



River Valley Veterinary Clinic

December 2016 Newsletter

cough* Pneumonia *cough

If you had to guess what calfhoo disease has the longest lasting consequences, what would it be? Maybe the title gives it away, but a calf that has pneumonia at less than 3 months of age will be affected well into her lactating career.

The effects are significant. In her first six months of life, she is 2.4 times more likely to not grow as fast as she should. It is also 2.4 times more likely that she will die between three months and 2½ years old, well before she reaches her full productive capacity. There is the same risk that she will have her first calf two months later than others her age, and that it also will be a difficult delivery. All this from a cough she had as a baby!

Pneumonia accounts for one in every five deaths among calves on milk and half of all deaths in weaned heifers. In addition to the long term consequences of poor growth, poor reproductive performance, decreased milk production and longevity, a sick calf becomes a source of infection to others.

The first episode of pneumonia often occurs when a calf is less than two weeks old. This episode often unfortunately goes unnoticed only to flare up later when other risk factors are present. Factors relating to the calf and environment significantly affect the incidence of disease in addition to the infectious agents that cause it.

There are three categories of pneumonia in calves: aspiration, bacterial and viral. While one of these agents usually begins the primary infection, it is not uncommon for other bacteria or viruses to take advantage and cause their own secondary infection.

Aspiration pneumonia occurs when any solid material is inhaled and enters the lungs. The most common cause is the improper use of esophageal feeders to give colostrum. Everyone who uses the tube feeder on farm should be properly trained to minimize the risk of aspiration. Ensure the tube goes down the esophagus by using plenty of lubrication and keeping the calf's head in a neutral position. If the neck is lifted up and stretched out, the tube will be more likely to go down the airway instead of the esophagus. Aspiration may also happen during a difficult birth where the calf inhales some meconium, the first manure which is sticky and yellow. No matter the cause of aspiration, it is difficult to treat due to the large amount of solid material in the lungs which can't be cleared by coughing or easily reached by systemic antibiotics.

The three main causes of *bacterial pneumonia* in calves are *Pasteurella multocida*, *Mannheimia hemolytica*, and *Mycoplasma* species. Bacterial pneumonia acquired within the first few days of life results from infection within the dam,

aspiration or contaminated colostrum. As the calf grows older, infections are acquired from the environment or other sick calves.

Viral infections in calves tend to instigate the disease, with BRSV (Bovine Respiratory Syncytial Virus) and IBR (Infectious Bovine Rhinotracheitis) being the most common as well as PI3 (Parainfluenza 3) and BVDV (Bovine Viral Diarrhea Virus). A viral pneumonia then predisposes calves to acquiring bacterial pneumonia.

Since the risk factors for pneumonia are well established, when an outbreak occurs, it is possible to systematically address each one and implement changes where they are needed. Failure of Passive Transfer (FPT) is a critical risk factor in the development and severity of respiratory disease: while a calf's immune system is functional when born and she can make antibodies, she hasn't been exposed to anything so therefore hasn't made any yet. For the first few weeks of life, she relies solely on the antibodies in the colostrum that have been transferred into her system. FPT occurs when she doesn't get colostrum in time (<6 hours after birth) or it's not enough (4 quarts). If the calf spends too long in a dirty maternity pen, she is exposed to a large amount of pathogens that increase her risk of gastrointestinal disease but also interfere with antibody absorption from colostrum. Checking the Total Protein level in a calf's blood is a simple, on-farm way of monitoring for FPT using a refractometer.

Along the same lines, quality colostrum is imperative for the health of the calf. It should be collected and stored in a way such that bacterial contamination and incubation are kept to a minimum. Vaccinating dry cows will ensure that antibodies against the major respiratory and gastrointestinal pathogens are present in a cow's colostrum when she calves. Colostrum quality can be monitored using a refractometer on farm for immediate feedback, or it can be cultured to determine if pathogens are present. If the quality is poor or there isn't enough, use a colostrum replacer instead. After the correct delivery of colostrum, proper nutrition is required for healthy growth rates and to sustain immune function. Adjust volume for cold temperatures as discussed in previous articles, and pasteurizers will kill the pathogens in whole milk that could otherwise stress a calf's immune system or cause infection.

Housing and bedding management also play a key role in respiratory disease. Clean air and deep bedding are the most important factors in preventing disease through housing management. Calf hutches should be a minimum of four feet

apart to prevent calf-to-calf contact. In individual calf pens in barns, solid panels should separate calves but have openings on either end to allow for ventilation to remove aerosolized pathogens. Proper ventilation systems in calf barns will bring in clean air and remove contaminated air. In a hutch or individual pen, each calf should have >26 sq. ft. of space for the best air quality. Calves in group pens need >30 sq. ft. per calf and tend to do best when group sizes are kept very small, around 7 calves or less. Larger groups, in addition to reducing the square footage available per calf, often combine a wider range of calf ages which creates stress on the younger ones who will acquire disease from the older ones.

When a calf leaves a hutch or pen, increasing the time that it lies empty will reduce the number of pathogens in the immediate environment by allowing time for proper disinfection and removal of old bedding before a new calf arrives. There should be 15% more hutches or individual pens than the maximum number of calves, in order to allow time for each hutch or pen to be properly disinfected before it is needed again.

When feeding or generally working with calves, move from youngest to oldest to avoid transmitting infections to the younger calves. Changing gloves and washing boots before moving back to the younger animals will also reduce transmission. In addition, calves housed in the same barn with adult cows, sick cows or even weaned calves are much more likely to be exposed to pneumonia-causing pathogens.

Environmental risk factors for pneumonia include extreme heat or cold, wind chill, rain, dust, or aerosolized pathogens. Extreme conditions stress the immune system and decrease its ability to fight infection. Other factors that stress the immune system are poor nutrition, over-medicating, under- or over-vaccinating and other infections.

In addition to addressing the risk factors, good vaccination protocols help protect calves against any pathogens to which they are exposed. A good intranasal vaccine at birth will stimulate the tissues in the airways to make antibodies and be ready to kill respiratory pathogens before they enter the body, thus providing additional protection for the calf for 4-6 weeks. The intranasal vaccine should be repeated around weaning so that the calf has good immune protection until her calf-hood vaccines.

While pneumonia is easiest to detect when a calf is coughing and off-milk, most don't make it that easy, which results in poor detection of early infections. They often have subtle changes in their attitude that aren't noticeable unless under constant surveillance, and they only stop drinking milk in advanced stages. A delay in diagnosis can result in a persistent pneumonia problem in all calves on a farm, leading to the prolonged use of antibiotics, chronic infections that flare up later in life and reduced production. An ideal time to watch for respiratory disease is at feeding time. A newly sick calf will be slower to drink or too uncomfortable to lie down afterward. Take a closer look at the calves that are the last to finish their milk or remain standing.

To improve respiratory disease detection in young calves, the Wisconsin School of Veterinary Medicine developed the Calf Health Scoring Chart to help identify calves needing treatment and monitor treatment efficacy. When calves are evaluated 1-2 times per week, the chart can correctly identify over 85% of all calves needing treatment for respiratory disease or diarrhea when used correctly. It is readily available for free online and is used to assign a numerical score to rectal temperature, nasal and ocular discharge, cough, and ear position. The scores are added up and calves with a score greater than four require treatment. Once a calf is being treated, recalculating her score will provide an indication of how well the antibiotic is working.

In cases where antibiotics aren't working or there is an outbreak, additional testing can identify which respiratory pathogen is causing the trouble and determine the antibiotic to which it will respond. The most common tests are post-mortems on calves that die and submitting tissue samples to a diagnostic lab, or swabbing the back of a calf's throat and culturing the fluid. Knowing the specific cause of pneumonia provides us with insight as to where the issues might have started and helps formulate a plan of attack.

Calf pneumonia is a complex disease consisting of a combination of respiratory pathogens and calf and environmental risk factors. An outbreak among the calves can be devastating and incredibly frustrating to control. Often the source of infection is found only after every other risk factor is ruled out. Focusing on early detection, proper vaccination and accurate treatment will make great strides in reducing pneumonia in calves and addressing the risk factors will ensure they remain healthy.

Happy Holidays from the RVVC family to yours and a Happy Moo Year!

