EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE

BROWARD HEALTH
Care Warriors

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Case of Viral Encephalitis

Pt is a 63-year-old male with PMH of hyperlipidemia, allergic rhinitis, generalized anxiety, and panic disorder who presented to the ED with altered mental status and fever worsening over the past 3 days. He was subsequently found face down by his partner at his home with trauma to his forehead and was taken into the ED by EMS. Pt has no history of drug or alcohol abuse. Patient does regularly see a chiropractor. Medications include Citalopram, Simvastatin, and OTC Flonase. On arrival to the ED patient was severely agitated, confused, extremely combative with staff and became hypertensive, tachycardic, and hypoxic. What is the first step to take in management of this patient?

A. Physically restrain patient and administer Benadryl 50 mg, Haloperidol 5 mg, and Lorazepam 2 mg IM

B. Intubate and sedate the patient in order to protect airway and start workup

C. Wait until patient calms on his own and proceed with workup.

D. Consult neurology right away to perform EEG to look for evidence of seizure

(https://healthjade.net/xanthochromia/)

CSF profile of viral encephalitis:

CSF will be clear color, cell count less than 1000 mm^3 (normal <5 mm^3), predominantly lymphocytes, normal glucose (>0.66 x serum), normal protein (<45 mg/dL).[1]

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

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The correct answer is B. The patient in this vignette was intubated and sedated in the ED in order to protect his airway and to perform proper workup without harm to self or others. After further workup, the patient in this vignette was diagnosed with West Nile Encephalitis.

Discussion:

The definition of encephalitis is inflammation of brain parenchyma. There is a broad differential diagnosis for the cause of encephalitis. These can be placed into three categories; infectious, post infectious, and noninfectious. Viral and autoimmune are the most commonly identified causes of encephalitis in the Emergency Department.[1] Viral encephalitis may be caused by direct invasion in the case of West Nile, or reactivation of the virus in neuronal tissue (HSV and VZV).[1] Post infectious cause, known as Acute Disseminated Encephalomyelitis is likely autoimmune and may develop after viral illness or vaccination.[1] It is more commonly seen in children and young adults. Noninfectious causes include hypertensive encephalopathy, toxins, paraneoplastic syndromes. Patients who present with encephalitis may have altered mental status, headache, and fever. Non-neurologic symptoms related to the cause, clinical presentation, and patient demographics may lead you to specific etiology.[1]

Herpes simplex virus (HSV)	Usually young and elderly; no seasonal predilection	Seizures, olfactory/gustatory hallucinations, aphasia, personality changes, hemiparesis (face/arm>leg), upper visual field cut	Rash
Varicella-zoster virus (VZV)	Most common in immunocompromised	Cranial nerve palsies, cerebellitis	Shingles
Cytomegalovirus (CMV)	Immunocompromised	Behavior changes, coma	Pneumonitis, retinitis, myelitis
Enterovirus	Usually young	Rhombencephalitis (myoclonus, tremors, ataxia, cranial nerve palsies), polio-like acute flaccid paralysis, neurogenic shock	Hand-Foot-Mouth disease, rash, myocarditis, pericarditis, conjunctivitis, pulmonary edema
Arboviruses	Summer months		
Flaviviridae West Nile Virus (80% infecions asymptomatic)	US, Africa, Europe, Middle East, Asia	Tremors, parkinsonism, asymmetric flaccid paralysis	Insect bite, myalgias, hepatitis, pancreatitis, myocarditis, rhabdomyolysis, orchitis, rash
St. Louis encephalitis virus	Widespread in US; Adults (> 50 yo_	Vomiting, confusion, disorientation, stupor, coma	Insect bite, malaise, myalgias, syndrome of inappropriate

(https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5082707/)

Management/Diagnosis:

Empirically, all patients with CNS infections should receive rapid administration of broad spectrum antibiotics.[1] Empiric treatment with Acyclovir 10 mg/kg intravenously every eight hours (adjusted for renal function) should be initiated as soon as encephalitis is suspected in order to reduce morbidity and mortality in patients with Herpes Simplex Virus- 1 (HSV1).[2] Lumbar puncture with opening pressure should be performed (unless contraindicated). CSF should be sent for glucose, protein, cell count, culture, and gram stain, as well as HSV PCR. Additional testing for IgM and IgG arbovirus and PCR for enterovirus can be ordered if suspected based on clinical presentation and time of the year.[1] In addition, for those who are immunocompromised or HIV positive, testing should be performed to rule out Cytomegalovirus (CMV), Epstein Bar virus (EBV), Varicella Zoster Virus (VZV), Toxoplasmosis, Listeria, Cryptococcus.[1] If diagnosis remains uncertain MRI may be performed. Various viral etiologies will present with certain characteristic findings on MRI.[3] EEG does not need to be performed routinely in all patients but may be helpful in comatose patients to reveal non-convulsive status epilepticus requiring anti-epileptic medication.[1]

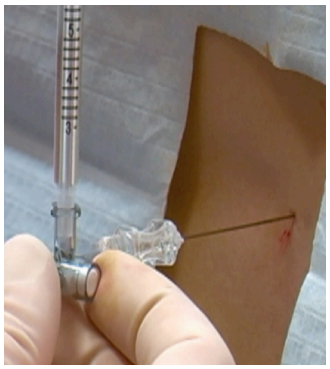

Image of lumbar puncture with manometer attached to the needle hub to measure opening pressure of CSF. In a patient with viral encephalitis opening pressure will be normal (<20 cm H20).
https://www.semanticscholar.org/paper/Spinal-Puncture-and-Cerebrospinal-Fluid-Examination-Euerle/12a787d1d1a797550b56013302ffbd0e7b20205f/figure/2

For a list of educational lectures, grand rounds, workshops, and didactics please visit ***BrowardER.com*** and **click** on the ***"Conference"*** **link**.

All are welcome to attend!

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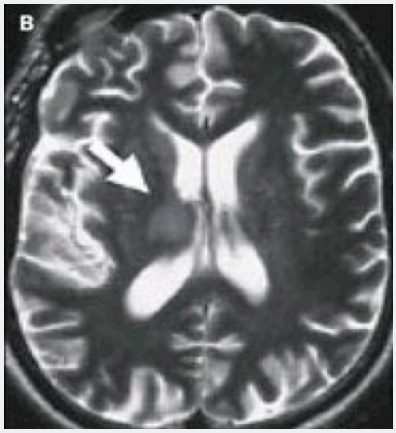

Imaging:

This is a T2 weighted MRI of patient with West Nile Encephalitis. There is high signal intensity in thalamus. Inflammation of the Basal Ganglia (predominantly Substantia Nigra) and Thalamus can result in movement abnormalities such as tremors, cogwheel rigidity, myoclonic jerks, choreoathetosis, orofacial dyskinesia.[2]
(https://www.nejm.org/doi/full/10.1056/NEJMra030476)

Treatment:

Patients with insect borne viruses (for example West Nile and Japanese Encephalitis) and Enterovirus are treated with supportive care only.[1]
Addition of Acyclovir 10 mg/kg every 8 hours (adjust for renal function) for treatment of VZV.[1]
Addition of Ganciclovir 5 mg/kg every 12 hours for treatment of CMV.[1]
Corticosteroids can reduce intra-parenchymal swelling and
Anticonvulsants can be used to stop or prevent seizures.[1]

Take Home Points

- There are many causes of encephalitis. However, viral encephalitis is the most commonly identified cause in the ED.
- Lumbar puncture should be performed if not contraindicated, which will reveal a similar CSF profile to that of viral meningitis.
- Patient physical, clinical and demographic findings may clue one in to the specific etiology of encephalitis. HSV can present with personality changes, psychosis, olfactory or gustatory hallucinations. West Nile Virus commonly involves basal ganglia and thalamus and can result in movement abnormalities.
- Empirically, CNS infections are treated with broad spectrum antibiotics and when encephalitis is suspected IV Acyclovir is added to reduce morbidity and mortality of those with HSV1. Those with West Nile encephalitis are managed with supportive care.

ABOUT THE AUTHOR

This month's case was written by Alexandra Held. Alexandra is a 4th year medical student from FIU Herbert Wertheim College of Medicine. She did her emergency medicine rotation at BHMC in October 2020. Alexandra plans on pursuing a career in Psychiatry after graduation.

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