

Canine Tick Diagnoses are a Sentinel for Tick-borne Diseases in People

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OBJECTIVE

To determine if ticks on dogs can provide early warning for tick-borne diseases in people.

BACKGROUND

A common method for determining the prevalence of ticks is flagging of vegetation or trapping and manual inspection of small mammals. Such methods are labor intensive and usually restricted to small geographic areas. In contrast, the 75 million dogs living in nearly half of all homes are often exposed to ticks and carry these ticks with them when they return home or visit a veterinarian's office. Although dogs are not directly involved in the zoonotic transmission of tick-borne diseases, we postulated surveillance of veterinarians' diagnoses of tick infestation can provide early warning for the occurrence of tick-related diseases in people. This information could then be used for tick prevention in both pets and people. A previous study suggested that tick activity in dogs preceded Lyme disease in people by approximately one month.¹

METHODS

A tick surveillance system was developed using electronic medical records of Banfield[®] with 33 primary care veterinary hospitals in NC (see map). The prevalence of tick infestation per 1,000 dog visits was calculated, plotted by month for a five-year period, and the results compared with tick-related activity in humans based on: 1. Number of doxycycline prescriptions using the IMS database, 2. Chief complaints in which the word "tick" appeared using NC DETECT, 3. ICD-9-CM discharge diagnoses of tick-related illnesses from all NC hospitals using an in-patient data base, and 4. Reportable tick-related diseases to the NC Division of Public Health. Graphs were overlaid and autoregressive moving average models used to determine the average lag time between tick-related events in dogs and people.

Fig. 1: Distribution of 33 Banfield[®] Hospitals in NC



RESULTS

The prevalence of tick diagnoses ranged from 9 per 1,000 dog visits in summer to 3 per 1,000 visits in winter, with regular cycles occurring yearly. In NC DETECT, the word "tick" appeared in the chief complaint for 1844 ED visits in 2007 and 1479 ED visits for the first six months of 2008. An ICD-9-CM code of "Lyme Disease" was recorded 65 times from 34 counties in NC in 2007 and a diagnosis of "Tick-borne Rickettsiosis" including Rocky Mountain spotted fever was reported 182 times from 40 counties in NC DETECT. Receipt of IMS and reportable disease data from NC is pending. Initial analyses of data received suggest overlapping patterns of activity between canine tick activity and diagnoses of tick-borne infections in people. The lag time between canine and human tick activity will be determined.

CONCLUSIONS

The concept of the "canary in the coal mine" was described early in the 20th century, but few scientific studies have demonstrated the value of conducting routine surveillance in pet animals as a sentinel for human diseases. Tick-borne diseases are important causes of morbidity in NC and are occasionally fatal. One study found ehrlichial infections may be as common as spotted fever group rickettsial infections in febrile patients in NC with a history of tick bite.² A state-wide pet surveillance system capable of signaling increased tick activity would allow time for public health agencies and veterinarians to conduct tick prevention education and alert ED physicians to the need for doxycycline treatment of febrile patients with a history of tick bite.

REFERENCES

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