Powassan Virus Infection: Diagnostics and Probable Coinfections

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Background: Powassan virus is a tick-borne flavivirus with severe health consequences, including an estimated 10% mortality rate and severe long-term neurological sequelae for most survivors. Historically, Powassan virus is rare, with an average of just 1 documented case annually from 1958 to 2005 in the United States and Canada, but it has reached historical highs as of late and has increased to more than 40 cases per year since 2022. There is no vaccine or direct antiviral treatment for Powassan virus. The purpose of this study was to collect data from patients in the Marshfield Clinic region of Sanford Health with Powassan virus infection to help develop an updated clinical profile and examine how Powassan virus may co-occur alongside other tick-borne illnesses.

Methods: This was a case series study using medical records data from all adult patients who presented with confirmed Powassan virus infection in the Marshfield Clinic between 2016 and 2026. Data was abstracted between the time of symptom onset and the end of residual symptoms, including confirmatory laboratory testing, medical sequelae, and coinfection with other tick-borne diseases. Data was then compared and analyzed to determine if patients had confirmed or suspected Powassan virus infection and/or coinfection with other tick-borne diseases.

Results: Nine adult patients were identified as having confirmed Powassan virus infection, per a positive Powassan immunoglobulin M test. The mean age at presentation was 64 years, 88% were male, and all patients presented between 2020 and 2026. Eight patients were hospitalized (mean stay of 10 days) and 2 were admitted to an intensive care unit. Most patients had cerebrospinal fluid with lymphocytic pleocytosis and high protein but normal glucose. There were no fatalities attributable to Powassan virus, but 7 patients had persistent neurological symptoms for at least 3 months (and some >2 years). Three patients had cerebellitis and meningitis per brain imaging. In terms of potential coinfections, 4 patients also had positive antibody tests for Jamestown Canyon virus, and 2 other patients had positive antibody tests for Lyme disease. These antibody tests measure prior exposures to pathogens and cannot distinguish between past and active infection directly.

Conclusions: While still rare overall, Powassan virus infection is seen with increasing regularity and often results in hospitalization and persistent neurological symptoms. It can occur alongside other tick-borne illnesses as well, which underscores the importance of clinical recognition in endemic areas like Wisconsin, as well as the need for better public health and prevention initiatives in the future.