

# Viper Snakebite Presenting with Cerebral Venous Thrombosis: A Very Rare Case Report from Somalia

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**Abstract:** Cerebral sinus venous thrombosis (CSVT) is an uncommon and potentially life-threatening neurological disorder that is often missed because its clinical and radiological symptoms are not specific. Snake bites are a rare cause of cerebral venous sinus thrombosis that must be recognized and treated promptly to improve survival. Here, we present a case of a 30-year-old male patient who had cerebral venous thrombosis after snake bite in the rural area of southern Somalia. After close monitoring with anticoagulation, the condition of the patient improved and discharged from the hospital with full of consciousness. There are only a few cases reported in the literature of snake bites causing cerebral venous thrombosis.

**Keywords:** snakebite, cerebral venous thrombosis, venom, viper, anticoagulant

## Introduction

Snake bites constitute a significant threat to many people living in rural areas of tropical countries, leading the World Health Organization (WHO) to recognize them as a neglected tropical illness in 2009.<sup>1</sup> Snakebite envenoming affects a significant number population every year, with several hundred thousand people being affected. Unfortunately, 5% of these victims died from complications associated with snakebite envenoming.<sup>2,3</sup> Unfortunately, southern Asia has the highest number of deaths caused by snakebites among the five continents.<sup>4</sup> Nevertheless, the launch of antivenom (AV) has significantly improved the chances of survival after being bitten by a venomous snake.<sup>5</sup> The pathophysiology of CVST is not well recognized. However, it is suggested that thrombosis causes a rise in intracranial pressure, causing a series of reactions involving cytotoxic and vasogenic edema, parenchymal bleeding, and hemorrhagic infarction.<sup>6</sup>

Snake venoms consist of complex combinations of enzymes, lipids, nucleotides, and carbohydrates. Snake venom has three primary toxins: hemotoxins, neurotoxins, and cytotoxins.<sup>7</sup> These toxins cause systemic harm, including cerebral complications. Complications frequently seen after viper envenomings include cerebral hemorrhage, ischemic stroke, cerebral infarction, and secondary inflammation. These complications are mostly caused by hemotoxic enzymes found in snake venom, such as snake-venom metalloproteinases (SVMPs),<sup>8</sup> coagulant enzymes,<sup>9</sup> and proteolytic enzyme toxicity.<sup>10</sup> Snake bites from poisonous species (esp. Viper envenom containing species) can result in a range of symptoms, such as superficial puncture wounds accompanied by pain and swelling, symptoms of nausea leading to vomiting, dizziness, and dyspnea.<sup>11</sup> Cerebral venous sinus thrombosis (CVST) is a rare and life-threatening illness defined by unclear clinical symptoms like headaches and nausea, making it difficult to diagnose accurately. Cerebral venous thrombosis (CVT) is more prevalent in young and middle-aged individuals, specifically, specifically, in women, with a threefold greater risk compared to males. However, this difference in gender is not observed in children or the elderly.<sup>12</sup> The unequal sex ratio is caused by gender-specific risk factors, such as the intake of oral contraceptives, pregnancy, especially during the postpartum period, and hormonal replacement therapy.<sup>13</sup> The symptoms presented by patients with CVT are quite different. The commonest and

typically initial signal of CVT is a severe headache, which happens in 60–90% of patients.<sup>14,15</sup> Within 2 weeks of diagnosis, 30–40% of patients develop acute symptomatic seizures, which is significantly higher than the incidence of seizures in the acute phase of arterial stroke (2–9%) or spontaneous ICH (8–14%).<sup>16,17</sup> The diagnosis of cerebral venous thrombosis is determined by the clinical presentation, magnetic resonance and CT venography are both appropriate for diagnosing CVT; however, the former is significantly better at seeing brain parenchymal lesion.<sup>18</sup> Unlike other types of strokes caused by occlusion of arteries, cerebral venous thrombosis (CVT) has a more favorable prognosis when identified and treated immediately.<sup>19</sup> The present case here describes a 30-year-old male patient who had cerebral venous thrombosis after a snake bite in a rural area of southern Somalia. The case illustrated the potential of snake bite envenomation to cause CVT and also emphasizes the significance of considering this complication during the treatment of patients with severe envenomation. By reporting this case, we expect to contribute to the body of knowledge about the possible neurological effects of snakebite envenomation.

## Case Presentation

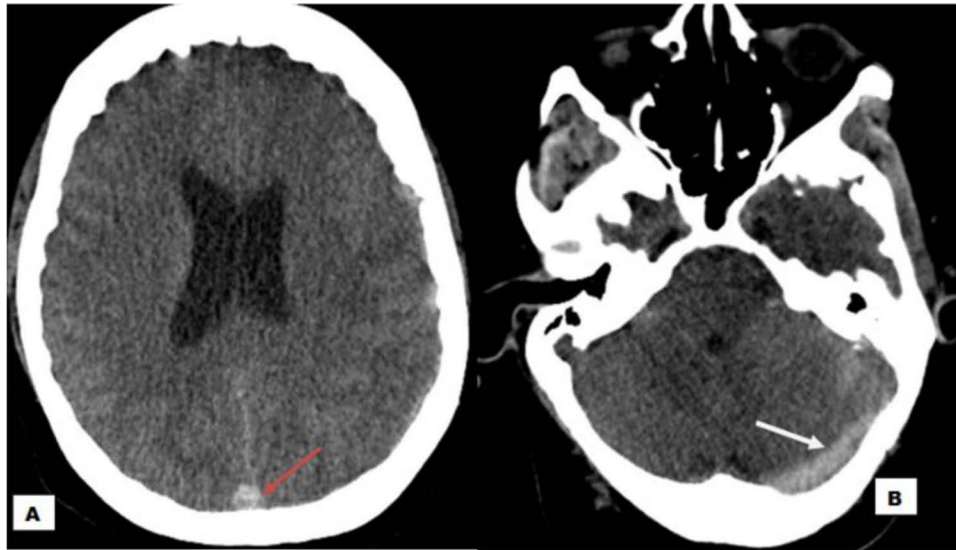
A 30-year-old male patient with no significant past medical history came to the emergency department of our hospital because of a convulsion and decreased level of consciousness for five days. The patient had a viper snake bite as the patient's family saw and noticed. After 30 minutes of snake bite, patient's level of consciousness decreased with too much pain on left leg where snake bite occurred, shortly after, suddenly, he developed generalized tonic clonic convulsions. Patient did not receive immediate health service as he lived in rural areas where there was no health facility, and they took him to Mogadishu-Somalia Turkey Recep Tayyip Erdogan Training and Research Hospital 2 days after several attacks involving seizures and deteriorating his consciousness level. The family reported that the patient was received three 10-mL polyvalent anti-snake venom in a military based facility at the incident site, but the family could not take a picture or kill the snake. According to that area of southern Somalia, which is part of sub-Saharan countries, the most present and coursing condition of snake bite is viper. There is a left foot plantar ulcer, which shows the site of the snake bite (Figure 1).

On arrival at our emergency department vital signs: BP 135/88, oxygen saturation 89 mmHg, RR 16, HR 110, and temperature 37.5 C. On neurological examination, he had decreased level of consciousness with GCS 9/15. Pupils both were equal and reactive to light; likewise, other cranial nerve examinations were normal. Bilateral Babinski sign was positive during examination. Other physical examinations were unremarkable, except the left foot was found to have superficial puncture wounds consistent with fang marks just below the great toe (1cm below the toe). His laboratory

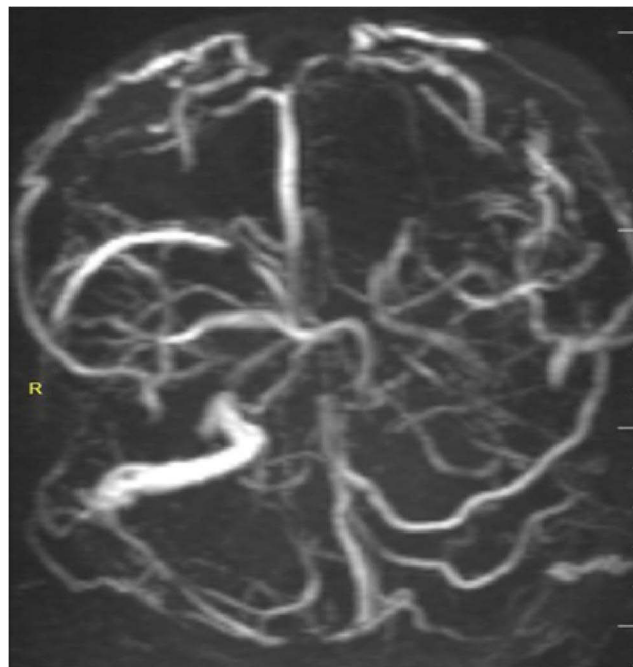


**Figure 1** Shows the left foot plantar ulcer of the patient, the white circles indicating the snake bite at the lateral side of the foot after 10 days from the snake bite.

investigation: leukocytosis (WBC: 17000), high level of hemoglobin (19,2), all biochemistry panel were within normal range except increased CRP (64) and creatine kinase (224). Coagulation parameters were within the normal limits. Thrombophilia screenings such as protein C and S levels could not be done due to the lack of availability in our laboratory. Non-contrast brain CT at the emergency department revealed hyperdense of superior sagittal sinus and left transverse sinus raising concerns of underlying venous thrombosis (Figure 2). A cranial MR venogram confirmed the presence of extensive thrombosis involving the superior sagittal sinus, bilateral transverse, left sigmoid sinuses, and left jugular venous bulb (Figure 3).



**Figure 2** Non-contrast computed tomography of the brain revealed a hyperdense superior sagittal sinus (A) and left transverse sinus (B) both the red and white arrow indicating dural sinus thrombosis.



**Figure 3** Cranial magnetic resonance venogram confirmed the presence of extensive thrombosis involving the superior sagittal sinus, bilateral transverse, left sigmoid sinuses, and left jugular venous bulb.

The patient was resuscitated in the emergency department and started on nasal oxygen, an injection of 2 g ceftriaxone, tetanus toxoid 0.5 mL IM, and 5 mg midazolam IV, and intubated due to multiple attacks of seizure and consciousness deteriorating. The patient was admitted to the intensive care unit and treated with low molecular weight heparin, followed by warfarin in a sequential manner. Mannitol was administered to decrease intracranial pressure. The patient was given Levetiracetam 500 mg twice daily infusion in order to manage the seizure. The patient was extubated and transferred from the ICU to the neurology ward after 4 days of admission, with a significant improvement in consciousness and seizure. After 5 days of monitoring and neurological evaluation, the patient was discharged with no attack of seizure during the admission, and the patient can speak and walk independently. The medications that have been discharged are oral levetiracetam 500 mg tablets twice a day and warfarin 5 mg tablets once a day for 3 months.

## Discussion

Snake bite is a neglected primary health problem, mainly affecting rural inhabitants, where access to medical care is very poor. In Africa and sub-Saharan countries, health workers are rarely prepared to deal with snake bite cases, and suitable antivenom is often not available.<sup>20</sup> In Africa, the real rate of snakebite varies between 100 and 650 bites per 100,000 people annually, and in rural areas, the annual mortality rate can surpass 10 deaths per 100,000 people. These numbers contribute to an estimated 1 million snakebites and 25,000 deaths annually across sub-Saharan Africa.<sup>21</sup> The guidelines for prevention and clinical management of snake bites in Africa have been developed by the World Health Organization regional office for Africa with contributions from technical experts. They discuss snake venoms, snake bites, and their consequences, with an emphasis on the medical importance of the snake, which causes serious envenoming.<sup>22</sup>

Snake venom is a complex mixture of enzymes, lipids, carbohydrates, and nucleotides. Snake venom contains three main toxins: hemotoxins, neurotoxins, and cytotoxins, all of which cause systemic damage, including cerebral hemorrhage, infarction, and systemic secondary inflammation, which all of them are common sequelae of vipers envenomings caused by hemotoxic enzymes like snake-venom metalloproteinases (SVMPs), coagulant enzymes, and proteolytic enzyme toxicity.<sup>23</sup> It is very rare that a snake bite causes cerebral venous thrombosis; only three cases have been reported in the literature. Our case will be the fourth. Cerebral sinus venous thrombosis (CSVT) is one of the causes of stroke in young adults, mainly in the female population. It results from the occlusion of partial or complete sinuses of the brain, especially the superior sagittal and transverse sinuses. The clinical manifestations are severe headaches, seizures, focal neurological difficulties, and altered mental status.<sup>24</sup> The treatment of CVST involves anticoagulation and diagnosing and treating the underlying etiology.<sup>25,26</sup> Our case is a 30-year-old male who is a soldier and works in a rural area of Southern Somalia. He developed an altered level of consciousness after a reported snake bite at his left foot. They gave antivenom in the same area and referred them to our hospital. After neurological and imaging examination with CT, brain, and MRV showed superior sagittal and transverse sinus thrombosis, after intensive care admission with anticoagulation, the patient discharged with good improvement, started walking by himself. Snake bites that cause cerebral venous thrombosis are rare, and need special attention and care in patients with snake-induced altered mental status and seizures. Community members and health workers in rural areas need to be educated about what to do and what not to do in snake bite cases and to transfer in cases of altered levels of consciousness in order to get an accurate and early diagnosis and treatment.

## Conclusion

Cerebral venous thrombosis resulting from snake bites is a rare occurrence. However, if diagnosed and treated promptly, the prognosis is good. On the other hand, if left untreated, mortality and morbidity rates are significantly increased. Thus, any patient with a previous snake bite and experiencing symptoms such as headache, seizure, or altered mental status should be very suspicious of cerebral venous sinus thrombosis (CVST).

## Consent Form

A written consent form was obtained from the patient for the image and publication of this case report.

## Ethical Consideration

No ethical approval is required for the publication of case reports from our hospital (Mogadishu-Somalia Turkey Recep Tayyip Erdoğan Training and Research Hospital).

## 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.

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## Disclosure

The authors have no conflicts of interest.

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