89. Evidence of High Rate of Powassan Virus Co-infection in Lyme Disease Patients

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Session: 32. Vectors and Viruses
Thursday, October 27, 2016: 8:30 AM

**Background.** Powassan virus (POWV) is reported to cause a rare, life-threatening tick-borne encephalitis in North America. The virus is transmitted by *Ixodes scapularis*, the same tick vector that transmits Lyme disease, anaplasmosis, and babesiosis. Given the relatively high incidence of these other tick-borne disease (TBD) infections in some regions of the United States, it is suspected that infections with POWV may be underreported and cause less severe or even asymptomatic infections. We evaluated evidence for POWV exposure and infection in patients residing in a TBD endemic focus to explore this hypothesis.

**Methods.** A total of 106 serum/plasma samples collected from patients presenting with suspected TBD in Wisconsin were included. Samples were assayed for Lyme disease (*Borrelia burgdorferi*) using CDC recommended two-tier serologic testing (TTS) and for flavivirus exposure using a flavivirus mosaic IFA and a tick-borne encephalitis virus complex (TBEV-C) ELISA. POWV exposure was confirmed for all TBEV-C positive samples using a proprietary POWV-specific IFA test (Coppe Laboratories).

**Results.** Flavivirus screening identified 22 samples that warranted confirmatory testing with the POWV IFA assay. In total, 11 of these samples had positive titers, representing a sero-prevalence of 10.4%. Eight samples were IgM positive, 2 samples were IgG positive, and 1 was IgM and IgG positive by IFA. POWV infection was confirmed for 2 IgG positive samples by plaque reduction neutralization testing. Of the 11 seropositive samples, 9 (81.8%) were from patients that also had positive TTS tests for Lyme disease. These samples made up 16.4% of the 55 total patients with positive Lyme TTS in our survey. A tenth POWV positive patient had a negative TTS, but reported a tick bite and a possible erythema migrans rash two weeks prior to being tested. Chart reviews of the patients whose data were available listed symptomology consistent with TBDs; e.g. fever, fatigue, headaches.

**Conclusion.** We found a previously undocumented high rate of co-infection with POWV in Lyme disease patients, suggesting that POWV infection may be more common than currently appreciated and that serologic testing is required for proper diagnosis. The high rate of co-infection with Lyme disease may have relevance for patient symptoms and outcomes and warrants further investigation.


Open Forum Infectious Diseases 2016;1(S1):S1–68
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DOI: 10.1093/ofid/ofw194