

Livestock Health Series

Bovine Virus Diarrhea (BVD)

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Introduction

BVD is a viral disease that can affect cattle of all ages. It is in the same viral family as the viruses that cause hog cholera in swine and border disease in sheep. Scientists first identified BVD in a New York State dairy herd in 1946. This disease continues to have a heavy economic impact in the cattle industry.

Several syndromes may develop as a result of cattle becoming infected with the BVD virus. These syndromes vary due to age of the animal and the particular strain of BVD virus. Some animals infected with the BVD virus may never show clinical signs. These infections are referred to as "inapparent." Other infected cattle will show signs of severe disease such as respiratory disease, acute enteritis (intestinal inflammation), reproductive failure, congenital abnormalities and mucosal disease. Transmission of the pathogenic virus can occur through secretions from an acutely or a persistently infected animal. The virus can then lead to immunosuppression in the newly infected animal, making it more susceptible to other infectious diseases. Below are descriptions of the different types of BVD syndromes that may be noted in an affected herd.

Acute Infection

An acute infection describes cattle that are exposed to the virus and develop an immune response to the disease. Cattle that become acutely infected may exhibit visible signs of disease. Calves exhibiting signs of illness may show respiratory or gastrointestinal symptoms.

Signs of respiratory disease include fever, nasal discharge, lethargy and



mild coughing. Gastrointestinal signs may or may not be present. These signs may include diarrhea, poor appetite and weight loss.

Although some animals come down with outward physical symptoms, many animals may show no outward symptoms. These animals have inapparent infections. Most infections that are studied under experimental conditions develop into the inapparent form. These calves show few outward symptoms even though the infection is occurring inside. The animals may incur a mild fever, a drop in white blood cell count and recover without significant illness being noted. It is important to note that cattle with inapparent disease shed the pathogenic virus during their short infection period. These animals can also experience the immunosuppression that occurs with BVD infection, paving the way for other infections to attack a weakened immune system.

Fetal Infection

If an unprotected cow acquires a BVD infection while she is pregnant, there are several possible outcomes depending on the stage of pregnancy when she is infected. A normal calf could be born to a cow that becomes infected during late gestation (>180 days). This occurs when the fetus

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has a competent immune response in utero, and it would be born without any negative results. An infection during early pregnancy (<125 days) can result in more detrimental outcomes. During this period, early embryonic death, abortion, fetal mummification or a calf that is born with a persistent infection are all possibilities. Fetuses exposed to BVD at 150 days or more of gestation could be born with congenital defects. These defects may lead to poor brain development, eye abnormalities, structural malformations and stunted growth. Calves born with congenital defects usually have difficulty standing and walking and may exhibit an early death due to a poor ability to nurse the dam.

Persistent Infection (PI)

A persistent infection describes an animal that will carry the infection for the rest of its life. This occurs when the calf is infected in utero (<125 days) before it develops a competent immune system. Therefore, when the calf's immune system begins to develop during gestation, it does not recognize the virus as foreign. When the calf is born, it will shed the virus from its body for the rest of its life, acting as a constant source of infection for other cattle. A persistently infected animal may appear normal but constantly sheds the virus, thus exposing herd mates.

Persistently infected cattle can be identified using a diagnostic test. The current test method used is an immunohistochemistry (IHC) test. This test can be run on a tissue sample from a suspect animal. The most common tissue sample used is a piece of skin taken from an ear notch. This tissue is placed in a formalin solution and sent to a diagnostic laboratory for testing.

Mucosal Disease

Mucosal disease only develops when a certain set of circumstances arise. In nature, BVD virus can be identified as two different biotypes, noncytopathic (NCP) and cytopathic (CP). The NCP biotype is by far the most common type identified in cattle infections, and is the only biotype that is associated with persistently infected cattle. Mucosal disease only occurs in animals that are persistently infected. They are carrying the NCP biotype and become exposed to another BVD virus that is the CP biotype.

Clinical signs identified with mucosal disease are associated with gastrointestinal pathology. Affected cattle may exhibit explosive diarrhea and ulcerative lesions throughout the digestive tract. Mortality rates attributed to this syndrome are extremely high (95-100%).

Diagnosis

Both blood tests and “ear notch” tests are now available to help identify BVD-infected cattle. The ear notch test can only be used to identify PI cattle. The picture below (Figure 1) shows laboratory procedures involved with the ear notch test. An acutely infected animal can be identified by virus isolation through a blood test. Your veterinarian can help you collect and submit samples for testing.



Figure 1. An ear notch is being prepared for laboratory testing.
(Photo provided by University of Nebraska)

Control

The best method to control BVD is vaccination – trying to protect cattle through immunization before pathogen exposure occurs. Many commercially licensed vaccines are available. A misconception may be that “BVD won't affect my herd because I vaccinate.” This is not entirely the case, but vaccination is the best measure available to cut down the potential of infection in a cow herd. Vaccinating cows prior to breeding is most important so that any possibility for fetal infection and production of PI calves is at a minimum.

Other methods of control focus on biosecurity measures. Quarantine any new animals brought onto your farm for a period of 30 days for observation. A screening test can be performed on incoming animals during this quarantine period to determine if they are PI. Your veterinarian can collect an ear notch sample and submit it to a veterinary diagnostic lab. PI positive animals should be culled before they have exposed the rest of the herd. For more information about this disease and other diseases affecting cattle, contact your local county Extension office.

Reference

Kirkpatrick, John. *Persistent Bovine Virus Diarrhea Infection in Cattle*. Oklahoma State University Cooperative Extension Service.

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