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ULTRASOUND EVALUATION OF THE KIDNEYS OF DOGS WITH VISCERAL LEISHMANIASIS - 485

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Introduction
The leishmaniosia is a public health problem in 88 countries, with annual registration rates from 1 to 1.5 million cases. It is considered by the World Health Organization (WHO) as one of the six most important infectious neglected diseases. The disease occurs in America, Africa, Asia and Europe (Taboada & Merchant 1997). In Brazil, the infection is endemic in the North, Northeast, Midwest and Southeast areas (Silva et al. 2001). The canine visceral leishmaniosis (CVL) is a chronic and often fatal disease, being dogs considered the most important vertebrate reservoir of the parasite (Moreno et al. 1998). In the host cells of the mononuclear phagocytic system, the Leishmania chagasi, parasite which causes the infection in Brazil, produces a range of immunological and inflammatory disorders which culminates with the clinical disease (Silva et al. 2001). The renal involvement is very common in dogs with CVL due to deposition of immunocomplexes in the basilar membranes of the renal parenchyma. This phenomenon is caused by persistent infection associated with prolonged antigenemia (Moura et al. 2002). According to Ikeda et al. (2003), about 35% of symptomatic dogs positive for anti-Leishmania antibodies present interstitial nephritis. Symptomatic and asymptomatic infected dogs can have varying degrees of renal lesions (Moura et al. 2002), as some studies have shown that near 100% of dogs with CVL have macro or microscopic renal lesions (Tafuri et al. 1989 & Costa et al. 2003). The clinical signs of renal dysfunction, however, only appear when the tissue injury is extensive (Ciaramella et al. 1997). The urinary tract ultrasound evaluation, especially of the kidneys, has become routine in veterinary medicine as a noninvasive, painless and non-ionizing method that allows to obtain information about the topography, size, shape and internal architecture of the evaluated organs (Vac 2004). As clinical and laboratory changes of renal disease are only present when most parts of the parenchyma had been lost, the ultrasonography is an important tool for early detection of morphological renal changes and establishment of diagnosis and prognosis (Vac 2004). Early diagnosis can prevent irreversible tissue injury, thus preventing loss of functionality of the organ and preserving the quality the animal’s life. As renal impairment in leishmaniosis is one of the main factors that lead to animal death, renal ultrasonography can be an useful tool in the diagnostic set for the clinical approach and treatment of affected dogs. The present work describes renal ultrasound findings of seropositive dogs for visceral leishmaniosis and the applicability of ultrasonography to assist the establishment of clinical diagnosis and prognosis of naturally infected dogs.

Material e method
Ten dogs, all positive for CVL were clinically evaluated and examined by abdominal ultrasonography. The animals were of various breeds, aged between one and eight years, and weighted from 20 to 70 kg. They were diagnosed for CVL by serologic test (ELISA) and lived at the northeast area of Bahia, Brazil, which is endemic for CVL. The dogs were examined at the Veterinary Hospital of the Federal University of Bahia (HOSPMEV-UFBA), between July 2006 and March 2007. Five healthy animals, all seronegative for anti-Leishmania antibodies by indirect ELISA, were used as controls. The clinical examinations were performed by anamnesis followed by physical examination, and blood sampling for laboratory tests (hemograms; urinalysis; and determinations of serum total protein and its fractions albumin and globulin, creatinin and urea (BUN), alanine aminotransferase -ALT- and alkaline phosphatase -ALP). Before the ultrasound examination, the dogs were placed at the thoraco-abdominal ventral area, from the last intercostal space to the pelvic region. A first abdominal scan was carried out to assess the uterus (females), prostate (males), urinary bladder, spleen, liver and intestines. The following scan was directed to the kidneys, primarily by examining the left and then the right kidney, being observed their topography, size, and cortico-medullar ratio and definition. The echogenicity of the cortical region was compared to the parenchyma of the spleen, being also evaluated the renal medullary area, pelvis and internal architecture. The measurements of length and width in the coronal plane were performed in both kidneys. Results: Among the clinical alterations of CVL, skin lesions were the most frequent cause of the owner complaint, along with hyporexia and weight loss. Lymphadenopathy was the most common clinical finding, present in 90% (9/10) of the infected animals (Table 1). Skin lesions were the second major finding, being present in 80% (8/10) of the infected animals, and included alopecia, hyperpigmentation, hyperkeratosis, muzzlez and interdigital lesions and ulcers. The most frequent laboratory findings were hyperglobulinemia and hypoalbuminemia, present in 100% of the dogs; proteinuria (80%) and anemia (70%). Five dogs (50%) had values of urea and creatinine above the reference value for the species and two dogs showed elevations of enzymes related to liver lesion. The main finding of the general ultrasound examination was splenomegaly, present in nine dogs (90%). Only one dog showed hepatomegaly, which was associated with high levels of ALT and ALP. Two dogs showed thickened urinary bladder associated with hyperchoic particles in the lumen, suggestive of the presence of urinary sediment. All ten dogs had kidney topography within the normality. One dog presented kidneys with irregular borders. Seven dogs had normal sized kidneys and three showed kidneys with reduced size. Four dogs showed reduced definition of the corticomedullary junction, among those three showed ultrasound images of changes in the renal architecture with increased cortical echogenicity consistent with parenchyma inflammation.
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Discussion
Most clinical and laboratory findings observed in the present study were similar to those described in the literature (Ciaramella et al. 1997; Amusatsegui et al. 2003 & Ikeda et al. 2003). The renal ultrasonographic alterations, as showed by the infected dogs of our study, such as size reduction and loss of cortico-medullary definition, can be defined as signs of chronic renal inflammatory disease (Vac 2004). In visceral leishmaniosis, the continuous deposition of immunocomplexes, leading to the development of glomerulonephritis is the cause of renal failure and clinical signs (Ciaramella et al. 1997 & Moura et al. 2002), as found in the dogs studied herein. The same animals also had loss of natural characteristics of the renal architecture and increased echogenicity of the renal cortical parenchyma when compared to the spleen, findings that may be interpreted as evidences of advanced kidney disease (Burk 1996 & Vac 2004). In fact, the laboratory tests of these dogs evidenced abnormally high values for urea and creatinine, as well as severe proteinuria (up to 300mg/dL). The elevation of serum levels of urea and creatinine, associated with proteinuria, as found in the dogs with image alterations in the present study, can be considered a clinical evidence of renal injury caused by deposition of immunocomplexes in the basal membranes of the renal parenchyma as described by various authors (Ciaramella et al. 1997; Ferrer 1992 & Moura et al. 2002). The laboratory changes observed in these dogs could be associated with alterations consistent with nephropathy, as diagnosed by ultrasound examination. Moreover, six dogs (60%) showed no ultrasound alterations of kidneys and no laboratory data indicative of renal disease, except for one which presented high serum creatinine and urea. In these cases, the ultrasonography allowed a diagnosis of the renal morphology, which ultimately could represent a better prognosis for those dogs, particularly on the guidance of therapeutic procedures.

Conclusions
All animals presenting ultrasound images of renal alterations also had clinical signs of visceral leishmaniosis and changes in laboratory tests for azotemia and / or proteinuria. The ultrasound findings allowed a diagnosis of the morphological renal condition which could be associated with laboratory evidences of renal dysfunction and ultimately providing information on the prognosis of seropositive dogs for CVL. Ultrasonography may be an important diagnostic tool in the diagnostic and prognostic approach of dogs with renal lesions due to diseases that lead to chronic loss of renal function, such as leishmaniosis.

References