

West Nile Virus Overview in Camelids

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In 2023, across Colorado and Wyoming specifically, CSU has observed a rise in incidence of West Nile Virus (WNV) both among equine (horses) and camelids (the majority being alpacas). A general hypothesis accepted for this trend is the abnormally increased rainfall during the spring season leading to a rise in mosquito population and, therefore, an increased risk to people and livestock for contracting WNV. The purpose of this short article is to highlight the disease and to inform the camelid community that WNV is still a concern within the population, although a low one. By no means are we recommending going out and vaccinating entire herds, but if incidence of WNV is rising in your area, vaccination may be considered with the help your veterinarian.

Background:

WNV is common nomenclature, especially during summer months, that likely all of us have heard over the last twenty years. After the first confirmation of WNV in the United States in the late 1990s, yearly occurrence comes and goes, but is made obvious to the public generally through confirmed cases. This is usually relayed via news sources, notifying people of human or equine positive cases along with alarming warnings against mosquitoes and measures to control the mosquito population.

WNV is maintained in a constant cycle through two main reservoirs: mosquitoes and birds. The cycle is maintained across the United States year-by-year via migration of infected birds which can then transmit to non-infected mosquitoes. Therefore, the virus is conserved yearly, which is why we have seen WNV each year since its introduction.

Infected mosquitoes transmit WNV to animals via a bite. Once bitten, the virus enters the bloodstream and starts circulating, medically coined a “viremia.” This viremia lasts a short time in most animals creating mild signs of general lethargy (lack of energy or weakness). Luckily, other than the bird, animals do not have a significant enough viremia to transmit the virus; in other words, if you or your animal contracts WNV, you are not contagious. In a small percentage of animals, the virus can enter the central nervous system (CNS) creating varying degrees of neurologic signs.

Camelids, historically, appear to be less susceptible to clinical disease via WNV than horses and birds (and humans). Since there has been low incidence, there is very limited data on WNV in camelids.

Disease in Camelids:

In a serological (blood) study performed in 2003 on the front range of Colorado, it was demonstrated that up to 80% of the camelids during that season had serological evidence of WNV (without clinical signs of disease). This data supports that fact that there is a short period of viremia (virus in the bloodstream) that may result in mild clinical signs of lethargy, but not severe clinical disease. During this viremic period, antibodies are formed by the body’s immune system against WNV. When this occurs, the body forms a natural immunity to the virus that can reduce the incidence and severity of disease if subsequently exposed.

Clinical Signs:

Most infections with WNV do not result in serious illness. When clinically ill, the general clinical sign is coined neurologic. The clinical signs can include lethargy, inappetence, ataxia (incoordination),

weakness, head/neck tremors, fasciculations, opisthotonos (neck extending up and over back), convulsions or paddling, and recumbency (going down).

Clinical severity can be divided into three main categories: mildly, moderately, and severely affected. Mildly affected animals tend to remain standing and eating, but can be lethargic, weak, mildly ataxic, and have tremors. Disease usually lasts up to two weeks, but mildly affected animals usually have a complete recovery. Moderately affected animals show similar signs but are even weaker to the point of recumbency. They can usually remain in a normal cushed position and eat/drink as long as offered within reach. Recovery in the moderately affected group is prolonged and can take a month or more to completely recover. Severely affected animals have rapid onset of clinical signs that progress to recumbency and convulsions. These animals are generally euthanized or pass due to respiratory arrest despite treatment.

Diagnosis:

A diagnosis can be achieved two ways: diagnosis of exclusion or confirmatory diagnostics. A diagnosis of exclusion means that clinical signs observed are compatible with the disease, some diagnostics are compatible with the disease, and other causes of disease have been excluded. There are two main confirmatory diagnostics that can be submitted to a referral laboratory. The first is called RT-PCR which finds and amplifies genetic material to find the virus within either blood or cerebrospinal fluid (CSF). The other main confirmatory diagnostic test is an antibody neutralization assay which detects antibodies against the virus within the blood or CSF.

The confirmatory tests can also be performed postmortem combined with histologic evidence of disease to achieve a diagnosis via necropsy.

Treatment:

There is no known treatment for WNV, aside from general supportive care. A veterinarian should be consulted prior to any treatment being administered. General considerations for supportive care include CNS inflammation mitigation (i.e., steroids, nonsteroidal anti-inflammatory drugs [NSAIDs], etc.), antioxidant medications (i.e., vitamin A/D/E, etc.), reduction of muscle pain/spasm (i.e., NSAIDs, benzodiazepine, etc.), pain management (i.e., opioids), and administration of WNV antibody positive plasma.

Generally, treatment is unrewarding unless clinical disease is observed early, the animal has been previously exposed, and intense nursing care is implemented. Severity and time of clinical signs can be prognostic indicators to decide if treatment is warranted versus humane euthanasia.

Prevention:

Since WNV is transmitted via mosquito, the main prevention strategy is to reduce the risk of being bitten by a mosquito. This may include fly/mosquito spray, reducing standing water on/near property, and city-wide efforts to reduce the population of mosquitoes locally.

An additional preventative strategy to consider is vaccination. There is not an approved WNV vaccine for camelids, but there is in horses. Data for efficacy of the vaccine is limited and from the early 2000s, but the data does suggest that vaccination can create a humoral immune response to the virus. The general recommendation for vaccination is two to three doses administered three to four weeks apart. Bear in mind that any vaccination could have an adverse effect on breeding animals within 30 days of copulation or parturition. If vaccination is pursued, please contact your veterinarian

and/or Colorado State University (CSU) Livestock Medicine and Surgery Service for complete recommendations/guidelines.

To Vaccinate or Not to Vaccinate

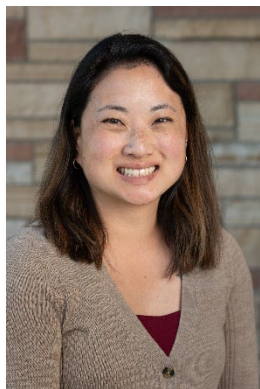
The incidence of clinically severe WNV is generally low, but the incidence of subclinical WNV is generally high. This means that the majority of camelids have been exposed to WNV and will likely have developed antibodies against the virus. The antibodies that have been generated naturally, due to exposure, will act as a defense against the virus if exposed to WNV in the future. This antibody response should reduce clinical signs and mortality. In the previously mentioned serological study, up to 80% of camelids surveyed had antibodies naturally due to exposure. Therefore, in the great majority of incidences, natural immunity to WNV should be achievable without vaccination in normal conditions.

Conclusion:

WNV is endemic (naturally occurring) in the mosquito and bird populations of the United States. Clinical disease of WNV has become important in the camelid industry across the country. While disease progression in most cases is minimal, there is risk of developing severe clinical disease that manifests as severe neurologic symptoms that can easily become fatal. Among strategies to mitigate disease from WNV is vaccination with an equine labeled product. Although we do not know the true efficacy of these products and the amount of immunity that they will bring, the vaccines are generally tolerated after administration in camelids.

About the authors

Dylan Thomas, DVM, is an intern for the Livestock Medicine and Surgery Service at Colorado State University. He attended Texas A&M University where he received an undergraduate degree in animal science and then Ross University School of Veterinary Medicine where he received his Doctor of Veterinary Medicine (DVM). He is originally from North Texas and has a passion for beef cattle, although he also enjoys practicing medicine on small animals, equine, small ruminants, and camelids.



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