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Story by
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Pneumonia can affect calves of any age, from birth through weaning time and after. Most pathogens that cause lung infection are always present in the calf's environment. They become a problem only when the calf's immune defenses are compromised by stress.

Stress may be due to bad weather, extreme changes in temperature, a long truck haul, overcrowding in a dirty environment or deficiencies of an important mineral, like copper (Cu) or selenium (Se). A newborn calf in a drafty or humid barn with saturated bedding and ammonia fumes that irritate lungs and airways may be a candidate for pneumonia.

Viral or bacterial?

"Most pneumonia cases are caused by pasteurella bacteria, but there are some viral pneumonias," Salmon, Idaho, veterinarian Robert Cope says. Viral pneumonias may be caused by bovine respiratory syncytial virus (BRSV), infectious

bovine rhinotracheitis (IBR) or bovine viral diarrhea (BVD).

"These can set a calf up for a more serious bacterial infection. Death from pneumonia doesn't always have to be bacterial, however," Cope says. "BRSV can cause enough problems ... without any bacteria being involved. This type of viral infection can cause serious lung damage or kill the calf."

A primary viral pneumonia may be mild, but secondary bacterial invaders can move in after the lung tissues are damaged by the virus. Bacterial pneumonia is generally more apt to kill the calf. Viral pneumonia may be insignificant and run its course without treatment — unless a secondary infection, such as pasteurella, turns it into an outbreak that may go through a group of calves with serious economic consequences.

Young calves between 2 and 6 weeks of age may be most susceptible to pneumonia. This is the age when temporary immunity provided by antibodies from the dams' colostrum is starting to wane. Calves that do

Pneumonia in Calves

Treatment and prevention are key to preventing calf loss.

not get colostrum, don't get enough colostrum or don't get it soon enough have less defense against pathogens in their environment. Calves stressed by a hard birth or calves that become chilled immediately after birth may not get up and nurse soon enough, or may not be able to absorb enough maternal antibodies due to stress and hastened thickening of the gut lining.

Calves of any age, up through yearlings and older, may develop pneumonia when weather conditions are stressful. Particularly dangerous are extremes of temperature in fall or spring, with hot days and cold nights. Cope says these cases are almost always due to pasteurella.

"What seems to be the key is a temperature differential of 40 to 50 degrees Fahrenheit or more," he says. Fall days with 80°-95° afternoons, dropping to 40° at night, or spring days with 60° afternoons, dropping to 20° at night, can encourage the onset of pneumonia. "With these conditions you will get primary pasteurella infections, and you don't need a virus to set them off. A virus vaccine won't protect calves in this instance, but a pasteurella vaccine will," he explains.

Signs of illness

A calf with pneumonia usually goes off feed, acts dull and depressed, and may spend a lot of time laying down. It may stand hunched up. The calf's ears may droop, it may have a snotty or crusty nose, and its respiration may be fast or labored. The calf will move slowly because it is in pain. It may have a cough or noisy breathing. In severe cases the calf may have difficulty breathing and might even breathe with its mouth open or with a grunting sound as the air is forced out of impaired lungs.

A thermometer can give a clue as to the seriousness of the problem. If you can confine the calf, take its temperature. "As a general rule, if a calf has a temperature of 106 or higher, it's usually viral," Cope says. "If the temperature is 104 or lower, it's usually bacterial. If it's up around 106 to 107, it's usually BRSV, which can be quite serious."

There are a number of pathogens that can cause respiratory disease. What we used to call "shipping fever" is now called bovine respiratory disease (BRD). There are more than 20 bacteria and viruses that can be involved in lung infections, he says.

Early treatment crucial

There are several good drugs available now for treating pneumonia, including Baytril®, Nuflo® and Micoil®, that are all more effective for bacterial infections than the old standard penicillins or oxytetracyclines and sulfas, Cope says, but the key to successful treatment is catching them quickly, and that's not always easy. "Often by the time a calf is obviously sick, there's already permanent lung damage," he says.

"The main thing, with pasteurella pneumonias especially, is treating the calf before lung damage can become permanent. There have been studies that indicate the damage can become permanent within less than 8 hours. At that point you will have some scarring, even if you clear up the infection," Cope says.

Whether the calf can make it to adulthood then depends on how much scarring there is. "Once the permanent damage exceeds 20% to 25% of the lung tissue, the calf won't do well, even if he survives the pneumonia. Those are often the 'chronics' that never grow, don't do well and die about a week before you were going to haul your calves to market," he says.

The calf, even if it seems to be doing OK, will eventually outgrow its lung supply, he says. Either the calf will not grow well, which is fairly common, or it outgrows its lung supply and then suddenly dies.

When treating a sick calf, if there is any congestion in the lungs, Cope recommends giving the calf dimethyl sulfoxide (DMSO) intravenously. DMSO helps reduce swelling and inflammation and reduces the fluid in the lungs. When it is difficult to find a vein in a young calf, DMSO can be injected under the skin or administered orally (squirting into the back of the mouth

Permanent damage

Bruce Anderson, veterinarian at the University of Idaho Caine Veterinary Teaching Center, Caldwell, Idaho, says that antibiotics may not always pull a calf through because you may not realize how sick the calf is until it's too late.

"Studies at the University of Nebraska's Great Plains Veterinary Education Center, where groups of calves were followed from birth through feedlot and slaughter showed the calves that did not get good passive transfer (from colostrum) 18 months later performed less well in the feedlot," he says. "These calves had less functional lung tissue than normal calves, probably because they had respiratory infections and pneumonia early in life. It is really the subclinical pneumonias that hurt you, because you never know these calves were really sick," he explains.

These are calves that may have been a little dull or off feed, but they never get treated because they don't appear sick — or you can't catch them if you do try to treat them. They end up with compromised lungs, however, and do not perform as well as the rest of the herd, Anderson says. "At slaughter we find that some of these cattle have 10% to 15% dead lung, or some old adhesions, and we know that they had a respiratory problem as a calf."

by syringe). DMSO is readily absorbed by the body tissues and will be taken into the lungs by the bloodstream; you can smell it on the calf's breath almost immediately.

Supportive care is very important. Make sure the calf is warm, dry and protected from bad weather. If the calf is not eating or drinking, you may need to force-feed fluids, or give fluids with nutrients (milk to a preweaning age calf). Anything you can do to help a calf will enable it to fight the battle more successfully.

If a calf has a high fever and does not feel like eating or drinking, anti-inflammatory drugs like Banamine® can lower the fever and make it feel better — often enough that the calf will start eating and drinking again. Do not give Banamine to a dehydrated calf, because there is risk for kidney damage. Using it in conjunction with fluid therapy, however, can be helpful.

Antibiotics are usually given, even if the pneumonia may be viral, since secondary bacterial infection may occur and is usually deadly. Be diligent with treatment and don't quit too soon. Even if the calf is feeling better, breathing better, eating, drinking and its fever is down, keep antibiotic levels high for at least two full days after all symptoms are gone, or the calf may relapse and be much harder to save the second time around.

Prevention is preferable

There are some good vaccines available for helping prevent respiratory disease in calves, Cope says, adding he has had good luck giving Presponse® or One-Shot® at branding time, or at about a month of age.

"One vaccination at branding time won't carry them all the way through the next winter," he cautions. "It works best to give these calves another shot just before weaning."

If you only give one shot during a calf's early life, it's usually best to give it preweaning, Cope says, a couple weeks before you take calves off the cows. Most of the pneumonia vaccines are designed for weaning-age calves, he says.

"We have also used this type of vaccine in the face of an outbreak," Cope says. "In our experience we usually find that calves are protected at seven days postvaccination. We've had weaned calves getting sick and have given them all a vaccination, and this pretty well shuts down new cases within a week."

The best prevention in early calfhood is to make sure each calf gets adequate colostrum soon enough, he says. "There is no substitute for good colostrum. If a calf doesn't get it, he is vulnerable to everything."

"This protection is probably waning by the time most calves are 3 weeks old, however, and many cows' immunity to pasteurilla isn't that great," he continues. "If you have cases of spring and summer pneumonia in calves, it may pay to vaccinate calves at around a month of age. It's also important to see if there are any underlying problems on

herd health. The cows may need a higher nutrition level. Energy, protein and trace minerals are things you should check if calves are getting pneumonia. A cow that's not in good shape herself will not have good colostrum."

If the cow herself does not have a properly functioning immune system due to being low on selenium, energy, protein, etc. — or you have cattle that are

persistently infected (PI) with BVD — the calf will not get good colostrum. So, if you are having a problem in the calves, you need to look hard at the cows. If you are getting pneumonia in calves less than 3 weeks old, it is generally less the calf's fault than the cow's, Cope says.

Most calves that have good colostrum and nutrition can handle quite a bit of weather stress without becoming sick, he

says, especially if they have some shelter. There are more effective drugs for treating pneumonia than there used to be, but prevention is still preferable. A good total herd health program will go a long way toward preventing pneumonia, and that involves a lot more than just vaccinations.

