



CANINE HEMOPLASMAS IN THE SWISS DOG POPULATION: PRESENCE, PHYLOGENETIC ANALYSIS AND CLINICAL IMPORTANCE



N. Wengi¹, B. Willi¹, F.S. Boretti², V. Cattori¹, M.L. Meli¹, B. Riond¹, C.E. Reusch², H. Lutz¹, and R. Hofmann-Lehmann¹

¹Clinical Laboratory and ²Clinic for Small Animal Internal Medicine, Vetsuisse Faculty, University of Zurich, Switzerland

Introduction

Hemotropic mycoplasmas (hemoplasmas) are epierythrocytic bacteria. In dogs, two distinct hemoplasmas have been described: *Mycoplasma haemocanis* (Mhc) and *Candidatus Mycoplasma haematoparvum* (CMhp). Infections with Mhc have been reported to cause hemolytic anemia mainly in splenectomized or immunocompromised dogs. So far, only one published study used real-time PCR-based methods to address the prevalence of canine hemoplasmosis by investigating blood samples from 460 dogs from Southern France (1): overall, 15.4% of the dogs tested PCR positive for canine hemoplasmas. The presence of canine hemoplasma infections in Switzerland has not been addressed to date. The tick *Rhipicephalus sanguineus*, a proposed vector for canine hemoplasmas (2) is occasionally encountered in Southern Switzerland (canton Ticino). This study aimed to investigate the presence of hemoplasma infections in dogs in Switzerland using sensitive real-time PCR assays, to molecularly characterize the hemoplasma isolates and to follow hemoplasma-infected dogs over time.

Materials & Methods

EDTA-blood samples from 889 Swiss dogs (883 sick and six healthy dogs) were analyzed for Mhc and CMhp with two real-time PCR assays established in our laboratory. Seven follow-up samples of three infected dogs were available. The nearly complete 16S rRNA gene of four isolates was cloned and sequenced. PCV values were available from 875 dogs. PCV values below 42% were considered anemic. Complete medical records for hemoplasma PCR-positive dogs were obtained from the Clinic for Small Animals of the University of Zurich, Switzerland. The latter data included gender, age, breed, residence, clinical diagnosis, treatment and travel history (foreign countries or Southern Switzerland).

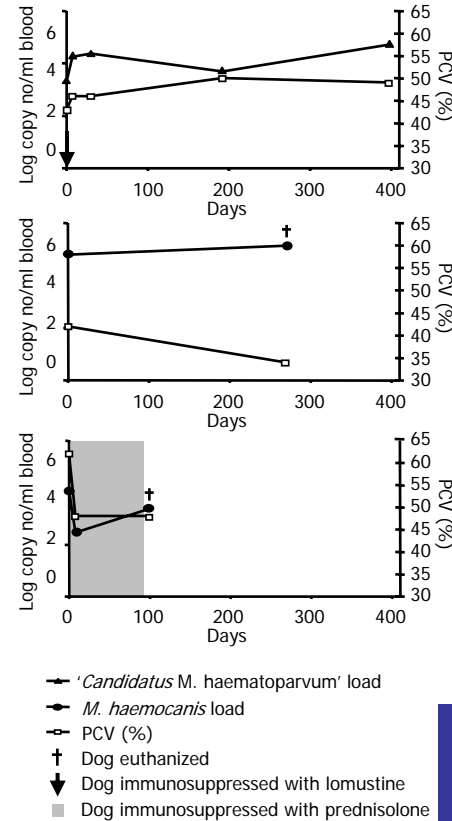
References

- Kenny, M. J., S. E. Shaw, F. Beugnet, and S. Tasker. 2004. Demonstration of two distinct hemotropic mycoplasmas in French dogs. *J Clin Microbiol* 42:5397-5399.
- Seneviratna P., N. Weerasinghe, and S. Ariyadasa. 1973. Transmission of *Haemobartonella canis* by the dog tick, *Rhipicephalus sanguineus*. *Res Vet Sci* 14:112-114.

Figure 1: Hemoplasma PCR-positive dogs



Figure 2: Follow-up



Results and Discussion

Mhc DNA was detected in eight (0.9%) and CMhp DNA in three (0.3%) out of 889 Swiss dogs (Fig. 1). No dog was found to be dually infected with both canine hemoplasmas. No significant association between the occurrence of canine hemoplasma infection and anemia was found: only two dogs infected with Mhc showed mild anemia (PCV values: 34%, 40%). Out of the 864 PCR-negative dogs with hematological data, 295 (34.1%) were considered anemic. In one CMhp and two Mhc infected animals a chronic carrier status of three to thirteen months was demonstrated (Fig. 2). Interestingly, the majority of the infected dogs visited regions where *R. sanguineus* is frequently found, such as Italy, Spain, France, Serbia, USA and Mexico. These dogs could have acquired the hemoplasma infection abroad. Phylogenetic analyses of the nearly complete 16S rRNA gene of one CMhp and three Mhc isolates revealed at least 99.8% identity to published sequences (Mhc: AF407208, CMhp: AY383241).

Summary and Conclusions

According to our results, canine hemoplasma infections play only a subordinate role in dogs in Switzerland. The infected dogs did not show signs attributable to hemoplasmosis; PCV values of these dogs were within or nearby the reference range.

We followed three infected dogs for up to 13 months.

We hypothesize that there is an association between the frequency of canine hemoplasma infections and the common exposure to *R. sanguineus* ticks.