Turk J Vet Anim Sci
29 (2005) 709-712

Research Article

Haemobartonellosis in Van Cats

Hasan Altan AKKAN*, Mehmet KARACA, Mehmet TÜTÜNCÜ
Department of Internal Medicine, Faculty of Veterinary Medicine, Yüzüncü Yıl University, Van - TURKEY
*E-mail: hasanaltanakkan@yahoo.com

Nalan ÖZDAL
Department of Parasitology, Faculty of Veterinary Medicine, Yüzüncü Yıl University, Van - TURKEY

Nazmi YÜKSEK, Zahid AĞAOĞLU
Department of Internal Medicine, Faculty of Veterinary Medicine, Yüzüncü Yıl University, Van - TURKEY

Serdar DEĞER
Department of Parasitology, Faculty of Veterinary Medicine, Yüzüncü Yıl University, Van - TURKEY

Received: 11.07.2003

Abstract: The present study was conducted to determine prevalence of *Haemobartonella felis* in Van cats. 121 Van cats (82 female, 39 male, aged 1-9 years) were the materials of the study. To determine biochemical and haematological parameters, 2 ml blood with and without anticoagulant were taken according to technique from vena cephalica antebrachii. *H. felis* was detected in blood smears preparations of 18 (14.88%) by Papenheim staining. Among biochemical parameters aspartate amino transferase (AST), alanine amino transferase (ALT), alkaline phosphatase (ALP), creatine phosphokinase (CPK) and bilirubin were in normal range as well as the packed cell volume (PCV) and red blood cell (RBC) counts. The infected cats were treated with oxytetracycline at 10 mg/kg dose intramuscularly (Geosol® flacon, Vetas) or oral oxytetracycline at 10 mg/kg dose (Neoterramycine® pow. Pfizer) for 15 days. After either above treatment blood smear preparations revealed negative for the rickettsia.

In conclusion, potentially lethal infection of *Haemobartonella felis* is prevalent in Van cats and can successfully be cured by oral or parenteral oxytetracycline application.

Key Words: *Haemobartonella felis*, Van cat, treatment, oxytetracycline, blood parameters.

Van Kedilerinde Haemobartonellosis

Özet: Bu çalışma, *Haemobartonella felis* enfeksiyonu tespit edilen Van kedilerinde bu parazitin prevalansını belirlemek amacıyla, 1-9 yaşlı, 72'si dişi, 39'u erkek 121 Van kedisi üzerinde yürütüldü.

Kedilerden, biyokimyasal ve hematolojik parametreleri belirlemek amacıyla, serum ve tam kan analizleri için tekniğine uygun olarak vena cephalica antebrachii'den 2'şer ml kan alındı. Papenheim boyama tekniği ile hazırlanan frotilerde kedilerin 18'inde (% 14,88) *H. felis* etkeni tespit edildi. Enfekte kedilerde biyokimyasal parametrelerden Aspartat amino transferase (AST), Alanin amino transferase (ALT), Alkalin phosphatase (ALP), Creatin phosphokinase (CPK) ve bilirübin seviyelerinin ve hematolojik parametrelerden eritrosit sayısı ile hematokrit değerlerin fizyolojik sınırlar içerisinde olduğu tespit edildi. Hasta kedilere tedavi amacıyla 10 mg/kg dozda, 15 gün süreyle oksitetrasiklin (Geosol enj. flk., Vetaş) kas içi ve aynı doz ve sürede oksitetrasiklin (Neoterramycine® pow. Pfizer) oral olarak uygulandı. Tedavi sonrası tekrar hazırlanan frotilerde *H. felis* etkenine rastlanmadı.

Sonuç olarak; tedavi edilmediğinde öldürücü olabilen *Haemobartonellozis* enfeksiyonunun Van kedilerinde de görülebileceği ve tedavide oksitetrasiklinlerin başarıyla kullanılabileceği belirlendi.

Anahtar Sözcükler: *Haemobartonella felis*, Van kedisi, tedavi, oksitetrasiklin, kan parametreleri.

Introduction

Haemobartonellosis, infectious anaemia of cats is caused by *Haemobartonella felis*, an anaplasma species belonging to the rickettsia family. The infection is characterised by extreme fatigue, depression, anorexia, weight loss and anaemia and may cause death (1-4). The pathogen can be identified as small coccoids, rings or strings on erythrocyte membrane or free in plasma in

Giemsa staining of blood smears (1,5). Mode of transmission has not been clearly identified but blood-sucking arthropods like ticks were the suspected vectors. Another possible mode of transmission is close fighting among cats. Intrauterine and lactation-related transmission was also reported (1).

Acute disease presents with fever, anorexia, weight loss, jaundice, apathy, adenopathy, motor incoordination and splenomegaly (6). Chronic disease has atypical symptoms like anaemia, weight loss, paraplegia, dehydration, hyperesthesia and depression (6). Latent form of the infection has also been described (7,8). Diagnosis of haemobartonellosis depends on clinical and hematological findings together with microscopic examination of blood smears and specific serological and PCR testing for the pathogen (9,10). Various antibiotics were reported to be effective in the treatment of haemobartonellosis. Different studies demonstrated that *H. felis* is sensitive to lincomycine (7), enrofloxacin, oxytetracyclin, doxycyclin and tiarsemid natrium (4,8,11) and resistant to azitromycin. (9,12).

Haemobartonellosis was first described in 1953 in the United States (13) but the number of studies about incidence and prevalence of the disease and the risk factors in transmission remains limited after 50 years (8,14). In addition, studies examining *H. felis* infection have not been came across in this country except for one study (15).

Therefore, this study was planned to investigate prevalence of *H. felis* infection in Van cats. Changes in biochemical and haematological parameters and response to the treatment with oxytetracycline were also examined.

Materials and Methods

Study population consisted of 121 van cats (82 female, 39 males, aged 1-9 years). To determine biochemical and haematological parameters, 2 ml blood with and without anticoagulant were taken according to technique from V. cephalica antebrachii. The cats were clinically examined and blood samples with and without anticoagulant were drawn into tubes for haematological and biochemical analysis. Haematological parameters were determined by Coulter MaxM® autocounter and biochemical tests for aspartate amino transferase (AST), alanine amino transferase (ALT), alkaline phosphatase (ALP), creatine phosphokinase (CPK) and bilirubin levels using commercial kits of the equipment were analysed with Hitachi P800 autoanalyser. Prepared blood smears were stained with Papenheim method and examined under light microscope according to the literature (16). The possible presence of ectoparasites on the cats was also looked for carefully.

Of the 18 cats with *Haemobartonella felis* 9 were treated with oxytetracycline (Geosol® flacon, Vetas) at 10 mg/kg dose intramuscularly for 15 days and other 9 were treated with oral oxytetracycline (Neoterramycine® pow. Pfizer) at 10 mg/kg for 15 days. The haematological and biochemical parameters were repeated a month after the treatments.

Statistical analyses were done using SPSS for Windows (17).

Results

Clinical signs including temperature, pulsation and respiration rates were in normal ranges. Some of the infected cats had anorexia and weight loss. Microscopic examination revealed *Haemobartonella felis* in 18 (14.88%) cats. The animals had no ectoparasites on them. Baseline haematological and biochemical findings did not differ after the treatment. Appearance of *H. felis* in Papenheim staining of blood smears is presented in Figure a, b.

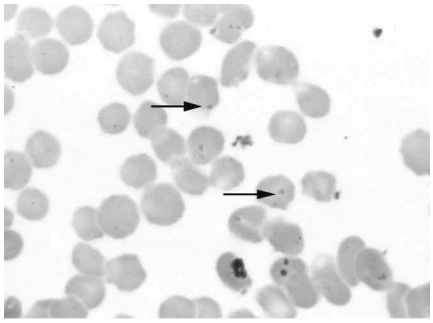
Haematological and biochemical parameters obtained from cats before treatment and a month after treatment are given in Table 1. According to the results sex and age had no effect on the infection of the cats (Tables 2 and 3).

Haematological and biochemical parameters obtained before treatment and a month after treatment were compared using Student's t test and no statistical importance was determined ($P > 0.05$).

Discussion

Untreated haemobartonellosis is a potentially lethal infection of cats. Because the symptoms are non-specific and the diagnosis is rather difficult, the infection is commonly overlooked. Therefore, few studies about the subject were present to date (18,19).

(a)



(b)

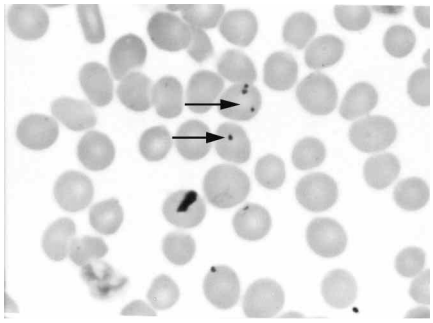


Figure. a, b. *H. felis* in Papenheim staining of blood smears.

The infected cats in our study showed atypical symptoms such as anorexia and weight loss in accordance with those previous studies reporting that haemobartonellosis of cats is usually associated with non-specific symptoms.

The infected cats had mild but insignificantly high red blood cell counts, haemoglobin content, serum AST and ALP levels and insignificantly low ALT levels. These findings are consistent with previous reports indicating normal liver function tests in haemobartonellosis of cats (20).

Stevenson (21) reported that incidence of the disease was increased and the success rate of medical treatment was decreased between 1995-97. In contrast some other researchers claimed that treatment with oral tetracycline preparations for 14-21 days is still sufficient to eradicate the pathogen (1,9,12). Similarly, in the present study oral and parenteral treatment with oxytetracycline was effective as confirmed by microscopic examination.

Table 2. Distributions of the findings according to the sex of the cats

Sex	Number	Positive	%
Female	82	12	14.63
Male	39	6	15.38
Total	121	18	14.88

Table 3. Distributions of the findings according to the age of the cats

Age group (years)	Number	Positive	%
1-2	29	4	13.79
3-4	23	3	13.04
5-6	28	4	14.29
7-8	25	4	16.00
9	16	3	18.75
Total	121	18	14.88

Nash and Bobade (14) found the prevalence of haemobartonellosis in cats to be 23.2%. Sauerwein and Grabner (8) performed a similar study and examined 164 cat interms of *H. felis*. They found 11 cats positive (6.71%) for *H. felis*. The prevalence rate in the present study was higher (14.88%) compared to the studies carried out by Sauerwein and Grabner (8) and lower than the studies carried out by Nash and Bobade (14).

Although this study was carried out during a hot summer, the cats were free of ectoparasites. Hence, the infection was most probably transmitted during fighting among the cats. Absence of clinical sings and death although presence of parasitaemia, can be explained by

Table 1. Haematological and biochemical parameters obtained before treatment and a month after treatment of infected cats.

Parameters	n	Before treatment x ± Sx	A month after treatment x ± Sx
RBC ($x10^6/mm^3$)	18	8.64 ± 0.34	8.19 ± 0.20
HTC (%)	18	37.86 ± 0.89	37.60 ± 0.45
ALT (IU/l)	18	42.57 ± 2.01	39.28 ± 0.02
AST (IU/l)	18	43.00 ± 3.08	36.29 ± 3.03
ALP (IU/l)	18	46.29 ± 3.51	41.28 ± 2.84
CPK (IU/l)	18	66.71 ± 4.80	62.14 ± 3.17
Bilirubin (mg/dl)	18	0.19 ± 0.02	0.18 ± 0.02

the possible preimmunity and the presence of parasites in a low density in the blood.

In conclusion, a rate of haemobartonellosis of 14.88% was determined in Van cats and it is believed that haemobartonellosis should always be suspected in cats presented to veterinary clinics with non-specific symptoms. In addition, serological investigations should also be done in future studies to document the prevalence of the disease in this country.

Acknowledgements

We would like to thank to Erkan Berberoğlu from Vetaş, and Hüseyin Şimşek from Pfizer, who generously donated the drugs used in this study.

References

1. Fraser, C.M., Bergeron, J.A., Mays, A., Aiello, S.E.: The Merck Veterinary Manual. 7th ed., Merck & Co. Inc., Rahway, New Jersey, 1991; 72.
2. Zulty, J.C., Kociba, G.J.: Cold agglutinins in cats with haemobartonellosis. J. Am. Vet. Med. Assoc., 1990; 196: 907-910.
3. Cooper, S.K., Berent, M.L., Meessick, B.J.: Competitive, quantitative PCR analysis of *Haemobartonella felis* in the blood of experimentally infected cats. J. Microbiol. Met., 1999; 34: 235-243.
4. Baneth, G., Aroch, I., Tal, N., Harrus, S.: Hepatozoon species infection in domestic cats: a retrospective study. Vet. Parasitol., 1998; 79: 123-133.
5. Carter, R., Chengappa, M.M.: Rickettsia and Chlamydia. In: Carter, R., Chengappa, M.M and Roberts, A.W. Eds. Essentials of Veterinary Microbiology. 5th ed. Williams & Wilkins, Baltimore, 1995; 237-238.
6. Gretillat, S.: Feline haemobartonellosis clinical findings, diagnosis prognosis and therapy-recent remarks. Ann. Med. Vet., 1984; 128: 21-32.
7. Ojeda, J.D., Skewes, H.R.: Haemobartonella infection of cats: report of an outbreak and its treatment. Vet. Mexico, 1978; 9: 55-60.
8. Sauerwein, G., Grabner, A.: Treatment of feline haemobartonellosis with thioacetarsamid sodium (Caparsolate). Kleintierpraxis, 1982; 27: 323-326.
9. Tasker, S., Lappin, M.R.: *Haemobartonella felis*: Recent developments in diagnosis and treatment. J. Fel. Med. Surg., 2001; 4: 3-11.
10. Bobade, P.A., Nash, A.S.: A comparative study of the efficiency of acridine orange and some Romanovsky staining procedures in the demonstration of *Haemobartonella felis* in feline blood. Vet. Parasitol., 1987; 26: 169-172.
11. Winter, R.M.: Using quinolones to treatment haemobartonellosis. Vet. Med., 1993; 88: 306-308.
12. Berent, L.M., Messick, J.B., Cooper, S.K.: Detection of *Haemobartonella felis* in cats with experimentally induced acute and chronic infections, using a polymerase chain reaction assay. Am. J. Vet. Res., 1998; 59: 1215-1220.
13. Grindem, C.B., Corbett, W.T., Tomkins, M.T.: Risk factors for *Haemobartonella felis* infection in cats. J. Am. Vet. Med. Assoc., 1990; 196: 96-99.
14. Nash, A.S., Bobade, P.A.: *Haemobartonella felis* infection in cats from the Glasgow area. Vet. Rec., 1986; 119: 373-375.
15. Tüzer, E., Göksu, K., Bilal, T., Yeşildere, T.: A case of haemobartonellosis in a cat in Istanbul. J. Protozool. Res., 1993; 3: 69-70.
16. Kaya, G.: Parazitoloji, Temel Ilkeler ve Laboratuvar Teknikleri. Mustafa Kemal Univ. Vet. Fak. Yay. No: 1, 2003; 89.
17. Norusis, J.M.: SPSS for Windows 7.5 Standard Version SPSS/PC. SPSS inc. Chicago, 1998.
18. Van-Steenhouse, J.L., Taboada, J., Millard, J.R.: Feline hemobartonellosis. Comp. Cont. Educ. Pract. Veterinarian, 1993; 15: 535-545.
19. Huml, O., Cada, F., Zahradka, F., Svatos, M.: Haemobartonella infection in cats. Veterinarstvi, 1995; 45: 100-103.
20. Scaramal, J.D., Gomez, P.N.D., Silva, R.M.C., Lema, C.P.: Haemobartonellosis in 40 cats. Rev. Med. Vet. Buenos Aires, 1997; 78: 278-284.
21. Stevenson, M.: Treatment for *Haemobartonella felis* in cats. Vet. Rec., 1997; 140: 512.