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Study of the epidemiological situation of heartworm disease in Algeria

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ABSTRACT
The coexistence of a dog to man is an important feature, at the same time can transmit diseases to the latter. Among these pathologies, there heartworm. Heartworm is a parasitic disease caused by a roundworm, heartworm, which parasite the heart of the dog. Following the bite of an infected mosquito; in case of massive infestation, severe hemolytic syndrome which falls under emergency or obstruction of the vena cava. The aim of this study was to determine the prevalence of heartworm disease in dogs at the clinic of the Institute of Veterinary Science, in the wilaya of Tiaret (Algeria). from 2010 to 2015, 1300 blood samples were collected from dogs, each sample was analyzed using various laboratory techniques (direct microscopic evaluation of a sample of fresh blood, MGG, immunomigration of rapid test "witness" . a prevalence of 0% was found for heartworm disease.

KEYWORDS: heartworm disease, dog, Algeria.Tiaret,prevalence.

INTRODUCTION

The heartworm infection is a serious and potentially fatal disease. The pathophysiological response to heartworm infection is mainly due to the presence of adult worms heartworm in the pulmonary arteries and the right ventricle of the heart [1, 2]. The number of worm, the immune response of the host, the duration of infection, and exercise levels determine the severity of cardiopulmonary disease [3, 4].

Clinical manifestations in dogs include coughing, shortness of breath, weight loss, exercise intolerance, weakness, anemia, cyanosis and congestive heart failure [5, 6].

The epidemiological situation of heartworm disease depends on several factors such as global warming, changes in the seasonal dynamics of the vector population, the movement of animals between countries [7] ; in this study, we will investigate the current prevalence and seroprevalence of heartworm in dogs living in Tiaret region (Algeria).

MATERIEL AND METHODS

The study was conducted in the region of Tiaret: Located west of the country, is as a contact zone between the Tell north and the high plains to the south. The territory of the province is made up of mountainous areas in the north and the high plains to the south center variation reliefs and the heterogeneity of space induces a variety of agricultural landscapes and other natural areas. Winter is harsh and the summer is hot and dry, it receives 300

to 400 mm of rain on average per year. Climate and socio-economic life in the region with farming do not offer very adequate conditions for the development of mosquitoes; vectors of these parasites.

The study lasted five years (2010 to 2015), the various samples were carried out, at the clinic of the Institute of Tiaret veterinary sciences where the animals found are from various parts of the wilaya, we was able to achieve in 1300 samples of dogs differing age, race and sex.

To highlight the existence of the disease Our methodological approach of detecting parasites in dogs was done at three levels:

1- Blood samples:

- At the institute: blood test at the cephalic vein.
- In veterinarian offices and farms: blood test (dry tubes and tube with anticogulant "EDTA").

The samples will be referred to the laboratory.

2- Parasitological techniques:

- Serum for serology (kit witness)
- The blood with anticoagulant: Search microfilariae after MGG staining. [8]
- Data on dogs followed will provide us information about the effect age, gender, regions (altitude, etc .....).

Clinical Diagnostics:

During consultations, all memorials for animals is recorded: race, age, sex, location, lifestyle, general signs, Subsequently, detailed clinical examination is carried out. [9,10]

Laboratory Diagnosis:

The MGG coloring:

To the laboratory or clinic is where the vacutainer sterile syringe on venous blood with anticoagulant (EDTA)

Smear:

The smear can be done on a slide or slip.

Smear On Blade:

- Place a drop of blood to medium size 1.5 cm from the right edge of a blade degreased,
- Spread capillary drop in contact with the edge of a second blade honed held at 45 degrees,
- quickly Push the second blade to the left of the first blade by driving the blood which runs in a single cell layer (smear).
- If the blood drop is a decent size, the smear should end about 1 cm from the left edge of the blade.
- Description: one can replace the second blade by a coverslip object.

Drying:

The smear is quickly air-dried protected from dust.

Colour:

- blade Coloration
- Add 10 to 15 drops of May-Grünwald on the smear and cover to prevent evaporation. For 3 minutes. This is the attachment.
- Add 10 to 15 drops of buffered water and mix by rotating the blade. 1 min
- Drain
- Cover Giemsa diluted 15 minutes. This is staining.
- Drain
- Wash with neutral water.
- Dry on paper Joseph.

Examination:

Review with the objective to 40X or hematology

Examine immersion 100X and weak eye

Move the blade making "niches" to not return to the same place.

Leukocyte count 100 (better 200) which gives the result immediately.

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3- Witness heartworm:

Test principle:

The heartworm test witness is a simple achievement test, based on a rapid immuno-migration.

The test sample containing the "anti-Dirofilaria" antibodies (whole blood, serum, or plasma) is contacted with colloidal gold particles coated. The complex thus formed migrate through a membrane before being captured on a reactive membrane, at which concentration causes the formation of a clearly visible pink color band.

This test can be performed on whole blood, serum or plasma. For whole blood, the sample must be anticoagulated (citrate or heparin) [11,12]

RESULTS AND DISCUSSION

1,300 dogs used in this study, 59, 07% were male and 40.92% were female; distributed in 14 races with a predominance of the German shepherd breed 35.61%. As for their use, 69.23% were kept as pets.

According to their habitats, 68.84% lived in urban areas and 31.15% lived in rural areas, 98.84% were owned and unowned 1.15%.

As regards their ages, the sample was divided into seven age groups whose highest percentage is represented by older dogs between 2 to 3 years. (28.63%).

I.1 CLINICAL STUDY OF CANINE Heartworm:

The clinic suspession revealed fairly varied symptoms but many dogs have no signs that can be attached to heartworm disease.

The following table summarizes the main symptoms observed in dogs of the study:

Table 1: main symptoms observed in dogs of the study:

signs	number	Percentage(%)
General signs	709	54 ,54
Digestive signs	208	16
Respiratorysigns	154	11,85
Heartsigns	97	7,46
osteo-articularsigns	29	2,23
Cutaneoussigns	34	2,62
others	69	5,30

Reason for consultation:

We included in the pattern "skin damage"; alopecia, ulcers, erythema, petechiae.

The "general signs" are the reduction, weight loss, pyrexia, anorexia

In "gastrointestinal symptoms" is class vomiting, diarrhea and constipation.

Lameness, soreness of the joints, locomotor problems, and arthritis were grouped under the term "musculoskeletal disorders".

Other: included are disorders of the nervous system, genital, urinary.

Other individual without any symptoms, (examined for an ant-operative consultation or for vaccination) were also removed for various reasons

- Canine heartworm disease may present a polymorphic table.
- It can crack without presenting symptoms (so many individuals not detected by clinical carriers may go unnoticed and they therefore represent a major danger as are the reservoirs of the parasite).

Table 2: Table summary dual input frequencies and percentages of the chief complaints

MOTIF	Gle	Dig	Res	hea	Ost	Cut	autrs	total
Gle	543	53		46		32	35	709
Dig	74	11	87	22	14			208
Res	12	123		7	2		10	154
hea	30	17	44		5	1		97
Ost		2	21		6			29
Cut	4	2		5			23	34
others	46		2	17	2	1	1	69
total	709	208	154	97	29	34	69	1300

(Legend: gen = general signs, dig=digestives signs, resp = respiratory signs, hea : heart signs , ost = osteo-articular signs , cut = cutaneous signs, others : others signs).

In terms of frequency, general signs represented by anorexia, depression, and hyperthermia is the most frequent reason for consultation. Then, in second position, just digestive signs. These two reasons are, in themselves, 70.5% of the chief complaints.

Some individuals had one or a few clinical signs of the disease.

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I.5 Results Of Laboratory Diagnosis:

Direct observation under a microscope:

The MGG coloring:

The MGG staining allowed us to highlight the parasite (if available) and see the level of some cells and simultaneously establish the leukocyte formula.

Witness test:

After staining was used MGG kits WITNESS TEST to confirm the condition when MGG staining provides dubious results.

The witness heartworm is a specific and sensitive test. [13,14] it provides us with negative results affirming the clinical and confirmatory suspicion MGG coloring.

Discussion:

The prevalence found in other studies citing:

Germany (Baden-Württemberg) is one of the hottest regions, 44 hunting dogs were tested in June 2007, using the test Knott, heartworm antigen was not detected in any samples; another sample of 288 dogs considerate of the upper Rhine central region tested negative for the antigen of heart worm between February and August 2007. [15]

France (2009), in order to determine the prevalence of heartworm disease; 1050 dogs was collected, analyzed, tested, a prevalence of 0.22% was found. [15]

Argentina (2006) investigate the canine heartworm made on different region of the country revealed a prevalence ranging from 0% in areas up to 71% in other regions.[16]

Italy (2001); the analysis of blood of 351 dogs revealed that 0.6 were carrier of D. immitis and D. repens. [17]

In 2012, a study found a prevalence of 3.6% of heartworm disease in healthy dogs Portuguese. In this study, the central region had a prevalence of 0.9% in healthy dogs [18].

In 2010, in Canada, there were a total of 367,385 dogs clinically tested to screen for heart worms. Of these, 564 dogs tested positive diagnosis for heart worm, that is to say, they have indeed been infected with the infamous blood parasite. These figures are higher than at the beginning of the decade, in 2002. That year, there were 354 dogs tested positifs.La prevalence of infection by heartworms in dogs would be Canadian now 0 , 15%. This means that a little over a dog is infected in 1000 in Canada. [19].

In France: Corsica, Camargue region Hyeres Dombes, Languedoc-Roussillon (parasitological prevalence dirofilarioses 0.7% over 5000 samples in 1986. [20]

Conclusion:

In Africa, particularly in Algeria, the dog's usefulness varies depending on the area where it is located. In rural areas, the dog fulfills the mission of protector of cattle, and participates actively in the hunt to track or track the game. While in urban areas, its interest is much wider because of its ability to effectively meet the needs of his master.

But like other animals, the dog is often exposed to certain diseases and of these diseases there is a parasitic disease such as canine heartworm disease. The diagnosis of this infection uses, in addition to clinical manifestations, a technique based on direct research on parasite blood smear.

It is in this context that we have conducted this study which has set a goal to evaluate the prevalence of canine heartworm in Tiaret region (Algeria).

The field work was carried out during a period of 5 years, so we worked on in 1300 dogs of different ages, gender, and races, from different regions of the province.

After this study we obtained the following results:

- For the clinical diagnosis: many dogs present a complete clinical picture of the disease but they are negative by laboratory tests
- For laboratory diagnostics: The prevalence of canine heartworm in Tiaret region is (0%).

REFERENCES

[1] MONTOYA, J.A., I. MELLADO, E. CARRETÓN, E.D. CABRERA-PEDRERO, R. MORCHÓN, F. SIMÓN, 2010. Canine dirofilariosis caused by *Dirofilaria immitis* is a risk factor for the human population on the Island of Gran Canaria, Canary Islands, Spain. Parasitology Research, 107: 1265-1269.

[2] VIEIRA, A.L., M.J. VIEIRA, J.M. OLIVEIRA, A.R. SIMÕES, P. DIEZ-BAÑOS and J. GESTAL, 2014. Prevalence of canine heartworm (Dirofilaria immitis) disease in dogs of central Portugal. Parasite, 21.

[3] CRINGOLI, G., L. RINALDI, V. VENEZIANO, G. CAPELLI, 2001. A prevalence survey and risk analysis of filariosis in dogs from the Mt. Vesuvius area of Southern Italy. Veterinary Parasitology, 102: 243-252.
[4] KRAMER, L.H., 2009. Pathogenesis of *Dirofilaria* spp. Infections, in Proceedings of Second European Dirofilaria Days, 16–18 September. Morchón R, Simón F, Montoya JA, Genchi C, Eds.Salamanca, Spain: pp: 116-123.
[5] HOCH, H., K. STRICKLAND, 2008. Canine and feline dirofilariasis: life cycle, pathophysiology, and diagnosis.Compendium Continuing Education Veterinary, 30: 133-140.
[6] MONTOYA, J.A., M. MORALES, O. FERRER, J.M. MOLINA, J.A. CORBERA, 1998. The prevalence of *Dirofilaria immitis* in Gran Canaria, Canary Islands, Spain (1994–1996). Veterinary Parasitology, 75: 221-226.
[7] CARDOSO, L., C. MENDÃO, D.E. MADEIRA, L. CARVALHO, 2012. Prevalence of *Dirofilaria immitis, Erlichia canis*, *Borrelia burgdorferi* sensu lato, *Anaplasma* spp. and *Leishmania infantum* in apparently healthy and CVBD-suspect dogs in Portugal – a national serological study. Parasites & Vectors, 5: 1-9.
[8] BELLIER, S., and N. CORDONNIER, 2010. Les valeurs usuelles en hématologie vétérinaire. Revue francophone des laboratoires, (420): 27-42.
[9] HERNANDEZ, J., 2011. Diagnostic des affections respiratoires d'origine parasitaire chez le chien et le chat. Pratique Médicale et Chirurgicale de l'Animal de Compagnie, 46(1): 17-22.
[10] PAPITE, K., 2014. *La dirofilariose canine à dirofilariaimmitis: étude bibliographique et estimation de la fréquence de suspicion dans le departement de la Martinique* (Doctoral dissertation).
[11] VEZZANI, D., M.F. FONTANARROSA and D.F. EIRAS, 2008. Are antigen test kits efficient for detecting heartworm-infected dogs at the southern distribution limit of the parasite in South America? Preliminary results. Research in veterinary science, 85(1): 113-115.
[12] SCHAFFNER, F., D.M. FONSECA, N. KEYGHOBADI, C.A. MALCOLM, MEHMET. M. SCHNYDER, and P. DEPLAZES, 2012. Cross-reactions of sera from dogs infected with Angiostrongylusvasorum in commercially available Dirofilariaimmitis test kits. Parasites & vectors, 5(1): 1.
[13] WATIER-GRILLOT, S., J.L. MARIÉ, O. CABRE and B. DAVOUST, 2011. Survey of canine Dirofilariaimmitis infection in New Caledonia. *Veterinary medicine international*.
[14] ALHO, A.M., M. SCHNYDER, J. MEIRELES, S. BELO, P. DEPLAZES and L.M. DE CARVALHO, 2014. Preliminary results on the seroprevalence of Angiostrongylusvasorum and co-infection with Dirofilariaimmitis in shelter dogs from Portugal. Parasites& Vectors, 7(1): 1.
[15] PANTCHEV, N., N. NORDEN, L. LORENTZEN, M. ROSSI, U. ROSSI, B. BRAND and V. DYACHENKO, 2009. Current surveys on the prevalence and distribution of Dirofilaria spp. in dogs in Germany. Parasitology research, 105(1): 63-74.
[16] FONTANARROSA, M.F., D. VEZZANI, J. BASABE and D.F. EIRAS, 2006. An epidemiological study of gastrointestinal parasites of dogs from Southern Greater Buenos Aires (Argentina): age, gender, breed, mixed infections, and seasonal and spatial patterns. Veterinary parasitology, 136(3): 283-295.
[17] RANJBAR-BAHADORI, S., S. ESLAMIABOKAIC, 2007. Evaluation of different methods for diagnosis of Dirofilariaimmitis. Pak J Biol Sci., 10(11): 1938-1940.
[18] CARDOSO, L., C. MENDÃO, D.E. MADEIRA, L. CARVALHO, 2012. Prevalence of *Dirofilariaimmitis, Erlichiacanis, Borreliaburgdorferi* sensulato, *Anaplasma* spp. and *Leishmaniainfantum* in apparently healthy and CVBD-suspect dogs in Portugal – a national serological study. Parasites & Vectors, 5: 1-9.
[19] VILLENEUVE, A., J. GORING, L. MARCOTTE and S. OVERVELDE, 2011. Seroprevalence of Borrelia burgdorferi, Anaplasma phagocytophilum, Ehrlichia canis, and Dirofilaria immitis among dogs in Canada. The Canadian Veterinary Journal, 52(5): 527.
[20] GAUCHARD, P.A., K. ASPMO, C. TEMME, A. STEFFEN, C. FERRARI, T. BERG and O. MAGAND, 2005. Study of the origin of atmospheric mercury depletion events recorded in Ny-Ålesund, Svalbard, spring 2003. AtmosphericEnvironment, 39(39): 7620-7632.