

Review Article

<https://doi.org/10.20546/ijcmas.2020.905.209>

Covid-19 and Animal Health Concerns-A Veterinarian Perspective

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ABSTRACT

Keywords

Covid-19,
Animal Health
Concerns

Article Info

Accepted:
15 April 2020
Available Online:
10 May 2020

Though Covid19 is closely related to SARS and MERS, the present SARS-COV-2 is different to these two other corona viruses with respect to mild infection in 80% of cases and 20% severe. Based on the available literature, the Covid-19 pandemic is linked to a fish market, though the exact source is yet to confirm. So far it is understood that this novel corona virus causes respiratory symptoms and spreads as droplet infection in humans, people who are infected but asymptomatic also play a role in spread. At the same time, there is no established evidence that the companion animals can spread covid19 to humans. It should be understood that any kind of pet and companion animal is not a vector of the present pandemic, and hence, there is no reason to abandon the man's beloved companion.

Introduction

Basically corona viruses are a group of viruses that causes disease in animals, named for the crown-like spikes on their surface. The genus *Corona* virus is composed of at least three genetically and antigenically distinct groups of corona virus that causes mild to severe enteric, respiratory or systemic disease in domestic and wild animals, poultry, rodents and carnivores and mild cold in humans. So far, there are four main sub-groups (alpha,

beta, gamma and delta) and seven types of corona viruses (229E, NL63, OC43, HKU1, MERS-CoV, SARS-CoV and SARS-CoV-2) have been identified including the recent new noval corona virus that entered humans, but most just cause cold (NCIRD, 2020). Though Covid19 is closely related to SARS and MERS, which swept around the world in 2002 and 2012, the present SARS-COV-2 is different to these two other corona viruses with respect to mild infection in 80% of cases and 20% severe. Almost every state is

affected by COVID-19, but the severity and stage of the pandemic is at different levels in different states. Whether it is a human or an animal, there is total 'lock down' in many places, where the life is confined to the indoor home environment. Cats and dogs are in close contact with humans, and therefore it is important to understand their susceptibility to SARS-CoV-2 for COVID-19 control.

Covid-19 and animal health

Primarily the SARS and MERS stand as examples for the corona viral infections that normally exist in animals but rarely spread to humans and then human to human. With the available evidence to date, the present corona virus pandemic is linked to a wet market, but the exact source is yet to know. So far it is understood that this novel corona virus causes respiratory symptoms in humans and spreads mostly through droplets from person to person and people who are infected but asymptomatic also play a role in spread. At the same time, there is no established evidence that the companion animals can spread covid19 to humans. Basically the corona virus that causes disease in pet animals was identified as canine and feline corona virus. The canine corona virus is usually restricted to gastro intestinal tract causing hemorrhagic gastroenteritis and is self limiting and whereas, the feline corona virus is associated with feline infectious peritonitis. However, veterinary scientists reported the potential for corona viruses to cause fatal enteric or respiratory infections in animal and for new corona virus strains to emerge from unknown reservoirs occasionally leading to fatal disease in naive population. Pensaert (1999) reported the outbreak of porcine epidemic diarrhoea corona virus (PEDV) during early 80s that caused severe enteritis and mortality in baby pigs. The PEDV is more closely related genotypically to human CoV 229E than animal CoV (Duarte *et al.*,

1994) that grows in vero cells like SARS Cov (Hoffman and Wayler 1988).

The emergence of SARS illustrate that these corona viruses are highly virulent particularly when they emerge from its natural animal reservoir and causes highly fatal in humans (Saif, 2004). Historically, human corona virus infections were mostly associated with simple common cold (Callow *et al.*, 1990 and Holmes 2001) with exceptions like emergence of new corona virus that was associated with SARS in 2003 (Drosten *et al.*, 2003, Poutanen *et al.*, 2003). The SARS CoV is genetically related to known CoVs and comprises a provisional new group –IV (Drosten *et al.*, 2003) or alternatively, using rooted tree phylogenetic analysis, belongs to a subgroup of group II (Snijder *et al.*, 2003).

While there are isolated reports of infected or asymptomatic human patients transmitting the SARS-CoV-2 to their pets, there are no published reports of these pets spreading virus to other animals or people. According to American Kennel Club proceedings, dogs can contract certain types of corona viruses, such as canine respiratory corona virus, but COVID-19 is believed to not be a threat to their health. So far, it was reported that two pet dogs (a 17 year old Pomeranian and 8 year old German shepherd) of COVID-19 infected owners were tested weak positive for the virus in Hong Kong.

Studies suggest that the cats can be naturally exposed to covid19 virus and the virus has been shown to replicate in ferrets and cats, through experimental inoculation (WSAVA 2020). The scientists also reported that the viral RNA and antibodies against SARS-CoV-2 was detected in the healthy cats that were kept along with infected one, thus suggesting the spread of virus through droplets that were breathed out by the infected cats. Previous studies of SARS-CoV, the

related coronavirus that causes severe acute respiratory syndrome (SARS), showed (Martina *et al.*, 2003) that cats can be infected and pass it on to other cats. But there was no indication during the SARS pandemic that SARS-CoV became widespread in house cats or was transmitted from cats to humans. Further studies are warranted to determine whether exotic cats are more susceptible to the COVID-19 virus than domestic cats. The Belgian cat of a COVID-19 positive owner was also found positive and the virus was detected in feces, a week later that was showing signs of diarrhoea, vomiting and respiratory difficulty (Gucht, 2020). Another study suggests that cats can be naturally exposed to SARS-CoV-2 and mount a serological response (WSAVA 2020).

So far there are no published reports stating the occurrence of or COVID19 positive among the wild animals maintained in various zoos, sanctuaries or reserve forests. However, there was a report stating that a four-year old female Malayan tiger of Bronx Zoo in New York, that was showing signs of cough and anorexia has tested positive for SARS-CoV-2 and the same was confirmed by the United States Department of Agriculture (USDA's) National Veterinary Services Laboratory. It was reported that the care taker who was asymptotically infected with the virus was the source. It was also reported that, though three other tigers and three African lions which are residing in the same habitation, were also had respiratory signs, such as dry cough, could not be tested due to certain practical difficulties. However, after a couple of weeks they were also reported positive by the authorities.

Few experimental studies so far carried out in a small group of other animal species ended up in mixed results, however, the dogs were found to be excreted viral RNA in their faeces when they were inoculated with SARS-CoV-

2, but none contained infectious virus. On the other hand, no viral RNA was identified in experimentally inoculated pigs, chicken and ducks and in those exposed to the inoculated ones, which suggests that none of these species plays a part in the epidemiology of COVID-19 (Mallapaty, 2020).

General guidelines for pet lovers and animal handlers

Even though there have been isolated reports of pet dogs and cats being infected with COVID-19, and while preliminary studies has shown that the virus can spread from cat to cat, there is no evidence as of now to support that the virus can become widespread among house cats or that the virus can be transmitted from cats to humans. However, a person with COVID-19 positive is instructed to avoid direct contact with pets. They should strictly maintain safe distance as they do with other household persons and they should not share food, sleeping locations with their pets and in fact they should avoid petting, grooming, kissing and licking them and should wear a personal protection equipment like face mask and gloves, wash hands before and after providing food and water. They can even recruit someone to take care of their pets during their home quarantine, if possible. Till now, all the major health organisations, including CDC, WHO and world organisation for animal health documented that though, there is no evidence that the SARS-CoV-2 that causes COVID-19 can spread to people from the skin or fur of companion animals, the pet animal owners and animal handlers should adhere to biosafety measures such as, washing hands and sanitizing frequently and wearing PPE etc. Though, so far there is no established evidence to suggest that any kind of animals, including pets, livestock, or wildlife, might be a source of SARS-CoV-2 that causes COVID-19 infection, one should remember to practice strict hygiene around

pets and other animals as they all can carry germs that can make people sick. Avoid frequent visit to a vet or clinic unless emergency and still maintain social distance while with vet. Regular deworming and routine annual preventive vaccination for pets can be postponed as relative confinement of pets also reduce the risk of the animals to contact with animal pathogens and thus, there will be less chance of contracting infections (WSAVA Vaccination guidelines 2020).

General bio-security guidelines for veterinary clinic

To develop the biosecurity plan at veterinary clinic, it should include a veterinary facility walkthrough to assess the flow of patients, personnel and clients through the hospital in general and in outbreaks. The critical biosecurity / control points in any clinic include: main entrance area, outpatient examination area / rooms, inpatient wards, operation theatres and laboratory. The following principles and practices can be used to develop guidelines and to review current protocols. Clinician or health worker hands can act as carriers of disease from animal to animal and from animals to humans, hence hand washing and sanitizing between the cases helps prevent spread of infections. Veterinary facilities should strive to place sinks in high use areas and ensure that plenty of soap, towels and hand sanitizers are available in all animal contact areas. Hand sanitizers serve a useful purpose, but do not take the place of thorough hand washing with running water and soap. Using hand sanitizers is inadequate when hands are contaminated with visible dirt or organic debris or in the presence of infectious agents. Cleaning and disinfecting should always be thought of as a 3-step process (Steneroden *et al.*, 2012). Step one is the mechanical removal of visible organic matter. This is the first and most important step in the sanitation process. Most

detergents and disinfectants are either completely or to some degree inactivated by the presence of organic material such as food, feces, urine or soil. So, removal of visible contamination before cleaning with soap or detergent is essential (Russell and Hugo, 1987). Step 2 involves cleaning with soap or detergent and warm to hot water. Removal of visible waste in step 1, along with thorough cleaning with soap or detergent and hot water in step 2 will remove 90% of environmental pathogens (Morgan and Jones, 1987) and are the most important factors in determining the outcome of disinfection activities (Kahrs, 1995). All surfaces should be rinsed thoroughly after cleaning with soap or detergent. Step 3 is disinfection, where disinfectants must be applied to clean surfaces as many of them are inactivated by the presence of organic matter (food, urine, feces, blood, saliva, etc.) Disinfectants can also be inactivated by the presence of detergent or soap left on a surface through inadequate rinsing during step 2. Disinfectant products should never be mixed together unless specifically approved by the manufacturer. For instance, soaps and detergents inactivate quaternary ammonium compounds (Jeffrey, 1995) and mixing bleach with ammonia can result in toxic vapors. Certain cleaning products should be used with caution or not at all in animal facilities. Phenolic compounds such as Lysol and Pinesol should be avoided in facilities that care for cats, as they are highly sensitive to these products (Petersen *et al.*, 2008).

It is concluded, so far, only three cases where the pet has been infected by humans are known across the world. It concerns two dogs in Hong Kong, and now a cat in Belgium. Both dogs did not show any signs of disease, but the cat has respiratory and digestive disorders. It should be understood that any kind of animal is not a vector of the present pandemic, and hence, there is no reason to

abandon your beloved companion pet. However, it is advised to remember and follow the general rules of strict hygiene, to wash your hands before and after petting and playing with your pet.

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How to cite this article:

Satish Kumar, K. 2020. Covid-19 and Animal Health Concerns-A Veterinarian Perspective. *Int.J.Curr.Microbiol.App.Sci*. 9(05): xx-xx. doi: <https://doi.org/10.20546/ijcmas.2020.905.209>