



## Study cites Powassan link to long-term Lyme symptoms

By Cynthia McCormick

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### Virus newly found in Cape ticks may complicate persistent cases of Lyme disease

Scientists at a Wisconsin laboratory say they suspect persistent cases of Lyme disease may be complicated by the potentially deadly Powassan virus that's been making headlines in recent years, including on Cape Cod.

Developing a better understanding of the frequency of the Powassan virus in humans could help doctors and scientists better treat patients with so-called post-treatment Lyme disease, said Dr. Konstance Knox, a virologist and microbiologist who helped found Coppe Laboratories in Waukesha, Wisconsin.

An unpublished study in 2010 showed the Powassan virus was detected in more than 15 percent of Lyme disease patients, she said.

More recently, in May, Knox produced a study of 106 patients with suspected acute tick-borne disease that showed 10.4 percent were positive for the Powassan virus.

"It is a virus that interferes with the normal immune functioning," Knox said. "It may make Lyme disease infections worse or the symptoms last longer."

Last month, Barnstable County officials released results from a study that showed the Powassan virus was found in deer ticks at four out of six sites surveyed on the Cape this spring.

More than 10 percent of the deer ticks at one site were found to carry the virus, according to Stephen Rich of the Laboratory of Medical Zoology at the University of Massachusetts, who worked with the county on the survey.

Within the past few years, the Powassan viral infection has sickened at least one resident of Barnstable County and taken the lives of at least two unidentified Massachusetts men.

Many patients treated for Lyme disease, a bacterial infection carried by the black-legged deer tick prevalent in the Upper Midwest, New York and New England — especially coastal areas such as Cape Cod — report lingering symptoms such as brain fog, joint pain and fatigue.

Doctors in Minnesota say as many as 30 percent of their Lyme patients do not make a full recovery, Knox said.

“That suggests there is something else going on,” she said.

Powassan was first documented in 1958 in Powassan, Ontario, but it made headlines in recent years after several reported deaths in New Jersey and New York.

Although carried by the same deer tick that transmits Lyme, Powassan is a virus.

And although the borrelia bacteria that causes Lyme takes about 24 to 48 hours to infect a person’s blood, the time it takes to transmit the Powassan virus from tick saliva to cells associated with human skin is only 15 minutes, Knox said.

“That confers a special risk,” she said.

Approximately 60 cases of Powassan have been reported in the U.S. in the past 10 years, according to the U.S. Centers for Disease Control and Prevention, but Knox said the real numbers are probably a lot higher.

“I think it’s really unknown how many individuals have been exposed or affected by the Powassan virus,” she said. “There’s no data. We’re just starting to know and understand how prevalent it is in ticks.”

In the U.S., only severe cases are reported, Knox said. About 10 percent of those with severe illness die, she said.

Powassan symptoms may be hard to distinguish from symptoms of Lyme and other tick-borne illnesses, with patients experiencing headaches, fatigue, nausea and weakness.

There is no treatment except for supportive care, but in Europe children get inoculated against a “cousin” illness known as tick-borne encephalitis virus, Knox said.

Although there was a severe case of Powassan on Martha’s Vineyard in 1994, the risk of human exposure in Massachusetts appears minimal, according to Sam R. Telford III, professor of infectious diseases at Cummings School of Veterinary Medicine at Tufts University.

Physicians are more aware of the possibility of encephalitis viruses with the rise of West Nile virus, which is related to Powassan, Telford wrote in an email.

Knox's finding that 10.4 percent of patients with suspected acute tick-borne disease tested positive for Powassan could be attributed to the type of test used, according to Telford.

Called an immunofluorescence assay, it will pick up antibodies to other flaviviruses including West Nile and dengue fever contracted during a tropical vacation, wrote Telford, who discovered the type of Powassan found in the Northeast, also known as the deer tick virus.

If the researchers used the standard assay, it also could have picked up antibodies to yellow fever vaccination, according to Telford.

"I would not be surprised if some of the atypical Lyme cases, those with neurologic involvement, might be complicated by deer tick virus," he wrote. "But I doubt that it is going to be a large proportion and certainly not in the 10 percent range."

But Knox says her Powassan antibody test was developed by her laboratory for the North American strain of tick-borne encephalitis virus and was designed specifically to exclude the other flaviviruses in the analysis.

It's important to get a handle on the prevalence of Powassan in the population, since the virus has evolved to persist and go to the brain, she said.

"Many of the 106 (patients in the study) were children," said Knox.

Her lab worked with Marshfield Clinic in Wisconsin, the New York Health Department and Children's Hospital of Wisconsin to develop the antibody test for long-term exposure, Knox said.

"We don't know the real numbers," said Marsha Jahn of Coppe Laboratories, which announced this spring that it is the first commercial lab to test for Powassan virus. Doctors' offices and other parties who submit samples get results in 14 days, Jahn said.

Knox said she is embarking on a study to test 300 samples from patients with post-infection fatigue, obtained from the National Institutes of Health, for Powassan, Lyme, West Nile, dengue and chikungunya.

The study is an attempt to find out why active, healthy people from across the U.S. suddenly got sick and never recovered, she said.

“Can we just try and figure out what is happening to people?” she said.

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