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BREAKING THE CYCLE OF LEISHMANIASIS INFECTION

By Anna Sochocky

An outbreak of the Leishmaniasis parasite in a foxhound kennel threatens to decimate any pack. New research from the University of Iowa offers hope to foxhunts and their hounds across the country.



Thomas Langdon Photo

Dr. Christine Petersen and her dog Chloe.

In collaboration with the University of Iowa, the Masters of Foxhounds Association Foundation funded a decade-long study about the effects of Leishmaniasis and its transmissibility in foxhounds. During the foundation's November 2012 meeting, board members voted to fully support the entire research project by allocating monies to the Morris Animal Foundation to fund the work of Christine Petersen, DVM, Ph.D. and director of the Center for Emerging Infectious Diseases and her team at the University of Iowa.

Visceral Leishmaniasis, a chronic, wasting disease, is a blood-borne parasite that infects dogs by entering white blood cells. The virus multiplies in the spleen

and the liver and may lead to kidney failure. Symptoms of infection include weight loss, lethargy, decreased appetite, watery or goopy eyes, crusty areas of the skin, a bloody nose or stool, and swollen glands. The infection can go undetected for months or years.

A New York foxhound kennel first reported multiple cases in 1999, soon followed by 33 states and two Canadian provinces documenting Leishmaniasis cases in their packs.

Kansas veterinarian Jane Jeffries, MFH, Mission Valley Hunt Club, recounts the beginning of suspicious symptoms surfacing in her hunt's kennel. "Two of the hounds had giant lymph nodes, lost their sense of smell and started to hunt poorly and were losing weight. My first thought was I've got two animals dying of lymphoma. I called some universities and started describing what I was seeing, and the name Leishmaniasis was mentioned.

"In the beginning, hounds in twos and threes were getting sick. We divided our kennel in half. The original hounds that we knew were sick were kept apart from new hounds we got from out west," remembers Jefferies, "but in the end, we lost our entire original kennel to Leishmaniasis. The hounds we drafted from out West and kept separate never got ill. We have those bloodlines to this day. The hounds we housed separately, that came to us healthy, remained disease-free."

No curative therapy exists for the Leishmaniasis parasite infection and cost-prohibitive treatment options are discouraged. Euthanizing infected animals doesn't assure the disease won't spread either.

After the state of New York recorded positive cases, the Center for Disease Control directed hunts to



David Traxler Photo

coordinate testing. Testing methods evolved but included serologic, PCR, culture or histopathology methods.

Preventing the introduction of Leishmaniasis into a kennel and reducing the spread of the infection required daunting biosecurity measures. Maintaining adequate nutrition, keeping to vaccination schedules and sanitizing and cleaning kennels corresponded with kennel protocols until routine diagnostic testing proved necessary.

Physically isolating seronegative hounds from hounds classified to be low-tier or high-tier infection and repeated blood and tissue specimen tests strained foxhound owners. They didn't provide any answers about how the transmission spread in kennels, either.

Petersen says that her first scientific study of the Leishmania parasite in foxhounds began when an outbreak of the protozoan parasite was detected in a kennel of dogs from Millbrook, New York.

"I worked with a couple different Masters and Huntsmen and then got a donation of a pregnant bitch from a hunt in Missouri," recounts Petersen, "and concluded that the primary avenue of transmission occurred from mother to offspring."

Petersen and her team continued their work in 2016, working with the Morris Animal Foundation and the Masters of Foxhounds Association Foundation

to assess the efficacy of the Brazilian vaccine, LeishTec©, used to prevent visceral Leishmaniasis infection and illness in dogs.

"We got a couple of years of funding to see if a vaccine that was licensed in Brazil could be used to help prevent the illness in the dogs. I worked with kennels, Huntsmen and Masters from across the country," Petersen said.

Commercially available in Brazil, the LeishTec© vaccine is frequently prescribed by veterinarians. The country's researchers concluded that the first licensed vaccine against Leishmaniasis interrupted disease transmission.

The University of Iowa conducted the first domestic clinical trial of the Brazilian vaccine as part of the Masters of Foxhounds Association Foundation-funded Leishmaniasis study.

Researchers evaluated the efficacy of the LeishTec© vaccine to prevent leishmania infection and disease spread in foxhounds. The research also marked the first vaccine evaluation for disease prevention after natural leishmania parasite exposure in animals.

Assessing the safety and effects of the vaccine on four hundred hounds in eight states – Colorado, Georgia, Alabama, Illinois, Maryland, Missouri and Virginia – University of Iowa researchers concluded that the vaccine proved effective in preventing infection



parasite-free hounds. Already infected hounds benefited from the vaccine, too, by not only minimizing symptoms of Leishmaniasis but bolstering the immune system to kill the parasite.

“We found that indeed the vaccine would prevent the death of dogs, kept them healthy and decreased the overall amount of disease in animals,” Petersen confirms.

While the results of clinical testing of the LeishTec© vaccine were a success, the likelihood of getting the domestic drugmaker to manufacture it faces significant challenges, according to Jeffries.

“If I was Pfizer, I’m not going to make a thousand doses of a vaccine for Leishmaniasis when I could make millions of doses of distemper vaccine and make money.”

The safety of the Leishmaniasis vaccine also holds promise for treating people infected with the parasite. Approximately forty thousand people living in tropical and subtropical climates die from Leishmaniasis annually. The disease, commonly transmitted from sand flies, leads to kidney failure in 25% of its victims.

“The National Institutes of Health and specifically the National Institutes of Allergy and Infectious Disease study Leishmaniasis globally and I’ve been involved in teams working in Brazil and India and Ethiopia. A company has to be willing to take it to market,” cautions Petersen.

Petersen and researchers thought that examining the role that opportunistic diseases like tick-borne infections presented another avenue for the control of Leishmaniasis.

Because the virus infects a white blood cell called a T-helper cell, the ability of an animal’s immune system to work is compromised by other opportunistic diseases like tick-borne infections.



Photo courtesy of the University of Iowa

The proximity of foxhounds and the prevalence of ticks in their environment contribute to the parasite’s transmission led researchers to the most recent study by University of Iowa researchers.

The study sought to identify clinical and immunologic changes in hounds with asymptomatic Leishmaniasis and tick-borne infections. Researchers also tested the effectiveness of tick prevention drugs to retard the progression of Leishmaniasis infection.



Sherri Holdridge Photo

In the study, 50 hounds, from three midwestern kennels, with asymptomatic Leishmania infection tested negative for the most common tick-borne conditions. Half of the hounds in the study pool received a newly developed but highly effective monthly tick prevention drug, sarolaner (brand name Simparica), while the remaining hounds received a placebo.

Despite the hurdles and restrictions that the COVID pandemic presented, team researchers administered 48 site visits and collected necessary blood samples. Researchers visited kennels every three months. The hounds were monitored for two years spanning two tick seasons in 2019 and 2020.

Study researchers compared the progression and severity of Leishmaniasis in hounds that contracted a co-infection of tick-borne bacteria. Hounds contracting a tick-borne infection demonstrated a more advanced progression and severity of the Leishmaniasis disease.

Hounds with a co-infection recorded more parasites in their blood, indicating a weakened immune response to parasite replication, too. The immune system also failed to produce anti-bodies necessary to counteract the reproduction of the Leishmania parasite.

Administration of the tick prevention drug contributed to a lower Leishmaniasis clinical score in treated hounds. Conversely, hounds in the placebo group not only revealed a higher number of parasites in the blood, but three of four animals succumbed to the Leishmaniasis infection.

“We could slow the spread of Leishmaniasis because, like it or not, we’re probably never going to get great drugs for Leishmaniasis. There’s not a lot of market pressure to make good drugs against it. What we have found so far is that tick prevention does seem to make a difference in the onward spread of the disease,” according to Petersen.

Petersen welcomes the open discussion and willingness of the hunt community to address Leishmaniasis in foxhounds and employ scientifically proven methods like tick prevention to stem the transmission of the virus.

“Hounds are like Q-tips running through the woods and much more likely to pick things up from their environment. There are ways to work with companies to get bulk pricing like one that’s offered to animal shelters for things like vaccines and treatments.”

Adopting a zero-tolerance policy in long-established bloodlines presents complicated obstacles and requires extensive discussion. According to Petersen, eliminating a disease from a particular population eventually surpasses available tools.

“Any time you want to try to eliminate a disease out of a population at a certain point, it’s not about tools. It’s about the political will to take a zero-tolerance policy. I do see people holding on to bloodlines that have parasites. I think it’s because there hasn’t been



Shannon T. Burke Photo

a decision that we are going to breed this out of our dogs.”

Outbreaks of Leishmaniasis once threatened to decimate hunt clubs across the country, but as spring arrives, the sounds of horses galloping and healthy hounds baying in the fields usher in days of better health. 🐕



David Traxler Photo