# Herpes simplex encephalitis complicated with vasculitis in a young Male: A case report

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**Herpes simplex encephalitis complicated with vasculitis in a young Male: A case report**

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**Abstract**

**Introduction**

HSV encephalitis is a common cause of fatal encephalitis, and early intervention has a significant impact on the prognosis, necessitating a prompt diagnosis.

**Case Presentation**

We present a case of a 28-year-old male who presented with a five-day history of headache, fatigue, and behavioral abnormalities. Brain MRI, EEG, and CSF investigation all indicated Herpes Simplex encephalitis. Vasculitis complicating encephalitis was diagnosed after he suffered deterioration in his neurologic status with new imaging findings.

**Conclusion**

A rare but possible consequence of herpes simplex encephalitis in patients who do not exhibit clinical improvement or worsening of symptoms in the weeks following treatment is HSV 1-associated vasculitis leading to ischemic stroke. Early diagnosis is made possible by imaging examinations done as early as possible, and considering empirical steroid treatment has paramount importance as it improves outcomes.

**Key Note Message**

High Index of suspicion for HSV related CNS vasculitis is imperative especially to patients diagnosed with HSV vasculitis where the clinical symptoms are either not improving or worsening in despite treatment with anti-viral agents.Basic brain imagings are crucial especially in resource-limited settings where vascular imaging is not readily available. Treatment with steroids empirically can also be valuable as it prevents further complications.

**Key words** : HSV1 ,HSV2, HSV Encephalitis , HSV Vasculitis,

**Abbreviation**

HSV- Herpes simplex Virus

EEG – Electroencephalogram

PCR – polymerase chain reaction

MCA- middle cerebral artery

**Introduction**

Herpes simplex virus (HSV) is one of the most commonly incriminated viral agents of encephalitis which describes an inflammation of the brain parenchyma (1,2). HSV-1 causes almost all cases of herpes encephalitis beyond the neonatal age, accounting for more than 90% of such cases (3). Detecting HSV DNA using PCR techniques is the gold standard test despite the presence of strongly suggestive brain MRI features. In addition to the significant mortality rate, HSV encephalitis is also associated with significant long-term sequelae including cognitive, behavioral, and memory abnormalities.

Central nervous system (CNS) vasculitis complicating the course of HSV encephalitis is a rare entity, with most such experience coming from case reports, making the pathophysiologic understanding, diagnosis, and therapeutic approach quite challenging. We present a case of HSV encephalitis complicated by CNS vasculitis in a 28-year-old male patient from Ethiopia. Currently, there are only a few such reports in the literature, and, to the best of the authors' knowledge, this is the first case report from Africa.

**Case History**

**Initial Presentation** : A 28-year-old male presented to our hospital with a five-day history of headache, fever, confusion, and frequent stiffening and jerking movement of the whole body. At presentation, he was tachycardic, tachypneic, febrile and had diffuse rhonchi with peripheral oxygen saturation of 75% on atmospheric air. His Glasgow Coma Scale was 7/15(E4, V2 M1). He was intubated for airway protection and started on Acyclovir for complicated viral meningoencephalitis (CSF PCR was sent at presentation (Image 2). After initial treatment, his GCS improved to 11/15 (E4, V2, M5) but still had left-sided body preference. He then started to experience a decline in GCS to 8/15 (E3, V1, M4), new onset anisocoria, and repeated episodes of generalized tonic-clonic seizure for which additional imaging with non-contrast CT(image 3C) and Brain MRI with MRV (Image 3E ) Both showed radiologic worsening and new MCA territory infarct.

## Methods

### Differential Diagnosis

The most important differential diagnosis that were considered for this patient include Cerebrovascular disease, metabolic encephalopathy and herpes simplex virus associated vasculitis .

### Investigation

see **Table 1**

### Treatment and outcome

With the consideration of CNS vasculitis, the patient started high-dose dexamethasone which resulted in a progressive improvement of his GCS to 15/15. His seizure was well-controlled, and he fully regained his motor function. He was then discharged from the hospital and improved. He had a follow-up at our hospital four months after the discharge date and was back to his daily routine activities.

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Discussion

Herpes Simplex Encephalitis is a destructive inflammatory condition that typically impacts the cortex and the underlying white matter found in the temporal lobe. (1) A delay in treatment significantly increases the potential for axonal spread of the infection (2) The diverse clinical symptoms, delayed diagnosis, and persistent alterations in brain structure following treatment can all contribute to the illness and death associated with HSV encephalitis. In cases of suspected viral encephalitis, the decision to start antiretroviral therapy is based on clinical assessment. Serological testing should not cause a delay in treatment initiation which was true, as well in our patient; he was started on Acyclovir until a CSF sample was sent for serologic study. In our patient, the clinical presentation, imaging, laboratory evidence, and initial clinical response to Acyclovir provided strong support for the diagnosis of HSV-1 encephalitis

Magnetic resonance imaging is more significant in the early detection of HSV encephalitis compared to computed tomography scans, (3). Early finding on MRI usually occurs in the cingulate gyrus and medial temporal lobe(3). In the reported case, the Initial Brain CT scan shows hypo-density in the right capsule and median temporal lobe with minimal white matter edema characteristic of HSV encephalitis. There are no EEG findings pathognomonic for HSV encephalitis, but certain EEG features can be helpful in the diagnosis, including the presence of focal or lateralized abnormalities (4). In our patient, the EEG (Image 1) performed within 24 hours supported the diagnosis.

Cerebrovascular disease can develop as a complication of various central nervous system (CNS) infections (5) even though HSV is one of the least recognized causes. Since the early 1970s, it has been acknowledged that Herpes Simplex Encephalitis (HSE) can, in some cases, manifest with a cerebral infarction (6). An epidemiological study of HSE conducted in the USA reported that ischemic complications occurred approximately twice as frequently, at a rate of 5.6%, compared to hemorrhagic complications (7). This complication can occur regardless of early initiation of antiviral therapy. Our patient has both clinical and brain MRI worsening after an initial brief improvement with acyclovir treatment. Though vascular imaging is not done in this patient, taking into account the course of the patient and bilateral MCA territorial area of worsening on the imaging, we considered HSV-1-associated vasculitis with bilateral ischemic stroke. The exact pathophysiology underlying infectious vasculopathy has not been fully elucidated. Even if the presence of vasculitis and seizure are markers of poor prognosis in a patient with HSE(7) our patient's neurological status returned to their baseline after treatment.

### In conclusion

HSE complicated by vasculitis should be considered, especially in patients who do not show clinical improvement or experience worsening symptoms in the weeks following the initiation of treatment. This complication is usually associated with HSV -2 (8), but HSV-1 is also a rare but possible cause. Considering empirical

treatment with steroids is of paramount importance since vascular imaging may not always be available or may not detect this complication, ultimately leading to better patient outcomes.

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**Conflict of Interests**

Authors have no conflict of interest.

**Approval of the research protocol by an institutional review board**

Not applicable

**Informed Consent**

The patient provided written informed consent for publication of the case report.

**Registry and the registration number of the trial**

Not applicable

**Authors Contribution**

1. **Dr Sebhatleab Teju Mulate:** Conceptualization, investigation, resources, supervision , writing original draft and reviewing and editing
2. **Dr Abel Tenaw Tasamma :** supervision , writing original draft and reviewing and editing
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**Figure Legend**

**Image 1** : EEG

**Image 2** : CSF Meningoencephalitis Panel

**Image 3A and 3B** - Non contrast Brain CT at presentation

**Image 3C** - Non contrast Brain CT after clinical deterioration (7 days after initial CT)

**Image3D** – Brain MRI on presentation

**Image 3E-** – Brain MRI and MRV afterclinicaldeterioration (7 days after initial MRI)

**Table 1** : Investigation Summary

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