Surveillance of EHD suspect mortalities and a test for vaccine efficacy

Progress Report and Results from 2016

to the Elk Research Council

by

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Objective

Epizootic hemorrhagic disease (EHD) was first diagnosed in both farmed and free-ranging elk herds in 2009. Newport Labs has offered an autogenous vaccine prepared for white-tailed deer and offers custom autogenous vaccines for other cervids including elk. The purpose of the study was to test the efficacy of the vaccine in farmed elk.

Methods and Results

Our intent was to collect virus from suspect EHD cases in elk in 2016 to prepare a vaccine for trials in 2017 in farmed elk. Five elk who were suspected to have died from EHD were submitted to CHeRI for diagnostic analysis. None of the 5 elk had EHD virus present in any tissue submitted. Serum was received for a single elk, which was positive for EHDV, indicating prior exposure to the virus but no active infection was detected at the time of death. Because no animal was viremic, we were not able to collect virus for preparation of vaccine. See below for detailed reports on the 5 elk.

Conclusions

Concurrent studies in farmed white-tailed deer in Florida by CHeRI strongly indicated that the Newport vaccine was not efficacious. Because of our findings in white-tailed deer, CHeRI does not support the use of the Newport Labs vaccine to protect animals against EHD. We have found that the vaccine is not protective against the viruses that cause EHD. As a result, we would like to terminate this study.

We did learn a great deal from the 5 HD suspect elk which were submitted to us. The most important finding was that none of the elk died from HD-causing viruses, or were infected with HD-causing viruses at the time of death. In all cases, death was due to bacterial infections (see 2016 results summary below). Detailed pathology reports have been sent to the addresses from where the samples were shipped.

2016 Results Summary- Five elk in three states. Serum was submitted only for Elk 2.

Elk 1 (August 2016): This animal tested negative for viral RNA EHDV and BTV infection in duplicate tests on homogenates of the spleen, kidney, liver, and lung. The spleen and kidney were grossly abnormal, indicating systemic lower gastrointestinal or blood-borne infection. The spleen tested positive for pathogenic E. coli as well as gram negative non-enteric bacteria (meaning the source of the bacteria was not from the animal itself). Systemic bacteremia was determined as the cause of death.

Elk 2 (August 2016): This animal tested positive for antibodies to EHDV. The animal tested negative for viral RNA EHDV and BTV infection in duplicate tests on homogenates of the spleen, heart and whole blood. This animal had vegetative endocarditis and cholestasis indicating reduced blood flow and heart function and bile flow, respectively. Trueperella pyogenes was isolated from multiple tissues of this animal. Grossly, the lungs were heavily infected and purulent pneumonia was observed in this animal and was ultimately determined to be the cause of death.

Elk 3 (August 2016): This animal tested negative for viral RNA EHDV and BTV infection in duplicate tests on homogenates of the spleen. The tissues were grossly abnormal and signs of rot due to heat were evident. Multiple bacteria were isolated from all tissues, including those indicating contamination. A single etiological agent could not be determine for this animal, but multi-system failure due to bacterial infection was likely the cause of death.

Elk 4 (September 2016): This animal tested negative for viral RNA EHDV and BTV infection in duplicate tests on homogenates of the spleen, kidney, liver, heart and lung. The liver was extremely foul smelling indicating a high likelihood of a severe, long-established bacterial infection. Klebsiella pneumoniae and 4 other bacterial species were isolated from the lungs and kidneys of this animal. The bacteria in this animal are associated with a weakened immune system, and stress due to aggression or other factors, may have allowed this bacteria to take hold. Bronchopneumonia was the cause of death in this animal.

Elk 5 (September 2016): This animal tested negative for viral RNA EHDV and BTV infection in duplicate tests on homogenates of the spleen and lung. The kidney, spleen and heart showed signs of bacterial infection (clear images available). Heavy growth of Pseudomonas aeruginosa and two other bacteria, leading to kidney failure and ultimately multisystem failure was the cause of death.