Defining the Epidemiology, Clinical Presentation, and Diagnostics for Acute Canine Anaplasmosis, an Increasingly Prevalent Tick-borne Disease in Pennsylvania

LuzKarla Rodriguez1, Holly Brown2, Michael Yabules2,4, Kayla Garrett3, Michelle Paret5, and Justin Brown1

1Department of Veterinary and Biomedical Sciences, Penn State University, University Park, PA 16802, USA; jdb56@psu.edu
2VCA Metzger Animal Hospital, 1044 Benner Pike, State College, PA 16801, USA; hollymoorebrown@gmail.com
3Southeastern Cooperative Wildlife Disease Study, College of Veterinary Medicine, University of Georgia, Athens, GA 30602
4Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602
5Department of Statistics, Penn State University, University Park, PA 16802

Introduction

In the last 5-10 years, cases of canine anaplasmosis have become increasingly common in Central Pennsylvania. Anaplasma phagocytophilum is a tick-transmitted bacterium that infects neutrophils in dogs.

Clinical signs of canine anaplasmosis may include lethargy, lameness, anorexia, vomiting, diarrhea, polyuria, polydipsia, and circling, which occur 1-2 weeks post-infection.1,2,3,4

Canine anaplasmosis is treatable with tetracycline class antibiotics (e.g. doxycycline).5,6

Diagnosing acute cases can be delayed due to non-specific clinical signs, lack of an understanding, and false negative results on in-clinic rapid antibody tests (e.g. SNAP 4Dx).

A detectable antibody response to A. phagocytophilum infection typically develops 6 to 19 days post-infection.5,7

Acute cases can be diagnosed through blood smear examination by identification of morulae, which appear as blue-gray cocci.

Objectives

To summarize the historical, signalment, physical exam, and ancillary diagnostic test results from suspect acute canine anaplasmosis from Central Pennsylvania.

Methods

Between November 2015 and July 2020, 61 cases of suspect canine anaplasmosis presented to VCA Metzger Animal Hospital (MAH) (State College, Pennsylvania).

History, signalment, and for referrals, clinical data were collected from each case at MAH.

Physical exams were performed and blood was collected into a purple-top vacutainer tube containing Potassium EDTA.

For one dog, fine-needle aspirates of the liver and spleen were collected.

Blood samples were antibody tested using the SNAP 4Dx Plus, and used to prepare blood smears, which were stained with a Romanowsky-type stain.

Blood smears were examined by a board-certified clinical pathologist.

The aspirates were stained and cytocologically examined as described for blood smears.

Dogs were diagnosed with suspect canine anaplasmosis based on the presence of morulae in neutrophils, consistent with Anaplasma phagocytophilum (Fig. 1).

Data on history, signalment, physical exam, ancillary diagnostic testing (blood smear review and SNAP 4Dx Plus) were compiled in Excel and statistically analyzed using Minitab 19 software.

Results

During 2015-2020, an increasing number of cases were diagnosed either as primary clients or referrals (Fig. 2).

These 59 cases represented 10 counties in Central Pennsylvania (Fig. 3).

Cases were most common in the spring and fall, and less common in the summer and winter (Fig. 4).

A tick preventative was not used in 79.31% of cases.

Clinical signs in these cases (n=58) included lethargy, febrile, anorexia, lameness, vomiting, coughing, and diarrhea (Fig. 5). Other clinical presentations were sporadically observed.

Of 55 dogs tested using the SNAP 4Dx Plus, only 40 (27.27%) of cases had a positive result for antibodies to Anaplasma spp. (Fig. 6).

Conclusions and Future Studies

Canine anaplasmosis has become increasingly prevalent in Central Pennsylvania.

False negative results on the SNAP 4Dx are possible during the acute stage and alternate diagnostics are needed such as blood smear examination.

Future studies are needed to continue identifying parameters associated with canine anaplasmosis to help improve the definition of the syndromes and increase understanding.

References


Acknowledgements

We would like to thank the College of Agricultural Sciences and Student Engagement Network for funding. We also thank the staff of Metzger Animal Hospital for assistance with these cases.