antitoxin that is passed in colostrum and milk.

Blackleg

Blackleg is caused by the bacterial organism *C. chauvoei*. These 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 the spleen, liver and digestive tract of healthy animals.

The disease is created when the bacteria multiply rapidly in muscle 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, with mortality approaching 100% of affected

calves. The disease is most common in calves between 6 months and 12 months of age, with animals more than 2 years of age rarely being affected.

The disease attacks rapidly. In many cases a dead calf is the first indication of a problem. If detected early enough, the signs of blackleg 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 is not considered a contagious disease because the primary mode of transmission is not from one animal to another. Rather, 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 organism is widespread in distribution and 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, laying water pipe — can initiate an outbreak of blackleg.

Vaccines that provide some protection against the 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 against the disease, so deaths from blackleg can occur in vaccinated herds. Because the vaccine is fairly effective, a program where calves are vaccinated at 2-3 months of age with subsequent revaccination is recommended in blackleg-prone areas.

Treatment of blackleg cases is not likely to be rewarding. Treatment with antibiotics, surgical drainage of the affected muscle areas, and supportive treatment (keeping calves dry, comfortable and hydrated) have been used with minimal success.

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