West Nile Virus Presentation with Superimposed Stroke

Carey Hung, DO[1] hungc2@upmc.edu, Angela Montalvo, DO[2].
1. Department of Anesthesiology, University of Pittsburgh Medical Center- Lititz, Lititz, PA
2. Department of Internal Medicine, University of Pittsburgh Medical Center- Lititz, Lititz, PA

Introduction

- West Nile virus (WNV) is the leading cause of mosquito-borne disease in the United States.
- People typically become infected from June through October. Around 2,000 people in the US are formally diagnosed with the virus each year.
- WNV is commonly spread by the bite of an infected mosquito. Mosquitoes become infected after feeding on infected birds, they then spread the virus when biting other animals. After about a week, infected mosquitoes can pass the virus to more birds when they bite. The virus can spread to humans, horses, and other mammals, despite these being recognized as "dead end" hosts; these hosts do not develop high levels of virus and cannot pass the virus to others.

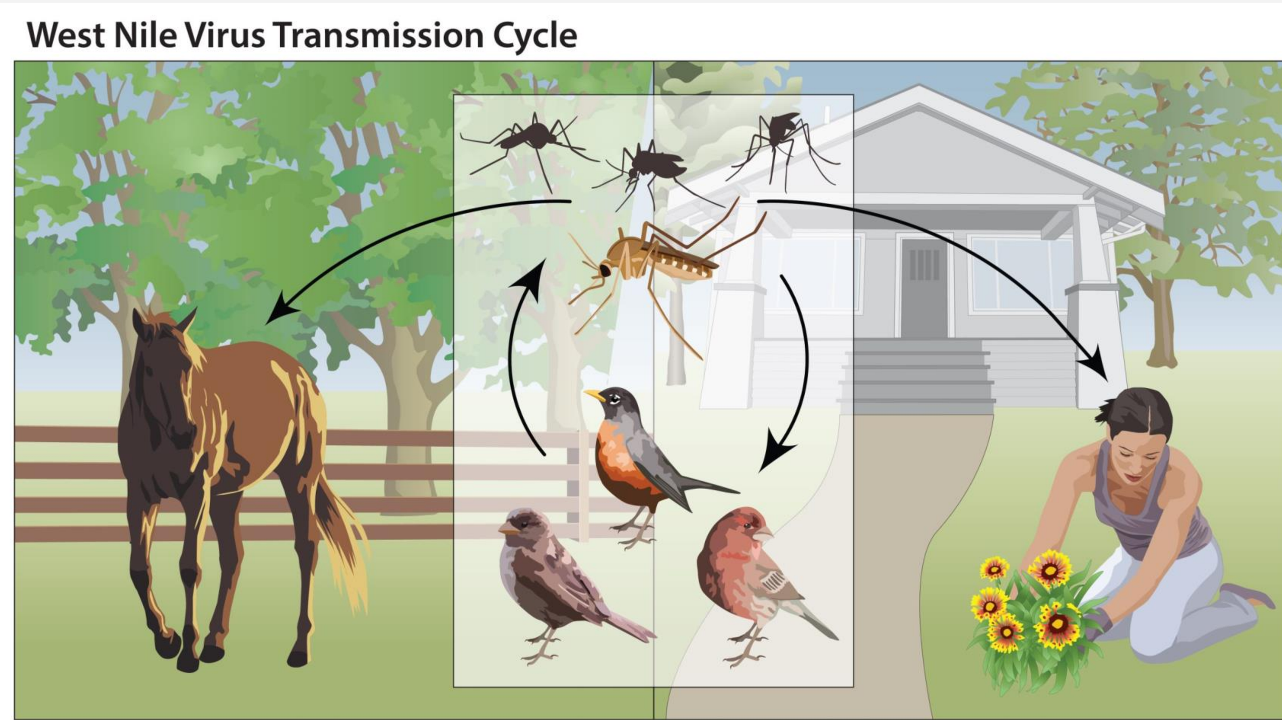

Figure 1. WNV cycles between mosquitoes, especially Culex species, and birds. Mosquitoes become infected after feeding on infected birds and they can spread WNV to people and other animals by biting them

- Incubation period from mosquito bite to onset of symptoms is typically 2-6 days but it may range from 2-14 days.
- While an estimated 80% of human WNV infections are asymptomatic or subclinical, those who develop symptoms may experience fever, fatigue, myalgia, arthralgia, headache, transient maculopapular rash, or gastrointestinal symptoms.
- Less than 1% of infected patients develop neurological disease, which typically manifests as encephalitis, meningitis, or acute flaccid myelitis.
- There are currently no medications available to treat the virus, only supportive care.

Case Description

History of Present Illness:

- 53-year-old male with past medical history of hypertension, chronic alcohol use presented to the emergency department with complaints of weakness, ataxia, tremulousness, intermittent fevers and chills, and vomiting for the past few days.
- He had spent the past week at the beach with his significant other. Towards the end of the trip, he developed a fine maculopapular non-itchy rash on his torso which coincided with his fever.
- In the ED, he was noted to be febrile (Tmax 103°F), tachycardic, and hypertensive 209/129. His lab work was significant for hypomagnesemia at 0.9 mg/dL, lactic acidosis at 2.5, mild transaminitis (AST 68, ALT 67) with total bilirubin 1.9.
- Physical exam findings included dry mucous membranes, tremors, maintained muscle strength, and cranial nerves II-XII grossly intact.

Figure 2. Fever curve during hospitalization. Temperatures are measured in Celsius.

Hospital Course:

- He received intravenous magnesium replacement, fluid replacement and thiamine and lorazepam for possible alcohol withdrawal. On further evaluation, he was ataxic with dysmetria of the left upper and lower extremities.
- CT angiogram and CT of the brain were obtained without evidence of acute pathology. MRI head was then obtained, which demonstrated an acute right internal capsule infarct with an old right lacunar infarct.
- Neurology was consulted, and he started on dual antiplatelet therapy (aspirin and clopidogrel).
- To investigate the etiology of his febrile illness, a tickborne panel, stool culture, giardia and vibrio panels, West Nile Virus PCR, and blood cultures were collected. He was empirically started on Doxycycline for possible tickborne illness. Infectious Disease was consulted for persistent fevers, and malaria testing and empiric Vancomycin and Cefepime were added to his treatment.
- By day 5 of hospitalization, his fever resolved, and he continued to show improved coordination during this time. He was discharged to a stroke rehabilitation facility on day 8 of hospitalization with pending workup including his West Nile Virus PCR, which later resulted as positive.

Discussion

- This case highlights the importance of continued evaluation and workup of potential differential diagnoses. It appeared there were two separate processes occurring, which added to the complexity of this patient's presentation.
- The patient's ataxia was attributable to an acute ischemic stroke, which was revealed to be in the posterior limb of the right internal capsule on brain MRI. His brain MRI also revealed a chronic lacunar infarct of the right thalamus, which may have been a product of his uncontrolled hypertension.

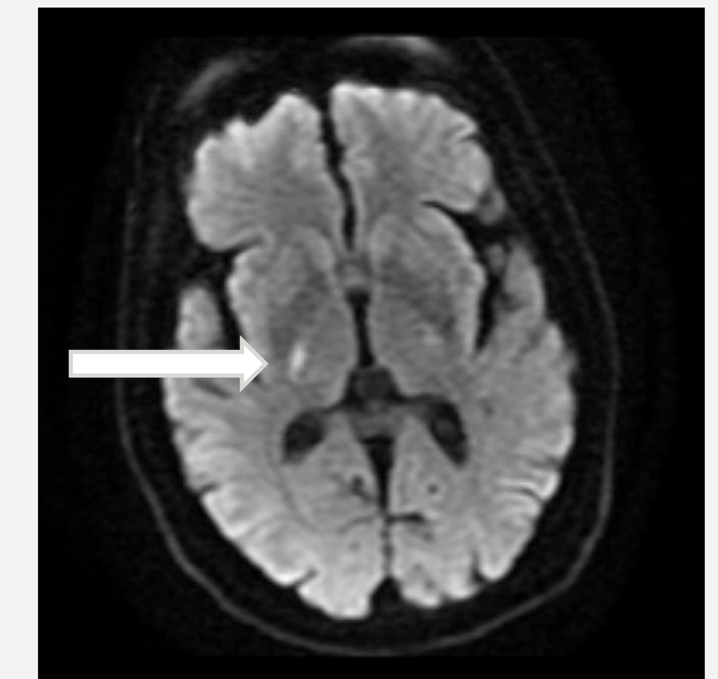

Figure 3. Acute ischemic stroke of the right internal capsule, posterior limb on brain MRI

- While fever may be caused by stroke, this patient's systemic and constitutional symptoms were more likely caused by a febrile viral illness due to these symptoms presenting before the development of weakness and ataxia.
- Although West Nile virus is less prevalent than other communicable diseases in Pennsylvania and lacks formal treatment, maintaining clinical suspicion is important when patients present with compatible symptoms, especially during summertime, as infection may result in significant complications.

References

- CDC. Clinical Signs and Symptoms of West Nile Virus Disease. West Nile Virus. Published May 17, 2024. https://www.cdc.gov/west-nile-virus/hcp/clinical-signs/index.html
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