

Listeriosis (Circling Disease)

Introduction

Listeriosis is a life-threatening disease caused by the *Listeria monocytogenes* bacteria. *L. monocytogenes* are gram-positive, extremely antibiotic-resistant coccoid to bacillus-shaped bacteria found in the environment. Spoiled forages and feed contaminated by *L. monocytogenes* are sources of contamination for goats. Listeriosis can infect animals and humans alike. The disease occurs worldwide and is widely distributed among avian species. *L. monocytogenes* is commonly found in the feces of infected birds, wild mammals, fish, crustaceans, insects, and in sewage. *L. monocytogenes* can contaminate water, milk, cheese, fetal feces (meconium), adult feces, and soil. *L. monocytogenes* can withstand various temperatures ranging from 39 to 111° F (4 to 44° C). Listeriosis is most prevalent during spring and winter months, which suggests that the prevalence of *L. monocytogenes* on ruminant farms is seasonal. Thus, management practices can be applied to minimize the risk of infection.

Listeriosis in goats is transmitted via the oral-fecal route, usually when animals ingest contaminated water or feed, or by fecal shedding of *L. monocytogenes*. Infection can also occur by inhalation. Infected animals could die if improperly treated.

Clinical Signs

Listeriosis can be presented in two forms:

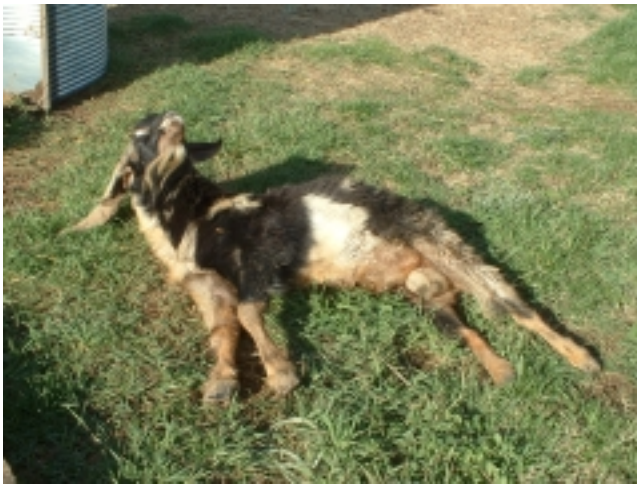
Encephalitic form: Characterized by encephalitis or meningoencephalitis (inflammation of the brain). This form contributes to the highest mortality rate. The bacterium enters the body through an opening in the mucosa of the oral cavity and migrates to the brain where it multiplies and causes inflammation. Early clinical signs are depression, decreased appetite,



decreased milk production, and fever. Signs progress to neuromuscular incoordination where animals circle in the same direction. Other progressive signs include seizures, facial nerve paralysis (on one side), ear droop, salivation, lack jaw, impaired swelling, and death.

The encephalitic form of listeriosis seems to be the most prevalent in small ruminants. Differential diagnosis must be accurate in order to exclude this disease from other neuromuscular system disorders such as those that result from polioencephalomalacia, rabies, caprine arthritis, encephalitis, pregnancy toxemia, and poisoning. Researchers have suggested that listeriosis can be disseminated in goats as a venereal route of transmission.

Septicemic form: The bacteria enter through the mouth and reach the bloodstream where they multiply and spread to other organs. In this form of the disease, diarrhea, abortion, and death are frequent. This form seems to be most prevalent in monogastric (humans, swine) species of all ages.



Diagnosis

Diagnosis is based upon clinical signs. A serological diagnosis using an enzyme-linked immunosorbent assay (ELISA) may also be used to confirm the presence of the bacteria. Confirmation of the clinical diagnosis can be done postmortem by a bacteriological culture, gram-staining, and immunohistochemistry in brain tissues extracted at necropsy. A DNA restriction analysis can be used for the confirmation of a *Listeria monocytogenes* infection.

Treatment, Prevention, and Control

- Successful treatment is dependent upon prompt diagnosis. The survival of an animal depends on whether diagnosis is made at an early stage and correct treatment applied.
- Administer penicillin and tetracycline orally at 25 mg/kg for 1 week or 11.5 mg/lb per day for 3 consecutive days. In the encephalic forms, intravenous sodium penicillin at a dosage of 40,000 IU/kg or 18,000 IU mg/lb every 6 hours until signs are improved, followed by administration of procaine penicillin at a dosage of 20,000 IU/kg body weight twice a day for 3 days.

- Administer intravenously 1-2 mg/kg or 0.05 mg/lb mg/kg or dexamethasone is recommended to treat inflammation in the brain. Intravenous fluid and electrolyte therapy and supplemental feeding are also recommended.
- Discard spoiled feed and hay.
- Improve sanitation of pens, water supply, pasture, and housing.
- Keep wild birds away from the herd as much as possible as these birds may serve as vectors for the disease.
- Identify the source of infection in order to help eliminate the causative agent.
- In the case of abortion, isolate aborting does and send aborted fetuses and placentas to a diagnosis center for isolation of the causative agent. (Wear latex gloves when handling placental membranes.)
- If a doe has listeriosis, feed kids pasteurized colostrums, milk, or a milk substitute.
- Human listeriosis is associated with the consumption of contaminated meat products, as well as milk and cheese obtained from nonpasteurized milk. Humans can also contract listeriosis by handling fetuses and specimens from aborted animals, and newborns of infected does. Always wear gloves when handling fetuses and specimens from aborted does.

Note: With the exception of ceftiofur, and neomycin, the Food and Drug Administration has not approved the antibiotics discussed for treating goats. Their use is considered extra-labeled, requiring consultation with a veterinarian for product usage and guidance.

Consult a local veterinarian for disease treatment and control.

References

- Bourry, A., Cochard, T., and Poutrel, B. (1997). Serological diagnosis of bovine, caprine, and ovine mastitis caused by *Listeria monocytogenes* by using an enzyme-linked immunosorbent assay. *Journal of Clinical Microbiology*, 35(6), 1606-1608.
- Braun, U., Stehle, C., and Ehrensperger, F. (2002). Clinical findings and treatment of listeriosis in 67 sheep and goats. *Veterinary Research*, 150(2), 38-42.
- Fensterbank, R. (1987). Vaccination with a listeria strain of reduced virulence against experimental listeria abortion in goats. *Annales de Recherches Vétérinaires (Annals of Veterinary Research)*, 18(4), 415-419.
- Fugett, E. B., Schoonmaker-Bopp, D., Dumas, N. B., Corby, J., and Wiedmann, M. (2007). Pulsed-field gel electrophoresis (PFGE) analysis of temporally matched *Listeria monocytogenes* isolates from human clinical cases, foods, ruminant farms, and urban and natural environments reveals source-associated as well as widely distributed PFGE types. *Journal of Clinical Microbiology*, 45(3), 865-873.
- Johnson, G. C., Maddox, C. W., Fales, W. H., Wolff, W. A., Randle, R. F., Ramos, J. A., et al. (1996). Epidemiologic evaluation of encephalitic listeriosis in goats. *Journal of the American Veterinary Medical Association*, 208(10), 1695-1699.
- The Merck Veterinarian Manual*. (2006). *Listeriosis*. Whitehouse Station, NJ: Merck and Company, Inc.
- Loeb, E. (2004). Encephalitic listeriosis in ruminants: Immunohistochemistry as a diagnostic tool. *Journal of Veterinary Medicine*, 51(9-10), 453-455.
- Nightingale, K. K., Fortes, E. D., Ho, A. J., Schukken, Y. H., Grohn, Y. T., and Wiedmann, M. (2005). Evaluation of farm management practices as risk factors for clinical listeriosis and fecal shedding of *Listeria monocytogenes* in ruminants. *Journal of Veterinary Medical Association*, 228(5), 737.
- Okwumabua O., O'Connor, M., Shull, E., Strelow, K., Hamacher, M., Kurzynski, T., and Warshauer, D. (2005). Characterization of *Listeria monocytogenes* isolates from food animal clinical cases: PFGE pattern similarity to strains from human listeriosis cases. *FEMS Microbiology Letters*, 249(2), 275-281.
- Shin, T., Weinstock, D., Castro, M. D., Acland, H., Walter, M., Kim, H. Y., et. al. Immunohistochemical study of constitutive neuronal and inducible nitric oxide synthase in the central nervous system of goat with natural listeriosis. *Journal of Veterinary Science*, 1(2), 77-80.
- Wiedmann, M., Mobini, S., Cole, J. R., Watson, C. K., Jeffers, G. T., and Boor, K. J. (1999). Molecular investigation of a listeriosis outbreak in goats caused by an unusual strain of *Listeria monocytogenes*. *Journal of American Veterinary Medical Association*, 215(3), 369-371, 340.
- Wood, J. S. (1972). Encephalitic listeriosis in a herd of goats. *The Canadian Veterinary Journal*, 13(3), 80-82.



UNP-64

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New March 2008; UNP-64