May 2nd, 12:00 AM

Out of Time: Altered Mental Status And Temporal Seizure On Background of Dementia & UTI

Jennifer Nguyen
Rowan University

Victoria Wong Murray
Rowan University

Judith Anne Lightfoot
Rowan University

Mukarram Razvi
Southern Ocean Medical Center

Kasturi Etukuru
Southern Ocean Medical Center

Out of Time: Altered Mental Status And Temporal Seizure On Background of Dementia & UTI

Jennifer Nguyen[1], Victoria Wong Murray[1], Judith Lightfoot DO, MACOI[1], Mukarram Razvi DO[2], Kasturi Etukuru MD[2]
1. Rowan-Virtua School of Osteopathic Medicine
2. Southern Ocean Medical Center

Introduction

Herpes simplex virus 1 is one of the leading causes of infectious encephalitis [1]. HSV1 has a seropositivity rate of 40% in industrialized nations The prevalence of HSV 2 is 12.1% nationwide [2]. Of those with HSV 1, herpes encephalitis affects 2-4 individuals per 1,000,000 per year worldwide [3]. Seizures occur in approximately 40% of patients with herpes encephalitis [4]. The typical symptoms of HSV-1 encephalitis are altered mental status with other features of brain inflammation, including fever, headache, seizures, and focal neurologic deficits. Cognitive, behavioral, and personality changes can also be present, typically executive and language dysfunction [5].

Patient history

Patient is an 85 year old female who was brought to the Emergency Department from a nursing home with altered mental status and uncontrolled facial movements; and was determined to be in refractory status epilepticus. The patient has no history of prior seizure. Her comorbidities included dementia, history of breast cancer, hypertension, history of multiple falls, bilateral knee replacement, and indwelling foley catheter for acute urinary retention since November 2023. The patient was obtunded and non-responsive to verbal and tactile stimuli, febrile, and tachypneic. On admission, patient was given lactated Ringer's sepsis bolus 30 mL/kg, meropenem 1 g by the ED and loaded with Keppra 1 g and acetaminophen 650 mg.

Diagnostic Criteria

Initial diagnosis is typically made through polymerase chain reaction testing of cerebrospinal fluid for HSV, or herpes simplex virus antibody testing of CSF; CT or MRI imaging without contrast may demonstrate hypodensity, hemorrhage, edema, early white matter change, and thalamic changes on FLAIR. EEG typically demonstrates recurrent uniform sharp and slow complexes in the temporal lobes and periodic waveforms or paroxysmal lateralizing epileptiform discharges, prominent intermittent high-amplitude slow waves, and diffuse slowing.

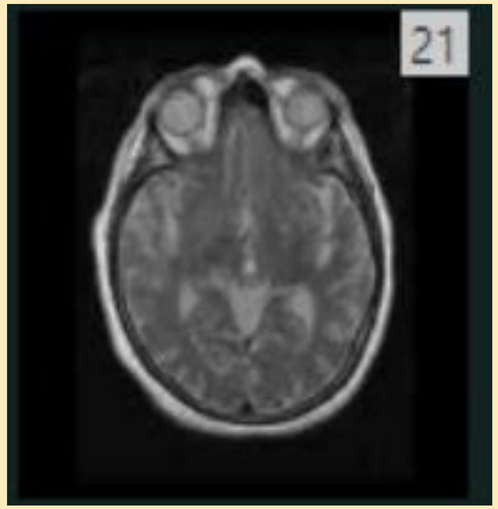
Differential Diagnosis

The following causes were considered in the management of this case.
Viral: EBV, CMV, VZV, HHVC 6 and 7, West Nile, St. Louis Encephalitis, EEEV, WEEV, California and Japanese Encephalitis, mumps, enterovirus, adenovirus, dengue, JC virus, SSPE
Bacterial: mycobacteria, atypical bacteria, neurosyphilis
Autoimmune: vasculitis, SLE, rheumatic diseases, autoimmune or paraneoplastic encephalitis
Other: seizure disorders, trauma, prions, fungi, parasites
hypoxemic or septic encephalopathies, hepatic or uremic encephalopathies, Wernicke, mitochondrial encephalopathies, electrolyte abnormalities

Imaging

EEG: Abnormal EEG due to the presence of periodic lateralizing epileptiform discharges appreciated in the right anterior temporal region without electrographic seizures. This is superimposed on the background of diffuse slowing and disorganization of background rhythm. There is diffuse slowing and disorganization of the background rhythm, suggesting generalized cortical dysfunction.

BRAIN MRI WITHOUT CONTRAST: No acute intracranial abnormality



Labs

CHEMISTRIES: Potassium: 2.8; Lactic acid: 2
CSF ANALYSIS: RBC: 7; WBC: 159; Protein: 99
MENINGITIS FILMARRAY PANEL: Herpes simplex 1 virus detected
UA: WBC: 15-20; Leukocyte esterase: moderate; Bacteria: moderate
URINE CULTURE: negative
BLOOD CULTURE: *Staphylococcus epidermidis*, *Streptococcus anginosus*
VIRAL SEROLOGY: CSF negative for HSV1 and 2 IgG and IgM
STAPH NASAL SCREEN BY PCR: MRSA detected

Treatment and Outcome

The patient was treated with vancomycin 1.25 g in NS 250 mL IVPB q24H, Keppra 1,500 mg in NaCl 100 mL IVPB q12H, potassium 20 mEq, Lasix 40 mg once, acyclovir 550 mg in NS 100 mL IVPB q12H, Tylenol 650 mg once, and morphine 2 mg q4H PRN. The patient also received oxygen and an indwelling urinary catheter. Acyclovir was started once HSV encephalitis was expected based on the EEG. Despite acyclovir and supportive care, she did not have any substantial improvement after 5 days. The family ultimately opted for inpatient hospice and she passed away 2 days later.

Teaching Points

- HSV encephalitis can be a possible differential in a patient with symptoms of infectious encephalitis, particularly in older adults
- Consider ordering HSV encephalitis testing in a patient presenting with new refractory temporal lobe seizure symptoms: these include PCR and HSV antibody testing of CSF, CT or MRI without contrast, and EEG. Viral culture is not recommended due to low sensitivity and long time to result. Brain biopsy is highly invasive and although definitive, may not be necessary as PCR is 99% specific.
- HSV encephalitis can be treated with acyclovir if given within 48 hours. 10 mg/kg IV acyclovir should be given every 8 hours in any patient with suspected or known HSE [6].

Discussion

For a patient with seizure, altered mental status, and signs of an infection, infectious encephalitis can be a possible differential. An EEG showing temporal epileptiform discharges indicated HSV encephalitis. Further labs such as Meningitis Filmarray panel confirmed the presence of HSV1. Reliance solely on MRI imaging interpretation rather than physical exam or PCR would have missed the temporal lobe signs in this patient. Corticosteroids were not prescribed for this patient given the equivocal evidence base and lack of radiological evidence of acute cerebral edema. Acyclovir was chosen as the treatment modality of choice according to Antimicrobial Stewardship Program and IDSA guidelines over valacyclovir.

References

1.Matthews E, Beckham JD, Piquet AL, Tyler KL, Chauhan L, Pastula DM. Herpesvirus-Associated Encephalitis: an Update. Current Tropical Medicine Reports. 2022;9(3):92-100. doi:https://doi.org/10.1007/s40475-022-00255-8
2.CDC. STD Facts - Genital Herpes (Detailed version). CDC. Published July 22, 2021. https://www.cdc.gov/std/herpes/stdfact-herpes-detailed.htm
3. Acute encephalitis - diagnosis and management. Ellul M, Solomon T. Clin Med (Lond) 2018;18:155–159.
4.Michael BD, Solomon T. Seizures and encephalitis: Clinical features, management, and potential pathophysiologic mechanisms. *Epilepsia*. 2012;53:63-71. doi:https://doi.org/10.1111/j.1528-1167.2012.03615.x
5.Bell DJ, Suckling R, Rothburn MM, et al. Management of suspected herpes simplex virus encephalitis in adults in a UK teaching hospital. *Clinical Medicine*. 2009;9(3):231-235. doi:https://doi.org/10.7861/clinmedicine.9-3-231
6.Rowan University Federation. Rowan.edu. Published 2024. Accessed April 23, 2024. https://www-dynamed-com.ezproxy.rowan.edu/condition/herpes-simplex-encephalitis