



FOAL PNEUMONIA

CAUSATIVE ORGANISM

Rhodococcus equi is a Gram-positive, pleomorphic, facultative, intracellular bacteria. The bacteria produces a capsular polysaccharide which can prevent its destruction by the host. It is parasitic in that it can survive and multiply within the alveolar macrophage of the host by interfering with phagosome-lysosome fusion¹.

THE DISEASE

Rhodococcus equi infection is a respiratory disease affecting young foals worldwide. *R. equi* primarily causes a serious and often fatal pneumonia. The disease can involve bronchial lymph glands, the gastrointestinal tract, and occasionally the joints. Infection usually occurs in the first 3 weeks of life, but may occur in foals up to 6 months of age. The incubation period appears to be 13–19 days². The specific way *R. equi* causes disease is still being investigated. Virulence of the organism and susceptibility of the foal are key factors. Virulence of the organism has been shown to be associated with the presence of a plasmid containing a gene for Virulence associated protein A (VapA). Increased susceptibility to infection and disease in foals less than 2 months old has been correlated with low or waning levels of passively derived *R. equi* antibodies³. The organism can be isolated from fecal and soil samples. Transmission is probably by inhalation or possibly by ingestion⁴.

Clinical signs may be acute, subacute or chronic. (It should be noted that foals will usually continue to suckle through the course of the disease.) Clinical signs include:

- Fever >38.8°C for >12 hrs
(Temperature spike in evening is typical);
- Elevated plasma fibrinogen levels (normal is <400mg/dl);
- Elevated platelets and neutrophils;
- Increase in resting respiratory rate >40/min;
- Increased diffuse bronchial sounds (may or may not cough);
- May have bilateral mucopurulent nasal discharge;
- Tachycardia;
- Pneumonia; and/or
- Lethargy/Depression.

Diagnosis is based on clinical observations, age group affected, trachibronchial aspirations and culture, thoracic radiography, serologic evaluations, and predisposing factors (endemic *R. equi* disease). Infection usually occurs weeks before clinical signs are noticed⁵. Ultrasonography of the lungs has been used successfully as an aid in early diagnosis⁶. The following serologic tests can be used to aid in early diagnosis and treatment of the disease, sometimes even prior to exhibition of clinical signs.

The **ELISA** (enzyme-linked immunosorbence assay) titer can measure existing antibodies to *Rhodococcus equi* capsular specific IgG. The tests must be done in a test laboratory.

The **SHI** (synergistic hemolysis inhibition) test measures equifactor-neutralizing antibody⁷. The test is sensitive but is difficult and time consuming.

The **AGID** (agar gel immunodiffusion) test detects antibody to soluble equifactors* which are released by the organism from an active locus of infection. The presence of these antibodies reflect active infection⁷.

*“Equifactors” are extracellular synergistic hemolysins of *R. equi*, which are also known as phospholipases.

Antibiotic Therapy should be aggressive and should continue until radiographic changes and fibrinogen levels have returned to normal and remain so for 7–14 days. Therapy may be necessary for 4–8 weeks. Adjuncts to antibiotic therapy may include expectorants and bronchodilators. Rifampin and a macrolide antibiotic in combination are currently the drugs of choice. They are synergistic and appear to be the only drugs that are effective once *R. equi* is in the macrophage. By using drug combinations, bacterial resistance that could occur with an individual drug could be delayed. Typical dosing is oral Rifampin 10mg/kg BID and azithromycin 10mg/kg SID.

Prevention of *R. equi* pneumonia can begin on the farm. This is especially important on those farms where the disease is endemic.



Environmental Factors	Corrective Measures
Dust	<ul style="list-style-type: none"> Plant grass, cover area with gravel, wet area with sprinklers
Manure	<ul style="list-style-type: none"> Remove.
Farm Management	Corrective Measures
Identify foals at risk	<ul style="list-style-type: none"> Daily observation of foals at rest Test for <i>R. equi</i> antibodies. Remove foals with low titers to an environment that will decrease their exposure to <i>R. equi</i> Monitor temperatures regularly Ultrasonographic chest scans⁶.

IMMUNOPROPHYLAXIS PROGRAM

Rhodococcus equi specific hyperimmune plasma has been shown to be effective prophylactic therapy in at-risk foals¹⁰. It should be noted that the passive transfer in the mare's colostrum of antibodies to *R. equi* does not appear to be effective in the prevention of *R. equi* disease in her foal¹¹. **Plasma must be administered before any significant exposure of the foal to *R. equi* in order to be a successful prophylaxis.** This should be in the first few days of life. The history of *R. equi* disease on the farm is important, as is the change in environmental conditions (temperature, dust conditions, humidity). Hyperimmune plasma should be administered again in 4–6 weeks. ELISA levels could be used as a guideline. By using a select group, ELISA titers could be measured at 2 week intervals to determine a trend for decline of antibody. It has been suggested that the plasma dose be repeated if the level drops below 20 ELISA units¹².

ASSISTANCE FOR ENDEMIC FARMS

Plasvacc USA Inc. offers several methods of assisting farms with a known *R. equi* problem.

LAB SERVICES—Experienced laboratory personnel are standing by to run AGID tests to aid in diagnosing individual *R. equi* cases with results faxed directly to your clinic.

HYPERIMMUNE PLASMA—USDA licensed EQUIPLAS[®]REA and EQUIPLAS[®]R (*Rhodococcus Equi* Antibody, equine origin) are available from Plasvacc USA Inc. as an aid in management of *R. equi* to offer some protection for foals on endemic farms.

REFERENCES

- Hietala, S.K. and Ardans, A.A., 1987.**
Interaction of *Rhodococcus equi* with phagocytic cells from *R. equi* exposed and non-exposed foals. *Vet. Microbiol.*, 14:307–320.
- Martens, R.J., et al, 1989.**
Rhodococcus equi Foal Pneumonia: Protective effects of immune plasma in experimentally infected foals. *Eq. Vet. J.*, 21(4):249–255.
- Hietala, S.K., Ardans, A.A., and Sansome, A., 1985.**
Detection of *Corynebacterium equi* – specific antibody in horses by enzyme-linked immunosorbent assay. *Am. J. Vet. Res.*, 46:13–15.
- Johnson, J.A., et al, 1983.**
The Pathology of Experimental *Corynebacterium equi* Infection in Foals Following Intrabronchial Challenge. *Vet. Pathol.*, 20:440–449.
- Martens, R.J., et al, 1989.**
Rhodococcus equi Foal Pneumonia: Pathogenesis & Immunoprophylaxis. In Proceedings. 35th Ann. Conv. Am. Eq. Practn. 199–213.
- McCracken, J.L., et al 2009**
Use of thoracic ultrasound for the prevention of *Rhodococcus equi* pneumonia on endemic farms 55th Annual AAEP Convention 2009, 55: 38-44.
- Skalka, B., Svastova, A. 1985.**
Two techniques for detection of antibodies against *Corynebacterium (Rhodococcus) equi* in horse sera. *Vet. Microbiol.* 10:293–300.
- Ardans, A.A., Hietala, S.K., et al. 1986.**
Studies of naturally occurring and experimental *Rhodococcus equi (Corynebacterium equi)* Pneumonia in Foals. *Am. J. Vet. Res.* 129–144.
- Prescott, J.F., Sweeney, C.R.. 1985.**
Treatment of *Corynebacterium equi* Pneumonia of Foals: A Review. *JAVMA* 187(7):725–728.
- Madigan, J.E., Hietala, S.K., Muller, N.. 1989.**
Acquisition of passive immunity against *Rhodococcus equi* in foals by administration of hyperimmune plasma, in Proceedings. 35th Ann. Conv. Am. Eq. Practnr. 521–522.
- Madigan, J.E., et al, 1991.**
Protection Against Naturally Acquired *Rhodococcus equi* Pneumonia in Foals by Administration of Hyperimmune Plasma. *J. Reprod. Fert. Suppl.* 44:571–578.
- Bertone, J.J., Madigan, J.E., 1992.**
Rhodococcus equi Immunoprophylaxis. *Eq. Vet. Data* V.13:16, 273.

PLASVACC USA Inc.
1535 Templeton Road
Templeton, CA 93465
Toll Free (800) 654-9743
Fax (805) 434-2720
Email usmail@plavaccusa.com
Web www.plavaccusa.com

Technical support and inquiries to Plasvacc
Phone (800) 654-9743
Email usmail@plavaccusa.com

To order
Please contact your local veterinary distributor

PLASVACC
FOR LIFE[®]