A note on Canine Distemper Virus (CDV), its Threat on Tiger (Panthera tigris) Population and Suggested ways for combating CDV

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Introduction

Canine distemper virus (CDV), a close relative of the measles virus (MV), is widespread and well known for its broad host range. When the goal of measles eradication is achieved, and when measles vaccination is stopped, CDV might eventually cross the species barrier to humans and emerge as a new human pathogen (Bieringer et al. 2013). The virus, a single-stranded negative RNA, can cause systemic infection in the host carnivore (Nishi et al. 2004). CDV was first described in 1905 by French veterinarian Henri Carre (Pomeroy et al. 2008).

CDV is thought to have caused several fatal epidemics in canids within the Serengeti–Mara ecosystem of East Africa, affecting silver-backed jackals and bat-eared foxes in 1978, and African wild dogs in 1991 (Macdonald 1992; Roelke-Parker et al. 1996). The large, closely monitored Serengeti lion population was not affected in these epidemics. However, an epidemic caused by a morbillivirus closely related to CDV emerged abruptly in the lion population of the Serengeti National Park, Tanzania, in early 1994, resulting in fatal neurological disease characterized by grand mal seizures and myoclonus (Packer and Pusey 1995; Roelke-Parker et al. 1996).
It was observed that the higher-density domestic dog populations to the west of the Serengeti National Park was a more likely source of the CDV infection for wildlife during 1994 than lower density pastoralist dogs to the south and east of the park (Roelke-Parker et al. 1996). According to Alexander et al. (1993) and Fiorello et al. (2007) “Nonnative species, including domestic animals, are frequently implicated as reservoirs of diseases that may cause significant population decline of wildlife. Large carnivores are at special risk from disease because of their close phylogenetic relationship with domestic dogs and cats (Cleaveland et al. 2001). Among adult dogs, the disease kills an estimated 50 percent of infected animals. A seroepidemiological survey of CDV infection in Asian felids revealed that the prevalence of antibodies varied depending on region and, in some cases, exposure to dogs.

The serologic pattern in cats with antibodies indicated that they had likely been exposed to field strains rather than typical CDV vaccine strains (Ikeda et al. 2001).

Wild tiger (Panthera tigris) which formerly inhabited vast tracts of forested landscape, has now been pushed to a corner due to increasing human habitation (Jhala et al. 2010). The wild tiger population is on the brink of extinction and presently 7% of its original population is restricted to thirteen tiger range countries (GTRP 2010). Although the major causes behind dwindling of wild tiger population were considered to be as poaching, habitat fragmentation and lack of prey base. The prevalence of CDV in wild tiger population remains obscure, and there are limited reports about naturally occurring morbillivirus infections in tiger.

Recently, there has been some media coverage regarding the spread of this lethal virus in tigers, in countries like Indonesia and the Russian Federation. John Lewis, Director of Wildlife Vets International found that, Sumatran tigers (Panthera tigris sumatrae) are at risk because of...
this virus. Dr. Lewis also reported that “Since 2000, in the Russian Far East, there have been a few cats reported as behaving strangely and coming into villages, apparently not showing much fear towards people”.

In India, occurrence of CDV has been detected by PCR in a tigress, two tiger cubs and a Red Panda in the tests conducted at the Virology lab of Centre for Animal Disease Research and Diagnosis, Indian Veterinary Research Institute (Dr. A.K Sharma personal communication). Seropsitivity of CDV was reported in 87.5% Asiatic Lion from western India in 1998-1999 (Balamurugan et al. 2012). Chronic encephalomyelitis caused by canine distemper virus has been also reported in Bengal tiger (Panthera tigris tigris) (Blythe et al. 1983).

**Infection**

CDV spreads through aerosol droplets and through contact with infected bodily fluids, including nasal and ocular secretions, feces, and urine, 6 to 22 days after exposure. It can also be spread by food and water contaminated with these fluids (Carter et al. 2006).

**Symptoms**

The disease causes high fever, watery eyes, lethargy, vomiting, and diarrhea, progressing to seizures, paralysis and even death. The infected animals have also been observed to display strange behavior accompanied with disorientation, inability to predate, besides loss of fear. CDV infection can contribute to respiratory illness or pathogenesis of the liver in domestic cats (Ikeda et al. 2001).

**Suggested ways for combating CDV**
1) Vaccination of stray cattle, cats and dogs living around tiger reserves should be done on a regular basis. The type of vaccine should be approved for the type of animal being inoculated, or else the animal could actually contract the disease from the vaccine.

2) Incidents of wild animals showing abnormal behaviour must be reported immediately.

3) Periodic checking of water quality in tiger reserves (pre and post monsoon) along with their chemical analysis should be undertaken.

4) There is an urgent need to conduct monitoring of sero prevalence of CDV in large cats (endangered species) both in captivity and in wild.

5) It should be made mandatory to look for CDV infection while conducting postmortem of a large felid.

6) Stray dogs should be prohibited from entering the peripheral forest villages or in the vicinity of the zoos.

Materials to be collected for diagnosis of sick animals

1) Heparinized whole blood about 10-15 ml in cold chain at 4º C (Not Frozen)

2) Serum 1.0 ml in cold chain (Frozen).

Materials to be collected from dead animals (post mortem)

1) Tissues for virus isolation: Spleen, lymph nodes, lung and brain in cold chain (frozen) or in 50% buffered glycerol.

2) Above tissues (0.5 cm thick) in 10% neutral buffered formalin for histopathological examination.
Literature cited


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