Pathogens associated with acute infectious canine tracheobronchitis in New Zealand

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ABSTRACT

Infectious canine tracheobronchitis (ICT) or canine infectious respiratory disease, commonly known as kennel cough, is an acute, highly contagious respiratory disease that affects the larynx, trachea, bronchi, and occasionally the parenchyma of the lower respiratory tract. Several pathogens have been implicated in ICT including viruses, bacteria and mycoplamsa. Little is known about the prevalence of canine respiratory pathogens in New Zealand. Hence, the aim of this study was to identify potential respiratory pathogens from dogs that are affected by ICT in New Zealand, and compare agents found in diseased dogs to those found in healthy dogs. In house (IH) qPCR assays were developed for the detection of canine adenovirus type 2 (CAdV-2), canine herpesvirus (CHV) and canine parainfluenza (CPIV).

A total of 96 dogs were sampled, including 47 healthy and 49 diseased dogs, which comprised three different groups of dogs: greyhounds, pet dogs, and working farm dogs. A questionnaire was included for each dog sampled. The samples collected were then subjected to the following tests: virus isolation, haemagglutination assay for CPIV, IH qPCR for CAdV-2 and CHV, as well as IDEXX RealPCR respiratory disease panel, and bovine respiratory coronavirus ELISA to detect antibody to canine respiratory coronavirus (CRCoV).

Based on IDEXX qPCR, CPIV (7.3%), *Bordetella bronchiseptica* (7.3%) and *Mycoplasma cynos* (17.0%) were the most common agents detected in samples from diseased dogs, whereas CAdV-2 (10.6%) was the most common pathogen amongst healthy dogs. Based on IH qPCR, CAdV-2 infection was very common among all dogs sampled, with 34/47 (72%) positive diseased dogs and 37/47 (78.6%) positive healthy dogs.

A total of 47/92 (51%) of dogs were positive for CRCoV antibodies, including 32/46 (69.6%) of diseased dogs and 14/46 (30.4%) of healthy dogs. In addition, acute serum samples from diseased dogs were significantly more likely to be positive for CRCoV antibodies compared to sera from healthy dogs (RR 5.22, CI 1.972, 14.115, p=0.0003).

The results of this study suggest that CRCoV, *M.cynos* and potentially CPIV may have a role in ICT in New Zealand, however further investigation is required to support these findings. In addition, if one excluded dogs positive for CAdV-2 (as there was no difference in levels of detection of this virus between healthy and diseased dogs), then only 13/47 (27.6%) of diseased dogs were positive for at least one agent via IDEXX and IH qPCR. This suggests that

other aetiological agents, not examined in this study, may have contributed to respiratory disease in sampled dogs. Techniques such as next generation sequencing may help to identify these pathogens.

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Table of Contents