VM166

UF UNIVERSITY of FLORIDA IFAS Extension

Bovine Genital Campylobacteriosis[1]

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Bovine campylobacteriosis, formerly known as vibriosis, is a venereal disease of cattle characterized primarily by early embryonic death, infertility, a protracted calving season and occasionally an abortion. It is considered one of the two classical sexually transmitted diseases of cattle, the other one being trichimoniasis caused by *Tritrichomonas foetus*. The disease campylobacteriosis is caused by *Campylobacter fetus venerealis, or Campylobacter fetus fetus* both being motile, curved or spiral, polar flagellated, microaerophilic, gram-negative bacteria. *Campylobacter fetus* was previously named *Vibrio fetus*, hence the name vibriosis.

Clinical Findings and Epidemiology

Infected cows are systemically normal, but have a variable degree of endometritis that is associated with early embryonic death, prolonged anestrous, irregular estrus cycles, repeat breeding, and extended calving periods, assuming the breeding season is long enough to allow a cow to clear the infection and rebreed. Observed abortions are not common. In herds not managed intensively, disease may be noticed only when pregnancy examinations reveal low or marginally low pregnancy rates. Perhaps most identifiable is an uneven calf crop, especially in herds where the disease has been recently introduced. In subsequent years, infertility is usually confined to replacement heifers and a few susceptible cows.

Infected bulls are asymptomatic and produce normal semen. Individually, bulls vary in their susceptibility to infection; some become permanent carriers while others appear to be resistant to infection. The primary factor associated with this variability seems to be age.

The disease can be introduced into a susceptible herd with a single breeding of an infected cow or bull. The organism survives in the vagina of the infected cow and is transmitted by the bull during mating. Regardless of age, cows not previously exposed to the organism are very susceptible to infection. The organism invades the uterus and attacks the early developing embryo causing death of the embryo with subsequent reabsorption or expulsion by abortion. Depending upon the length of time it takes for this process to occur, the cow may "skip" her next normal cycle, resembling a cow that is bred, and then show signs of heat again at her next cycle. If the disease process is prolonged, you may see an abortion, however detected abortions are not frequently seen with this disease. Following

1. This document is VM166, one of a series of the College of Veterinary Medicine, Department of Large Animal Clinical Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date March 2007. Reviewed July 2010. Visit the EDIS Web Site at http://edis.ifas.ufl.edu.

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infection, most cows will develop some degree of resistance against the organism. If the resistance level is high enough, the cow will clear herself of the infection, become pregnant and stay pregnant on subsequent breeding. If the resistance level is low, the cow may repeat the process several times before she develops enough resistance to overcome the disease challenge. In this case, the cow may not be able to re-cycle and rebreed during the breeding season, even a long breeding season. Resistance to the organism is relatively short-lived, and a "cleared" cow can become reinfected at a later time. Some cows never clear the infection; they remain infected and serve as reservoirs of the disease.

Bulls generally act as a mechanical transporter of the organism by carrying the organism from one cow to another. Individually bulls vary in their susceptibility to infection; some become permanent carriers, while others appear to resist infection. As in trichimoniasis , the primary factor associated with this variability seems to be the age-related depth of the preputial and penile epithelial crypts. In bulls under 2 to 4 years of age, the crypts have not yet developed, and infection tends to be transient, with transmission apparently relying on sexual contact with a noninfected cow within a matter of minutes to days following the initial breeding of an infected cow. Spontaneous clearance in younger bulls does not seem to be related to any immune response, so reinfection can readily occur. In older bulls, the deeper crypts and folds of the prepuce become contaminated with the organism and provide the proper environment for establishment of chronic infections. Some bulls remain infected for years. In the bull, there are no observable signs or lesions to indicate infection, but because of the strain of extra breeding, the bulls may show excessive fatigue, loss of condition, and decreased libido.

The degree or severity of the reproductive problems noticed in an infected herd depends upon the degree of resistance that a herd has developed. Newly infected herds exhibit more severe problems than chronically infected herds (herds that have been infected for many years). In a newly infected herd with little resistance developed, we will notice a "strung out" calving season affecting up to 80% of the herd. The decreased reproductive efficiency for the herd is initiated by adding infected herd additions, either new females or new bulls. In chronically infected herds, 80 to 85% of the cows may conceive and carry the fetus to term, with pregnancy rates lower in the young cows. The chronically infected herds may have a 3 to 5% abortion rate each year, generally at four to six months of pregnancy.

A review of the herd reproductive history is an important step toward determining if campylobacter is a problem in a herd. A herd with a long calving season or a decrease in calf crop is a prime suspect for campylobacteriosis. Diagnosis of campylobacteriosis is made by culturing and identifying the organism. A blood test will not provide a satisfactory diagnosis. Collecting mucus samples from the vagina and sending them to the diagnostic lab for culturing and identifying the organism appears to be the best way of confirming the disease.

In most females the disease is self-limiting and will clean up in two to three months. Occasionally it may take as long as seven months. Antibiotics are of no value in treatment of the infected female, however vaccination will hasten recovery. Campylobacteriosis in the female can be effectively prevented and controlled by vaccination. The initial vaccination sequence consists of injecting the female with two doses of vaccine 21 days apart with the second dose given at least 30 days before breeding. In the event that the second dose cannot be given this close to breeding, a third dose may be required during the breeding season to maintain a high level of resistance to the disease. Routinely an annual booster is recommended 30 days before breeding. Vaccinations administered more than 30 days before the breeding season starts may not stimulate sufficient resistance to persist through the breeding season. The same problem can also occur in a protracted breeding season, when the disease challenge persists for too long. The resistance stimulated by a vaccine administered before the breeding season may not last long enough, and a second booster may be required to extend the needed resistance level through the breeding season. Another alternative would be to select a vaccine with an adjuvant that provides a longer "depot-effect," thus prolonging the antigenic stimulus. This “depot effect” vaccine provides a prolonged exposure to the vaccine antigen, which is

thought to be correlated with prolonged resistance levels. In Australia, researchers have cured campylobacter-contaminated bulls with high doses of vaccine. They injected bulls with 3-5 times the recommended dose of vaccine and repeated the injection in two to three weeks. Because the use of multiple vaccine doses could cause a reaction in the animal, this method has not been approved by the Food and Drug Administration in the United States. Multiple vaccine doses would be considered extra-label, therefore the procedure must be performed under the direction and supervision of a licensed veterinarian. Bulls cleared of the campylobacter organism are still susceptible to re-contamination and require an annual booster vaccination.

Vibrio is still a potential problem in our beef herds; however, using vaccines properly, which includes timing them properly, using booster vaccinations, and selecting the right vaccine to fit the herd management, can adequately control the disease or prevent it from affecting your breeding herd.