Canine Influenza Virus

Canine influenza virus (CIV) is a type A influenza virus, primarily affecting dogs. CIV is considered an emerging pathogen. No human infections have been reported.

Virology

The causative CIV strains have been classified as H3N8 and H3N2, based on the amino acid composition of the hemaglutinin (H) and neuraminidase (N) glycoproteins in the lipid outer layer of the capsid. The viruses are 80-120 nanometers (nm) in diameter, and consist of a core of eight separate pieces of single-strand ribonucleic acid (RNA) surrounded by a spiked arrangement of glycoproteins.

The H3N8 canine influenza virus represents a very rare event in adaptive evolution; the entire genome of the H3N8 equine influenza virus was transferred to dogs, and the virus adapted to the canine species to emerge as a new canine-specific virus. The first recognized outbreak of H3N8 canine influenza occurred in racing greyhounds in January 2004 at a track in Florida. Since then, the H3N8 canine influenza has been documented in 40 states and Washington, DC. The H3N8 strain of canine influenza virus is endemic in areas of Colorado, Florida, New York, and Pennsylvania.

The H3N2 strain emerged in Asia in 2006-2007 among dogs suffering from respiratory disease. This strain likely arose through the direct transfer of an avian influenza virus to dogs. The new canine virus spread widely among dogs in South Korea and in several regions of China, and caused an outbreak of respiratory disease among dogs in Thailand in 2012. In 2015, a canine H3N2 that was genetically almost identical (99% identical) to the Asian strain was detected in the United States.

Clinical Signs

The majority of infected dogs exhibit the mild form of canine influenza. In the mild form, the most common clinical sign is a cough that persists for 10 to 21 days. Affected dogs may have either a soft, moist cough or a dry cough similar. Nasal and/or ocular discharge, sneezing, lethargy and anorexia may also be observed. Dogs may develop a purulent nasal discharge and fever (104-105^{o}F). The nasal discharge is usually caused by secondary bacterial infections, including *Pasteurella multocida* and mycoplasma species.

Some dogs are more severely affected with clinical signs of pneumonia, such as a high-grade fever (104°F to 106°F) and increased respiratory rate and effort. Thoracic radiography (chest x-rays) may reveal consolidation of lung lobes.

Epidemiology of Transmission

Almost all dogs are susceptible to the virus, and illness tends to spread among dogs housed in kennels and shelters. CIV can spread to other dogs by direct contact, through aerosolized respiratory secretions

(coughing and sneezing) from infected dogs, and via contact with contaminated objects (fomites). Therefore, dog owners whose animals are coughing or showing other signs of respiratory disease should not expose their dog to other dogs. Clothing, equipment, surfaces, and hands should be cleaned and disinfected after exposure to dogs showing signs of respiratory disease.

Prevention, Treatment and Control

There is an approved vaccine to protect dogs against canine influenza A H3N8 available in the United States. It is unknown at this time whether this vaccine will protect against the H3N2 canine flu virus.

There are no specific therapeutic treatments for CIV. Often, antimicrobials are used to prevent or control secondary bacterial infections. For severely affected dogs, intensive care including anti-inflammatory medication and fluid therapy may offer relief.

References

American Veterinary Medical Association (AVMA)
https://www.avma.org/KB/Resources/Reference/Pages/Canine-Influenza-Backgrounder.aspx

Center for Disease Control and Prevention (CDC)
http://www.cdc.gov/flu/canineflu/keyfacts.htm