Cerebral Venous Sinus Thrombosis (CVST): A Review of the Deadly Threat

Abidullah Khan1*, Mohammad Humayun2, Wazir Muhammad Khan3 and Maimoona Ayub1

1Department of Medicine, Khyber Teaching Hospital, Pakistan
2Professor of Medicine, Khyber Teaching Hospital, Pakistan
3Associate Prof Medicine, Khyber Teaching Hospital, Pakistan

Abstract
Although, the frequency of cerebral venous sinus thrombosis (CVST) has dropped remarkably in recent years but unfortunately, it is still seen commonly in a developing country like Pakistan. The diagnosis of CVST needs high threshold for suspicion, especially in patients with meningitis or sinusitis who present with focal neurological deficit. Early recognition and treatment improves mortality and morbidity rates of this potentially deadly disease. Intravenous, wide spectrum, antibiotics plus anticoagulation with low molecular weight heparin and/or early surgical intervention of the primary site of infection whenever possible are crucial.

Keywords: Cerebral venous sinus thrombosis (CVST); Iron-deficiency anemia (IDA) Cerebral; Tuberculous meningitis (TBM); Dural; Venous; Thrombosis; Thrombophilia; Meningitis

Introduction
CVST is the presence of blood clot in the dural vein. This happens when a thrombus forms in the brain’s venous sinus that stops blood from flowing out of the brain [1]. Such patients present with a variety of symptoms [1,2]. The most severe and prognostically poor form of presentation of CVST is the venous hemorrhagic infarction (VHI) [2]. However, CVST is a rarer cause of cerebral infarction compared to arterial diseases [1].

CVST can result from a variety of congenital or acquired diseases. These may include medical conditions such as, dehydration, infection, malignancy or hematologic disorder and so forth [3]. It is interesting to note that iron-deficiency anemia (IDA) is one of common etiologies behind pediatric CVST but not of adult CVST [4]. Being a developing country, infections are a common cause of hospitalization to medical and pediatric wards in Pakistan.

Amongst the most dreadful infectious diseases, pyogenic and tuberculous meningitides are of particular concern. Such infections are dangerous on their own; however, their complications are more devastating.

Once such complication of meningitis and septic head and neck infections is CVST. This mini review will focus on the etiology, pathogenesis and common presentation of CVST to a tertiary care hospital in Pakistan.

Discussion
Pathogenesis
There are no valves in the dural venous sinuses and the cerebral and emissary veins. Therefore, they permit blood to flow in either direction determined by the pressure gradients in the vascular system [3-6]. This pressure gradient dependent circulation makes them vulnerable to septic thrombosis resulting from the spread of infection from adjacent locations. Although, septic thrombophlebitis can affect any part of the cerebral venous system, but certain sinuses are more commonly thrombosed than others such as, the cavernous sinus followed by the lateral sinuses [5-9].

Dural sinus thrombosis results from a spread of infection from the surrounding area. Bacterial meningitis can spread to involve and thrombose any part of the cerebral venous system, but it commonly involves the sagittal sinus or the transverse and sigmoid sinuses. Similarly, in sphenoid and/or ethmoid sinusitis, infection spreads to the adjacent in cavernous sinus resulting in cavernous sinus thrombophlebitis.7-11 Moreover, the mastoid

Diagnosis

High level of suspicion is essential for early identification and management. The initial work up should include complete blood count, blood cultures, x-ray films of the paranasal sinuses and enhanced brain MRI plus MRV and/or Head CT scanning. Cerebrospinal fluid (CSF) analysis as well as culture is crucial in the diagnosis of the cause of CVT [17-18]. The CSF analysis in non-septic sinus thrombosis is usually normal, but occasionally, it may be bloody or xanthochromic as the result of cortical and meningeal hemorrhage. Nevertheless, in septic thrombosis, it is often abnormal and has high granulocyte and/or lymphocyte count depending on the underlying etiology such bacterial versus mycobacterial and elevated protein. The CSF culture may be positive in some of the cases. Other work may be cause directed and may include a malignancy screen, a systemic infection screen and/or thrombophilia screen and so forth [15-19].

Management

The management includes general and specific measures and largely depends upon the etiology of CVST. Generally speaking, every patient with suspected or confirmed CVST should have his/her airways, breathing and circulation attended to [18-20]. Moreover, they should be started on sufficient amount of fluids, oxygen where needed and nutritional support. Every effort should be made to keep the metabolic and electrolyte balances in place. The caring team must ideally involve a physician, a neurologist, a neurosurgeon, a microbiologist, a hematologist and ancillary staff [13-16].

Specific measures include the early management with broad spectrum intravenous antibiotics and early surgical drainage of the primary site of infection such as that of mastoid sinus in case of mastoiditis and so forth. Similarly, most authorities recommend anticoagulation with low molecular weight heparin. However, intravenous heparin infusion and corticosteroids are of uncertain benefit, although some reports have shown favorable response rates. The need for a long term anticoagulation with an oral agent such as warfarin or dabigatran or rivaroxoban should be decided on a case to case basis as such decision largely depends on the etiologies of CVST and on the presence or absence of concomitant co-morbidities [11,15,18,19].

Conclusion

CVST must be considered in the differential diagnoses of complicated meningitides and head and neck infections. MRI along with MRV is good enough to give a diagnosis. Treatment depends upon the cause and usually involves broad spectrum intravenous antibiotics and anticoagulation with low molecular weight heparin in the short term.

References


Your next submission with Juniper Publishers will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats (Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission

https://juniperpublishers.com/online-submission.php