

## Case Report

### Herpes simplex virus encephalitis presenting as frontal lobe hemorrhage

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#### Case:

A 66-year-old left handed female presented to the emergency department after being found unable to answer questions by a security officer. Vital signs in the ED were temperature 103.1 F, blood pressure 163/73 mm Hg, and heart rate 117 beats/min. On examination, she would shake her head “yes” and “no” to questions but otherwise was nonverbal and unable to follow multi-step commands. Her neck was supple. Initial CBC, coagulation profile, serum and urine drug screen, and CMP were normal. Past medical and social history were unremarkable while family history was notable for a sister with breast cancer. Initial head CT without contrast demonstrated a right frontal hemorrhage with adjacent edema and mild mass effect on the adjacent frontal lobe (figure A).

She was admitted to the ICU with differential diagnosis of hemorrhagic tumor or primary intracerebral hemorrhage. Lumbar puncture was deferred after discussion with radiologist suggested possible mass effect and risk of herniation. On hospital day one, clinical improvement was noted with improved responsiveness to speech therapy, a successful swallow evaluation, mobilization with physical therapy, and improvement of fever to 100.2 F. Initial fever work up including blood, respiratory, and urine cultures were unrevealing. Discussion with family members at this time revealed no recent illness, headaches, seizure, or change in behavior.

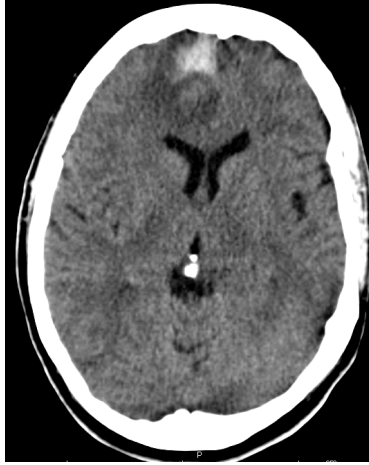
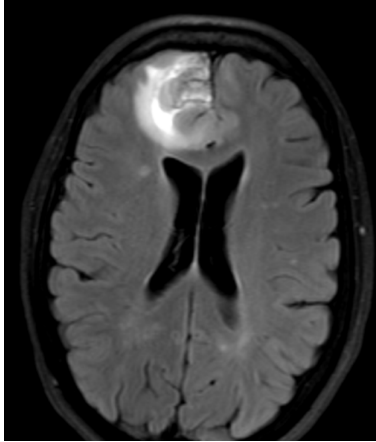


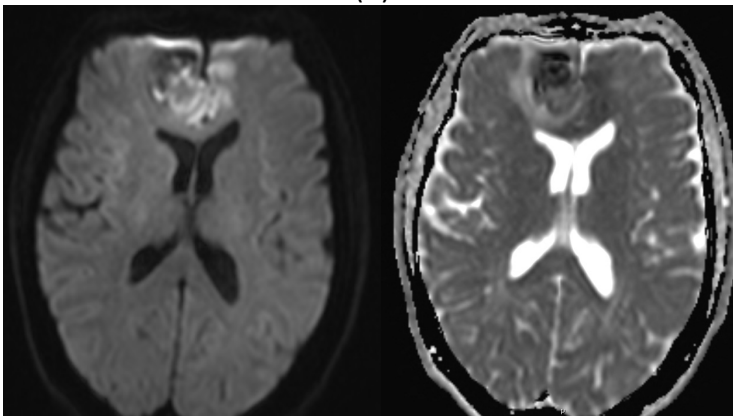
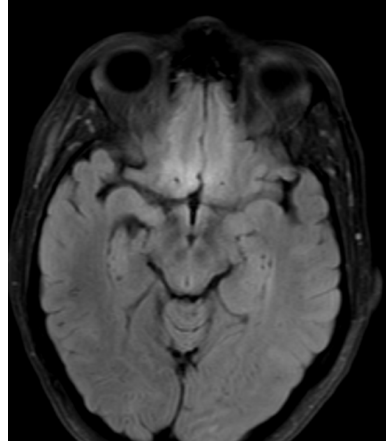
Figure A. Admission CT head without contrast showing right frontal hemorrhage.

On hospital day two, there was an acute neurologic change with left gaze preference and unresponsiveness which prompted an EEG that revealed right frontal periodic lateralized epileptiform discharges (PLEDs). Levetiracetam was prescribed. Brain MRI (figures B-D) demonstrated similar findings as on CT but with diffusion restriction and FLAIR hyperintensity involving the right frontal lobe as well as the left frontal lobe. Conventional angiogram was unremarkable.

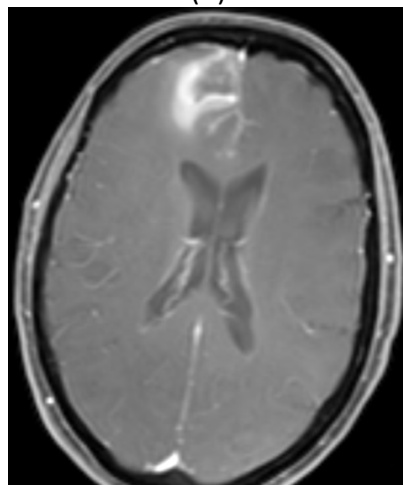
On hospital day three, the patient continued with low grade fever and blood culture grew gram positive cocci in clusters. She was started on vancomycin. Tumor imaging survey using CT did not show an occult malignancy.



(B)



(C)



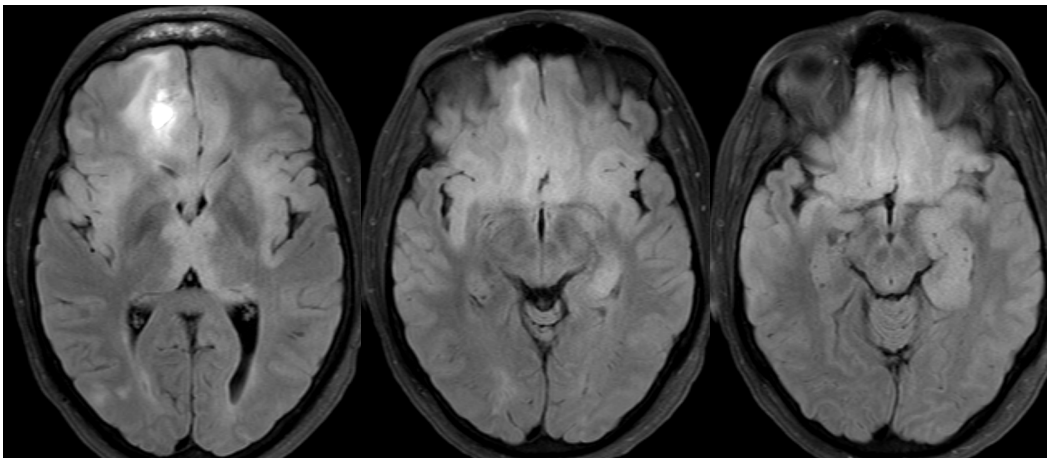
(D)

Figures B-D. MRI brain FLAIR (B), DWI and ADC (C), and T1 with contrast (D) showing right frontal hemorrhage with FLAIR hyperintensity in adjacent left frontal lobe, spares corpus callosum.

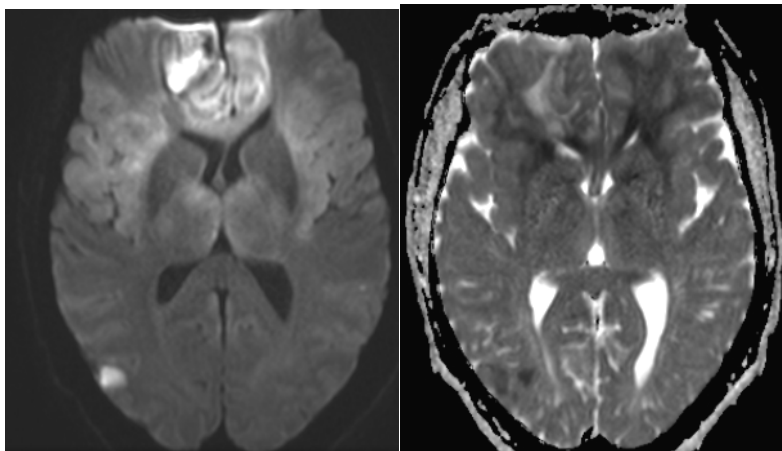
On day four she became stuporous with a left gaze preference and rhythmic mouth twitching, which responded to lorazepam and fosphenytoin. Repeat CT head was stable. Repeat EEG showed BiPLEDs without electrographic seizures.

On day five, she transitioned to coma and was intubated. Lumbar puncture was done and cerebrospinal fluid (CSF) analysis showed pleocytosis WBC 91/mm<sup>3</sup> (88% lymphocytes) , RBC 175/mm<sup>3</sup> , protein 96 mg/dL, glucose 84 mg/dL. She was started on acyclovir. No clinical improvement was seen in the following days.

On hospital day eight, follow up brain MRI (figures E-F) demonstrated progression of diffusion restriction and FLAIR hyperintensity to involve the bilateral frontal lobes, thalami, and mesial temporal lobes suggestive of herpes simplex virus encephalitis (HSVE).



(E)



(F)

Figure E-F. MRI brain FLAIR (E) , DWI and ADC (F) showing extension of the FLAIR hyperintensity to bilateral frontal

lobes, medial temporal lobes, thalami, and portion of right occipital lobe.

On hospital day nine, CSF HSV PCR returned positive. Remaining CSF studies, including cytology, were unremarkable. The patient began to demonstrate clinical signs of increased intracranial pressure that responded to osmotic therapy. A follow up MRI brain on day 10, again demonstrated progression of diffusion and FLAIR changes with bilateral uncal herniation. At the request of the family, life sustaining measures were withdrawn on day twelve.

### **Discussion:**

HSVE classically presents with fever, mental status changes, headache, and seizure. It is caused by primary infection or reactivation of latent HSV1 in the olfactory and trigeminal ganglion [1]. Cerebral infection causes necrotizing vasculopathy with hemorrhagic necrosis and perivascular cuffing in the medial temporal and orbitofrontal areas [6]. This is reflected in imaging with MRI FLAIR imaging initially best demonstrating temporal lobe and orbitofrontal hypertintensity. Other areas of abnormality follow including insular cortex, inferomedial frontal lobes, cingulate gyrus, and thalami. Although initial CSF shows red cells related to the necrotizing vasculopathy, ICH is rarely associated with HSV [6].

A case series of 106 patients with HSVE found 101 patients presenting with temporal lobe involvement on MRI. None of these case cases reported hemorrhage [1]. Further literature review has shown ten reported cases of intracerebral hematoma as a presenting imaging finding [1, 3, 4, 5]. One was in the thalamus, four in the temporal lobe, and two in the parietal lobe and one in the frontotemporal lobe.

We report an atypical case of HSVE presenting as a frontal lobe hematoma that spares the temporal lobes. This case highlights the possible stroke-like presentation of HSVE and the importance of maintaining a high index of suspicion for HSVE when a patient presents with intracerebral hemorrhage and fever.

### **References:**

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