

# A Rare Case of Postpartum Cerebral Venous Thrombosis and Hemorrhagic Infarction From Somalia

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**Introduction:** Cerebral venous thrombosis (CVT) is a rare but serious complication that can occur during pregnancy and the postpartum period. This case report discusses a unique instance of postpartum CVT complicated by hemorrhagic infarction in a patient from Somalia.

**Case Presentation:** We report the case of a 35-year-old woman, gravida 9, para 8, who presented on the 13th postpartum day with right-sided weakness, seizures, and severe headache. Initially misdiagnosed as impending eclampsia due to the absence of hypertension and proteinuria, she underwent CT and MRI scans, revealing a significant superior sagittal sinus thrombosis with hemorrhagic infarction. The patient was treated in the ICU with increased intracranial pressure management, seizure prophylaxis, and anticoagulation therapy, resulting in substantial clinical improvement.

**Discussion:** This case emphasizes the necessity of maintaining a high index of suspicion for CVT in postpartum women displaying neurological symptoms. Misdiagnosis can impede timely intervention, highlighting the need for access to advanced imaging and a multidisciplinary approach. Increasing awareness and training for healthcare providers are essential for timely diagnosis.

**Conclusion:** The management of this case illustrates the importance of early recognition of CVT in the postpartum population. Enhancing diagnostic resources and treatment strategies, particularly in resource-limited settings, can significantly improve maternal health outcomes and reduce morbidity and mortality.

**Keywords:** cerebral venous sinus thrombosis, postpartum, hemorrhagic infarction, eclampsia, maternal health, Somaliland, neurology, anticoagulation

## Introduction

Cerebral venous thrombosis (CVT) is a rare but serious cause of stroke, with an increased incidence during pregnancy and the postpartum period.<sup>1,2</sup> However, recent studies in Somalia/Somaliland suggest that Cerebral venous thrombosis (CVT) may be the most common type of stroke in pregnant and postpartum women.<sup>3</sup> Cerebral venous sinus thrombosis (CVT) commonly involves the superior sagittal and transverse sinuses, which are significant sites for thrombosis in affected individuals.<sup>4-9</sup> A significant challenge in the management of postpartum CVT is its frequent misdiagnosis as preeclampsia or eclampsia due to overlapping clinical features.<sup>4</sup> Several risk factors contribute to the development of CVT in these populations, which are important to consider for early identification and management. Pregnancy induces a hypercoagulable state due to hormonal changes, which increases the risk of thrombus formation. This state persists for several weeks postpartum.<sup>10</sup> Women who undergo cesarean sections are at a higher risk for CVT, likely due to surgical trauma and the associated inflammatory response.<sup>11</sup> This pregnancy complication is associated with increased risk factors for thrombosis, including elevated blood

pressure and proteinuria, which can contribute to CVT.<sup>11</sup> Infections during pregnancy or the postpartum period can exacerbate the risk of thrombosis, as they may lead to dehydration and other physiological changes that promote clot formation.<sup>12</sup> Conditions such as anemia and elevated platelet counts during pregnancy can increase susceptibility to CVT. This can occur during labor and delivery, particularly in cases of significant blood loss, further increasing the risk of CVT.<sup>12</sup> Additional risk factors include obesity, smoking, and a history of thrombophilia, which can further complicate the clinical picture.<sup>12</sup> This diagnostic ambiguity can lead to delays in appropriate treatment and potentially adverse outcomes. Prompt diagnosis, facilitated by neuroimaging, is crucial to prevent life-threatening complications. This case report describes a unique instance of postpartum CVT initially misdiagnosed as impending eclampsia, highlighting these diagnostic challenges and emphasizing the importance of timely intervention in a resource-limited setting.

## Case History/Examination

### Case Presentation

A 35-year-old woman, gravida 9, para 8, presented to the hospital on the 13th postpartum day following an uncomplicated spontaneous vaginal delivery at home, attended by a traditional birth attendant. The patient exhibited a 5-day history of right-sided weakness and generalized tonic-clonic seizures. Notably, her family history was significant for the sudden deaths of two brothers and one sister, all of whom exhibited similar neurological symptoms.

Prior to the onset of her neurological manifestations, the patient experienced an abrupt, severe generalized headache accompanied by blurred vision and visual field deficits. Additionally, she reported rapid mood fluctuations and initially sought care at a local clinic, where she received unspecified oral medication without any improvement, but was unable to provide further details regarding the type or composition of the medication. She denied knowingly taking any other traditional or herbal medications during or before her pregnancy. Due to cultural practices and potential stigma, it remains possible that she may have used undisclosed herbal remedies.

The patient reported receiving unspecified oral medication from a local clinic prior to admission, but was unable to provide further details regarding the type or composition of the medication. She denied knowingly taking any other traditional or herbal medications during or before her pregnancy. Due to cultural practices and potential stigma, it remains possible that she may have used undisclosed herbal remedies.

Considering the patient's multiparity (G9, P8), a thorough exploration of her obstetric history was undertaken to identify any previous complications associated with childbirth, particularly venous thromboembolism (VTE) or indications for thrombophilia screening. The patient denied any prior history of postpartum complications or VTE, and her medical records revealed no documentation of thrombophilia screening. This absence of previous events may have contributed to the initial oversight of her symptoms during the current postpartum period.

Upon admission to the gynecology ward of a regional hospital in Borama, the patient was administered haloperidol and diazepam; however, her level of consciousness subsequently declined. The patient's past medical history was unremarkable, with no known hypertension, diabetes, epilepsy, or history of oral contraceptive use. She denied any known drug or food allergies. The patient was married, had eight children, resided in traditional housing, and reported no history of substance abuse.

### Physical Examination

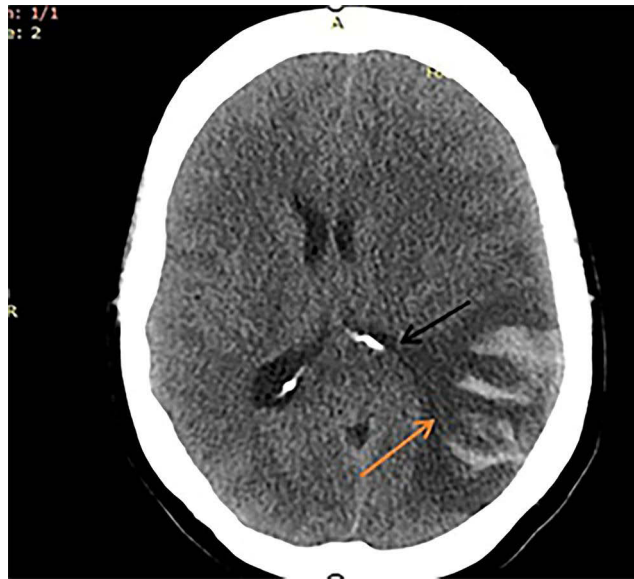
On admission, the patient exhibited a reduced level of consciousness with a Glasgow Coma Scale (GCS) score of 9/15. She appeared restless and agitated, was normocephalic without facial asymmetry, but exhibited neck stiffness. Vital signs included blood pressure of 130/90 mmHg, heart rate of 100 bpm, respiratory rate of 20/min, oxygen saturation of 96% on room air, and temperature of 36.9°C. Neurological examination revealed vigorous movements of the left limbs, right-sided hypotonia, and an equivocal plantar response.

## Methods (Differential Diagnosis, Investigations, and Treatment)

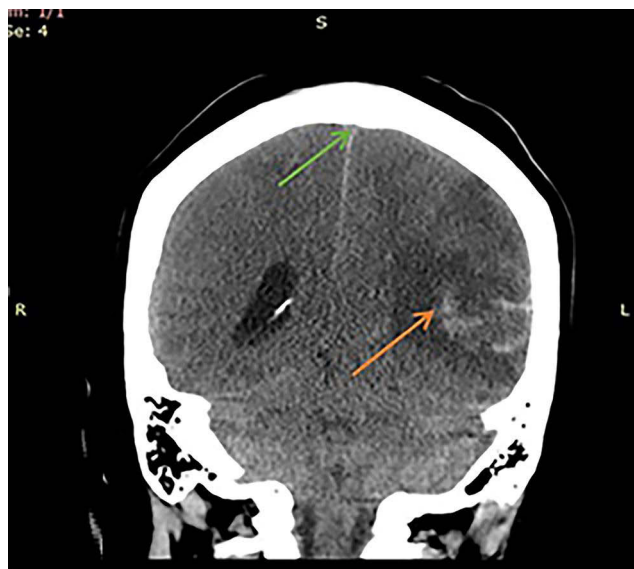
### Investigations

Complete Blood Count (CBC): Total WBC 11,100 cells/ $\mu$ L (Neutrophils 9500 cells/ $\mu$ L), hemoglobin 7.5 g/dL, MCV 61.2%, platelets 455,000 cells/ $\mu$ L. Renal Function Tests (RFT): Urea 17 mg/dL, creatinine 0.6 mg/dL. Liver Function Tests

(LFT): GOT 17 IU/L, GPT 21 IU/L, total bilirubin 0.8 mg/dL. Blood Group: O positive. Urine Analysis: pH 5, protein 2+, WBCs 1–5/HPF. Following five days of management for presumed eclampsia and postpartum psychosis, a brain CT scan was performed, (Figures 1–4) revealing an irregularly shaped hyperdense hemorrhage in the left parieto-occipital lobe at the gray-white matter junction, accompanied by surrounding hypodense edema and effacement of the ipsilateral lateral ventricle, indicating mild midline shift to the right. The findings suggested a large venous hemorrhagic infarction secondary to superior sagittal sinus thrombosis, complicated by mild subarachnoid hemorrhage, brain edema, and mild subfalcine herniation to the right. A subsequent MRI/MRV confirmed subacute hemorrhagic ischemia in the left temporo-parieto-occipital region with signs of left sigmoid venous sinus thrombosis as shown in Figures 5–7.



**Figure 1** Axial non contrast brain CT scan show: Irregularly shaped hyper dense hemorrhage in the left parieto-occipital lobe on at grey white matter junction with surrounding hypo dense edema (Orange arrows) with Effacement of the ipsilateral lateral ventricle seen (black arrows) causing mild midline shift to the right side.



**Figure 2** Coronal non contrast brain CT scan show: Irregularly shaped hyper dense hemorrhage in the left parieto-occipital lobe on at grey white matter junction with surrounding hypo dense edema (Orange arrows). hyperdense foci seen in the superior sagittal sinus forming delta sign (green arrow).



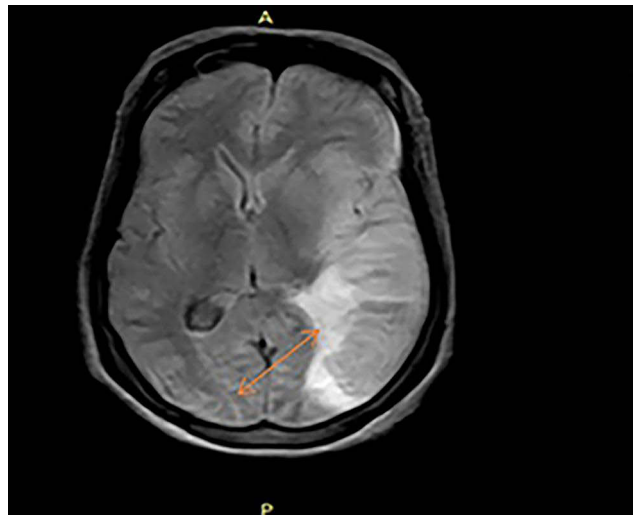
**Figure 3** Sagittal non contrast brain CT scan show: Irregularly shaped hyper dense hemorrhage in the left parieto-occipital lobe on at grey white matter junction with surrounding hypo dense edema (Orange arrow).



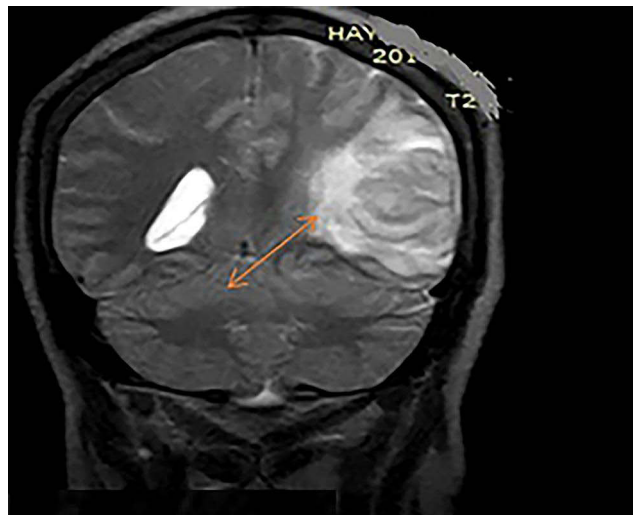
**Figure 4** Axial non contrast brain CT scan shows: Irregularly shaped hyper dense hemorrhage in the left parieto-occipital lobe at grey white matter junction with surrounding hypo dense edema (Orange arrow), with Effacement of the ipsilateral lateral ventricle seen (black arrow) causing mild midline shift to the right side.

## Differential Diagnosis

Our initial differential diagnoses included: Postpartum Eclampsia: Given the patient's recent delivery and presentation of headache, visual disturbances, and seizures. Pseudotumor Cerebri: Due to signs of increased intracranial pressure such as



**Figure 5** Axial image shows Left parietal and occipital cortical and subcortical area of abnormal signal with central foci of heterogeneous signal in keeping with venous hemorrhagic infarction (Orange double head arrow) associated mass effect and effacement of the occipital horn of the lateral ventricle.



**Figure 6** Coronal T2w image show Left parietal and occipital cortical and subcortical area of abnormal signal with central foci of heterogeneous signal in keeping with venous hemorrhagic infarction (Orange double head arrow) associated mass effect and effacement of the ventricle.

headache and visual changes. Other Cerebrovascular Accidents: Due to the sudden onset of neurological deficits. Postpartum psychosis: As a possible contributing factor.

## Treatment

The patient was transferred to the intensive care unit (ICU) and treated as follows: Intracranial Pressure Management: Mannitol infusion (350 mL IV loading dose, followed by 200 mL IV TID for 3 days). Seizure Prophylaxis: Phenytoin 100 mg PO TID. Anticoagulation: Unfractionated heparin (UFH) 5000 IU IV loading dose, followed by 17,500 IU SC BID, and warfarin 5mg PO /day (target INR 2.0–3.0). Acetazolamide 500mg PO TID. Other: Paracetamol 300 mg IV as needed, intravenous normal saline 1000mL BID, and bromocriptine 2.5 mg PO BID.



**Figure 7** Image MRV showed flow void involving the most of the superior sagittal sinus (Orange double head arrow).

## Conclusions and Results (Outcome and Follow-Up)

### Clinical Course and Follow Up

By day 3 of admission, the patient regained full consciousness with no cranial nerve deficits but presented with dense spastic right-sided hemiplegia and intact sensory function. Coagulation studies indicated a prothrombin time (PT) of 24 seconds, partial thromboplastin time (PTT) of 27.5 seconds, and an INR of 2.4. On day 9, her GCS improved to 15/15, although she retained right spastic hemiplegia (power 0/5) and exaggerated deep tendon reflexes. The INR was noted to be 3. She was discharged on day 16 with residual word-finding difficulties and flickering movements in her right hand. Warfarin therapy was continued at 2.5 mg daily. At a one-month follow-up, the patient was able to walk with slight support, exhibiting power of 4/5 and continued word-finding difficulties, along with sleep disturbances.

### Discussion

We report a case of postpartum cerebral venous thrombosis (CVT) in a 35-year-old woman from Somaliland, complicated by hemorrhagic infarction. The patient's initial symptoms—severe headache, visual disturbances, seizures, and focal deficits—closely resembled impending eclampsia, which led to a delay in accurate diagnosis. However, prompt recognition of CVT through CT and MRI venography, followed by appropriate medical management, resulted in a positive clinical outcome. This case highlights the diagnostic challenges of CVT, particularly in settings where advanced imaging may not be immediately available, and emphasizes the importance of maintaining a high level of suspicion for this condition in the postpartum period.

Cerebrovascular disorders, while uncommon, pose significant risks to both mother and child during pregnancy and the postpartum period, potentially leading to life-threatening and disabling complications. They can be divided into two main categories: Thrombosis and ischemia, which include arterial and venous strokes and hemorrhage.<sup>4,5,13,14</sup> The estimated incidence of CVT is low, ranging from 0.22 to 1.57 per 100,000 annually,<sup>15</sup> with a higher prevalence among women, especially during the postpartum phase.<sup>16,17</sup> In contrast to global estimates, a study in Mogadishu, Somalia found that CVT accounted for a significant proportion of strokes in pregnant and postpartum women [Adam et al, 2025]. Furthermore, Adam et al noted that a significant proportion (56.9%) of patients with CVT in their study had no identifiable pre-existing risk factors, emphasizing the need for heightened clinical suspicion for CVT even in the absence of traditional risk factors in this population.<sup>3</sup> The underlying pathophysiology involves a complex interplay of hypercoagulability, venous stasis, and endothelial dysfunction,<sup>7,8</sup> all of which are heightened during pregnancy and the postpartum period.<sup>18</sup> Several factors contribute to the increased risk of CVT in the postpartum period, including hypercoagulability related to pregnancy, cesarean delivery, infections, blood loss during delivery and dehydration, fluctuations of intracranial pressure during labor, hypertensive complications of pregnancy, and even cerebrospinal fluid loss following dural puncture.<sup>11,12,19</sup>

Consistent with previous studies,<sup>1,2</sup> our case underscores the postpartum period as a significant risk factor for CVT. The patient's clinical presentation—headache, visual changes, seizures, and neurological deficits—aligns with common manifestations of CVT.<sup>2,13,16–18</sup> also noted that headaches, seizures, and focal neurological deficits are among the most common symptoms observed with CVT, which correlates highly with our patient's presentation. However, the rapid progression of symptoms in our case, leading to impaired consciousness and hemiparesis, highlights the potential severity and rapid clinical course of CVT, contrasting with cases reported with more subtle symptom onset that contribute to misdiagnosis and delays in care.<sup>20</sup>

The potential contribution of dehydration, possible infection, and especially anemia to the patient's hypercoagulable state cannot be definitively ruled out given the limitations in available documentation and diagnostic resources. Anemia itself is a known risk factor for thrombosis during pregnancy and postpartum.<sup>17,21</sup> While the WBC count of 11,100 cells/ $\mu$ L suggests possible infection, further investigation was not possible. The absence of formal evaluation for these conditions underscores the challenges of providing comprehensive maternal care in resource-limited settings and highlights an area for future improvement. These circumstances underscore the need for enhanced resources and trained healthcare professionals to prevent, identify, and manage modifiable risk factors for CVT.

A key challenge in this case was the initial misdiagnosis of impending eclampsia, a common condition in postpartum women with similar symptoms.<sup>22</sup> This underscores the documented difficulty in differentiating between CVT, eclampsia, and other conditions such as posterior reversible encephalopathy syndrome (PRES).<sup>23</sup> The patient's initial clinical picture led to treatment for eclampsia, further emphasizing the need to consider fewer common etiologies when patients do not respond to conventional treatment.

A significant diagnostic challenge in this case, and in others like it, is the considerable overlap in clinical features between CVT and preeclampsia. Both conditions frequently present with severe headaches, seizures, visual disturbances, and altered mental status, particularly in the postpartum period.<sup>24</sup> Moreover, the shared risk factor of the hypercoagulable state associated with pregnancy and the puerperium further complicates the diagnostic process.<sup>25,26</sup> In both conditions, endothelial dysfunction and inflammatory processes may contribute to cerebral edema and neurological symptoms.<sup>15,27</sup> This convergence of clinical and pathophysiological features makes differentiating between CVT and preeclampsia a significant challenge, demanding a high index of suspicion and the judicious use of neuroimaging.

While the similarities between CVT and postpartum preeclampsia/eclampsia create diagnostic challenges, critical distinctions can aid in differentiation. Focal neurological deficits, such as hemiparesis, aphasia, or cranial nerve palsies, are more commonly observed in CVT than in preeclampsia/eclampsia.<sup>28–30</sup> While hypertension and proteinuria are characteristic features of preeclampsia, they may be absent in CVT, as seen in our case. Furthermore, while laboratory findings in preeclampsia often reveal elevated liver enzymes and thrombocytopenia (HELLP syndrome), these abnormalities are typically absent in CVT unless secondary complications arise.<sup>31,32</sup> Ultimately, neuroimaging is essential for differentiating these conditions. While CT or MRI may be normal or show nonspecific findings in preeclampsia, they reveal the characteristic venous thrombosis and potential infarction or hemorrhage in CVT.<sup>33</sup>

While the diagnostic challenges are significant, a review of published cases highlights the importance of considering CVT in the differential diagnosis of postpartum neurological deficits. For example, Chen et al described a similar case of a 32-year-old postpartum woman presenting with headache and seizures, initially suspected to be eclampsia. However, MRV revealed superior sagittal sinus thrombosis, and the patient made a full recovery with anticoagulation. This underscores the need for a high index of suspicion, even when initial symptoms suggest more common conditions. Similarly, Garcia et al reported a case where CT venography was crucial in diagnosing CVT in a postpartum patient with atypical symptoms. The patient had a less favorable outcome due to delays in treatment.<sup>28</sup> This highlights the value of CT venography in the diagnosis, particularly when MRV is not readily available.

Despite the initial misdiagnosis and subsequent delay in initiating anticoagulation therapy, our patient experienced a positive clinical outcome following prompt recognition of CVT on CT imaging and appropriate medical management. This outcome underscores the importance of maintaining a high index of suspicion for CVT and acting decisively once the diagnosis is suspected, even if there was an initial delay.

This case adds to the existing literature by highlighting several key points. First, the occurrence in a low-resource setting in Somalia, where access to advanced imaging and prompt specialized care may be limited, emphasizes the need for heightened

clinical vigilance and the use of CT scan as an acceptable initial imaging method. Second, the patient's family history of sudden deaths with similar symptoms suggests a potential inherited prothrombotic disorder, which was unable to be investigated in the context of this case. This is noteworthy as inherited prothrombotic conditions are recognized risk factors for CVT.<sup>15</sup> Third, the patient was managed by a multidisciplinary team, which resulted in a positive outcome. Lastly, this case highlights the importance of multidisciplinary care for CVST patients.

This case is particularly innovative because the diagnosis was made and the patient was managed effectively in a resource-limited setting where advanced neuroimaging techniques such as MRV were not immediately available. This highlights the value of utilizing available resources, such as CT scanning, and the importance of clinical vigilance in settings where diagnostic options are limited.

Compared to some previously reported cases, our management strategy demonstrated several advantages, particularly given the resource constraints. While Lee et al demonstrated the effectiveness of early MRV in diagnosing CVT and initiating timely anticoagulation, leading to a full recovery, our case demonstrates that a CT scan can serve as a valuable initial diagnostic tool in settings where MRV is not immediately accessible. The prompt use of CT imaging in our case facilitated a quicker diagnosis compared to cases where imaging was delayed,<sup>34</sup> potentially contributing to the positive outcome. Furthermore, the multidisciplinary approach involving gynecologists, neurologists, and intensivists likely contributed to optimizing the management of intracranial pressure, seizures, and anticoagulation. This contrasts with cases where a lack of coordinated care may have led to less favorable outcomes.<sup>35</sup>

The potential role of traditional or herbal medications in influencing the patient's coagulation status cannot be ruled out. Traditional medicine is commonly used in Somalia, and some herbal remedies are known to have anticoagulant or procoagulant properties.<sup>33–35</sup> This poses a challenge for accurate clinical assessment, as patients may be hesitant to disclose the use of such remedies due to cultural beliefs or concerns about judgment from healthcare providers. Future research is needed to investigate the prevalence of traditional medicine use among pregnant and postpartum women in the region and to assess the potential impact of specific herbal remedies on coagulation parameters.

However, it's also important to acknowledge the limitations of our approach. The lack of availability of MRV and advanced endovascular therapies restricted our ability to pursue more aggressive interventions. Furthermore, the inability to investigate the potential inherited prothrombotic disorder due to limited resources represents a missed opportunity to gain further insights into the patient's underlying risk factors. Despite these limitations, our case demonstrates that effective management of CVT with hemorrhagic infarction is possible even in resource-limited settings through timely diagnosis, appropriate medical management, and a coordinated multidisciplinary approach.

The successful management of this case contributes to several Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-being) and Goal 5 (Gender Equality). Achieving SDG 3 requires reducing maternal morbidity and mortality, which is directly impacted by the successful management of conditions like CVT. By advocating for early diagnosis and treatment of CVT, this case highlights a path towards improving maternal health outcomes, particularly in low-resource settings. While we are unaware of any specific programs or policies explicitly targeting stroke or CVT diagnosis in postpartum women in Somaliland, and despite our efforts, we were unable to locate publicly available documentation detailing even broader maternal health initiatives. This lack of readily accessible information highlights a critical need for greater transparency and data sharing regarding healthcare programs and their implementation in Somaliland. Without such transparency, it is difficult to accurately assess the current landscape of maternal health interventions and to effectively advocate for targeted improvements. We can encourage Somaliland's Ministry of Health and related stakeholders to prioritize the formulation of explicit maternal health policies that tackle rare neurological disorders and promote implementation research in this area so as to improve patient care.

This case, along with the challenges encountered in diagnosis and management, underscores the need for specific policy recommendations to improve maternal stroke awareness and outcomes in Somalia/Somaliland. We propose the following:

- **Enhanced Healthcare Provider Training:** Incorporate stroke education, specifically focusing on CVT and its atypical presentations in the postpartum period, into existing maternal health training programs for all healthcare providers. This training should target those working in primary care, antenatal clinics, and emergency obstetric settings to facilitate early recognition and appropriate referral.

- **Public Awareness Campaigns:** Develop and disseminate culturally appropriate educational materials for pregnant and postpartum women on the signs and symptoms of stroke, including headache, visual disturbances, seizures, and focal neurological deficits. These materials should be available in multiple languages and formats (eg, posters, brochures, radio broadcasts) to reach a wide audience. These materials should also emphasize the importance of seeking immediate medical attention if any of these symptoms develop, especially after delivery.
- **Strengthened Referral Systems:** Improve referral systems to ensure that women with suspected stroke can be rapidly transferred to facilities with advanced diagnostic capabilities (eg, CT scanners, MRI) and specialized neurological care. This requires clear referral protocols, reliable transportation options, and effective communication between healthcare providers at different levels of the healthcare system.
- **Data Collection and Surveillance:** Implement a system for collecting data on maternal stroke incidence, risk factors, and outcomes in Somaliland to better understand the burden of disease and to monitor the effectiveness of interventions.
- **Resource Allocation:** Advocate for increased resource allocation towards maternal health services, including funding for stroke education, diagnostic equipment, and specialized neurological care”.

## Conclusion

This case report highlights a rare instance of postpartum cerebral venous thrombosis (CVT) complicated by hemorrhagic infarction in a 35-year-old woman from Somaliland. The initial misdiagnosis as impending eclampsia underscores the critical need to avoid diagnostic anchoring and to maintain a high index of suspicion for CVT in postpartum patients presenting with neurological symptoms. Enhancing diagnostic resources and treatment strategies, particularly in resource-limited settings, can significantly improve maternal health outcomes and reduce morbidity and mortality from CVT, a condition that disproportionately affects women and is often complicated by diagnostic delays due to its similarity to other postpartum conditions.

## Implications

1. **Clinical Practice:** This case emphasizes the need for healthcare providers, particularly in low-resource settings, to be vigilant in considering CVT as a differential diagnosis for postpartum neurological symptoms. Enhanced training and awareness can lead to quicker diagnoses and improved patient outcomes.
2. **Healthcare Access:** The findings underscore the critical need for improved access to advanced imaging techniques, such as CT and MRI, in order to facilitate timely and accurate diagnosis of CVT and similar conditions.
3. **Multidisciplinary Approach:** The case highlights the importance of a multidisciplinary approach in managing complex cases of CVT, which can enhance treatment efficacy and patient support.
4. **Public Health:** Understanding the factors contributing to CVT in postpartum women can inform public health initiatives aimed at reducing maternal morbidity and mortality, particularly in vulnerable populations.

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## Data Sharing Statement

Important for case reports were included in the article, and additional sources of information were not needed.

## Patient Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Ethical Considerations

The study protocol, case investigation, and consent documentation were subjected to rigorous evaluation by the institutional review board of the College of Health Sciences at Amoud University. The study was approved in collaboration with the Ministry of Health and Borama Regional Hospital located in the Awdal Region of Somaliland (BRH-170/2024). Before initiating the study, written informed consent was obtained from each participant involved.

## Acknowledgments

We extend our sincere gratitude to the esteemed director of Borama Regional Hospital, Dr. Ahmed Nour, along with his dedicated staff members at the institution, particularly the physicians who provided exemplary care for the patient, Hoodo Ahmed Hoosh, namely, Mohamed Ali, A. Nasir Ali Bade, and Hasan Aqli, as well as the nursing professionals, Nasra Ahmed, Rahma Abdilahi, Nimco Cawale, Umulkhayr Mohamed, Abdiwahab Osman, Khadra Hassan, and Abdiqani.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Funding

We had no sponsor nor funding for the writing of the case report.

## Disclosure

The authors report no declarations of interest.

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