A Rare Case of Neuroinvasive Mosquito-Borne Viral Illness: Eastern Equine Encephalitis

Introduction:
Eastern equine encephalitis (EEE) is a rare and potentially fatal neuroinvasive disease with a mortality rate as high as 33%. It is an uncommon vector-borne illness, with an average of seven cases reported in the United States annually. Alarmingly, in 2019 alone the Center of Disease Control (CDC) has confirmed 36 cases of EEE in the United States. We present one of only five cases of EEE reported in New Jersey in the past decade.

Case Presentation:
A 42-year-old male public works employee who worked primarily in wooded areas in Southern New Jersey, presented to the emergency department the evening of August 28, 2019 with an intractable headache described as the “worst headache of his life”. The headache began the morning of presentation and was associated with paresthesias, nausea, and generalized malaise. As he reported multiple tick bites in the weeks preceding his presentation, Doxycycline was started for presumed tick borne illness on admission. Despite reporting improvement in symptoms the morning of his first hospital day, the patient’s headaches returned and worsened into the afternoon. He became febrile with a maximal temperature of 102°F. A rapid response was called at 3:30am on day two of admission after the patient was found actively seizing. The seizures resolved with intravenous Lorazepam however, his level of consciousness was significantly depressed. He was also noted to have marked weakness and decreased sensation in his right upper and lower extremities. Intravenous Vancomycin, Ceftriaxone, and dexamethasone were initiated immediately given our high index of suspicion for encephalitis. Lumbar puncture was performed with an increased opening pressure noted; CSF analysis revealed an elevated protein level and normal glucose. MRI demonstrated an area of edema involving the medial aspect of the left temporal lobe with diffuse abnormal T2 signal within the basal ganglia extending into the midbrain concerning for encephalitis. Over the course of 24 hours, the patient remained febrile with temperatures ranging from 102-105°F despite antipyretics and a cooling blanket. The patient’s mentation worsened with a GCS of 7 as did his respiratory status. He began to demonstrate paradoxical breathing with a respiratory rate of fifty and was subsequently intubated. Targeted temperature management to achieve normothermia was initiated. A prophylactic external ventricular drain (EVD) was inserted given the increased opening pressure, cerebral edema on MRI, and deterioration of his mental status. CSF cultures were sent to the CDC which later confirmed the diagnosis of EEE.

After stabilization, our patient exhibited significant neurologic deficits including moderate aphasia, dysphagia and global weakness. He underwent aggressive therapy for sixty days with improvement in his deficits. His aphasia and dysphagia resolved and he is able to ambulate with assistance.

Discussion:
Currently, therapy for EEE remains limited to supportive care. Our case is unique in that early aggressive treatment with TTM and EVD placement were initiated and appeared to result
in favorable outcomes. The role of TTM and EVD placement as neuroprotective interventions in EEE should be further explored.