Diagnostic Slide Session 2017
Case 2017-4

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Disclosures

- No conflicts of interest to report.
Clinical history

- 61 year-old man with multiple recent tick bites presented with 3 day history of headache, gait instability, lethargy and confusion
- Symptoms worsened rapidly requiring endotracheal intubation and failing to open his eyes to stimulation or follow commands despite minimal sedation
- LP showed lymphocytic pleocytosis
  - 430 leukocytes (96% lymphocytes and 4% monocytes) and 5 red blood cells per cubic millimeter, protein of 133 mg per deciliter, and glucose of 43 mg per deciliter
- Past HX: Crohn’s disease (Rx: adalimumab)
Audience discussion
Timeline of diagnostic tests

- Wide range of testing performed initially
- Day 8: patient enrolled in research protocol for deep sequencing of CSF sample
- Day 11: Brain biopsy performed
- Day 12: Powassan virus sequences detected in CSF sample. With permission of IRB, information reported to clinical team
- CDC received tissue block, IHC equivocal
- Day 40: Serology testing positive at CDC
Research study

- Metagenomic sequencing was performed for rapid and unbiased pathogen detection
- Among 2.4 million total sequencing reads, ten reads belonged to Powassan virus
- Partial Powassan virus genome was assembled from CSF representing 19% of the genome
- Powassan virus not detected in patient’s plasma (7.3 million reads) or whole blood (9.3 million reads)
- Metagenomic sequencing from brain biopsy performed later also detected Powassan virus, and assembled another partial genome (22%)
- These partial genomes were highly similar, and both belonged to Powassan lineage II
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Final diagnosis

Powassan virus encephalitis

• Revealed by metagenomic CSF testing
• Confirmed by serology testing at CDC
• All other studies negative
Protect yourself from infected ticks carrying life-threatening Powassan virus

Experts warn of deadly tick-borne Powassan virus

Powassan Virus Is the Scary New Reason to Avoid Ticks

Rare, tick-borne Powassan virus worries some experts about possible spread

For more, visit TIME Health.
Powassan virus

- Emerging flavivirus transmitted by *Ixodes* ticks
- Presenting symptoms include fever, headache, nausea, confusion, weakness
- CSF: usually normal glucose, elevated protein, and pleocytosis of 100 to 400 leukocytes per cubic millimeter
- Brain MRI: T2-weighted/FLAIR hyperintensities within the basal ganglia and thalamus
- Unlike other *Ixodes*-borne pathogens, Powassan virus can be transmitted within just 15 minutes of tick attachment
Conclusion

- We describe a patient with severe encephalitis secondary to Powassan virus, identified by rapid metagenomic sequencing four weeks earlier than by standard serologic testing.
- Rapid, unbiased, sensitive diagnostic testing.
- Powassan encephalitis virus confers high morbidity & mortality even in immunocompetent patients; supportive care only.

- This patient:
  - Minimal neurological recovery, with a tracheostomy and percutaneous endoscopic gastrostomy tube.
  - Discharged to SNF on hospital day 30.
  - Four months after discharge, he was able to nod his head to questions but remained quadriplegic.
References


