

Rhodococcus equi Infection in Foals

A PowerPage Presented By



Rhodococcus equi infection in foals is a significant cause of morbidity and mortality. Interestingly, only foals, typically between 1-6 months of age, develop *R. equi* pneumonia suggesting a deficiency in immunity of this age of horse. If diagnosed and treated early, the prognosis is good with complete recovery possible. However, if not detected, foals can succumb to severe respiratory failure. This PowerPage will discuss basic information in regard to *R. equi* infection in foals including clinical signs, diagnosis and treatment. An exuberant amount of information is available in regard to this topic due to its wide prevalence in the equine population.

Key Points

- *R. equi* infection typically affects foals between the ages of **1-6 months**
- *R. equi* is inhaled early in life and has a slow and insidious onset. Thus affected foals may have significant **pneumonia** before clinically recognized
- The drugs of choice for treatment are a **macrolide** (**erythromycin**, clarithromycin, azithromycin) combined with **rifampin**
- Many cases of *R. equi* pneumonia resolve with appropriate therapy. However, complications such as abdominal abscessation and septic arthritis are possible

Pathogenesis

Causative Organism: *Rhodococcus equi*

- Gram-positive facultative intracellular coccobacillus (previously known as *Corynebacterium equi*)
- Not a normal inhabitant of equine respiratory tract but common environmental pathogen, especially in large equine breeding operations. Can be readily aerosolized during **dry and dusty** periods

Pathogenesis:

- Foals are typically **1-6 months of age** when they demonstrate clinical signs
- Organism is inhaled, especially in dusty environments, and subsequently invades alveolar **macrophages** of infected foals where it replicates, producing **pyogranulomatous pneumonia and pulmonary abscessation** (Figure 1)
- Some foals with *R. equi* infection develop ulcerative colitis and/or mesenteric lymphadenitis which may manifest clinically as diarrhea or colic

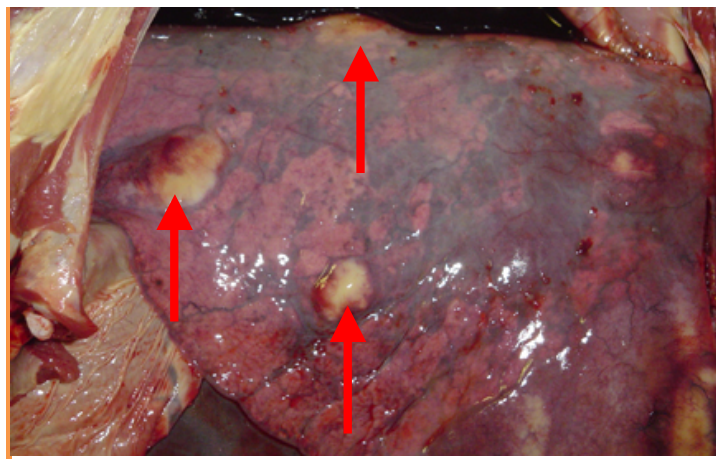


Figure 1: Post-mortem photo of the right lung of a 3-month old foal with *R. equi* pneumonia. Notice the distinct yellow colored abscesses (arrows) distributed throughout the lung field.

Clinical Signs and Clinicopathologic Abnormalities

Clinical Signs:

- Intermittent Fever
- Inappetance and weight loss/failure to gain weight
- Cough, tachypnea and increased respiratory effort (e.g. nostril flaring)
- Abnormal thoracic auscultation (wheezes and/or crackles)
- Occasionally will see nasal discharge

Clinicopathologic Abnormalities:

- Neutrophilic leukocytosis
- Hyperfibrinogenemia

Diagnosis

- *R. equi* pneumonia can be suspected in the appropriately aged foal (**1-6 months of age**) that demonstrates cough, respiratory embarrassment, poor weight gain, intermittent fever and/or have a leukocytosis or hyperfibrinogenemia.
- Characteristic radiographic findings of pulmonary abscesses (Figure 2) or ultrasonographic evidence of pulmonary abscesses (Figure 3) are highly suggestive
- Confirmation of disease is based on transtracheal wash and positive culture of the organism

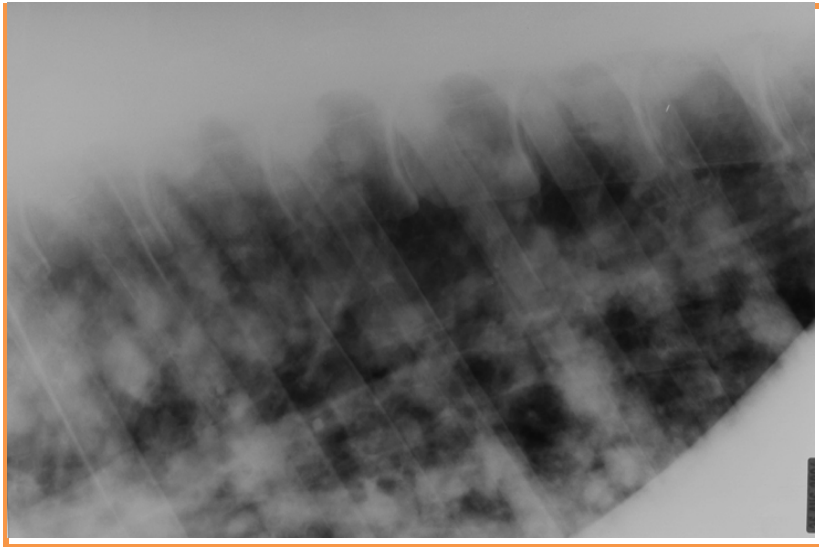


Figure 2: Lateral radiograph of a 4-month old foal with moderate to severe *R. equi* pneumonia. Note the numerous radiodense abscesses distributed throughout the lung field. (Cranial is to the left)



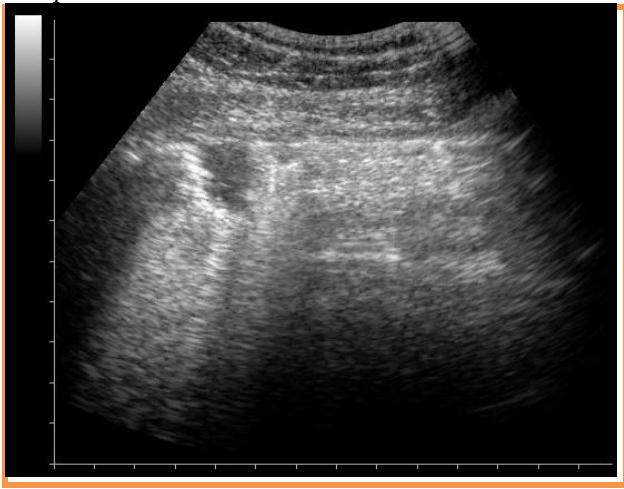


Figure 3: Ultrasonographic image of the peripheral lung and pleura of the same foal as Figure 2. Note the distinct circular abscess involving the peripheral aspect of the lung.

Treatment

- *R. equi* pneumonia is responsive to treatment with the appropriate antimicrobials. This would include a macrolide antimicrobial such as **Erythromycin**, **Clarithromycin**, or **Azithromycin** combined with **Rifampin**. In addition, supportive care can include:
 - Cool temperature-controlled environment
 - Intranasal oxygen supplementation (if necessary)
 - Maintenance of hydration (if necessary)

Complications of *R. equi* Infection

- Numerous complications are associated with *R. equi* infection in horses. Some of the more common complications include:
 - **Internal Abscessation**
 - Ulcerative colitis and/or mesenteric lymphadenitis as previously mentioned resulting in signs of intermittent colic, diarrhea and weight loss (Figure 4)
 - Intervertebral abscess resulting in neurologic deficits caudal to the lesion such as weakness and ataxia
 - **Septic Arthritis**
 - Organism can occasionally cause septic arthritis resulting in an inflamed joint associated with pain and lameness

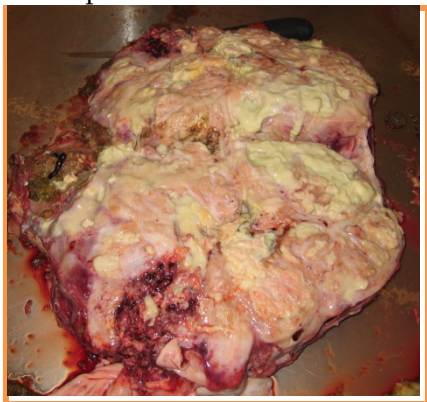


Figure 4: Post-mortem photo of a large abdominal abscess (*R. equi*) in a 5-month old foal. The foal had intermittent signs of colic, fever, inappetance and weight loss. Pulmonary abscesses were also present.

- **Osteomyelitis**
- **Joint effusion (non-septic)**
- **Subcutaneous abscessation**



Prognosis and Prevention

- The prognosis with *R. equi* pneumonia in foals is fair to good as long as appropriate therapy is instituted as soon as the disease is recognized. Because of the slow and insidious nature of the disease, some foals do not get examined and treated until the disease is severe, thus worsening the prognosis. Occasionally foals are found acutely dead from respiratory distress.
- *R. equi* pneumonia can present as a sporadic disease affecting individual foals. However, it can also be a devastating endemic problem, especially at breeding facilities. It is not uncommon for some farms to have recurrent problems with *R. equi* each foal crop/year. Thus, means of prevention and early detection have been investigated. This is a lengthy topic but some brief highlights include the following:
 - **Prevention:**
 - Administration of hyperimmunized plasma against *R. equi*, early in life
 - Prophylactic administration of macrolide antimicrobials
 - Maintain strict environmental cleanliness and reduce dusty environments as much as possible
 - **Early Detection:**
 - Routine measurement of body temperature and respiratory rate in age susceptible foals. Elevations in either parameter may suggest infection
 - Routine screening of a complete blood count observing for leukocytosis and/or hyperfibrinogenemia
 - Routine diagnostic screening of the lung field via ultrasonography or radiography

References

- Pathogenesis and virulence of *Rhodococcus equi*. Hondalus MK. *Vet Microbiol* 1997;56:257-268
- *Rhodococcus equi* infection in foals: the science of “rattles”. Muscatello G, Leadon DP, Klay M et al. *Equine Vet J* 2007;39(5):470-8

