Equine Coronavirus (ECoV)

Definition

Equine Coronavirus (ECoV) is an important cause of enteric disease in adult horses. Reported worldwide with increasing incidence, it is a single-stranded RNA virus in the beta coronavirus family. The role of ECoV as a cause of diarrhea in foals is still unclear as the virus can be detected in both healthy and sick foals.

Prevalence

Unknown, but likely low. In a study of horses presenting for gastrointestinal disease, ECoV was isolated by PCR from only 1/258 fecal samples (*Sanz et al 2019*). In a study investigating seroprevalance, 9.6% of adult healthy horses from the United States tested seropositive to ECoV (*Kooijman et al 2017*). Geographic region (Mid-West), breed (Draft horses) and specific uses of horses (ranch/farm and breeding use) were all statistically significant risk factors for seropositivity. ECoV infections have predominantly been reported in adult horses since 2010 with increasing frequency of positive cases reported by diagnostic laboratories.

Clinical signs

Clinical disease is generally mild, but mortality from necrotizing enteritis and hyperammonemic encephalopathy has been reported. Miniature horses appear to be at higher risk of complications from ECoV infection. ECoV cases occur year round, with a large proportion diagnosed during the winter months.

- May occur as an individual case or outbreak
- Fever up to 105° F (40.5° C)
- Leukopenia characterized by neutropenia and lymphopenia (can be severe)
- Inappetance
- Lethargy
- Diarrhea is an inconsistent finding
- Scant fecal production
- Colic

Complications that occur in rare cases:

- Hypoproteinemia, electrolyte and metabolic derangements secondary to intestinal inflammation
- Hyperammonemic encephalopathy (lethargy, obtundation, wandering, ataxia, seizures)
- Death secondary to septicemia

Incubation period	2-4 days
Risk Factors	• Exposure to clinical and subclinical horses shedding ECoV in feces • Co-mingling with horses of unknown infection status
Transmission	Fecal-oral • During farm outbreaks, clinically unaffected horses may shed virus • Transmission can occur directly between horses as well as through environmental contamination • Fomite transmission is possible, especially via contaminated stalls, muck forks, manure spreaders, thermometers, hands, and clothing
Diagnostic Sampling, Testing, and Handling	A diagnosis of ECoV infection relies on the presence of clinical signs compatible with ECoV infection, the exclusion of other infectious agents, and the detection of ECoV in feces. A consistent hematological abnormality observed in horses infected with ECoV is leukopenia due to neutropenia and/or lymphopenia. Laboratory support of ECoV infection should be based on the molecular detection of ECoV in feces via PCR. Post-mortem diagnosis of ECoV can be achieved by PCR on feces or small intestinal contents collected at post-mortem examination. In outbreak situations, the testing of in-contact healthy horses may help determine the extent of the outbreak and confine ECoV shedding from subclinically infected horses.
Shedding of Virus	Under natural conditions, fecal shedding of ECoV has been reported to range from 3 to 25 days. In a small experimental infection study, horses shed from days 3 to 15 following infection (*Schaefer 2018*). Horses with no clinical signs of the disease can shed the virus.
Carrier status	Carrier status is currently unknown but subclinical horses (horses with no clinical signs) have been found to shed the virus in feces, and likely serve as silent reservoirs for infection.
Treatment	Treatment for ECoV involves supportive care based on the clinical signs. Severe cases may require hospitalization for intravenous fluid treatment, colloid support, and/or correction of electrolyte and metabolic derangements.
Prognosis	Good. Exposure to the virus can result in up to 85% infection rate but most animals do not show clinical signs. Mortality is generally low.
Environmental Persistence	Unknown, however greater survival and viability of ECoV is to be expected in colder weather and is one possible explanation for the apparent higher prevalence of virus positive fecal samples and clinical disease during cooler weather.

Prevention	There are currently no vaccines for ECoV. Prevention involves minimizing contact between at-risk horses, maintaining high standards of sanitation in all equine facilities and carefully disposing of manure where it cannot contaminate pastures, paddocks or drinking water.
Biosecurity	ECoV should be suspected in any horse with fever and no evidence of respiratory illness. Horses positive for ECoV should be isolated and strict biosecurity measures and manure management instituted to prevent the spread of infection to other horses in the vicinity. Other horses on the property should be monitored for fevers and/or leukopenia. Personnel working with infected horses should use disposable gloves and personal protective equipment (gowns, boot covers) and wash hands thoroughly with liquid hand soap and water followed by 70% ethanol hand sanitizer after handing sick animals. The AAEP General Biosecurity Guidelines are available at: https://aaep.org/sites/default/files/Documents/BiosecurityGuidelines_Sept2018.pdf
Release of Animals from Isolation	Clinical and subclinical horses should remain in isolation until fecal PCR negative.
Zoonotic Potential	No known zoonotic potential. However, standard hygiene precautions and use of personal protective equipment should be utilized with any diarrheic patient due to risk of coinfection with zoonotic agents.

ECoV and COVID-19 are two distinct RNA viruses. While coronaviruses are known to infect a variety of species worldwide including equine coronavirus (ECoV), bovine coronavirus (BoV), feline coronavirus (FCoV), and canine coronavirus (CCoV), these viruses are very species specific, and at this time there is no evidence that animals infected with these viruses pose a risk to their veterinarians and/or human handlers.

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