

# Clostridial Diseases of Cattle

The clostridial diseases are caused by bacteria which belong to a group of organisms called *Clostridium*. These bacteria are important in farm animal production because they can cause significant disease problems. The *Clostridium* group of organisms produces very potent exotoxins (poisons) which are damaging to animals.

Most clostridia are found throughout the United States. The movement of infected animals, carrier animals, and contaminated animal products such as bones, hides, and meat, can spread the organism into previously uncontaminated areas. Once the organisms are found on a premise, the premise should be considered permanently infected, and a vaccination program must be maintained.

Most of the clostridial species are spore formers, which means that during periods of unfavorable growth, the organism will survive in the soil for long periods of time as an “inactive form” called spores. Many of the clostridia species are normal inhabitants of the intestinal tract of farm animals. However, these organisms apparently do not cause a problem until specific conditions occur that allow the organisms to multiply and invade the tissues of the animal. Usually, the clostridial infections are very severe and occur suddenly. This acute onset and the explosive nature of the outbreaks are useful in diagnosing the diseases. The major clostridial diseases seen in farm animals are tetanus, botulism, blackleg, clostridial hepatitis, overeating disease, malignant edema, and acute cervical edema.

## Tetanus

Tetanus is a fatal, infectious toxicosis of all domestic species caused by the organism *Clostridium tetani*. It is characterized by the animal's reactions to sound, light, and movement. These actions include over-response tightening of the muscles, staggering, convulsions, tetany (extreme tenseness of the muscles), and a prominence of the third eyelid. The organisms frequently enter the body through wounds, such as castration infections and deep puncture wounds. The course of the disease is usually three to ten days. Treatment of tetanus is not very successful unless it is started early. The animal should be placed

in a quiet, dark stall and treated with tranquilizers and penicillin to eliminate the infection source. A vaccine for tetanus does exist; however, it is not routinely used in cattle unless tetanus has been on the particular premise before.

## Botulism

Botulism is a fatal toxicosis which generally occurs after cattle ingest plant or animal material containing the toxins produced by the bacteria *Clostridium botulinum*. The clinical signs which are seen in cattle vary somewhat but generally are weakness, muscle incoordination, depression, and paralysis, followed by death. Treatment for this condition is generally unsuccessful, so prevention is the key to control. To control this condition, it is essential that you remove the contaminated animal or plant products. No vaccine for prevention is presently available.

## Blackleg

Blackleg is an acute disease in which severe inflammation and death of muscle tissue in the heavy muscled parts of the body occur as a result of the toxins produced by the bacteria *Clostridium chauvoei*. The disease is characterized by a sudden onset of lameness and severe depression, followed by death. Frequently, as a result of this condition, accumulations of gas may be felt under the skin on infected and dead animals. Treatment is generally unsuccessful because of the severe damage already done to the muscles before the disease is first noticed. Large doses of penicillin have been used with some success in mild cases that are discovered early. Prevention should be the main objective in outbreaks of this disease. A very effective vaccine is available and can be given to calves as early as two weeks of age in areas where there is a high incidence of blackleg. The calves should be revaccinated after three months of age and then yearly boosters should be given.

## Clostridial Hepatitis

Two different diseases are known as clostridial hepatitis. The first is bacillary hemoglobinuria, caused by the organism *Clostridium hemolyticum*; the second is infectious necrotic hepatitis (Black disease), which is caused by *Clostridium novyi* Type B. These

conditions are similar in that they are both acute diseases of cattle and sheep and have a high death rate. As with other clostridial diseases, high temperature and depression are common, and the animals die after a very short disease process. Inspection of the carcass after death usually demonstrates areas of dead tissue in the liver. Animals that have bacillary hemoglobinuria frequently show hemoglobinuria (red water) and jaundice (yellowing of the mucous membranes).

Infectious necrotic hepatitis in field conditions frequently are associated with parasitic fluke infestations in cattle. Treatment of these clostridial conditions is generally unsuccessful because of the rapid nature of these diseases, but high levels of penicillin and tetracycline have been used in some cases when the diseases are diagnosed early. In areas where black disease is associated with parasitic flukes, it is very important to control the flukes.

Commercial vaccines are available to prevent clostridial diseases. It is usually necessary to give two injections three to four weeks apart to develop adequate immunity. Revaccination may be required in six months.

## Overeating Disease

Overeating disease (enterotoxemia) is a toxicosis caused by the organism *Clostridium perfringens* Type D. It often results in sudden death. This condition is usually seen in feedlot cattle or cattle that are fed a ration containing a high level of concentrate. Frequently, the clinical signs of the disease are not noticed and healthy-looking animals are found dead. These animals are usually on full feed or have been nursing a high producing cow. Those animals that recover frequently show an elevated temperature and severe diarrhea. The treatment of enterotoxemia is usually of a supportive nature and is often unsuccessful. The cattle that do survive generally respond poorly to treatment. A vaccine is available and may be given if the disease becomes a problem and if the feeding ration cannot be changed. Control has been achieved in feed lots by feeding low levels of tetracycline.

## Malignant Edema

Malignant edema is an acute toxicosis caused by the organism *Clostridium septicum* and usually develops through a wound infection. The condition is very similar to blackleg with swelling around the wound, high fever, and depression, followed by death. When the dead animal is examined, a large quantity of fluid (edema) and swelling may be found in the area of the wound under the skin. Like blackleg, treatment is frequently unsuccessful, but penicillin may be used if the case is detected early. Local treatment of the wound area to provide drainage is useful. A commercial vaccine can prevent the disease. To prevent and control the spread of malignant edema, do all that you can to prevent wounds, maintain sanitary conditions, and disinfect castration equipment.

## Acute Cervical Hemorrhagic Edema

Acute cervical hemorrhagic edema is caused by the organism *Clostridium sordelli*. This condition is similar in appearance to malignant edema except it is generally not associated with wound infection. The primary lesions are subcutaneous edema and muscle necrosis (death) in the necks of the animals that are affected. The animals normally show an elevated temperature, depression, and incoordination. Death usually occurs within six to twenty-four hours. Many times, the animals are simply found dead. Treatment is generally unsuccessful. However, when the disease is caught early, penicillin may be helpful. A commercial vaccine is available and is effective in stopping outbreaks when the toxoid/bacteria is used.

## Summary

Clostridial diseases are acute diseases in cattle that result in a rapid death. Treatment is usually unsuccessful, but good vaccines are available for prevention of these diseases, with the exception of botulism. Various vaccine combinations for the clostridial species are available. Use care in selecting the proper vaccine for your specific needs. Consult your veterinarian for specific recommendations in your herd.

---

Publication 3836 (POD-01-22)

Reviewed by **Carla Huston**, PhD, Professor and Extension Veterinarian, Pathobiology and Population Medicine. Written by Thomas C. Randolph, DVM, retired Associate Professor, College of Veterinary Medicine, and Clyde E. Taylor, DVM, retired Acting Leader, Extension Veterinary Medicine.

Copyright 2022 by Mississippi State University. All rights reserved. This publication may be copied and distributed without alteration for nonprofit educational purposes provided that credit is given to the Mississippi State University Extension Service.

Produced by Agricultural Communications.

Mississippi State University is an equal opportunity institution. Discrimination in university employment, programs, or activities based on race, color, ethnicity, sex, pregnancy, religion, national origin, disability, age, sexual orientation, gender identity, genetic information, status as a U.S. veteran, or any other status protected by applicable law is prohibited.

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. STEVE MARTIN, Interim Director