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BOVINE VIRUS DIARRHEA: Part II

Last month I summarized what we know about the Bovine Virus Diarrhea (BVD) virus and some of the disease problems caused by this virus. It is always important for us to remember that the BVD virus can change easily. This tendency to change means our understanding of the virus will need to change and we can anticipate that this virus will continue to cause us problems in the future. In this article I will outline some of the current tools we can use to diagnose cattle diseases caused by the BVD virus. There are diagnostic tests that are used on dead cattle and those that can be used on live cattle. All available tests have limitations and disadvantages and often one type of test will not resolve all problem situations. Thus, diagnosing BVD can be simple and routine or complicated and frustrating depending on the individual circumstances.

Can BVD be Determined from the Necropsy Examination of Dead Cattle?

The short answer is yes! Many of the disease problems caused by the BVD virus cause characteristic lesions in various tissues of cattle. A lesion is an abnormal change in the structure of a tissue. This abnormal structure or lesion might be observable with the naked eye and is referred to as a gross lesion. Or the lesion may be seen only with the aid of a microscope and is referred to as a microscopic lesion. The BVD virus causes both gross and microscopic lesions and decades of study have found there are certain patterns of damage typical of BVD infection. In typical outbreaks of BVD there are erosions and ulcers throughout the digestive tract—often from the mouth to the anus. The BVD virus has a tendency to attack specific areas of the gut, such as the Peyer's patches. The Peyer's patches are regions of the gut involved with the immune system. This is one of the reasons the BVD virus can be so damaging—it attacks the immune system, which has the responsibility for fighting off infections of all types, including BVD. In addition to observing the gross and microscopic lesions in a dead animal, veterinary pathologists can use special reagents and stains to detect the presence of the BVD virus in affected tissues. This allows the diagnostician to correlate the pattern of lesions with the presence of the BVD virus (or evidence of the "footprints" of the BVD virus) and the pattern of lesions typical of BVD infection. This correlation increases the probability that BVD was the cause of the animal's illness or death. Also, your veterinarian can send samples to a diagnostic lab to aid in diagnosing BVD in a dead animal. Our diagnostic laboratory system in California (California Animal Health and Food Safety; CAHFS) has state of the art methods for diagnosing BVD in dead animals or tissues samples sent to them by your veterinarian.

Can the BVD Virus Be Grown and Identified in the Laboratory?

Growth and identification of viruses is often referred to as the "gold standard" for diagnosis. This growth and identification of a virus in the laboratory is often referred to as "virus isolation". The BVD virus can be isolated from fresh tissues, blood, and serum. All specimens have certain advantages and limitations. Your veterinarian working with the CAHFS can determine the best and most cost-effective virus isolation method for the needs in your herd. Isolation of the BVD virus is relatively difficult and time-consuming compared to other cattle viruses and this is a limitation of this test.

What About Serology as a Diagnostic Test for BVD?

Serum is the part of the blood that remains after the blood has clotted and all the cells have all been removed. It is the clear, straw-colored fluid that is left after clotting and subsequent separation. Serum is the fluid that contains the antibodies the animal makes when a virus (or other pathogen) infects an animal. These antibodies can be measured and they are specific for each pathogenic virus or bacteria. The presence of antibodies and the relative amount of the antibodies (the antibody titer) are useful in determining if the animal has "seen" the BVD virus and responded by making these specific antibodies. The titer can increase when the animal is given a vaccine or when the animal is infected with a virus. Therefore, a very accurate history of when the animal was ill **OR** when a vaccine was given is essential for proper interpretation of any serologic titers, including BVD. Usually, both an acute and a convalescent serum sample are submitted as a pair. The paired acute and convalescent samples are usually taken 10 to 14 days apart. The antibody titers are measured in both samples and the diagnostician is looking for at least a four-fold increase (or decrease) to make a decision regarding recent exposure or vaccination. Serology can be a useful test particularly after a suspected outbreak of sickness in live cattle. The vaccination history must be known to properly interpret the BVD serology results.

What Value are the New Ear Punch Tests?

Last month I talked about the problem with calves that become persistently infected (PI) with the non-cytopathic BVD virus strains (non-CPE). These are calves you want to get out of the herd as they can shed enormous amounts of the BVD virus.

Also, when the PI calves go to the feedlot, they always perform below the average if they survive! The diagnosis of this condition can be difficult. The ear punch test can detect these calves more conveniently and consistently than many of the other tests. This can be an excellent screening test if BVD PI calves are a concern in your herd.

There are a relatively large number of laboratory tests for BVD. Whenever there is a large number of tests that means no one test is perfect! Therefore, it is very important you work with your veterinarian and the diagnostic laboratory to be sure the tests you use will be of the maximum benefit in your situation. Next month I will discuss some of the important methods for prevention of BVD.

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