Rangelia vitalli Infection in Dogs: Epidemiological, Clinicopathological and Ultrastructural Findings

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This report describes the epidemiological, clinical, pathological and ultrastructural findings of a tick-borne disease of dogs caused by the obligate intracellular organism Rangelia vitalli. The disease, first described in Brazil in 1908, has been referred to popularly as “nambiuvú” (bloody ears) or “peste de sangue” (bleeding plague). The life-cycle of R. vitalli consists of an intraerythrocytic developmental phase, and an exoerythrocytic phase occurring in the cytoplasm of endothelial cells. R. vitalli-parasitized erythrocytes are regarded as uncommon to rare findings in blood smears, especially in the chronic form of the infection. In this case series (2000 and 2002-3), the disease was diagnosed in 8 dogs from southern Brazil. It was characterized by anemia, jaundice, fever, splenomegaly, lymphadenomegaly, widespread petechiation on the oral and vaginal mucosa, persistent bleeding from tips and external surface of the pinnae and mouth, epistaxis, and bloody feces. The disease was observed in dogs from rural and suburban areas of 3 different counties in the state of Rio Grande do Sul (RS). Categories of dogs affected by the pathogen included hunting dogs, guard dogs and companion dogs. The disease occurred at any time of the year, although peak occurrence was observed during the summer and was associated with the presence of large populations of ticks. The ixodid ticks Rhipicephalus sanguineus and Amblyomma aureolatum were consistently found infesting affected dogs from suburban areas and rural areas, respectively. Laboratory findings included regenerative anemia, spherocytosis, icteric plasma and bilirubinuria. Four animals died spontaneously. Of those, 3 animals were jaundiced and died acutely after approximately 1 week. One animal that died after a long, protracted clinical course of approximately 2-3 months had anemia. One animal recovered after therapy with imidocarb dipropionate and blood transfusion, and another one recovered after treatment with doxycycline and corticotherapy. Two animals died after therapy with diminazene aceturate. Necropsy findings included diffuse pallor or yellowish discoloration of the carcass and internal organs, enlarged lymph node enlargement and hemorrhage in the gastrointestinal tract. Microscopically, R. vitalli was seen in parasitophorous vacuoles in the cytoplasm of endothelial cells of blood capillaries. R. vitalli was not found in erythrocytes. Marked erythrophagocytosis was observed in the lymph nodes. Ultrastructurally, those organisms were also observed free in the lumen of the capillaries. The fine structure of both the parasite and its parasitophorous vacuole were similar to those protozoa of the phylum Apicomplexa. The disease was successfully reproduced in one experimental dog inoculated IV with blood sampled from an infected dog. Immunohistochemistry for L. chagasi, N. caninum and T. gondii was consistently negative. No other blood parasites or rickettsial agents were found in erythrocytes or leucocytes in both spontaneous and experimental cases. Gross and histological findings typical of diamidine poisoning i.e. symmetric bilateral hemorrhagic encephalomalacia affecting the brainstem were observed in those 2 animals treated with diminazene aceturate. In both cases, the gross and histological lesions were consistent with R. vitalli infection but no parasites were observed. Tentative clinical diagnosis of R. vitalli infection was based on the history, clinical picture, hemogram and favorable response to therapy. The diagnosis was confirmed through microscopic examination of smears from the bone marrow sampled during necropsy or histological sections from multiple tissues especially the lymph nodes where the organisms were most frequently found. Based on our ultrastructural findings, we suggest that R. vitalli be considered as a protozoan parasite of the phylum Apicomplexa. Spherocytosis and erythrophagocytosis suggest that R. vitalli causes an immune mediated hemolytic anemia as previously observed by other authors. Maybe wild animals are reservoirs of this parasite since in rural areas the tick A. aureolatum has been found infesting domestic dogs as well as wild carnivores.