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CASE REPORT

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Temporal lobe hemorrhage as a complication of HSV encephalitis: a case report

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Key Clinical Message: This case underlined the importance of having high suspicion for lobar hemorrhage as a rare but deadly complication of herpes simplex virus encephalitis and shone light upon the added complexity it poses on management on an already deadly disease.

Abstract: Herpes simplex virus (HSV) encephalitis is the most common type of sporadic encephalitis that inflicts high rates of morbidity and mortality. Differentiating a progressing encephalitis syndrome from a lobar hemorrhage as a complication presents a challenge and requires great vigilance and insight on part of the treating physician.

KEYWORDS
encephalitis, herpes simplex virus encephalitis, lobar hemorrhage

1 | INTRODUCTION

Herpes simplex virus (HSV) encephalitis remains one of the most common causes of fatal sporadic viral encephalitis.[1,2] The causative agent in beyond the neonatal period is usually HSV-1 but HSV-2 and HSV-1 both can cause HSV encephalitis (HSE) in neonatal period. The mortality rate is high in non-treated patients compared to treate dones. The mortality rate of HSE has been reduced to 28% from 70% with development of anti viral therapy.[3] HSV- encephalitis accounts approximately 10%–20% of the 20,000 annual viral encephalitis in United States.[4] Incidence of HSV encephalitis varies worldwide with incidence reported around 0.7–13.8 per 100,000 for all ages. (0.7–12.6 /100,000 for adults and 10.5–13.8/100,000 for children).[2,5] Patients with HSV-1 encephalitis usually presents with altered mentation and consciousness for more than 24 h, fever, new onset of seizures or focal neurological deficits. Focal neurological deficits may include any focal cranial nerve deficits, paraparesis, dysphasia, aphasia or ataxia.[6] The diagnosis of herpes simplex encephalitis is confirmed by positive polymerase reactions (PCR) results for HSV DNA in the cerebrospinal fluid (CSF).[7] HSV encephalitis causes perivascular edema and hemorrhagic necrosis of the brain parenchyma, frequently in orbitofrontal, and temporal region. Magnetic resonance imaging (MRI) performed in the acute course of the disease helps to get the best visualization of cerebral edema and hemorragic necrosis.[8] However, the occurrence of a frank intracerebral hematoma in the setting of HSE is rare. We report a case of delayed temporal lobe hemorrhage managed conservatively in an immunocompetent patient with HSE.

2 | CASE REPORT

A 37-year-old male presented to our hospital with persistent severe headache and fever. He was apparently well

8 days prior when he had malaise and moderate headache. Following this, the same day he had fever of recorded temp of 104 F with chills and rigor associated with generalized myalgia but reported no vomiting, photophobia, or loss of consciousness. The next day he had multiple episodes of vomiting followed by an episode of loss of consciousness associated with tonic spasm of the body and followed by clonic jerky movements of limbs for about 1 min. It was associated with frothing from the mouth, lateral tongue bite, and deviation of angle of mouth to the left side. There was no bowel bladder incontinence. It was followed by period of post-ictal confusion for about half an hour where he could not speak coherently but was able to move all four limbs. He was swiftly taken to nearby hospital and managed as seizure disorder. During the 6 days stay at the hospital he did not have another episode of loss of consciousness but fever and headache persisted which were still moderate in intensity. Likewise, after the first 3 days of hospital stay, he complained of increased somnolence and was disorientation to time and place. He developed irrelevant talking and mutism at other times. Thus, dissatisfied with the level of care and deteriorating status of patient, the family members brought him to our hospital after being discharged on patient request. On presentation, he had a fever of 102 F. On CNS examination his naming, short-term, and long-term memory were impaired. His sensory and motor examination were intact. There were no cerebellar or meningeal signs. Planters were bilateral downgoing. His chest and cardiovascular examination were within normal limits. Thus with these background clinical features a provisional diagnosis of viral encephalitis was made and acyclovir started.

Investigations were sent, including blood investigation, CSF analysis. Here, total white blood cells (WBC) counts were elevated to about 19,680 cells/cu mm and blood sodium was 127 mEq/L rest were within normal limits. On CSF examination, his blood count was raised to 200 cells/cu mm with monomorphs of 40% and polymorphs of 60%, CSF glucose level was normal (60 mg/dL), and protein was raised (159 mg/dL); RBCs were not mentioned. The microbiological exam of CSF showed no growth on culture and no bacterial cells on gram stain. MRI brain showed features suggestive of herpes encephalitis involving right temporal lobe and cingulated gyrus without any signs of hemorrhage as depicted in Figure 1. These findings were supportive of our provisional diagnosis of viral encephalitis. Thus, CSF polymerase chain reaction (PCR) was sent which came positive for HSV 1 DNA. Thus a final diagnosis of HSV 1 encephalitis was made.

However, on Day 6 he began to develop severe headache and began to be disoriented to time place and person. Consequently, a head computed tomography (CT) scan of head showed hematoma on right temporal lobe, as seen on the Figure 2. A coagulation profile was done at that time

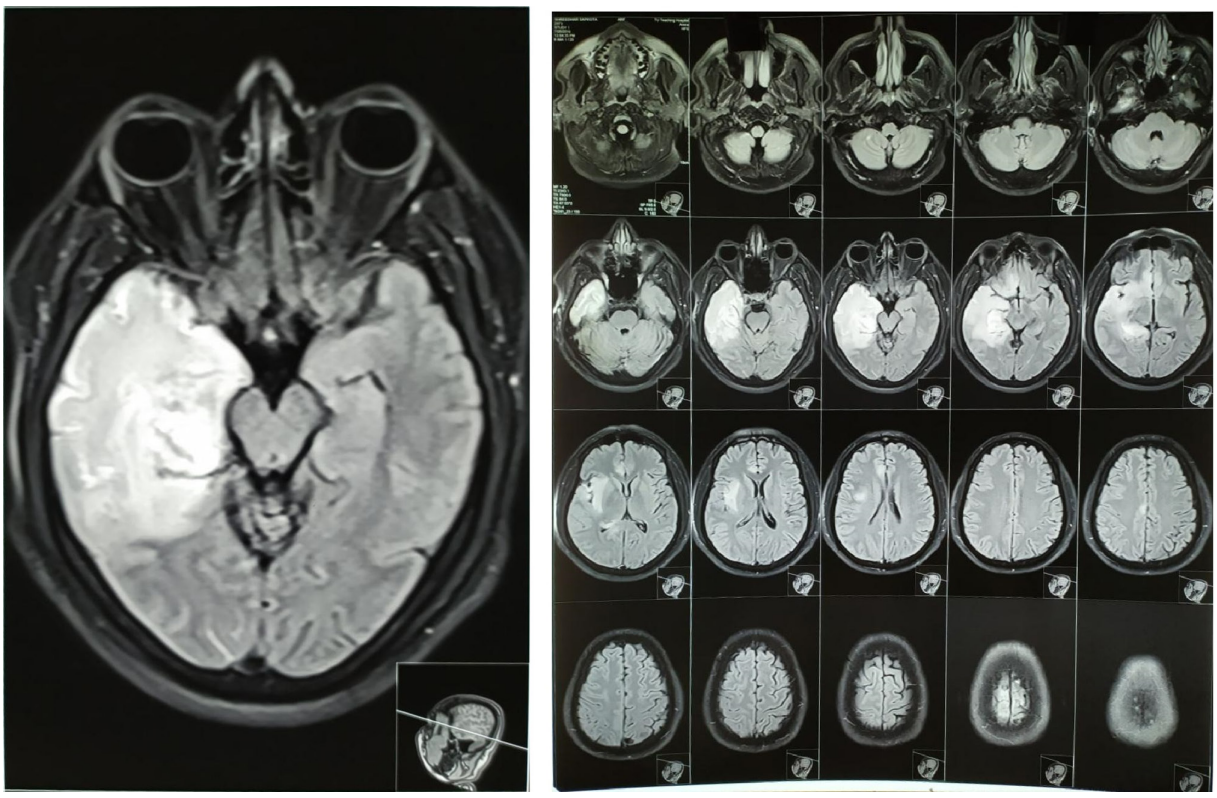

FIGURE 1 Initial T2-FLAIR fat supressed MRI brain showing right temporal lobe enhancement without any sighs of hemorrhage.

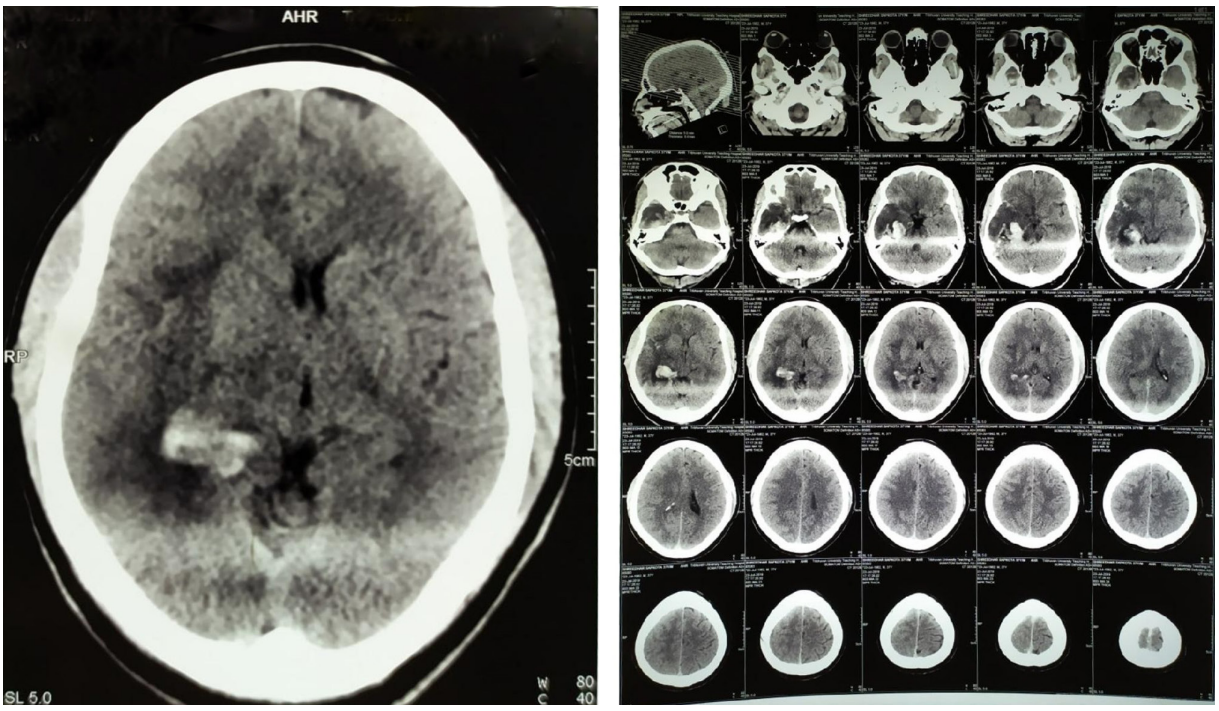

FIGURE 2 CT scan done on Day 6 of admission showing right temporal lobe hemorrhage.

showed no abnormality. Therefore, he was shifted to medical ICU for close monitoring of his hemodynamic and neurological status. The headache persisted for three more days then gradually subsided. To address the raised ICP head elevation was done, mannitol and hypertonic saline were used but steroids were not. No surgical interventions were needed. He was well oriented to time place and person by the end of sixth day of ICU stay. His naming, short-term and long-term memorywere still impaired otherwise his neurological exam was the same. Following 8 days of ICU stay he was shifted to general ward. On discharge, his naming, short-term and long-term memory function had not still recovered. Motor and sensory examinations were intact throughout. He had completed 21 days of acyclovir therapy. He was discharged after 27 days of hospital stay on levatiracetam for seizure prophylaxis and was asked to come for follow-up in 15 days. His assessment 15 days later, he still had problems with naming, short-term, and long-term memories but was gradually improving. Rest of the neurological examinations were normal.

3 | DISCUSSION

Herpes simplex virus is a neuro-tropic virus that enters the body through the mucosal surface. It travels along the axons through retrograde transport and lies dormant in the sensory ganglia. The exact mechanism of transport to CNS is not described but it is postulated that it is a similar mechanism of retrograde transport along the sensory nerves, given its predilection to mesiotemporal lobe and orbitofrontal cortex.[9] Once in the CNS, the manifestations of encephalitis prevail. CNS complications include seizures (38.4%), status epilepticus (5.5%), acute respiratory failure (20.1%), ischemic stroke (5.6%), and intracranial hemorrhage (2.7%).[10] Thus, intracranial hemorrhage being rare but fatal consequence in many instance.[10] Untreated, the mortality rate in herpes encephalitis due to its complication can reach to 70% and most of the survivors can have serious neurological deficits like neuropsychiatric or neurobehavior issues. HSV encephalitis needs a prompt treatment with IV acyclovir for the reduction of mortality and morbidity from HSV encephalitis and its complication.

The exact mechanism of hemorrhage has not been found but few theories have been described to show the relationship of HSV encephalitis and lobar hemorrhages. Vasculitis or transient hypertension caused by increased ICP plays a major role in having lobar hemorrhage. The hypothesis include the rupture of the small vessels due to these above causes.[11] MRI of the brain is the preferred imaging study; T2 images may be more helpful than T1 images.[12]

Our patient's presentation was consistent with HSV encephalitisbut later he developed brain hematoma. Otherwise, the clinical features of brain hemorrhage were not distinctive and overlapped significantly with those of HSV encephalitis. It is thus difficult to suspect this complication on clinical grounds alone. The lack of clinical improvement or the worsening of initial symptoms,

particularly during first to second week of admission, should lead to this suspicion and be followed by a neuroimaging study. If the evidences discard the possibility of structural complication, a lack of improvement with the treatment of acyclovir may raise concern of acyclovir resistance or treatment adverse effect. This scenario may warrant the start or switch the therapy to foscarnet.[13]

During management of this complication, supportive care, and intensive monitoring was sufficient, and surgical intervention was not required. Mannitol was used for management of raised ICP but corticosteroids were not used, the role of which remains still debatable in this area.[14] A multicenter randomized controlled trial was done to study the role of corticosteroid in treatment of HSV encephalitis but was prematurely terminated due to small number of study participants.[15] Thus, higher level of evidence to support the use of corticosteroid is lacking. Intensive care physicians involvement in the care team seems imminent as up to 32% require ICU stay and 17% require mechanical ventilation.[16] Similarly, need for surgical intervention may be as high as 50% following intracerebral hemorrhage as reported by Sainz et al.[17] The neurological outcome in the non-operated group was similar, although in this case it could be argued that they were less severely affected. Thus, the role of neurosurgery in these patients is still unclear.

4 | CONCLUSION

In conclusion, herpes simplex encephalitis presents as a potentially lethal disease if it was not for acyclovir therapy. Even still deceased burden remains high. Lobar hemorrhage as a complication further compounds the complexity of management and warrants higher level of care and demands vigilance in part of the management team to detect any neurological deterioration which at times may masquerade just as a progressing encephalitis syndrome.

AUTHOR CONTRIBUTIONS

Ashes Rijal: Conceptualization; data curation; formal analysis; investigation; methodology; resources; writing – original draft; writing – review and editing. **Sharmila Chaudhary:** Formal analysis; supervision; writing – review and editing. **Sangam Shah:** Supervision; validation; writing – review and editing. **Asmita Itani:** Formal analysis; investigation; writing – original draft; writing – review and editing. **Anil Suryabanshi:** Supervision; writing – review and editing. **Sangharsha Thapa:** Supervision; validation; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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