

Diagnosis of *diotophyma renale* using ultrasonography and microscopy – A case report

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ABSTRACT

Dioctophyma renale is classified as a cosmopolitan zoonotic helminth, belonging to Nematoda class and Dioctophymoidea superfamily. Dogs are considered definitive hosts, suffering large kidney damage. The diagnosis can be done through ultrasound, x-ray and light microscopy. The aim in this paper was to report the sonographic and microscopic aspects of a canine affected by *Dioctophyma renale*. Dark colored urine evolving to hematuria and abdominal pain were the main symptoms observed in the animal. After performing urinalysis it was verified *D. renale* eggs. Ultrasonography could observe total destruction of the right renal parenchyma, hyperechoic structures of cylindrical and rounded shape bounded by the renal capsule, suggesting the presence of the parasite, while the left kidney had normal size. The animal was submitted to nephrectomy, confirming the worm presence, measuring 31.8 cm long. It can be stated that ultrasound and light microscopy are highly effective to establish a definitive diagnosis of *Dioctophyma renale*.

Keywords: Kidney Damage. Parasitology. Ultrasonography. Urinalysis.

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Veterinária em Foco	Canoas	v. 14	n. 2	p. 48-53	jan./jun. 2017
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Diagnóstico de *Dioctophyma renale* utilizando a ultrassonografia e microscopia em um cão em Belém do Pará, Brasil – Relato de caso

RESUMO

O *dioctophyma renale* é classificado como um helminto zoonótico cosmopolita, pertencente à classe de Nematoda e superfamília de Dioctophymoidea. Os cães são considerados hospedeiros definitivos, e sofrem grande dano renal. O diagnóstico pode ser feito através de ultrassom, raios x e microscopia de luz. O objetivo deste trabalho foi relatar os aspectos ultrassonográficos e microscópicos de um canino afetado por *Dioctophyma renale*. A urina de cor escura com evolução para hematúria e dor abdominal foram os principais sintomas observados no animal. Foi realizada a urinálise, onde foi evidenciado os ovos de *D. renale*. Na ultrassonografia pôde-se observar destruição total do parênquima renal direito, estruturas hiperecoicas de forma cilíndrica e arredondada delimitadas pela cápsula renal, sugerindo a presença do parasita, enquanto o rim esquerdo estava com seu tamanho normal. O animal foi submetido à nefrectomia, confirmando a presença do verme, medindo 31,8 cm de comprimento. Pode-se afirmar que o ultrassom e a microscopia de luz são altamente eficazes para estabelecer um diagnóstico definitivo de *Dioctophyma renale*.

Palavras-chave: Danos renais. Parasitologia. Ultrassonografia. Análise de urina.

INTRODUCTION

Dioctophyma renale is classified as a cosmopolitan zoonotic helminth, belonging to Nematoda class and Dioctophymoidea superfamily (COLPO et al., 2007). Dogs are considered definitive terminal hosts of dioctophymosis, and so wild carnivores, canids and mustelids. A water oligochaete annelid, the *Lumbriculus variegatus*, represents the intermediate host that ingests the eggs containing first life stage parasite larvae (KOMMERS et al., 1999). Fish, frogs and rats are considered paratenic hosts, the parasite can not reproduce or grow in these animals but remains viable until it finds a definitive host. Therefore, the fishing areas are extremely important once the intake of contaminated fish contributes to the parasite cycle perpetuation (PEDRASSANI, et al. 2009).

Leite et al. (2005) and Pedrassani et al. (2009) state the existence of some papers reporting that most adult parasites reproduce in the right kidney of definitive hosts, and its eggs are released into the urine. Because of its topography, the right kidney is the most affected due to the worm passage over the duodenal wall to the kidney. However, there is a possibility of migration to other abdominal regions (MATTOS JÚNIOR and PINHEIRO, 1994).

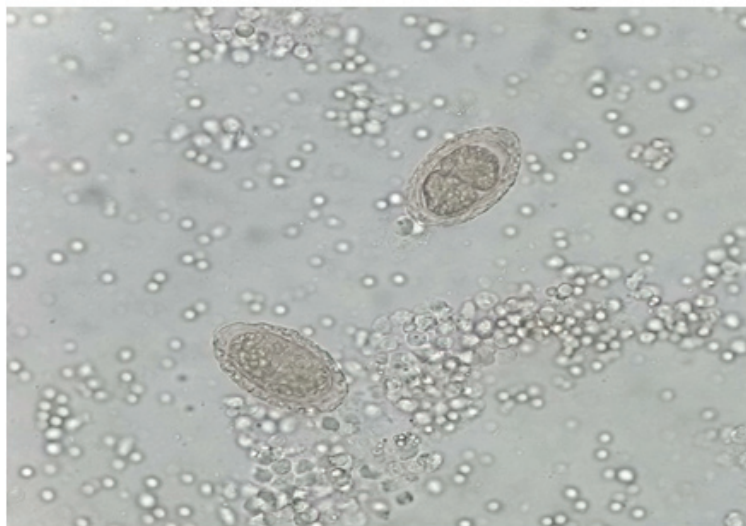
Diagnosis can be done through urinalysis, where we may observe parasite eggs on the sediment, while *D. renale* adult is usually visualized on abdominal ultrasound examination and radiographs (LIMA et al., 2016). Therefore, the aim in this paper was to report the sonographic and microscopic aspects of a canine affected by *Dioctophyma renale*, treated at the Veterinary Hospital (HOVET) of the Federal Rural University of Amazon (UFRA – Belém/PA).

CASE REPORT

A five month old Poodle dog was attended in September 2016 in the Veterinary Hospital at UFRA. The owner reported that the animal was kidnapped, after ten days the animal was found, it was presenting urine with fresh blood followed by dark urine after two weeks, it had also hyporexia, sensitivity and abdominal pain. However, in physical exam this pain was not observed. Then, the following laboratory tests were requested: Hemogram, serum biochemistry of kidney and liver function (urea, creatinine, alkaline phosphatase, alanine aminotransferase, total protein and fractions), urinalysis (collection performed through cystocentesis), relation between urinary protein and creatinine, abdominal ultrasound and simple abdominal radiography.

The haematological tests showed normocytic normochromic anemia, besides the increased levels of alkaline phosphatase and urea. On the urinalysis, epithelial cell desquamation (common), large amount of pus cells, red blood cells and granular cylinders were noticed, still being observed 26 ellipsoidal shape eggs with symmetrical end surrounded by a thick roughened layer of transparent coloration and slightly yellowish in the center, compatible with *Dioctophyma renale* eggs (Figure 1).

FIGURE 1 – Eggs of *D. renale* identified by light microscopy.

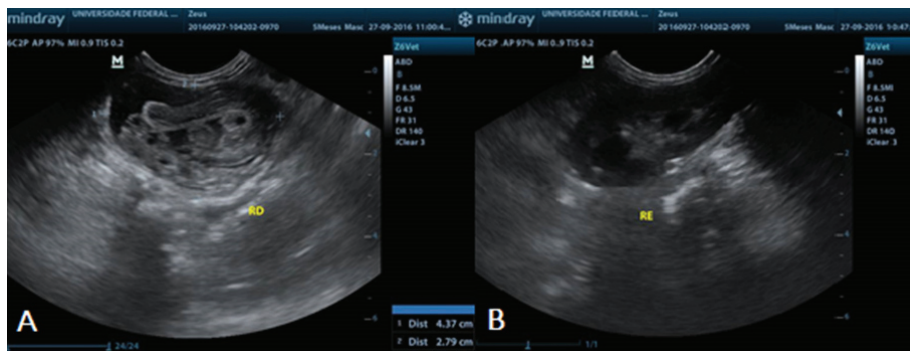


Source: The author.

The ultrasound showed total loss of corticomedullar pattern of right renal parenchyma, containing inside a small amount of anechoic particulate material containing, as well as hyperechoic structures with hypoechoic center of cylindrical or rounded shape being contained by the kidney capsule, suggesting the renal destruction by the presence

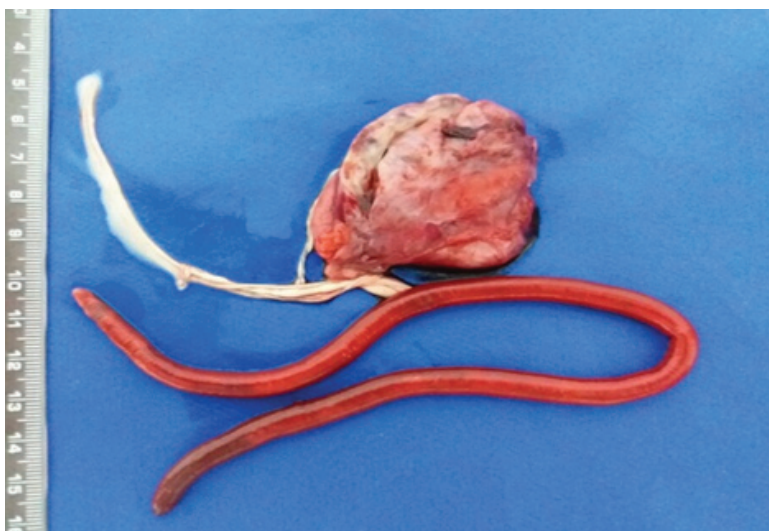
of *Dioctophyma renale* (Figure 2A). But the left kidney was in normal range (Figure 2B). The next day, it was performed a nephrectomy where the right kidney was removed, being confirmed an infection by the parasite *Dioctophyma renale*, which measured 31.8 cm in length (Figure 3).

FIGURE 2 – (A) An ultrasonographic examination of the right kidney shows the internal replacement of the parenchyma by a cylindrical and rounded hyperechoic structure with preservation of the renal capsule alone. (B) Intact left kidney with normal echogenicity and ecotexture.



Source: The author.

FIGURE 3 – Right kidney and *Dioctophyma renale*, after nephrectomy.



Source: The author.

DISCUSSION

The animal affected by diotrophimosis compatible with other studies for the occurrence of this disease and is reported mainly in young animals (less than 6 months old) (STAINKI et al., 2011). However, it differs from the work of Arantes and Santos (2012), which reports *D. renale* in adult animals, confirming that it can affect animals of any age group. Therefore, this parasite can affect animals of all ages.

In most cases, diotrophimosis is considered asymptomatic, or has non specificity clinical signs, like in this report, and in Ferreira et al. (2009), where the achievement of exams like ultrasound and the laboratory tests were very important to diagnose the parasite. In this study, the morphological characteristics of the eggs found in the urine were evidenced by microscopic examination, confirming the diagnosis of *D. renale*, as well as in the case reported by Pedrassaniet al., (2009).

On ultrasonography the parasite presented a similar aspect to that described in the study of Oliveira et al. (2005), in which they visualized rounded structures, approximately 8 mm in diameter, with a thin external hyperechoic layer and hypoechoic center. The left kidney was normal, like reported by Kano et al. (2003), disagreeing with Oliveira et al. (2005), who reported an increase in volume on the opposite kidney to the parasite. Probably the left kidney showed normal because it was a recent infestation.

Abdominal ultrasonography showed that the right kidney only had the region of the capsule since the parasite had destroyed the medullar and cortical regions, as well as in the work of Leite et al.,(2005), in which it analyzed the anatomopathological characteristics in dogs infected by this parasite, revealing that adult parasites were usually located in the right kidney of their definitive hosts causing progressive destruction of their parenchyma, and reducing it to a fibrous capsule.

In this study, the established treatment was nephrectomy as in Martins (2007), where it states that the only treatment for diotrophimosis is a nephrectomy of the parasitized kidney, and we should stabilize metabolic and water imbalances before the surgery.

CONCLUSION

Abdominal ultrasonography and microscopy should be the recommended tests in cases of suspected diotrophimosis, once in this work through the ultrasound it was possible to evidence the pathognomonic aspects of the parasite, being complemented with the light microscopy examinations.

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