



CLINICAL PROFILE AND MANAGEMENT OF CEREBRAL VENOUS SINUS THROMBOSIS: A COMPREHENSIVE REVIEW OF SYMPTOMS, RISK FACTORS, AND OUTCOMES

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ABSTRACT:

Objective: This study aims to provide a comprehensive analysis of the clinical profile of cerebral venous sinus thrombosis (CVST), focusing on symptom prevalence, risk factors, diagnostic challenges, and patient outcomes.

Methods: A retrospective cohort study was conducted using medical records from January 2015 to December 2023 across multiple healthcare institutions. Patients aged 18 and older with confirmed CVST via neuroimaging were included. Data on symptoms, risk factors, diagnostic methods, imaging findings, and treatment outcomes were extracted and analyzed. Exclusion criteria included incomplete records, presence of other significant neurological conditions, and cases where CVST diagnosis was not confirmed by imaging.

Results: The study identified headache (85%), seizures (55%), focal neurological deficits (40%), and altered consciousness (30%) as the most common symptoms of CVST. Risk factors included hypercoagulable states (60%), oral contraceptive use (25%), postpartum period (20%), and systemic diseases (15%). Diagnostic challenges included variable symptom presentation (70%), overlap with other disorders (50%), and delayed imaging (30%). Imaging findings revealed venous sinus thrombosis in 90% of cases, cerebral edema in 60%, and hemorrhage in 40%. Early treatment was associated with favorable outcomes in 70% of patients, while 20% experienced residual deficits and 5% had mortality.

Conclusion: CVST exhibits a diverse clinical presentation with significant implications for diagnosis and management. Headache is the most prevalent symptom, with risk factors predominantly related to hypercoagulability and hormonal changes. Diagnostic challenges and delays in imaging impact outcomes, but early intervention improves prognosis. Continued research and advancements in diagnostic techniques and treatment strategies are essential for better management of CVST and enhancing patient outcomes.

Keywords: Cerebral venous sinus thrombosis, clinical profile, symptoms, risk factors, diagnostic challenges, treatment outcomes

INTRODUCTION

Cerebral venous sinus thrombosis (CVST) is a rare but potentially severe form of cerebral venous thrombosis that affects the venous sinuses of the brain. This condition can lead to significant neurological impairment or even death if not diagnosed and managed promptly. The clinical profile of patients with CVST is

diverse, with a broad range of symptoms that can complicate diagnosis. Patients may present with headaches, seizures, focal neurological deficits, or altered consciousness, which can mimic other neurological disorders, making early diagnosis challenging.

CVST can occur in individuals of any age, though it has a notable prevalence in young adults and women, particularly during the postpartum period. The pathophysiology involves the formation of a thrombus in the cerebral venous sinuses, which disrupts normal venous outflow and can lead to increased intracranial pressure and secondary cerebral ischemia. The clinical presentation varies widely based on the location of the thrombus and the extent of the resultant cerebral damage.

The risk factors for CVST include conditions such as hypercoagulable states, infection, trauma, and certain medications, particularly hormonal contraceptives. Other predisposing factors include systemic diseases like systemic lupus erythematosus and certain malignancies. Understanding the clinical profile of CVST patients helps in tailoring specific diagnostic and therapeutic approaches. Recent advances in imaging techniques and management strategies have improved outcomes, but timely recognition and treatment remain critical.

Aim

To investigate the clinical profile of patients with cerebral venous sinus thrombosis (CVST) by evaluating common symptoms, associated risk factors, diagnostic challenges, and treatment outcomes.

Objectives

1. To identify and characterize the most prevalent symptoms and neurological deficits in patients with CVST.
2. To assess the primary risk factors and predisposing conditions associated with CVST and their impact on patient outcomes.

Materials and Methods

This study employed a retrospective cohort design to analyze the clinical profile of patients diagnosed with cerebral venous sinus

thrombosis (CVST). We conducted a detailed review of medical records from multiple healthcare institutions, covering the period from January 2015 to December 2017. Data were collected from patients who were diagnosed with CVST based on clinical presentation and confirmed by neuroimaging, such as magnetic resonance imaging (MRI) or computed tomography (CT) scans.

Inclusion Criteria for this study were: (1) patients with a confirmed diagnosis of CVST based on neuroimaging; (2) patients aged 18 years or older; and (3) availability of complete medical records including clinical symptoms, risk factors, treatment regimens, and follow-up outcomes. We included only those studies where detailed information on symptoms, risk factors, imaging findings, and treatment outcomes was available.

Exclusion Criteria consisted of: (1) patients with incomplete or missing clinical records; (2) those who had other significant neurological conditions that could confound the diagnosis of CVST; (3) pediatric patients under 18 years of age; and (4) cases where the diagnosis of CVST was not confirmed by imaging studies.

Data extraction involved reviewing patient charts for demographics, clinical presentation, predisposing factors, diagnostic methods, and treatment outcomes. This information was systematically compiled and analyzed to identify common clinical patterns, evaluate the impact of risk factors, and assess treatment effectiveness. Statistical analysis was performed to determine the association between risk factors and clinical outcomes, using descriptive and inferential statistical methods. The study was approved by the institutional review board, and patient confidentiality was maintained throughout the research process.

Results

Table 1: Prevalent Symptoms in CVST Patients

Symptom	Percentage of Patients
Headache	85%
Seizures	55%
Focal Neurological Deficits	40%
Altered Consciousness	30%

The data reveal that headache is the most frequently reported symptom, present in 85% of patients with CVST. Seizures and focal neurological deficits are also common, observed in 55% and 40% of patients, respectively. Altered consciousness is noted in 30% of cases, indicating more severe manifestations.

Table 2: Risk Factors Associated with CVST

Risk Factor	Percentage of Patients
Hypercoagulable States	60%
Oral Contraceptive Use	25%
Postpartum Period	20%
Systemic Diseases (e.g., SLE)	15%

Hypercoagulable states are identified as the most significant risk factor for CVST, affecting 60% of patients. Oral contraceptive use and the postpartum period are relevant in 25% and 20% of cases, respectively. Systemic diseases like systemic lupus erythematosus contribute to 15% of the cases.

Table 3: Diagnostic Challenges in CVST

Challenge	Percentage of Cases
Variable Symptom Presentation	70%
Overlap with Other Disorders	50%
Delayed Imaging	30%

Diagnostic challenges are significant, with 70% of patients presenting with variable symptoms that complicate early diagnosis. Overlap with other neurological disorders affects 50% of cases, and 30% experience delays in imaging, which can impact timely treatment.

Table 4: Imaging findings in CVST

Imaging Finding	Percentage of Patients
Venous Sinus Thrombosis	90%
Cerebral Edema	60%
Hemorrhage	40%

Neuroimaging commonly shows venous sinus thrombosis in 90% of patients. Cerebral edema is observed in 60% of cases, and hemorrhage is noted in 40%, reflecting the range of complications associated with CVST.

Table 5: Patient Outcomes

Outcome	Percentage of Patients
Favorable Outcomes with Early Treatment	70%
Residual Deficits	20%
Mortality Rate	5%

Early treatment leads to favorable outcomes in 70% of patients. However, 20% experience residual deficits, and the mortality rate stands at 5%, underscoring the importance of prompt and effective management.

Discussion

Cerebral venous sinus thrombosis (CVST) presents a multifaceted clinical picture,

characterized by a diverse range of symptoms, risk factors, and diagnostic challenges. This review highlights several key aspects of the clinical profile of CVST, providing insights into the prevalence of symptoms, associated risk factors, and outcomes.

Headache is identified as the most prevalent symptom, affecting 85% of patients, consistent with prior studies emphasizing headache as a

hallmark of CVST (1,4). The frequency of seizures (55%) and focal neurological deficits (40%) corroborates findings that these symptoms often result from the elevated intracranial pressure and venous congestion associated with CVST (3,6). Altered consciousness, reported in 30% of cases, indicates more severe disease, which aligns with previous research showing that severe manifestations are linked to worse outcomes (8).

Risk factors for CVST include hypercoagulable states, oral contraceptive use, and the postpartum period. Hypercoagulable conditions are present in 60% of patients, highlighting their significant role in the pathogenesis of CVST (7,13). The association with oral contraceptives (25%) and the postpartum period (20%) reflects known hormonal influences on thrombosis risk (11). Systemic diseases like systemic lupus erythematosus (15%) also contribute to the risk, emphasizing the need to consider CVST in patients with such underlying conditions (4).

Diagnostic challenges are a major issue, with 70% of patients presenting with variable symptoms that complicate early identification. The overlap of CVST symptoms with other neurological disorders can delay diagnosis, as noted in 50% of cases (6). Delayed imaging, occurring in 30% of patients, further underscores the importance of timely neuroimaging to confirm diagnosis and guide treatment (9).

Imaging findings consistently reveal venous sinus thrombosis in 90% of cases, with associated cerebral edema (60%) and hemorrhage (40%) (13,14). These findings are consistent with the pathophysiology of CVST, where thrombosis leads to impaired venous outflow and secondary complications such as edema and hemorrhage (13).

Outcomes are generally favorable with early treatment, as seen in 70% of patients who experience positive results. However, 20% of patients have residual deficits, and the mortality rate of 5% highlights the critical need for prompt intervention and effective management strategies (13,14).

In conclusion, the clinical profile of CVST is diverse, with significant implications for diagnosis and treatment. Improved awareness of symptoms and risk factors, coupled with timely imaging and intervention, is crucial for optimizing patient outcomes and minimizing long-term complications.

Conclusion

Cerebral venous sinus thrombosis (CVST) is a complex and heterogeneous condition with a broad clinical spectrum. The findings from this review underscore that headache, seizures, focal neurological deficits, and altered consciousness are the most prevalent symptoms, highlighting the variability in how CVST can present. Identifying these symptoms is crucial for early diagnosis and intervention.

The study confirms that hypercoagulable states, oral contraceptive use, and the postpartum period are significant risk factors for CVST. These associations emphasize the importance of considering CVST in patients with known thrombotic risks or those experiencing relevant hormonal changes. The presence of systemic diseases like systemic lupus erythematosus further complicates the risk profile and necessitates a thorough evaluation in such patients.

Diagnostic challenges remain a major concern due to the diverse presentation of symptoms and the potential for overlap with other neurological disorders. Delays in imaging and diagnosis can adversely impact patient outcomes, underscoring the need for heightened clinical awareness and prompt neuroimaging to confirm the diagnosis.

Imaging typically reveals venous sinus thrombosis, often accompanied by cerebral edema and hemorrhage, reflecting the pathophysiological impact of impaired venous drainage and resultant secondary effects. Early and accurate diagnosis is critical, as timely treatment significantly improves outcomes, with 70% of patients experiencing favorable results. Nonetheless, a subset of patients faces residual deficits or mortality, highlighting the need for

ongoing vigilance and refinement of treatment strategies.

In summary, improving the recognition of CVST symptoms, understanding associated risk factors, and addressing diagnostic challenges are essential for optimizing patient management. Continued research and advancements in diagnostic and therapeutic approaches will be key to enhancing patient outcomes and reducing the burden of CVST.

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