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Clinical Characteristics and Management of Cerebral Venous Thrombosis: Insights from an Indian Cohort

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Abstract: Cerebral venous thrombosis (CVT) poses significant diagnostic and therapeutic challenges, particularly in young and postpartum individuals, owing to its diverse and sometimes deceptive clinical presentations. This study aimed to assess the clinical profiles and diagnostic approaches in a cohort of CVT patients in India. Forty patients, clinically suspected of CVT, were enrolled from the Medical Emergency Ward and underwent neuroimaging evaluation. Analysis of the data revealed a predominance of females (M:F = 1:19) in the peripartum period, with the highest incidence observed in the 21-40 age group. Headache (87.5%), seizures (67.5%), and altered sensorium (55%) were among the most common presenting symptoms, with a subacute mode of presentation in 70% of cases. Radiologically, the superior sagittal sinus was frequently involved (60%). Prognosis was favorable in both puerperal and non-puerperal groups. Diagnosis of CVT necessitates a high index of suspicion, with key clinical indicators including seizures, recent headache, vomiting, and papilloedema in appropriate clinical contexts. Neuroimaging emerged as pivotal in diagnosis, with management involving heparin and oral anticoagulants deemed safe and effective. This study underscores the importance of recognizing the clinical features of CVT and highlights the efficacy of neuroimaging and anticoagulation therapy in its

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management, providing valuable insights for clinicians managing similar cases in the Indian population.

(**Keywords**: Cerebralvenousthrombosis; Peripartumperiod; Neuroimaging;Clinical presentations)

Inroduction: Cerebral Venous Sinus Thrombosis (CVT) poses ongoing challenges for clinicians due to its diverse and often misleading clinical presentation. Despite its recognition since the nineteenth century, diagnosing and treating CVT remains difficult. It constitutes a notable subset of cerebrovascular diseases and ranks among the leading causes of stroke in India. According to Cross et al[1], recovery from CVT is typically rapid and complete if the patient survives the acute episode. In pregnancy and the postpartum period, three-fourths of reported cases of cerebral thrombosis resulted in good recovery. Headache emerges as the most common and often earliest symptom[2]. Diagnosing CVT demands a high index of suspicion. While CT brain scans may reveal direct or indirect signs of CVT, they may appear normal in 10% of cases. In such instances, advanced neurological diagnostic tools like Magnetic Resonance Imaging with venography become necessary for confirmation, albeit not always readily available in many hospitals [3].Early detection proves crucial as prompt treatment can mitigate morbidity and potentially save lives.

CVT is deemed a medical emergency [4], characterized by highly variable onset and a broad spectrum of clinical manifestations. This study aims to assess a cohort of CVT patients, focusing on their clinical presentations and pertinent investigations.

Objective: The aim of this study is to analyze the clinical characteristics of cerebral venous thrombosis (CVT).

Methodology : Between March 2011 and April 2024, this study enrolled patients diagnosed with cerebral venous sinus thrombosis and admitted to Kurnool Medical College & General Hospital in Kurnool. A total of forty patients were selected based on clinical presentation and CT findings indicative of cerebral sinus venous thrombosis. Inclusion criteria included patients with a history suggestive of cerebral venous thrombosis, confirmed by brain imaging through CT scans revealing both direct and indirect signs. Direct signs comprised hyperdense sinus, cord sign, empty delta sign, and dense triangle sign on plain CT scans, while indirect signs included cerebral edema, cerebral infarction outside arterial

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territories, small ventricles, bilateral signs, gyral enhancement, and tentorial enhancement.

Results: In the current investigation, a total of 40 cases of cerebral venous thrombosis (CVT) were meticulously examined. The mean age of the patients was 24.2 years, with the majority falling within the age range of 21-40 years, constituting 70% of the cohort. Notably, the youngest patient was 17 years old, while the oldest was 56 years. Regarding gender distribution, the study revealed a striking predominance of females, with 38 females compared to only 2 males, reflecting a male-to-female ratio of 1:19. In terms of literacy status, the majority of patients were found to be illiterate (65%), followed by those with primary education (25%) and secondary education and above (10%). Socio-economic status, as classified by the modified Kuppuswami's scale, indicated that 67.5% of patients belonged to the low socio-economic class, while 22.5% were classified as middle class. Puerperal CVT was the most prevalent type, accounting for 90% of cases, whereas non-puerperal CVT constituted the remaining 10%. Among puerperal cases, a significant portion (69.44%) had home deliveries. The onset of CVT symptoms predominantly occurred within 1-10 days post-delivery, as observed in 69.44% of puerperal patients.

Clinical presentation revealed that 70% of CVT cases had a subacute onset, followed by 27.5% with acute onset. Neurological manifestations included hemiplegia (42.5%), dysphasia (17.5%), and papilloedema (37.5%). Anemia was prevalent, with 75% of patients exhibiting hemoglobin levels below 10g%. CT

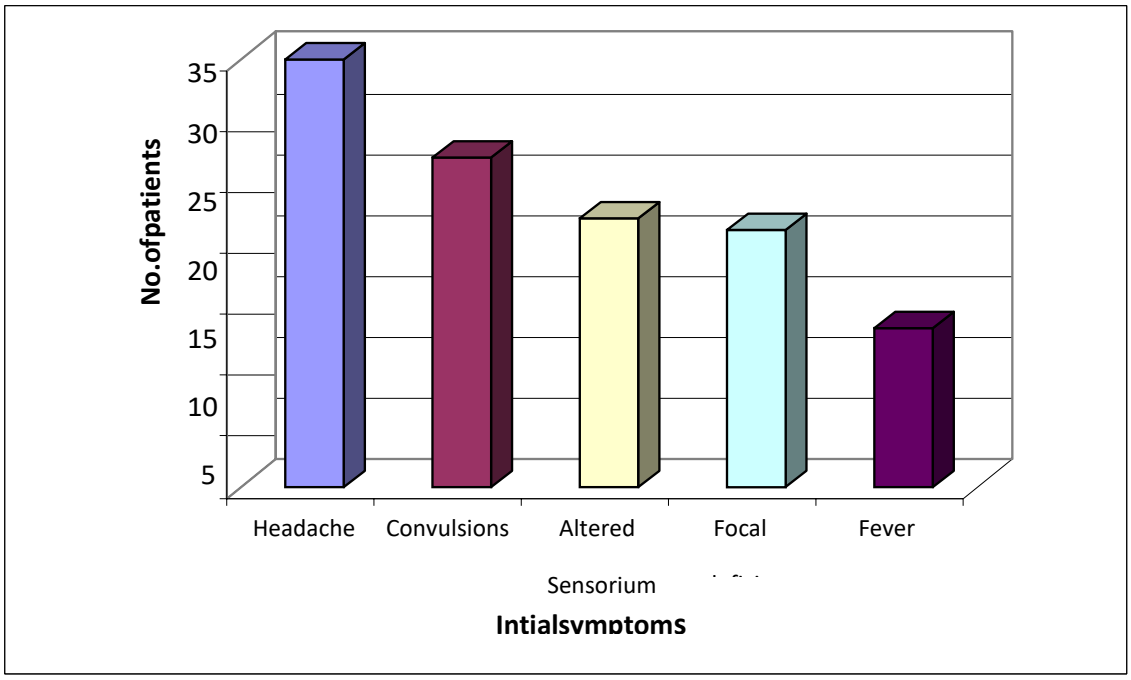

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Figure 1: clinical manifestations

scan findings depicted edema (87.5%) and hemorrhagic infarction (55%) as the most common. Superior sagittal sinus was the most frequently involved sinus (65%). In terms of mortality, the study reported a total of 4 deaths, with a mortality rate of 10%.

Discussion: In this study, a comprehensive analysis of 40 cases of cerebral venous thrombosis (CVT) was undertaken, shedding light on various demographic, clinical, and investigative aspects. The mean age of onset was found to be 24.2 years, with a significant proportion of patients falling within the age range of 20-40 years, consistent with previous studies by Nagaraj et al. and Ameri et al[5]. The preponderance of cases in this age group could be attributed to peripartum events, as observed in our setting. Interestingly, the study revealed a markedly skewed sex ratio with a male-to-female ratio of 1:19. While this ratio deviates from previous findings, it underscores potential lacunae in our study methodology compared to studies utilizing advanced diagnostic modalities. A notable majority of patients were found to be illiterate (65%) and belonged to the low socio-economic strata, likely influenced by unhygienic health practices prevalent among this demographic.

Puerperal CVT constituted the majority (90%) of cases, aligning with findings from Nagaraj et al. and Neki NS et al[6]. This underscores the significance of peripartum events as a common precipitating factor.The study revealed that a significant proportion (69.44%) of patients presented within 10 days post-delivery, consistent with findings by Kumar S et al[7]. Altered level of consciousness was observed in 55% of patients, comparable to previous studies by Nagaraj et al. and Neki NS et al. Headache emerged as the most prevalent symptom (87.5%), aligning with observations from various other studies.

Anemia was prevalent in 75% of patients, especially notable in puerperal CVT cases[8]. However, investigative procedures like CSF analysis often yielded non-specific findings, emphasizing the need for further research into more accurate diagnostic markers. Hemorrhagic infarction (55%) emerged as the most common CT scan finding, consistent with observations from Nagaraj et al. and Dixit et al. Superior sagittal sinus involvement was predominant (65%), corroborating findings from Strolz E et al. and Ameri et al. Despite the severity of CVT, the study reported a mortality rate of 10%, akin to findings from Strolz E et al[9], Srinivas et al[10], and Nagaraj et al. This emphasizes the critical importance of prompt diagnosis and intervention in mitigating adverse outcomes.

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Overall, this study provides valuable insights into the demographic, clinical, and investigative aspects of CVT, further highlighting the need for continued research to enhance diagnostic accuracy and improve patient outcomes.

Conclusion: The current study underscores the significance of cerebral venous thrombosis (CVT) as a notable cause of stroke, particularly prevalent in peripartum settings and among young individuals. The spectrum of clinical presentations associated with CVT is notably diverse, with important clinical signs including seizures, recent headache, vomiting, and papilloedema in relevant clinical contexts. MRI with MR venography stands out as the diagnostic test of choice for this condition. Management typically involves initiating treatment with intravenous heparin followed by oral anticoagulants, with the prognosis generally deemed favorable. This study highlights the critical importance of early recognition, accurate diagnosis, and timely intervention in optimizing outcomes for patients with cerebral venous thrombosis.

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