Listeriosis in an Immature Black Buck Antelope (Antilope cervicapra) 1

Authors: Webb, Dale M., and Rebar, Alan H.

Source: Journal of Wildlife Diseases, 23(2) : 318-320

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-23.2.318

Journal of Wildlife Diseases, 23(2), 1987, pp. 318–320

Listeriosis in an Immature Black Buck Antelope (*Antilope cervicapra*)[1]

Dale M. Webb and Alan H. Rebar,[2] Animal Disease Diagnostic Laboratory, School of Veterinary Medicine, Purdue University, West Lafayette, Indiana 47907, USA. [1] Submitted as Journal Paper No. 10,082, Purdue University Agricultural Experiment Station. [2] Author to whom reprint requests should be addressed.

ABSTRACT: A 10-week-old, black buck antelope calf, from the Mesker Park Zoo in Evansville, Indiana was found dead without observed signs of illness. Necropsy disclosed disseminated ecchymoses on the pericardium, diaphragm, intestines, and renal capsules and more extensive hemorrhage in the muscles of the hindquarters. There were numerous, 1 mm, pale foci on the capsular and cut surfaces of the liver and spleen which, on microscopic examination, were necrotic foci containing variable numbers of neutrophils and mononuclear leukocytes with numerous, short, Gram-positive, cocco-bacilli at the periphery. *Listeria monocytogenes* was isolated from the liver. Septicemia is the most common form of listeriosis in non-domestic ruminants. Listeriosis should be suspected when unexpected deaths are accompanied by multifocal necrotizing hepatitis and splenitis, myocarditis, and disseminated hemorrhage.

Key words: Listeriosis, *Listeria monocytogenes*, black buck calf, *Antilope cervicapra*, case report, California.

Listeriosis is an uncommon, but significant, cause of morbidity and mortality in wild and domestic animals. It is responsible also for human disease, most often following consumption of contaminated foodstuffs. Listeriosis has been reported in a variety of non-domestic animals (Dijkstra, 1981). This report describes a case of listeriosis in a captive black buck antelope calf.

Tissues from a 10-week-old black buck antelope calf (*Antilope cervicapra*) were submitted to the Animal Disease Diagnostic Laboratory at Purdue University for histologic and virologic examination. The calf had been found dead without observed signs of illness. It had been housed with its sire, dam, several other black buck females, and two nilgai (*Boselaphus tragocamelus*) females in an approximately 0.4 ha enclosure at the Mesker Park Zoo in Evansville, Indiana where it was born. The other animals in the enclosure appeared clinically normal.

Necropsy findings included disseminated ecchymoses on the serosa of the epicardium, diaphragm, intestines, and on the renal capsules. More extensive hemorrhage was present in muscles of the hindquarters. The liver had numerous, disseminated, 1 mm diameter, slightly depressed, pale gray foci on capsular and cut surfaces. The rumen was filled with normal ingesta.

The principal histopathologic alterations were multifocal acute necrotizing hepatitis and splenitis. Sections of liver had numerous, irregular, variably-sized (sublobular to involvement of several adjacent lobules), randomly-distributed foci of coagulative necrosis surrounded by zones of intense basophilia (Fig. 1). The central portion of the lesions was composed of fibrillar, eosinophilic material with embedded nuclear debris and minimal numbers of invading neutrophils. At the periphery of these necrotic foci were necrotic and degenerate hepatocytes; nuclear debris; a few neutrophils, lymphocytes, and macrophages; and numerous, short cocco-bacilli occurring singly or in short chains (Fig. 2). Although visible in hematoxylin and eosin-stained sections, the bacteria were more readily apparent in sections stained using the McCallum-Goodpasture method (Luna, 1968) where they were Gram-positive.

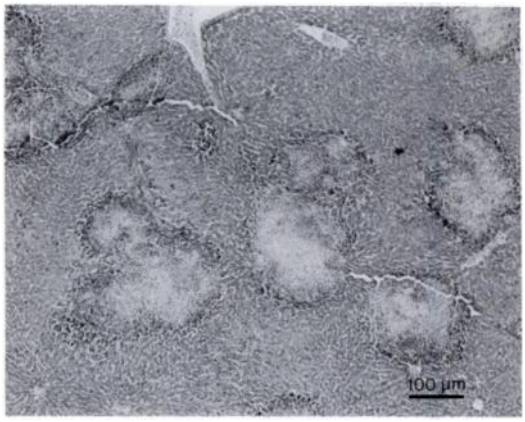

FIGURE 1. Section of liver with characteristic necrotic foci. McCallum-Goodpasture stain.

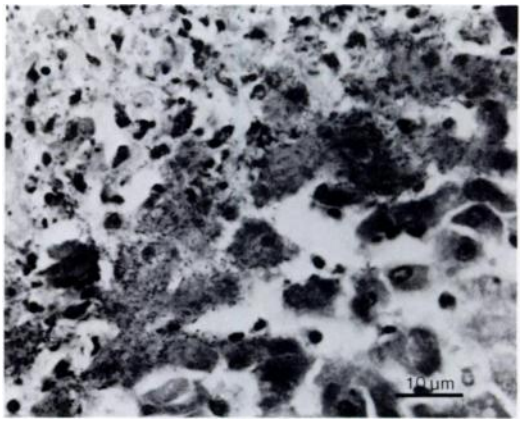

FIGURE 2. Section of liver with myriads of bacilli and moderate numbers of neutrophils visible at the junction of viable and necrotic hepatocytes. McCallum-Goodpasture stain.

Splenic alterations involved the capsule, trabeculae, and the parenchyma. Areas of intracapsular and intratrabecular necrosis with nuclear debris and bacteria were present multifocally. Parenchymal lesions consisted of irregular foci of coagulative necrosis composed of homogeneous, eosinophilic material with hemorrhage, central accumulations of nuclear debris, and relatively few bacteria. A section of mesenteric artery had endothelial swelling and fibrinoid degeneration of the tunica media. Significant histologic alterations were not observed in heart, kidney, lymph node, or brain.

Virus isolation was attempted by inoculation of cultured bovine turbinate epithelium and bovine fetal lung cells with filtered suspensions of frozen kidney, spleen, and rumen. Cytopathic effects were not observed through two cell passages. Direct fluorescent antibody tests on the inoculated cells were negative for bovine virus diarrhea virus and epizootic hemorrhagic disease virus of deer.

Because bacteria were observed in tissue sections, blood agar was inoculated with material from frozen liver and incubated in a candle jar. Within 24 hr a pure culture of Gram-positive bacilli was present which had biochemical and morphological characteristics of *Listeria monocytogenes* (Carter, 1982).

L. monocytogenes is a short (1–2 µm), Gram-positive, nonsporeforming, fermentative, catalase-positive bacillus. It is widely distributed in nature and can be commonly isolated from animal and human feces. The organism is extremely resistant to environmental influences provided the pH remains >5.0. Anaerobically ensiled herbage becomes acidic enough to inhibit the growth of *L. monocytogenes*. However, the organism is common in improperly (aerobically) fermented silage. Animals consuming such silage are more likely to develop listeriosis (Kruger, 1962).

The septicemic form of listeriosis, as was observed in this black buck calf, is the most common manifestation of listeriosis in monogastric animals, young domestic ruminants (Gray and Killinger, 1966), and wild ruminants of all ages (Dijkstra, 1981). Septicemia is uncommon in adult domestic ruminants, in which the principal form of the disease is encephalitis (Gray and Killinger, 1966). The encephalitic form may be uncommon in wild ruminants because they are less frequently exposed to silage than are domestic ruminants.

Definitive diagnosis of all forms of listeriosis requires isolation and identification of the organism. Cold-enrichment at 4 C enhances isolation and culturally negative tissues should be held at refrigerator temperatures and recultured weekly for up to 12 wk before considered negative (Carter, 1982). In adult domestic ruminants, characteristic "microabscesses" in the brain stem are considered nearly pathognomonic for the disease. Necropsy findings in animals with the septicemic form of listeriosis are reasonably distinctive with necrotizing splenitis, necrotizing hepatitis, disseminated hemorrhage, and, often, necrotizing epicarditis and myocarditis as the characteristic lesions. Impressions of affected liver and spleen frequently contain large numbers of Gram-positive bacilli. Differential diagnosis of the septicemic form with typical, disseminated, visceral lesions in ruminants and monogastric animals would include infection with *Salmonella* spp., *Yersinia pseudotuberculosis*, *Francisella tularensis*, and *Pasteurella* spp. Disease caused by these organisms may be differentiated from listeriosis using histologic Gram stains and cultural methods.

The authors thank Dr. S. W. Epperson for submission of the tissues, Sam Royer for the photomicrography, Dr. Charles Armstrong for bacterial isolation, Dr. Charles Kanitz for virus isolation, and Janeice Samman for preparation of special histologic stains.

LITERATURE CITED

CARTER, G. R. 1982. Listeriosis. *In* Essentials of veterinary bacteriology and mycology. Michigan State University Press, East Lansing, Michigan, pp. 146–150.

DIJKSTRA, R. G. 1981. Listeriosis. *In* Infectious diseases of wild animals, 2nd ed., J. W. Davis, L. H. Karstad, and D. O. Trainer (eds.). Iowa State University Press, Ames, Iowa, pp. 306–316.

GRAY, M. L., AND A. H. KILLINGER. 1966. *Listeria monocytogenes* and listeric infection. Bacteriologic Review 30: 309–382.

KRUGER, W. 1962. Das Vorkommen von *Listeria monocytogenes* in den Verschiedenen Silagen und Dessen Atiologische Bedentung. Archives für Experimental Veterinary Medicine 17: 181–203.

LUNA, L. G. (ed.). 1968. Manual of histologic staining methods of the Armed Forces Institute of Pathology, 3rd ed. McGraw-Hill Book Co., New York, New York, pp. 225–226.

Received for publication 2 September 1986.