SHORT COMMUNICATION
COMUNICAÇÃO CURTA
COMUNICACIÓN CORTA

ENVIRONMENTAL SMOKE
(www.environmentalsmoke.com.br)
ISSN 2595-5527
v. 3, n. 2, p. 86-90, 2020

SURGICAL INTERVENTION IN CANINE HEARTWORM. LITERATURE REVIEW

Gil Dutra FURTADO[1*]; Tamara de Moura MENDES[2]; Leonardo Alves de FARIAS[3]

[1]Veterinary Medicine student/Maurício de Nassau University Center (UNINASSAU), João Pessoa; Agronomist/Federal University of Paraíba (UFPB); Ph.D. in Psychobiology/Federal University of Rio Grande do Norte (UFRN); Socio-partner of the Agribusiness Cooperative (COOPAGRO), Natal, Rio Grande do Norte, Brazil.

[2]Veterinary Medicine student/University Center Maurício de Nassau (UNINASSAU), João Pessoa; Biologist/UFPB, João Pessoa, Paraíba, Brazil.

[3]Professor of Veterinary Medicine/Maurício de Nassau University Center (UNINASSAU), João Pessoa; Veterinary Physician/Federal University of Paraíba (UFPB), João Pessoa, Paraíba, Brazil.

*Corresponding author. E-mail: gdfurtado@hotmail.com

Abstract. In Brazil, surgical intervention in the treatment of dogs heavily infected by *Dirofilaria* nematode is an uncommon procedure. This is a technique where mechanical removal of the parasite is performed using plenty kinds of recovery tweezers. Removing *Dirofilaria* using recovery devices, such as grasping forceps, is an efficient and safe therapeutic alternative for treating dogs with a high load of this worm.

Keywords: Tweezers; Pathology; Surgical intervention.

INTERVENÇÃO CIRÚRGICA EM DIROFILARIOSE CANINA. REVISÃO BIBLIOGRAFICA

Resumo. No Brasil, a intervenção cirúrgica no tratamento de cães fortemente infectados pelo nemátodo do gênero *Dirofilaria* é um procedimento pouco utilizado. Esta é uma técnica onde se realiza a remoção mecânica do parasita usando vários tipos de pinças de recuperação. A remoção de *Dirofilaria* com a utilização de dispositivos de recuperação, como as pinças de apreensão, mostram-se uma alternativa terapêutica eficiente e segura no tratamento de cães com grande carga deste verme.

Palavras-chave: Pinça; Patologia; Intervenção cirúrgica.

INTERVENCIÓN QUIRÚRGICA EN DIROFILARIOSIS CANINA. REVISIÓN DE LITERATURA

Resumen. En Brasil, la intervención quirúrgica en el tratamiento de perros muy infectados por el nematodo *Dirofilaria* es un procedimiento poco utilizado. Esta es una técnica en la que la eliminación mecánica del parásito se realiza utilizando varios tipos de pinzas de recuperación. Eliminar las *Dirofilaria* usando dispositivos de recuperación, como pinzas de agarre, es una alternativa terapéutica eficiente y segura para el tratamiento de perros con una alta carga de este gusano.

Palabras clave: Pinzas; Patología; Intervención quirúrgica.

Submitted on: 13 Jun. 2020; Accepted on: 15 Aug. 2020; Published on: 31 Aug. 2020
DOI: 10.32435/envsmoke.20203286-90

INTRODUCTION

Preventive action is a priority for veterinarians, as this becomes the main key to give a good quality of life for domestic animals as well as for the whole society where they are inserted (FURTADO et al., 2018). Still, cases such as heartworm disease, which is a silent pathology, often, after the pathogen is already very established in the host, requires more specialized medical procedures (SALGUEIRO, 2016).

Heartworm disease is the name of a serious disease that can be fatal, affecting mainly dogs, but can also occur in cats and other wild animals. In this disease, adult helminths live in the heart and pulmonary arteries and can cause heart failure and severe lung disease, leading the animal to death (ATKINS, 2004).

TRANSMISOR AGENT

The disease is transmitted by several species of mosquitoes, which act as mandatory intermediate hosts (NELSON; COUTO, 2010), of which about 70 species of the genera *Aedes*, *Anopheles* and *Culex* are known, which may be potential vectors of the parasite, but the vector transmission capacity has been proven only in 12 species (SALGUEIRO, 2016).

It was observed that the population with the highest risk of infection is composed of dogs that are more exposed to the bite of transmitting mosquitoes, in example those that do not have a permanent shelter, hunting dogs, dogs living in rural areas, grazing dogs, in addition to outdoor competition dogs and those that are transported to endemic areas (TZIPORY; CRAWFORD; LEVY, 2010).

When the transmitting agent performs blood repast in mammals (dogs, humans, cats, among others) the disease can be disseminated, a situation that occurs by the action of young microfilariae, which are transmitted through the mouthpiece of the transmitting agent (ATKINS, 2004).

HEART'S MICROFILARIA

Once installed in the heart, these parasites lead to important changes in the heart, veins and arteries. These can be diagnosed with the aid of a serological test (rapid blood test), by an echocardiogram test or visualization of microfilariae in blood smear (ATKINS, 2004). Once heartworm disease is detected in dogs, one of the contemplated treatments is surgical intervention, which is still little performed in Brazil (DELLING, 2019).

Some dogs that are infected by heartworm disease may develop serious complications due to adult worms that become clogging the blood flow of the heart valves. This situation

can trigger very severe congestion in the hepatic system, systolic murmur of tricuspid valve regurgitation, and it is possible to observe pulsations in the jugulars. As indicators of this pathology, it is also observed that the animal presents lethargy, dyspnea, membranes and pale mucosa, weakness accompanied by hemoglobinemia and hemoglobinuria (ATWELL; LITISTER, 2002; VENCO, 1993). These symptoms, if untreated, will cause the dog to die. One technique that can be used is the removal of worms through surgery (DELLING, 2019).

SURGICAL INTERVENTION

This surgery consists of the removal of the worms from the heart, but appropriately, from the atrium and orifice of the tricuspid valve. The most common approach is right jugular venotomy in the left lateral decubitus in order to remove adult parasites through an incision in the jugular vein (NELSON; COUTO, 2010).

This, according to the techniques applied in other countries, they can be performed by means of a slight sedation and/or local anesthesia, which will allow the use of flexible tweezers, such as long alligator tweezers or basket seizure clamp or tripod grip clamp, and proceed with the introduction of this, preferably, through the right external jugular vein (YOON et al., 2013).

Using a radioscopy, will give greater safety to the procedure, the long alligator tweezers should remove the worms until there are no more of these endoparasites in the patient's heart (ISHIHARA; KITAGAWA; SASAKI, 1988; YOON et al., 2005; YOON; HAN; HYUN, 2010).

Another recent technique is surgical percutaneous removal of worms. The main advantages of this method are the reduced invasion of the process as well as the vascular endothelium and a shorter duration of general anesthesia. A recent study showed that the rate of removal of worms using alligator forceps was 91.4% during 30.0 ± 7.6 minutes of the procedure time. Despite the advantages that embolectomy presents, this method still needs improvement to obtain better accessibility to the pulmonary arteries, minimize the bleeding that occurs during catheterization and to improve the removal of parasites (LEE; MOON; HYUN, 2008).

Another technique that has been used in very small dogs is the right ear cannulation performed through thoracotomy, for removal of worms (NELSON; COUTO, 2010).

Since the surgical intervention is well developed, the patient should present the heart murmur softened or null, and after 24 hours hemoglobinuria must have disappeared (ALHO et al., 2016).

The patient, after a successful intervention, should be ascertained to assess the presence of some worm still present in the heart. If a few parasites are still observed, "adulticide" treatment should be carried out to eliminate the heartworm still present (ALHO et al., 2016).

It was observed that the postoperative survival rate was efficient, presenting a result without statistical differentiation, but several complications associated with the intervention of removal of dirofilariasis were reported in the recovery devices used in the study of Yoon and collaborators (YOON et al., 2013).

CONCLUSIONS

Considering the information and data obtained in the studies, it is suggested that the removal of heartworm disease through surgical intervention is a therapeutic method that imprints relative safety and presents itself as a safe measure to be applied to canine patients with a large worm load, presenting a good survival rate, although it still requires further studies directed to this surgical technique (ALHO et al., 2016).

REFERENCES

ALHO, A.M.; FIARRESGA, A.; LANDUM, M.; LIMA, C.; GAMBOA, Ó.; MEIRELES, J.; LUÍS, J.S.; CARVALHO, L.M. A homemade snare: an alternative method for mechanical removal of *Dirofilaria immitis* in dogs. **Veterinary Medicine International**, Art. ID 5780408, 6 p., 2016.

ATKINS, C. **Canine heartworm disease.** In: ETTINGER SJ, FELDMAN EC (eds.). Saunders, Philadelphia: Textbook of Veterinary Internal Medicine. ed. 6, p. 1118-1136, 2004.

ATWELL, R.B.; LITSTER, A.L. Surgical extraction of transplanted adult *Dirofilaria immitis* in cats. **Veterinary Research Communications**, v. 26, p. 301-308, 2002.

DELLING, G.F. **Dirofilariose em cão da raça pinscher no município de Joinville – SC:** relato de caso. Trabalho de Conclusão de Curso de Graduação em Medicina Veterinária. Universidade Federal de Santa Catarina. Bacharel em Medicina Veterinária. Curitiba – SC. 51p. 2019.

FURTADO, G.D.; SILVA, A.S.; TELES, J.A.A. Estudo do comportamento e a medicina veterinária da conservação. **Environmental Smoke**, João Pessoa, v. 1, n. 2, p. 176-182, 2018.

ISHIHARA, K.; KITAGAWA, H.; SASAKI, Y. Efficacy of heartworm removal in dogs with dirofilarial hemoglobinuria using flexible alligator forceps. **The Japanese Journal of Veterinary Science**, v. 50, n. 3, p. 739-745, 1988.

LEE, S.; MOON, H.; HYUN, C. Percutaneous heartworm removal from dogs with severe heart worm (*Dirofilaria immitis*) infestation. **Journal of Veterinary Science**, v. 9, n. 2, p. 197-202, 2008.

NELSON, R.W.; COUTO, C. **Medicina interna de pequenos animais.** ed. 4. Rio de Janeiro: Elsevier Editora. 2010.

SALGUEIRO, J.M. **Dirofilariose canina**. Dissertação de Mestrado em Medicina Veterinária pela Universidade Lusófona de Humanidades e Tecnologias. Lisboa – Portugal. p. 64, 2016.

TZIPORY, N.; CRAWFORD, P.C.; LEVY, J.K. Prevalence of *Dirofilaria immitis*, *Ehrlichia canis*, and *Borrelia burgdorferi* in pet dogs, racing greyhounds, and shelter dogs in Florida. **Veterinary Parasitology**, v. 171, n. 1-2, p. 136-139, 2010.

VENCO, L.A. Diagnosis of vena cava syndrome. **Veterinaria**, v. 7, p. 11-18, 1993.

YOON, H.Y.; JEONG, S.W.; KIM, J.Y.; HAN, H.J.; JANG, H.Y.; LEE, B.; NAMKANG, H.S. The efficacy of surgical treatment with flexible alligator forceps in dogs with heartworm infection. **Journal of Veterinary Clinics**, v. 22, p. 309-313, 2005.

YOON, W.K.; CHOI, R.; LEE, S.G.; HYUN, C. Comparison of 2 retrieval devices for heartworm removal in 52 dogs with heavy worm burden. **Journal of Veterinary Internal Medicine**, v. 27, p. 469–473, 2013.

YOON, W.K.; HAN, D.; HYUN, C. Catheter-guided percutaneous heartworm removal using a nitinol basket in dogs with caval syndrome. **Journal of Veterinary Science.** v. 12, p. 199–201, 2010.