

Livestock Health Series

Bovine Viral Diarrhea (BVD)

Heidi Ward,
DVM, PhD
Assistant Professor
and Veterinarian

Jeremy Powell,
DVM, PhD
Professor

Introduction

Bovine viral diarrhea (BVD) affects cattle of all ages and is considered the most costly viral cattle disease in the United States. Cattle that become infected with BVD exhibit a wide variety of clinical signs according to the age of the animal and the particular strain of BVD virus. Some animals infected with the BVD virus may never show clinical signs while others show signs of severe disease, such as respiratory disease, acute enteritis (intestinal inflammation), reproductive failure, congenital abnormalities and mucosal disease.

Transmission of the virus occurs through secretions from infected animals that are shedding the virus. Infection leads to immunosuppression in newly infected animals, making them more susceptible to other infectious diseases. Below are descriptions of the different types of BVD syndromes that can be seen 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 such as gastrointestinal symptoms directly from the virus or respiratory symptoms from secondary infections. Gastrointestinal signs include diarrhea, poor appetite and weight loss. Signs of secondary respiratory disease include fever, nasal discharge, lethargy and mild coughing.

Although some animals will show outward physical symptoms, many animals may show no outward symptoms. These animals have “inapparent” infections, where animals appear normal but shed the pathogenic virus during their short infectious period. Cattle with “inapparent” infections can also experience immunosuppression that occurs with BVD infection, paving the way for other infections to attack a weakened immune system.

Fetal Infection

If an unvaccinated cow or heifer is exposed to the BVD virus while pregnant, there are several possible outcomes depending on the stage of pregnancy when exposure occurred. If a pregnant animal is infected during late gestation (>180 days), a normal calf could be born because the calf was able to mount an immune response *in utero*. If an infection happens during early pregnancy (<125 days), there can be different detrimental outcomes including early embryonic death, abortion, fetal mummification or a calf born with a persistent infection. If fetuses are exposed to BVD at >150 days of gestation, they can be born with congenital defects that may lead to poor brain development, eye abnormalities, structural malformations and stunted growth.

Persistent Infection

A persistent infection (PI) 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

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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 PI animal may appear normal but constantly sheds the virus, thus exposing herd mates and allowing an exponential spread of BVD.

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 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 the gastrointestinal tract. Affected cattle may exhibit explosive diarrhea and ulcerative lesions throughout the digestive tract. Mortality rates attributed to this syndrome are extremely high (95 to 100 percent).

Diagnosis

Both blood tests and "ear notch" tests are available to help identify BVD-infected cattle. The ear notch test can only be used to identify PI cattle but can be done quickly on the farm by a producer or veterinarian. This quick type of test is an enzyme-linked immunosorbent assay (ELISA) test which detects BVD antigen. An acutely infected animal can be identified by sending a blood sample to a diagnostic laboratory for virus isolation or polymerase chain reaction (PCR). Your veterinarian can help you collect and submit samples for testing.

Control

The best method to control BVD is to immunize cattle to the virus before exposure occurs. Many commercially licensed vaccines are available to help decrease the impact of infection in a cow herd. Most BVD vaccines are combined with other common cattle viruses in a single injection that contains either killed virus or modified live virus.

It is vital that instructions for the vaccine are followed exactly in order to provide protection for the animal. If a vaccine calls for a booster and the booster is not given, then the animal is not protected from BVD. Vaccinating cows and heifers at least 30 days prior to breeding is very important to minimize any possibility for fetal infection and production of PI calves.

Biosecurity is another method for controlling BVD. New animals brought onto the farm should be quarantined for a period of 30 days for observation. In addition, a screening test can be performed on incoming animals during this quarantine period to determine if they are PI. PI-positive animals should be culled immediately so as to not expose the rest of the herd to the virus. To develop a sound herd vaccination schedule and biosecurity plan, consult with your veterinarian.

References

- Radostits, Otto, Clive Gay, Kenneth Hinchcliff and Peter Constable. "Bovine Virus Diarrhea." *Veterinary Medicine: A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs and Goats*. 10th ed. Edinburgh and New York: Saunders Elsevier, 2007. pp. 1248-1277. Print.
- Aiello, Susan, Michael Moses and Dana Allen. "Bovine Viral Diarrhea and Mucosal Disease Complex." *The Merck Veterinary Manual*. 11th ed. Kenilworth: Merck & Co., Inc., 2016. pp. 267-270. Print.

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HEIDI WARD, DVM, PhD, is assistant professor and veterinarian with the Department of Animal Science, University of Arkansas System Division of Agriculture, Little Rock. **JEREMY POWELL, DVM, PhD**, is professor, Department of Animal Science, University of Arkansas, Fayetteville.

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