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CEREBRAL VENOUS SINUS THROMBOSIS WITH BLUNT HEAD INJURY IN A PEDIATRIC PATIENT- A CASE REPORT

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ABSTRACT Cerebral venous sinus thrombosis (CVST) is an uncommon condition, accounting for less than 0.5 to 1–2% of all strokes. It most commonly affects the sagittal sinus (70–80%) and the transverse and sigmoid sinuses (70%) and can also involve cerebral veins. Cerebral venous sinus thrombosis following blunt trauma to the head is a relatively uncommon condition and is often overlooked due to the rarity of the situation and thus results in increased mortality. Here we present a rare case report of a pediatric patient from Arunachal Pradesh who presented with cerebral venous sinus thrombosis and was admitted in Assam Medical College and Hospital.

KEYWORDS : cerebral venous sinus thrombosis, pediatric, trauma , head injury

Introduction:

Cerebral venous sinus thrombosis (CVST) is an uncommon condition, accounting for less than 0.5 to 1–2% of all strokes[1–3]. It most commonly affects the sagittal sinus (70–80%) and the transverse and sigmoid sinuses (70%) and can also involve cerebral veins. CVST is typically idiopathic but can be linked to factors such as thrombophilia, pregnancy, chronic inflammatory conditions, and meningitis. Nevertheless, a rare but often neglected cause is traumatic head injury.[4]

The clinical presentation of CVST is highly variable and nonspecific, with symptoms ranging from mild headache and vomiting to progressive neurological decline, impaired consciousness, coma, and even death. Diagnosing CVST in a trauma setting is particularly challenging because other head injury-related conditions can obscure it. The prognosis depends on several factors, including the dominance of the internal jugular vein (IJV), venous collateral circulation, and the extent of the occlusion. Due to the clinical variability and rarity of CVST, especially in acute trauma scenarios, there is no consensus on the overall strategy for surgical or medical treatment (anticoagulation, thrombolytic, and antiedema therapy), including when, how, or in which cases these treatments should be applied.

We present the case of a pediatric patient who sustained a blunt head injury and epidural hematoma, subsequently developing dural sinus thrombosis. The diagnosis and management of this condition are discussed based on a literature review.[5,6]

Case Report:

The patient, a 1-year-old male came to the Emergency Department of Assam Medical College, Dibrugarh from Changlang, Arunachal Pradesh with a history of blunt head trauma following a history of fall from his brother's arm. Upon receiving, the patient in Central ICU of AMCH, he was irritated and conscious.However after 2 hours, the patient had neurological deterioration and needed orotracheal intubation. Bilateral pupils were sluggishly reactive to light. Noncontrast CT of the head was done and showed a Subdural hemorrhage of a maximum depth of 3.6mm in the left parietal convexity with no midline shift.

Figure 1: *Subdural hemorrhage in Left Parietal convexity*

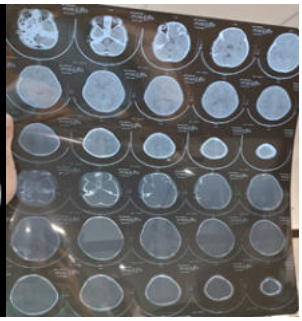

Figure 2: *CT Head Film*

A Neurosurgery opinion was taken and they suggested conservative management and a repeat CT Head. Repeat CT Head was done after 12 hours and showed Dural Venous Sinus Thrombosis of inferior saggital sinus, and bilateral sigmoid sinus along with subacute infarct of bilateral fronto-temporo-parietal-occipital lobe with sparing of bilateral basal ganglia, bilateral thalami and posterior fossa and few focal areas of right frontal, parietal and temporal lobe causing effacement of sulci and gyri and bilateral cerebral hemisphere.

Neurology consultation was taken and they suggested conservative treatment and no need for anticoagulation therapy. The patient improved after 13 days of ICU stay. MRI Brain was planned but the patient's party refused consent and left against medical advice.

DISCUSSION

The primary causes of CVST in children include hypercoagulability syndromes, malignant disease, dehydration, metabolic acidosis, localized central nervous system infections, and cyanotic heart disease. While craniotomy and head injury are less common causes of this type of thrombosis, they carry the same risk of a fatal outcome. CVST resulting from closed head injury is Rare: Since Bagley's pioneering report in 1934, only a few cases of CVST [4]induced by blunt head trauma have been documented in the literature.

The clinical and radiologic manifestations of traumatic CVST are highly variable, making the condition challenging to diagnose and manage[2]. There is a known association between CVST and high-energy trauma or skull fractures overlying the sinuses. However, the condition can also present with mild, moderate, or severe head trauma, with or without fractures crossing the dural sinuses.

Our case is unique in several ways. The patient experienced a closed head injury with a subdural hemorrhage. Additionally, the extensive thrombosis affecting the inferior sagittal sinus and bilateral sigmoid sinus is not commonly reported. The child's initial neurological status was attributed to the subdural hemorrhage, diverting attention from less common traumatic pathologies.

Upon retrospective review of the initial non-enhanced head CT scans, no obvious venous sinus thrombosis was detected, suggesting that a thrombus likely formed at the time of injury but was not identified initially. The combination of factors such as the compressive effect of the subdural hemorrhage and edema may have contributed to the gradual extension of the thrombus, which ultimately increased cytotoxic edema and intracranial pressure, accelerating the process of a vicious cycle.

Many theories such as the release of abundant thromboplastin, compression of the sinus by intracranial edema or bleeding, intramural hemorrhages, extension of injured emissary veins, and trauma to the endothelial lining can all contribute to the development of a thrombus, but the exact origin remains uncertain[7].

Diagnosis of CVST relies on radiological imaging, guided by clinical and neurological presentations. In a trauma setting, CT venography is

often the first and best option due to its availability, speed, and higher sensitivity compared to MRI. Depending on the case, MRI might be used as an initial option or to complement CT imaging.

Delgado Almandoz et al. recommend CT venography for patients with blunt head trauma and skull fractures extending to a dural venous sinus or jugular bulb, given the high prevalence of traumatic CVST. Additionally, CT venography should be considered for patients involved in high-energy head trauma or those with focal lesions on non-enhanced CT scans where neurological status cannot be monitored. A small number of blunt trauma patients may also have a combination of arterial injury and traumatic CVST, making it crucial to carefully review non-enhanced CT images of the head and cervical spine to identify exact fracture patterns and optimize the neurovascular imaging protocol. The clinical impact of early diagnosis of traumatic CVST remains unclear and requires further study.

Managing patients with a combination of traumatic head injury and CVST is challenging. Formal anticoagulation might be difficult or contraindicated, but withholding anticoagulation could risk the propagation of CVST and subsequent cerebral edema, as seen in our patient.

Medical and surgical approaches to CVST treatment vary. Some authors favor anticoagulation and local or systemic endovascular thrombolytic therapy with urokinase or recombinant tissue plasminogen activator. Others, particularly for traumatic CVST, advocate symptomatic treatment with mannitol, steroids, and acetazolamide, among other drugs. Bishop et al. suggested the use of endovascular balloons as an alternative in cases resistant to anticoagulation and decompressive craniectomy.

In reviewing the treatment of lateral sinus thrombosis due to minor head trauma, Nehme et al. recommended testing patients for hypercoagulation states, such as protein C, S, antithrombin III deficiency, or factor V Leiden mutation, before deciding on observation or anticoagulation treatment. The diagnosis of CVST relies on radiological imaging, guided by clinical and neurological presentations. In a trauma setting, CT venography is the first and best option due to its availability, speed, and higher sensitivity compared to MRI. Understanding the various medical and surgical treatments helps facilitate therapeutic decisions, which should be based on the patient's clinical status.[8]

CONCLUSION:

Cerebral venous sinus thrombosis (CVST) following blunt head trauma is a rare condition, with literature indicating a lack of consensus on its diagnosis and management While most reports suggest good outcomes and recovery, CVST can sometimes result in poor recovery or even death. Therefore, it is crucial to maintain a high degree of suspicion for CVST, particularly in patients involved in high-energy head trauma or those with focal lesions on non-enhanced CT scans where neurological status cannot be monitored. Early diagnosis is essential to prevent potentially treatable catastrophic outcomes.

REFERENCES:

1. Bousser MG, Ferro JM. Cerebral venous thrombosis: an update.
2. Bousser MG, Chiras J, Bories J, Castaigne P. Cerebral venous thrombosis--a review of 38 cases. *Stroke*. 1985;16(2):199-213. doi:10.1161/01.STR.16.2.199
3. Renowden S. Cerebral venous sinus thrombosis. *Eur Radiol*. 2004;14(2):215-226. doi:10.1007/s00330-003-2021-6
4. Beer-Furlan A, De Almeida CC, Noleto G, Paiva W, Ferreira AA, Teixeira MJ. Dural sinus and internal jugular vein thrombosis complicating a blunt head injury in a pediatric patient. *Childs Nerv Syst*. 2013;29(8):1231-1234. doi:10.1007/s00381-013-2184-7
5. Barron TF, Gusnard DA, Zimmerman RA, Clancy RR. Cerebral venous thrombosis in neonates and children. *Pediatr Neurol*. 1992;8(2):112-116. doi:10.1016/0887-8994(92)90030-3
6. Renowden S. Cerebral venous sinus thrombosis. *Eur Radiol*. 2004;14(2):215-226. doi:10.1007/s00330-003-2021-6
7. Holzmann D, Huisman TAGM, Linder TE. Lateral Dural Sinus Thrombosis in Childhood. *The Laryngoscope*. 1999;109(4):645-651. doi:10.1097/00005537-199904000-00024.