

Rhodococcal Infections in Foals

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For reasons which have not been clearly defined, young foals appear to be at increasing risk for developing severe pneumonia due to infection by *Rhodococcus equi*. *Rhodococcus equi* pneumonia, sometimes known as the "rattles," represents a potentially devastating disease necessitating expensive and time-consuming treatment and frequently leads to death or the need for humane destruction of affected foals. *Rhodococcus equi* is a soil-based bacterial organism that was previously known as *Corynebacterium equi*.

This organism is found almost everywhere in the environment, but it is especially concentrated in grounds where horses and cattle have been intensively accommodated and maintained. *Rhodococcus equi* is passed onto the ground in feces by infected foals and adults where it thrives and multiplies. Infection by this organism can cause severe disease in foals aged between 6 to 24 weeks. However, foals as young as 2 to 3 weeks may also be severely affected. Rhodococcal pneumonia tends to occur on a seasonal basis in foals; most foals are infected during the warmer months (April through September). We see most of our cases of this disease in the month of July. Disease associated with *Rhodococcus equi* hardly ever affects adult horses. However, in rare instances, immunocompromised adult horses may be infected with *Rhodococcus equi*.

Of particular concern for horse owners is the fact that symptoms of disease in infected foals are too often not recognized until the disease is very advanced. The success of treatment for this condition is highly dependent on **early recognition** of the clinical signs.

When do foals become infected with *Rhodococcus equi*?

The newest information suggests that foals are primarily infected during the **first few days of life** (maybe just the first day). Foals born into an environment that is relatively severely contaminated with *Rhodococcus equi* are at greater risk (especially on farms on which this disease has been seen before). The risk of infection is greater for foals that are slow to obtain colostrum from the mare. Dry, dusty, windy environments are also especially dangerous for risk of this infection.

How do foals become infected with *Rhodococcus equi*?

Although many young foals are probably exposed to small numbers of *Rhodococcus equi* in their environment, most healthy foals are able to develop good immunity against this organism and "fight off" the infection.

Rhodococcus equi causes infection of the foal's lungs when it gains access through the airways on contaminated dust particles. It has been well documented that foals accommodated on dusty dry lots in hot weather are at particular risk for developing *Rhodococcus equi* pneumonia. Infection is much less likely in foals that have been raised on grassy paddocks in temperate climates. Some foals develop infection via the intestinal tract – in those cases, the lungs might be spared the disease.

What are the factors which contribute to reduced immunity in foals leading to risk of pneumonia?

Newborn foals acquire their immunity (antibodies) in the mare's first milk (colostrum). Colostral antibodies are able to fight off infection until the foal begins to produce antibodies itself.

There is a natural phase of waning immunity between the ages of 4 and 8 weeks during which the foal's total antibody levels are relatively low. This temporary phase of low immunity is the period in which the antibodies from the mare are being used up and the foal's own antibody production has not yet caught up. During this phase, the foal is at *particular* risk for infection by opportunistic bacterial pathogens such as *Rhodococcus equi* if they are inside the foal's system (since the first few days of life). Foals which receive marginal antibodies from the mare are at greater risk than foals receiving a plentiful antibody supply.

Other factors that may adversely affect the foal's immunity include the numerous stresses to which young foals are exposed early in their life. Typical and common examples of stressful factors which adversely affect immunity and increase risk of *Rhodococcus equi* pneumonia include: excessive and rough handling, transport, inclement weather (hot or cold), other diseases, various drugs and injections, overcrowding and mixing with other equids of different origin, and hospitalization. Pneumonia associated with this infection can be prevented by ensuring that the foal obtains a plentiful supply of antibodies against *Rhodococcus equi*; these antibodies can be provided (via plasma transfusion) by the veterinarian if necessary (see below).

What are the symptoms of *Rhodococcus equi* pneumonia?

Most affected foals are presented to veterinarians between 6 and 12 weeks of age with a variety of possible problems. Some affected foals are mildly diseased, showing signs such as a slightly reduced growth rate, slight lethargy and depression, and a poor quality hair-coat. Other foals are presented with clear evidence of infection of the respiratory system including signs such as: fever, increased respiratory rate, exercise intolerance, nasal discharge, and coughing. However, it should be noted that nasal discharge and coughing are often mild and infrequent with this disease. Many affected foals develop clattering breath sounds due to the presence of inflammatory material in their airway (hence the name "rattles"). In many respects, *Rhodococcus equi* pneumonia is similar to tuberculosis in people, which used to be known as the "consumption". Consumptive lung disease caused insidious, slowly-progressive, extensive, and devastating destruction of the lungs over a long period of time.

Some infected foals develop remote immune-mediated changes such as joint-distention (especially the tibio-tarsal joints), limb swelling, and uveitis (inflammation in the eyes). Lymph nodes near the throat may be enlarged.

It is particularly interesting and puzzling that affected foals are commonly presented to veterinarians in a state of severe, life-threatening respiratory distress but that the owners comment that the foal had been unremarkable on the preceding day. Sudden-onset respiratory distress in the face of progressive consumption of the lung occurs when the foal's remarkable compensatory mechanisms have been finally depleted or if the lungs of an affected foal are called on for increased work such as occurs during exhaustion by the need to run fast (in a field) or to breath hard for thermoregulation (on a hot day).

In those foals affected by the abdominal form of the disease, symptoms might include diarrhea, colic, abdominal distention and fever. Affected foals tend to be anorectic and become thin. Affected foals fail to thrive and grow. Infection by *Rhodococcus equi* does sometimes also lead to joint and bone infections; these foals are typically older.

