



Mycoplasma and Bovine Viral Diarrhea Virus (BVDV) - Common Ground

The BVD Education Project - a BVD continuing education brief by Dr. Bill Hessman, DVM

Bovine Respiratory Disease (BRD) may be the single most costly disease we see in the cattle industry. The pathogens involved in BRD are too vast and numerous to list here. The conditions that promote BRD are also numerous and some are to a degree, manageable but others are not. For years veterinarians have gathered at scientific conferences to discuss not just the management of BRD but maybe more appropriately the cause of BRD. I have set in on many of these discussions about the role of vaccination, nutrition, parasitism, viral/bacterial pathogens, stress and others that are responsible for BRD. In the end there is never a consensus of what exactly initiates BRD.

Recently I was attending a conference of research summaries involving BVDV and BRD and once again the question was asked “what causes BRD and why does it seem we can’t get a handle on this disease?” Expert opinions were produced quickly as we all had our opinions. Then someone in the room answered, “It’s pretty simple folks, BRD is a result of immune system failure.” There was a fairly long pause in the discussion as everyone digested this simple explanation. It is a fact, if the animal’s immune system was functioning normally; BRD would be less likely to occur.

So, this poses the next question, what causes the immune system failure that leads to BRD? This answer is very complex, convoluted, arguable and cyclic sending you back to where you started- immune system failure. A role is played by all of the components often discussed at these conferences- stress, nutrition, pathogens, management, vaccination, blah, blah, blah. But in the end it comes back to the animals immune system failing.

As a group the cattle industry has been, for the most part, riding the same horse in that we are doing the correct things we know will reduce the stresses that lead to immune failure and promoting immune function through vaccinations. But at times it feels like we are losing the race.

Immune system failure should become our focus. Immune system failure is how BVDV can become a component of BRD. Many, if not most diseases of cattle, have depressive effects on the animal’s immune system. Some of these diseases have only mild effects while others have been well documented to have profound effects on immune function. BVDV falls within that later, depressing immune function to a point where common pathogens that normally would have little impact now cause severe BRD. Because BVDV is often subclinical it goes undiagnosed but the results of the immune failure do not, *M. haemolytica*, *P. multocida*, *H. somnus*, *Mycoplasma*, *IBR*, *BRSV*, you choose the pathogen.

I’m choosing mycoplasma because it is kind of an “oddball” and there are several scientific reports showing a synergism between BVDV and mycoplasma. Another factor for this discussion is that we do not yet have an efficacious vaccine for mycoplasma and in our arsenal of antibiotics we do not have a choice that works well.

Many studies show an association between BVDV and BRD and more specifically mycoplasma. A study by Martin (1999) reported that of the common viral agents, BVDV had the most consistent association with elevated risk of BRD and poorer performance. In 2001, Haines concluded the most common pathogens found in antibiotic-unresponsive, chronic disease in the feedlot, such as BRD and arthritis were BVDV and mycoplasma. The presence of mycoplasma in



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92% and BVDV in 63% of antibiotic-unresponsive cases was reported by Shahriar in 2002. Finally, in a study by Loneragan in 2005, BVDV exposure and specifically to BVD-PI animals resulted in a 43% increase in BRD.

Recently a commercial viral vaccine was found to be contaminated with a wild, extraneous strain of BVDV. In my feedlot clients that used the vaccine, many health parameters were affected compared to lots of cattle not receiving the contaminated vaccine. Of the 31 lots of cattle receiving the contaminated vaccine the morbidity and respiratory mortality rates increased 198% and 407% respectively. Treatment success decreased 25% and treatment costs rose 310%. The average days on feed of BRD deaths increased 255% and the chronic rate increased 1,474%. Most importantly, the gross post mortem diagnosis of *Mycoplasma pneumoniae* increased from 29% in the 15 lots immediately preceding the use of the contaminated vaccine to 63% in lots receiving the BVDV contaminated vaccine. While mycoplasma was not likely the only opportunistic pathogen that took advantage of the immune suppression caused by the BVDV contaminated vaccine, it was the pathogen that was most easily identifiable grossly. This observational case would be consistent with scientific reports showing a correlation between BVDV and BRD and specifically mycoplasma pneumoniae.

The importance here is the difference between *Mycoplasma* and the other common causes of BRD such as *M. haemolytica*, *P. multocida* and *H. somnus*. With mycoplasma we do not have vaccines that provide good efficacy or antibiotics that perform well like we do for the others. The lack of these tools to combat mycoplasma disease has been a continual frustration for the cattle industry.

Recognizing the synergism between BVDV and mycoplasma or BRD in general, another method to minimize BRD is to mitigate the impact of immune suppression or immune system failure by reducing the impact of BVDV. This can be accomplished by proper BVDV vaccination in combination with identifying the most common source of BVDV transmission, the BVDV-PI animal and eliminating it.

We need to continue to provide the best management techniques we commonly do to help prevent immune system failures. We can improve this management by minimizing the impact of at least one of the most immunosuppressive diseases seen in cattle by testing for and removing BVD-PI animals. This additional management step can decrease the incidence of mycoplasma disease. Remember it is immune system failure that causes BRD.

The BVD Education Project is a producer focused series of articles by Dr. Bill Hessman, DVM, Sublette Kansas, aimed at providing cattlemen with information that will allow them to protect their herds from the impact of Bovine Viral Diarrhea Virus (BVDV or BVD) and persistent infection (BVD-PI).