Protocol for Identification of BVD PI Calves with Maternal Antibodies in Beef and Dairy Operations

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Introduction

Bovine Virus Diarrhea (BVD) virus was first recognized as a pathogen in1946, and has been implicated as the cause of one of the most widespread and economically important diseases of cattle.

The importance of bovine virus diarrhea-persistently infected (BVD-PI) cattle in the spread and propagation of BVD virus has been well documented. A persistent BVD infection occurs when a fetus is exposed to the BVD virus in the first 120 days of gestation. At this stage, the developing fetal immune system recognizes the virus as part of "self", therefore, no immune response occurs. After birth, these BVD-PI cattle excrete tremendous amounts of virus from every body orifice throughout most of their lives, and thus are considered to be the most important reservoir for BVD virus. It is estimated that approximately 1% of all cattle are persistently infected.

Although many BVD-PI animals exhibit poor growth rate and an unthrifty appearance, a significant number are clinically normal. Hence, control and eradication of BVD virus has been primarily focused on the development of tests to detect the persistently infected animal. New BVD diagnostic tests, including immunohistochemistry, antigen capture enzyme-linked-immunosorbent-assay (ELISA) and polymerase chain reaction (PCR) are available at many veterinary diagnostic laboratories and are capable of detecting the virus.

Since the BVD-PI state only develops during early gestation and there are no vaccines that protect the fetus from infection, identification and elimination of BVD-PI cattle from the herd prior to exposure to early gestating cows is a critical control point for BVD. This requires that calves be tested before the breeding season, and most of these calves will be carrying maternal antibody titers that may interfere with tests designed to identify BVD-PI animals. Consequently, it is vital to BVD control programs that testing methodology be developed that can identify BVD-PI calves while they are carrying maternal antibody titers.

Two methods of detecting BVD virus in neonatal calves have been developed: immunohistochemistry on skin sections (ear notches) by Dr. Broderson at Nebraska and BVD antigen capture ELISA testing of nasal swabs by Drs. Sorden and Yoon at Iowa State.

Materials and Methods

Beef and dairy herds were selected based on a history of BVD and laboratory conformation of BVD. Neonatal calves were tested for BVD-PI using BVD antigen capture ELISA. A polyester fiber tipped swab was inserted about 1 inch into a nostril of each calf. The swab was then placed in a sterile tube containing 1.5 ml of virus transport media, refrigerated and shipped to the diagnostic lab. BVD antigen capture ELISA tests were performed to detect BVD antigen in the media. If the test was positive, a serum sample was obtained from the calf and serum neutralization tests were done to determine the titer of BVD type 1 and BVD type 2 viruses in the calf's serum. The calves were isolated and a second nasal swab was obtained three to five weeks later. If that sample was positive for BVD antigen, the calf was considered BVD-PI, eliminated from the herd and the dam tested for BVD PI.

Results and Conclusions

BVD antigen capture ELISA tests performed on nasal secretions can detect BVD antigen in neonatal calves carrying BVD virus antibodies. Ability to determine the BVD-PI status of neonatal calves prior to exposure to breeding or gestating cows is critical to the control of BVD.