

Overcoming Diagnostic and Management Hurdles: A Case Report on Superior Sagittal Sinus Thrombosis with Subarachnoid Hemorrhage

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Abstract

Cerebral venous thrombosis is a rare but critical condition, presenting significant diagnostic challenges due to its varied clinical manifestations. This report underscores the complexity of the superior sagittal sinus thrombosis diagnosis and management, highlighting the need for heightened clinical awareness and prompt intervention.

We present a case of a 47-year-old male with a history of cerebral aneurysm, who arrived at the emergency department exhibiting acute neurological symptoms, including loss of consciousness, seizures, and muscular contractions, without any recent history of trauma or medication use. Neurological examination showed a Glasgow Coma Scale (GCS) of 15, with specific findings suggesting a significant neurological impact. Neuroimaging revealed subarachnoid hemorrhage in the left interhemispheric fissure and thrombosis of the superior sagittal sinus. Despite the complex presentation and rapid progression of symptoms, a multidisciplinary approach involving continuous monitoring, decompressive craniectomy, and subsequent rehabilitative measures led to a significant improvement in the patient's condition.

This case illustrates the critical nature of superior sagittal sinus thrombosis, and the challenges associated with its diagnosis and management. It emphasizes the importance of considering cerebral venous thrombosis in the differential diagnosis of acute neurological events and the effectiveness of a comprehensive, multidisciplinary approach in managing such complex cases. The positive outcome in this case contributes to the growing body of evidence supporting aggressive intervention strategies in managing cerebral venous thrombosis. (**International Journal of Biomedicine. 2024;14(2):341-344.**)

Keywords: cerebral venous thrombosis • superior sagittal sinus • subarachnoid hemorrhage • diagnosis

For citation: Pilika K, Shehu A, Pilika A, Shpuza A, Xhetani X. Overcoming Diagnostic and Management Hurdles: A Case Report on Superior Sagittal Sinus Thrombosis with Subarachnoid Hemorrhage. International Journal of Biomedicine. 2024;14(2):341-344. doi:10.21103/Article14(2)_CR2

Abbreviations

CVT, cerebral venous thrombosis; CT, computed tomography; MRI, magnetic resonance imaging SSS, superior sagittal sinus; SSST, SSS thrombosis; SAH, subarachnoid hemorrhage.

Introduction

Cerebral venous thrombosis (CVT) is a rare disorder with an estimated annual incidence of three to four cases per million, occurring slightly less frequently in peripartum and postpartum pregnant women (about 12 cases per 100,000 deliveries) compared to peripartum and postpartum arterial

stroke, and it is three times more common in women than in men.⁽¹⁾ Initial presenting symptoms that resemble stroke in young patients, including focal neurological deficits like hemiparesis, signs of intracranial hypertension, seizures, and encephalopathy, should prompt consideration of thrombosis of the superior sagittal sinus (SSS), a major component of the superficial cerebral venous system, due to its variable

presentation.⁽²⁾ Surgical thrombectomy is typically considered for severe neurological decline not improved by medical treatments, while decompressive surgery, despite being primarily supported by level C evidence, is deemed life-saving for large venous infarcts and hemorrhages with a risk of herniation, showing favorable outcomes in over 50% of patients and a mortality rate around 20%.⁽³⁾ Given the intricate nature of CVT diagnosis and the broad spectrum of initial symptoms that may mimic those of a stroke, this case underscores the paramount importance of incorporating CVT, particularly superior sagittal sinus thrombosis (SSST), into the differential diagnosis of acute neurological events. It supports the utility of aggressive, multidisciplinary management strategies to optimize patient outcomes.

Case Presentation

A 47-year-old male patient presented to the Emergency Department of Internal Diseases at University Medical Center "Mother Teresa," with a history of a recent episode involving loss of consciousness, muscle spasms, and fixed gaze. The patient had been diagnosed with a cerebral aneurysm two years prior and had been monitored dynamically with MRI scans of the cranium. He reported no history of trauma and was not on any medications at the time.

Neurological examination revealed a Glasgow Coma Scale (GCS) score of 15 and a Hunt and Hess grade of 2. The patient was alert, conscious, and oriented in time, space, and person. Pupils were isochoric and photoreactive, with intact oculomotor function and no facial asymmetry. There were no evident deficits in other cranial nerves. The neck was rigid and painful on flexion. There were no sensory-motor deficits in the upper limbs, but a 3/5 deficit was noted in the lower right side.

Cranial CT and supra-aortic Angio CT scans showed subarachnoid hemorrhage (SAH), predominantly interhemispheric on the left side, with no evidence of an aneurysm in this examination. There was an absence of the A1 segment on the right side and lack of contrast in the anterior two-thirds of the SSS, suggesting thrombosis (Figure 1). Cranial MRI confirmed SAH mainly on the left interhemispheric side and the absence of contrast in two-thirds of the SSS, indicating sinus thrombosis.

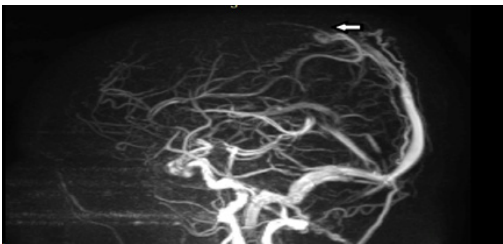


Fig. 1. The superior sagittal sinus is not visualized in its anterior two-thirds, indicating extensive thrombosis.

Initially, the patient was hospitalized in the Stroke Unit for continuous monitoring. After 10 hours, discreet right-sided prefrontal cortex symptoms and motor deficits on the right

side were noted. Twelve hours later, the patient's condition worsened, showing closed eyes, unresponsive to verbal stimuli, right-sided hemiplegia, and spontaneous movement on the left side. After 16 hours, anisocoria began. Repeated cranial CT and MRI scans revealed an enlargement of the intraparenchymal hemorrhage with ventricular effusion (Figure 2). The patient was then transferred to the Neurosurgery ICU. On August 12, 2023, a decompressive right hemicraniectomy and evacuation of the hematoma were performed (Figure 3). A tracheostomy was performed on August 16. The skull was reconstructed without cortical damage on August 31 (Figure 4).

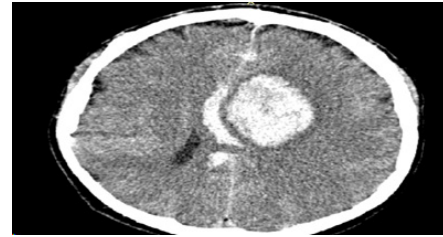


Fig. 2. CT scan revealed an enlargement of the intraparenchymal hemorrhage with ventricular effusion.

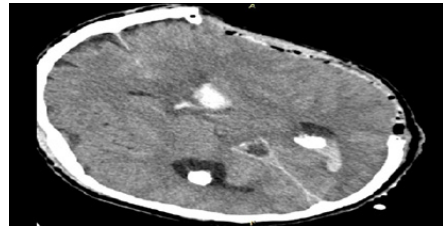


Fig. 3. A decompressive right hemicraniectomy and evacuation of the hematoma were performed.

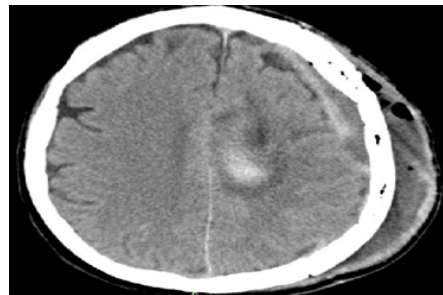


Fig. 4. Skull reconstruction without cortical damage.

During hospitalization, the patient was dynamically monitored with laboratory analyses and imaging examinations and received multidisciplinary consultations from neurology, infectious diseases, and hematology departments. The patient was discharged in an improved condition on September 19, 2023.

Discussion

In the intricate landscape of neurology, the diagnosis and management of SSST intertwined with SAH represent a formidable challenge, exemplified by the case of a 47-year-old male with a notable history of a cerebral aneurysm. This case encapsulates the critical nature of cerebral venous thrombosis and its potential to manifest in a spectrum of clinical presentations, underscoring the diagnostic hurdles and the imperative for prompt, multifaceted intervention strategies. The patient's acute neurological symptoms, devoid of any recent trauma or medication history, accentuate the unpredictable clinical course of cerebral venous thrombosis, aligning with the diagnostic complexities highlighted by other studies, which have advocated for cerebral venous thrombosis to be considered in the differential diagnosis of acute neurological events to mitigate the risk of rapid clinical deterioration.⁽⁴⁾

The use of sophisticated neuroimaging techniques, such as CT and MRI, has played an important role in establishing the SSST diagnosis and associated SAH. This echoes the sentiments of Ferro et al.⁽⁵⁾ regarding the indispensable role of imaging in accurately identifying and characterizing cerebral venous thrombosis and its sequelae.

This case's pivotal decision to undertake decompressive craniectomy highlights the potential life-saving outcomes of aggressive surgical intervention in the face of large venous infarcts and hemorrhagic complications, reinforcing the critical need for timely and decisive action in the management of such complex clinical scenarios, also described in the literature.⁽⁶⁾ The comprehensive, multidisciplinary approach to patient care, encompassing continuous monitoring and expert consultations from various specialties, mirrors the integrated care model proposed by Stam for optimizing patient outcomes in cerebral venous thrombosis, emphasizing the value of collaborative, cross-disciplinary strategies in navigating the complexities of this condition.⁽⁷⁾

This case not only showcases the multifaceted challenges in diagnosing and treating superior sagittal sinus thrombosis with subarachnoid hemorrhage but also illuminates the importance of maintaining a high index of suspicion, leveraging advanced neuroimaging techniques, and adopting a coordinated, aggressive management plan, as echoed in the broader literature.

Further, the literature underscores the variability in cerebral venous thrombosis clinical manifestations, which can range from headache to severe neurological deficits, emphasizing the heterogeneity of cerebral venous thrombosis presentations and the consequent challenges in achieving a timely diagnosis.⁽⁸⁾

This case's reliance on neuroimaging for CVT diagnosis and the subsequent surgical intervention aligns with the recommendations of other studies, which highlight the role of imaging in confirming cerebral venous thrombosis and guiding treatment decisions, particularly in cases where traditional treatment modalities are insufficient.

Many studies support the significance of a tailored therapeutic approach, considering both anticoagulation

therapy and surgical options. Most patients with cerebral venous thrombosis have a good prognosis after anticoagulant therapy, and a minority of patients with malignant cerebral venous thrombosis may also benefit from endovascular treatment or decompressive surgery.⁽¹⁰⁾ Anticoagulation is the current standard of care for cerebral venous thrombosis, but more aggressive therapies, such as mechanical thrombectomy with or without intrasinus thrombolysis, may be required in selected cases.⁽¹¹⁾ This nuanced approach to management, reflecting the complexities inherent in cerebral venous thrombosis cases, further highlights the need for a wide range of therapeutic strategies to address the varied presentations and complications associated with this condition.⁽¹²⁾

This case report not only exemplifies the diagnostic and management challenges associated with superior sagittal sinus thrombosis and subarachnoid hemorrhage but also contributes to the evolving discourse on the necessity for heightened clinical vigilance, the pivotal role of neuroimaging, and the efficacy of a comprehensive, aggressive treatment approach in improving patient outcomes. It reaffirms the consensus within the neurology community, as documented in the literature, on the imperative for an adaptive, multidisciplinary strategy in managing cerebral venous thrombosis, underscoring the continuous evolution of best practices in the face of such complex neurological conditions.

Conclusion

Our case report on a 47-year-old male with superior sagittal sinus thrombosis underscores the critical importance of recognizing and managing this rare but severe condition. Highlighting the necessity for high clinical suspicion, rapid multidisciplinary intervention, and the pivotal role of neuroimaging in diagnosis, the successful outcome of this case reinforces the potential for significant patient recovery. It emphasizes the value of a comprehensive approach, combining surgical, medical, and rehabilitative strategies to address the complex challenges posed by cerebral venous thrombosis, thereby improving patient prognosis and contributing valuable insights to the management of this intricate condition.

Competing Interests

The authors declare that they have no competing interests.

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