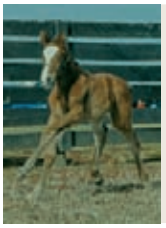

Pneumonia in Foals

BY HEATHER SMITH THOMAS

BUCK WHEELER

Foals that do not receive adequate antibodies through the colostrum generally become weak and unable to nurse

Respiratory disease in foals can occur in the first few days of life—especially if newborn foals don't get adequate colostrum and passive transfer from the dam. It can also occur in older foals up to a year of age.

Dr. Katherine Wilson (Clinical Assistant Professor, Large Animal Medicine, Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, Va.) said pneumonia in very young foals is often secondary to sepsis (bacterial infection in the blood that localizes in the lungs). In other situations the lungs can be the primary source of infection. Weather, stress, and a contaminated environment can make a difference also.

"Some foals that don't receive ideal passive transfer—if they are kept in a really clean environment—may stay healthy, but the best option is to test foals the first day of life, to make sure they got enough colostrum. Then you can supplement with more antibodies, if necessary," said Wilson.

"Usually a foal that did not receive adequate antibodies will develop other problems before pneumonia. These foals generally become weak and unable to nurse and have a fever. They become sick very quickly if they develop pneumonia as a secondary infection resulting from inadequate antibody protection. There are often a lot of other problems going on that are pretty obvious," she explained.

A variety of pathogens can cause pneumonia in foals, but in newborns a lung infection is generally bacterial.

"They often pick up bacteria from their environment. The most common ones we see are gram negative bacteria like *E. coli* or *Klebsiella*. These bacteria are often found

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in shavings or manure. The bacteria that cause neonatal pneumonia are normally present in the foal's environment and difficult to avoid."

Thus, the best protection is adequate colostrum.

"The most common route of infection in young foals is the umbilicus. The classic scenario with a foal that doesn't get enough colostrum is inability to fight off infection that enters at birth through the umbilicus, although lungs and gastrointestinal tract can also be sources of bacterial infection. Bacteria get into the bloodstream if the foal can't fight them off and can then localize in other places such as joints or lungs," said Wilson.

Care of the umbilical stump at birth is just as important as making sure the foal gets adequate colostrum.

Weak newborn foals may aspirate milk, especially if they are being bottle fed, and may develop aspiration pneumonia. This can be extremely severe, and care should be taken to avoid getting milk into the windpipe if bottle feeding a foal.

"The two other major categories of foal pneumonia are *Rhodococcus equi* infection and acute interstitial pneumonia. The latter generally hits foals anywhere from a couple of weeks of age up to 8 months (sometimes almost a year) old, whereas *Rhodococcus* pneumonia occurs less commonly in foals over 6 months of age. I have seen it in foals as young as one month, but the classic situation for *Rhodococcus*

COURTESY DR. KATHERINE WILSON

Dr. Katherine Wilson

pneumonia is around 3 to 4 months of age," she said.

"That's when these foals start to show clinical signs even though most foals pick it up during the first week of life. Regarding when you might notice signs depends on their ability to fight it off. Typically they are infected very early in life and then it slowly develops to the point where they might be showing signs or even become very sick by the time they are 3 to 4 months old. Unfortunately, if there is not a history of *Rhodococcus equi* on the farm, or the owners don't have some sort of surveillance program to try to detect it in foals, the first foals noticed are very, very sick by the time they start showing clinical signs," she explained.

Rhodococcus bacteria thrive in dry, dusty, environments such as a barnyard. A foal can be breathing dust laden with bacteria.

"It is easier for these bacteria to live in dry, dusty environments, but they can also live in moist soil. Once *Rhodococcus equi* is on the farm, it's impossible to get rid of it in the environment," she said.

This disease is prevalent on many big breeding farms, especially when many horses are coming in and out. Mares sent out to be bred may pick it up and bring it back.

"Adult horses can transmit it to foals. Mares may get it into their GI tract from eating off the ground and pass it in the manure. They could pick it up at a breeding farm and bring it to their home farm," said Wilson.

This is a sneaky, insidious disease. The foal may be losing weight and then become very ill before the owner realizes it is a *Rhodococcus* infection.

"One of the first signs might be fever. By the time the foal is coughing or has increased respiratory rate or is in respiratory distress, he is in bad shape," said Wilson.

This is in contrast to most other kinds of pneumonia in which respiratory signs are some of the first things noticed.

DIAGNOSIS

"If there is a history of *Rhodococcus* infection on the farm, many owners just start treating foals that have any clinical signs or early indicators if they are using detection methods. If it's a new case, however, there are some things the veterinarian might to do try to diagnose it. Blood tests can be helpful. Usually with *Rhodococcus equi* there's an increase in total white blood cell count, primarily neutrophils. There can also be an increase in fibrinogen, which is an acute-phase protein that usually increases with chronic types of inflammation. Both changes merely indicate there is inflammation within the foal's body somewhere, and are not necessarily specific for *Rhodococcus equi*," Wilson said.

"Other diagnostics include ultrasound of the lungs. This can be done in the field (the foal doesn't need to be brought to the hospital). *Rhodococcus equi* classically causes multiple abscesses throughout the lungs, so we can often see those—or at least see changes on the surface of the lungs—with ultrasound," she explained.

"Other diagnostic tools include X-rays of the foal's chest. Some can be done in the field with regular X-ray equipment. The X-rays show a fairly characteristic pattern in the lungs. All these things, put together, can give us a clinical picture as to whether we suspect *Rhodococcus* pneumonia. The best way to determine whether it is actually *Rhodoccus equi* is to do a tracheal wash and obtain fluid from the foal's trachea and lower airways and either culture the *Rhodococcus equi* bacteria or test it with PCR for the *Rhodococcus* DNA," she said.

"Usually with the first cases on a farm (that hasn't had a history of *Rhodococcus* infection previously), it is important to confirm that it really is *Rhodococcus*, since the other foals would be at risk. It's wise to begin some kind of surveillance program. The stumbling block is that treatment for *Rhodococcus* pneumonia is very specific for that pathogen, versus any other kind of bacterial pneumonia."

In addition to pneumonia, *Rhodococcus equi* can also cause disease in other body systems, including abscesses in the GI tract or joint/bone infection.

TREATMENT

Treatment for *Rhodococcus equi* is very specific, compared to other types of pneumonia.

"If foals have other bacterial pneumonias I usually put them on broad-spectrum antibiotics. Without doing a tracheal wash, a person really doesn't know how

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best to treat the foal. If it is not *Rhodococcus*, we may prescribe broad spectrum antibiotics, and if the foal is not responding we can do a tracheal wash and determine if there are resistant bacteria. If it turns out to be *Rhodococcus equi*, you realize that normal antibiotics won't be effective. You need to target that pathogen more specifically.

"Usually we use a combination of antibiotics. One class is called the macrolides and includes erythromycin, azithromycin, clarithromycin, and tulathromycin. Depending on availability, people often choose one of those. Some have been shown to work better than others. One study showed clarithromycin to be more effective, but there may be problems with availability," she said.

"A drug from that class is usually paired with rifampin to treat *Rhodococcus equi*. Even though these have been used together for several decades, there is new evidence showing that rifampin may actually prevent absorption of the other drug in the GI tract, and some veterinarians may opt to only use a macrolide," said Wilson.

"Other ancillary treatments that do not specifically target the bacteria but aid in supportive care include anti-inflammatories like Banamine. Usually these foals have a fever and don't feel good (and don't nurse). Banamine helps with that. In really bad cases, foals may need to be hospitalized and be on oxygen. These foals can be nebulized with aerosolized saline and sometimes with antibiotics (but not necessarily the antibiotics used for treating *Rhodococcus equi*). They may need supportive care beyond what they can get at home," she explained.

COURTESY DR. LAIS COSTA

A foal with *Rhodococcus equi* pneumonia may lose weight and become very ill

"It generally takes a long time for these foals to recover—up to a couple of months. It is important to make sure the foal is normal and fully recovered before stopping the antibiotics, or there is risk for relapse—which can be more difficult to treat," she said.

Most cases are simply abscesses in the lungs, but some foals have abscesses in the abdomen as well—usually lymph nodes that become abscessed. Unfortunately these may not be detected until they are very large.

"By the time they are discovered, they may be very difficult to treat," said Wilson.

These foals can also get joint or bone infections from *Rhodococcus*.

"These tend to have a poor prognosis in terms of the foal becoming an athlete. There have been studies looking at *Rhodococcus* pneumonia and racing prognosis. If a foal with *Rhodococcus* pneumonia survives, it doesn't seem to significantly affect the ability to perform later in life, after the lungs heal, but joint involvement can be more serious. *Rhodococcus* is definitely something that you want to treat as early as possible," she said.

MONITORING FOALS

Farms that have a history of *Rhodococcus equi* infection often try to monitor young foals, so early cases can be discovered and treated.

"Some people give plasma to all their foals at birth, containing specific antibodies targeting *Rhodococcus*. There are several protocols used, and they all have some benefit, but there is some conflicting evidence regarding how helpful this is, in preventing this disease," said Wilson.

For surveillance, many people monitor foals' temperature starting at 2 to 4 weeks of age until the foals are 6 months old.

"The problem with this is the fact that other signs may precede a fever. Some farms ultrasound every foal's lungs on a weekly basis. Usually there will be changes that show up," she said.

"The other thing people do is run complete blood counts on foals to see if the white cell count elevates. Usually an elevated white blood count and changes on ultrasound are noticeable long before the foal shows outward signs of illness."

Starting treatment as soon as possible will usually shorten the treatment time and help assure a better outcome than waiting until signs appear.

"If a person waits too long, there's a good chance the foal will not recover. Treating it before it gets that bad will increase the chance for a good prognosis and decreases the cost of treatment," Wilson said.

Some farms with a history of this disease year after year have

also started a protocol of putting all foals on antibiotics to target *Rhodococcus equi*.

"We generally recommend not doing that because there is resistance to these drugs developing.

"There are also side effects from macrolides and rifampin that you may not want. Any time we put a horse on antibiotics there is potential for that horse to develop severe diarrhea. Some of the macrolides can make foals sensitive to heat, as well, so they overheat readily when they are outdoors in the sun," said Wilson.

ACUTE INTERSTITIAL PNEUMONIA

"This disease can affect the same age group but with a wider range—affecting foals anywhere from a couple of weeks of age to 9 months," she said. "Acute interstitial pneumonia is a bit of a mystery because we don't really know what causes it. Usually these foals don't have any bacteria that can be cultured from a tracheal wash, and we can't isolate any viruses. Unlike *Rhodococcus* infection, it is very rapidly progressive."

The foal might be a little bit dumpy one day and have a fever, and be dead the next day or in severe respiratory distress—needing intensive care.

"Foals that develop interstitial pneumonia—if they make it long enough to be treated—the prognosis is 60 to 70% for them to survive, but many of them become so rapidly sick that they either die or people opt not to treat them. Treatment revolves around trying to decrease inflammation. We generally use corticosteroids and supportive care (oxygen, and trying to keep them cool during hot weather)," she said.

These foals tend to overheat.

"For these foals to survive, they usually need aggressive medical treatment. One risk factor for this disease is warm climate/environment. One study showed that previous history of antibiotic treatments could be a risk factor, but this may not necessarily be associated with the cause of this disease. The foal may have been treated with antibiotics for something else or because it started to develop respiratory signs."

There is not a good way to predict which foals might be susceptible, or how to prevent it.

"It is not nearly as common as *Rhodococcus equi* and usually only affects individual foals, causing clinical signs that are very different than *Rhodococcus* infection," said Wilson.

Then there is another category of typical pneumonia caused by various types of bacteria that end up in the lungs.

"These can cause pneumonia if a foal is stressed at weaning, for instance, or during a long transport, and the immune system is unable to fight it off. Sometimes the foal gets a respiratory virus (influenza, for instance) and then gets a secondary bacterial infection. So it is important to try to determine whether it's *Rodococcus* infection or something else, because the antibiotic you'd select will be different."

The immune system does an amazing job of protecting the body, but if it is compromised by stress, the horse can easily become ill. BH