



An empty delta sign: Pathognomonic of cerebral venous thrombosis

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Abstract

Here we discuss the case of a 37 year old gentleman found collapsed and unresponsive at home. He was subsequently diagnosed with a Cerebral Venous Thrombosis. Successful treatment with therapeutic Low Molecular Weight Heparin was achieved.

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Introduction

Cerebral Venous Thromboses arise in the draining dural sinuses. Annual incidence is between 0.22 and 1.57 per 100,000 population [1]. Women are affected three times more commonly than men. In adults, CVT affects individuals younger than those with arterial strokes. The International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT) demonstrated a mean age of 39 years in CVT [2]. Only 8 percent of the patients in that study were older than 65. A triangular filling defect seen on contrast enhanced imaging is pathognomonic and classically described as the empty delta sign [3].

Case report

A 37 year old gentleman was found unconscious at home by a family member and brought in to Hospital by ambulance. The period of time collapsed was unknown.

On arrival he had a generalized pallor with extensive left sided ecchymoses. No facial trauma was evident. Initial management and stabilization of the patient included; intubation and subsequent ICU admission. A non-contrast CT brain was performed. This showed areas of acute haemorrhage in the right parieto-occipital region with oedema present too. Steroids were added to treatment in light of this oedema. At this point, further Investigation with MRI was recommended. An MRA showed no evidence of arterial venous malformations. A subsequent CT with contrast the following day provided conclusive evidence to support the diagnosis of CVT. An "Empty Delta" – representative of a thrombosed sinus, was apparent [4].

Treatment with therapeutic tinzaparin effectuated a steady recovery over the subsequent days. Clinically, left sided hemiplegia was slow to resolve and seizure-like activity continued



over successive days. After four months of medical treatment plus intense rehabilitation, the patient was discharged home on a minimum of six months anti-coagulation [5]. He had no residual neurological deficits. No underlying aetiology was identified in this case.

Discussion

The exact pathogenesis of CVT is not completely understood due to the high variability of venous system anatomy. The two most frequently cited mechanisms that may contribute to the clinical features of CVT are as follows; Thrombosis of cerebral veins or dural sinus obstructs blood drainage from brain tissue, leading to cerebral parenchymal lesions or dysfunction, and to increased venous and capillary pressure with disruption of the blood-brain barrier. Occlusion of dural sinus resulting in decreased cerebrospinal fluid (CSF) absorption and elevated intracranial pressure is also postulated as another likely mechanism [6].

A number of conditions are associated with CVT. Major risk factors for CVT in adults can be classified as either transient or permanent. Most frequently encountered of these are; Prothrombotic conditions (Genetic/Acquired), Oral contraceptives, Pregnancy and the puerperium, Malignancy, Infection and traumatic precipitants [7].

In patients with clinically suspected CVT (eg; presenting with a new headache, isolated intracranial hypertension syndrome, focal neurologic deficits, seizures, and/or encephalopathy), urgent neuroimaging with contrast is necessary. No underlying etiology for CVT is identified in approximately 13 percent of adult patients. However, it is important to continue searching for a cause even after the acute phase of the condition, as there may be a predisposing condition. With swift and targeted treatment, approximately 80% of patients with CVT make a near total recovery.

Conclusion

The above case highlights the importance of considering a diagnosis of CVT with a patient presenting with such neurological signs and more importantly; the use of contrast-enhanced imaging in reaching a diagnosis. The "Empty Delta Sign" is pathognomonic of the disease and will only be evident on contrast-enhanced imaging. This sign will appear as a triangular area of enhancement over the thrombosed segment of sinus

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