

BVD Testing: Diagnostic Challenge

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Our recent experience with a Colorado dairy exposed to Bovine Diarrhea Virus (BVD) illustrates that we continue to learn from this virus. In the Spring of 1994, Mo's Dairy (fictitious name) experienced a series of abortions in mid to late gestation replacement heifers, followed shortly by 3 abortions in adult cows. Over the next month, at least 20 milking and dry cows thought to be pregnant and in mid to late gestation were found open. Blood was collected from many of these animals and titers to IBR and BVD were elevated, but the herd had been vaccinated with modified live vaccines for years and the titers could have resulted from recent vaccination. In the late summer, 2 abnormal calves were born and were found to be carrying BVD virus. Their dams were also tested, and found to be carriers of BVD. Review of management procedures revealed that the aborting heifers had been in fence-line contact with random-source feeder steers. The logical conclusion was that the abortion outbreak was due to a new strain of BVD introduced to the herd through contact with the feeder steers.

It was quite clear that Mo's dairy had experienced an outbreak of BVD, as evidenced by elevated antibody titers and the identification of BVD in abnormal calves. It was also clear that the reproductive performance was taking a severe turn for the worse, with declining conception rates and continued discovery of pregnancy loss from mid-gestation cows. We suspected a persistent source of BVD in the herd. The most likely source was thought to be one or more persistently infected (PI) cattle that had been infected in utero with the BVD virus during the first trimester of pregnancy. To detect these PI cattle, it was necessary to perform virus isolation (VI) on blood samples. Traditionally, VI has been a time-consuming and expensive procedure that has not lent itself well to herd testing. However, the VI procedures have been modified recently and now a serum sample can be tested for as little as \$2.00, and results are often available in a week.

A decision was made to test the entire herd at the CSU Diagnostic Laboratory for active BVD infection and shedding using the new VI procedures. The goal was to identify and cull PI cattle that could have been serving as sources of infection of BVD virus for the rest of the herd. Out of approximately 600 animals tested, twenty were found to be carrying the virus. At this point we didn't know whether these animals were persistently infected, or simply experiencing an acute infection that would be eliminated in a few weeks. When tested again 2-3 weeks later, all 20 were still positive and were then considered to be persistently infected.

We recommended that these "PI" cows be culled as soon as possible. Most of them were milking well, and Mo decided that he would like to keep them until dry-off time. He set up a separate quarantine pen for them to eliminate contact with the rest of the herd. In the meantime, we tested all offspring of these cattle, assuming that they would be persistently infected as well. However, of the 12 offspring of these "PI" cows still in the herd, only 2 were infected. These results were contrary to all our current knowledge. We began to doubt our interpretation of the test results. All "PI" cows and their offspring were

sampled again and serum was sent off to a second lab. Much to our surprise, none of these samples were positive for BVD virus, and when the same samples were tested at CSU most of them were still positive! The same cows and offspring were tested one more time at both labs, and this time both sets were negative. We had to assume the cows were NOT persistently infected, but had cleared an acute transient infection. We released the cows from quarantine.

After much discussion we believe that the discrepancy between the two labs was due to differences in test methodology. The procedure used at CSU was more sensitive than the one used in the second lab; so sensitive, in fact, that we were able to detect the miniscule amount of virus present in acute transient infections over a period of several weeks. The second lab's less sensitive test could not detect these infections, and it was not intended to do so. It was designed only to detect the large number of virus typical of persistent infections. Our interpretation of our results was, in retrospect, incorrect: we thought that these acute transient infections were persistent infections. The second lab's less sensitive test would have told us that the cattle were not persistently infected.

The lesson we learned from this case study is that one must be very careful choosing a test to identify cattle persistently infected with BVD. A test such as the one used by the second lab is intentionally less sensitive so that it will detect only those cattle shedding large numbers of BVD virus, as is typical in PI cattle. The CSU Diagnostic Lab will run this less-sensitive test if indicated. For more information on BVD testing, contact your herd veterinarian or the Food Animal Clinicians at the CSU Veterinary Teaching Hospital.