HEMATOLOGIC VALORATION OF TICK-BORNE DISEASES

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INTRODUCTION & AIMS:

Ticks are among the most important group of pathogen vectors causing major diseases, in both domestic and wild animals, capable of transmitting a wide variety of infectious agents: protozoa, rickettsiae, bacteria, viruses and even some fungi. The climate of our country makes some of tick-borne diseases constitute a major problem in pets and livestock, especially during the warm seasons of the year. Some of these diseases are: Babesiosis, Theileriosis, Anaplasmosis, Lyme Disease, Cytauxzoonosis, Equine Piroplasmosis, Ehrlichiosis, Rocky Mountain Spotted Fever, Q Fever and Tularemia.

After reviewing the main tick-borne diseases in dogs, cats and horses, we set out to know the casuistry that the Hematology Veterinary Clinic Service (SHCV) of the Universitat Autònoma de Barcelona (UAB) has had during the last five years of these diseases, through a retrospective study of the SHCV analytical made in the period between 2010 and 2015.

MATERIAL & METHODS:

Venous blood samples were collected with EDTA (ethylene diamine tetra-acetic acid) and processed at the time of extraction or been kept refrigerated at 4 ° C, for no longer than 12 hours. Samples were analyzed using an hematology analyzer ADVIA laser beam 120 which provided the following parameters: RBCs (x10^6/µl), Hgb (g/dl), Hct (%), WBC (10^3/µl), Ptl (10^3/µl). The hematocrit value was determined, using a microcentrifuge, which centrifuged the blood in capillary at 14,000 rpm, for five minutes. Total proteins were determined by refractometry. From each blood sample, the blood smear was stained by Diff Quick staining. We classified the all the results according to the reference values. The study of the seasonality of cases was done by a review of the dates on which each animal hematological analysis were performed.

RESULTS & DISCUSSION:

	Dog	Horse	Cat
Babesiosis	14	5*	
Anaplasmosis	3	1	1
Theileriosis		7*	
Ehrlichiosis	2		
Cytauxzoonosis			1
Total n=32	19	11	2

Table 1. Incidence of the various parasitic agents in the canine, equine and feline species.

*Two of the horses studied were simultaneously positive to *Theileria* and *Babesia*. And the horse with *Ehrlichia* was also positive for *Theileria*.

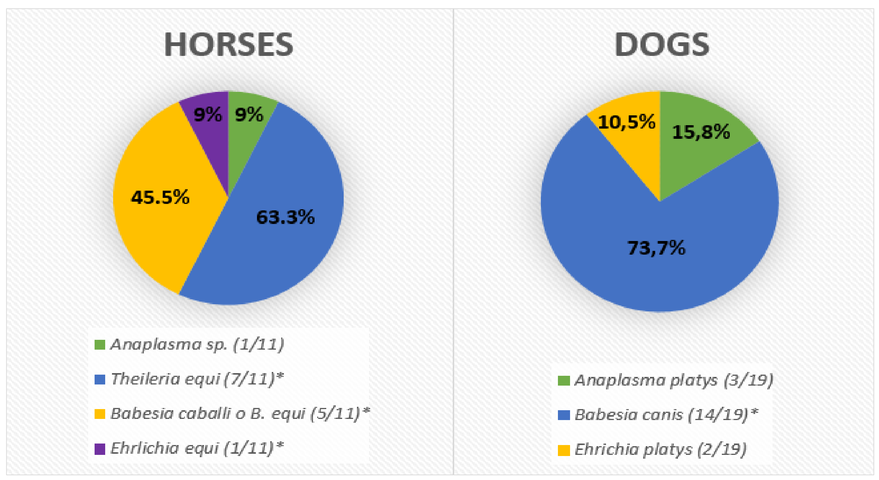

Figure 1. Parasitic diagnoses in dogs and horses studied.

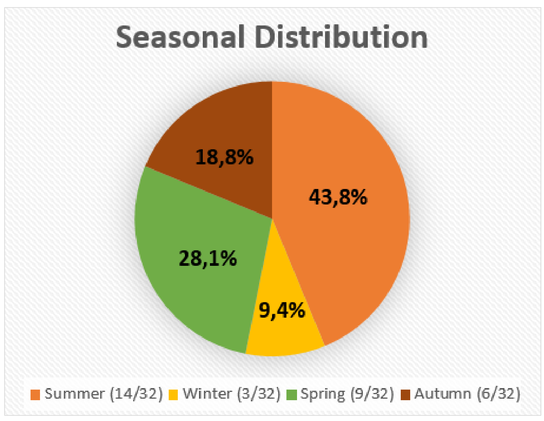

Figure 2. Seasonal distribution of parasitic diagnoses.

Red Blood Cells: 54.5% (6/11) Anemia	
Erythrocyte count: 4.8±2.2 x 10^6 erythrocytes/µl Hematocrit: 18.2±8.1 %	2 infected with *T. equi* 2 infected with *B. equi* 1 infected with *B. caballi* 1 infected with *B. caballi* y *T. equi*
White Blood Cells	
Leukopenia 9.1% (1/11) 4.4 x10^3 leukocytes/µl 1 infected with *B. equi*	Leukocytosis 36.4% (4/11) 19.2±4.6 x10^3 leukocytes/µl 1 infected with *B. equi* 2 infected with *T. equi* 1 infected with *T. equi* y *E. equi*
Platelets: 36.4% (4/11) thrombocytopenia	
56.3±25.8 x 10^3 platelets/µl	1 infected with *B. caballi* y *T. equi* 1 infected with *T. equi* 2 infected with *B. equi*

Table 2. Haematological alterations found in horses's blood.

Red Blood Cells: 36.8% (7/19) Anemia	
Erythrocyte count: 3.9 ± 1.7 x 10^6 erythrocytes/µl Hematocrit: 25.2±11.6 %	Non-regenerative: 6 infected with *B. canis* Regenerative: 1 infected with *A. platys*
White Blood Cells:	
Leukopenia 31.6% (6/19) 4.8±0.8 x10^3 leukocytes/µl 1 infected with *A. platys* 5 infected with *B. canis*	Leukocytosis 26.3% (5/19) 19.1±8.8 x10^3 leukocytes/µl 1 infected with *A. platys* 4 infected with *B. canis*
Platelets: 73.7 % (14/19) thrombocytopenia	
96.6±61.4 x 10^3 platelets/µl	1 infected with *A. platys* 11 infected with *B. canis* 2 infected with *E. platys*

Table 3. Haematological alterations found in dogs's blood.

The first cat studied was positive for *Anaplasma sp.*, and the second one was positive for *C. felis.* Both presented anemia with values of 6.4 ± 1.2 x 10^6 erythrocytes/µl and 23.5 ± 4.9% for hematocrit. The cat affected by *Anaplasma sp.* showed a marked leukopenia (3.2 x10^3 cells/µl). By contrast, the cat affected by *C. felis* presented leukocytosis (22.0 x10^3 cells/µl).

The incidence table shows that the dog is the specie with more cases of tick-borne diseases, followed by the horse and finally, the cat. As for dogs, most of the cases were positive for *B. canis* (73.3%). The most important hematological changes observed in these dogs were: non-regenerative anemia, leukopenia or leukocytosis and marked thrombocytopenia.

As for the horses, the parasites most diagnosed by far were *B. caballi / B. equi* (63.3%) and *T. equi* (45.5%). These two parasites were found in both single infections and co-infections. The main hematological changes in horses were also: anemia, leukocytosis and thrombocytopenia.

Clearly diagnosed cases are concentrated in the seasons of greatest heat, spring and summer.

CONCLUSIONS:

By this study, we have seen that tick-borne diseases are a potential threat for our pets due to high distribution and variety of ticks that live in our territory. We have seen which are the most abundant hematic parasites in our dogs, cats and horses and which are the main hematological changes they cause. However, the detection method that we used may not be as sensitive as other techniques, such as serology and PCR. These ones allow us to distinguish more accurately than direct observation of infectious agents in the blood smear.