

## Septic cavernous sinus thrombosis – a case report

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### Abstract

*Septic Cavernous sinus thrombosis (CST) is a rare, life-threatening condition. A case of septic cavernous sinus thrombosis is reported in a 42 year old male who presented with a history of trauma to upper lip with razor blade followed by high grade fever with rigors, headache, swelling over right eye region, inward deviation of eye with diplopia and gross diminution of vision. On examination, there was diffuse periorbital oedema with conjunctival chemosis, esodeviation of both eyes and retinal venous engorgement. Magnetic Resonance Imaging (MRI) brain with venography confirmed the clinical diagnosis. Patient responded well with broad spectrum intravenous antibiotics and supportive treatment. In our modern age of computerization and laboratory-based medical care, cavernous sinus thrombosis demands the diagnostic skill of the clinician, whose prompt ministrations should usually yield a favourable result.*

**Key words :** *cavernous sinus thrombosis, bilateral, MRI brain with venography, intravenous antibiotics*

### Introduction

Two cavernous sinuses are positioned on either side of the sella turcica. They are connected by intercavernous sinuses located anterior and posterior to them. These dural sinuses drain blood from the brain. They have valveless communications from face, nose, teeth, mastoid region and scalp. Infection from these sites may easily travel to cavernous sinus and cause its thrombosis and occlusion leading to serious implications involving brain and eye. CST is a potentially lethal disease and delay in treatment may prove fatal.

### Case report

A 42 year old male sustained a cut injury to right side of upper lip with a razor blade while shaving. After 2 days of injury, he developed fever, headache and painful swelling over right eye region. Soon, he also developed

diplopia. He became drowsy in the next 24 hours. He was taken to a nearby hospital where he was admitted and treated for 10 days with antimalarials and antibiotics. A computerised tomography (CT) brain and orbit was reported to be normal. As his condition continued to deteriorate, he was advised to be taken to a higher centre.

He was brought to our hospital where on examination, he was found to be febrile with temperature of 37.8° C, blood pressure was 90/50 mm of Hg, pulse rate was 108/min and respiratory rate was 26/min. He was pale and moderately dehydrated. He had a small cut wound with crust formation and swelling over right side of upper lip (Figure 1). He was drowsy, responding to repeated verbal commands only. Both eyes were turned inwards and third, fourth, fifth and sixth nerves were found to be affected. Neck rigidity and Kernig's sign were positive. There was no swelling over mastoid region. Other systems were within normal limit. On investigations, his haemoglobin was 8.8 gm%, total leucocyte count was 27,200/ cubic mm, and platelets were 3 lacs/ $\mu$ l. Renal and liver function tests were within normal limit. Random blood sugar was 100 mg/dl. Peripheral smear for malaria, widal test, HIV tridot

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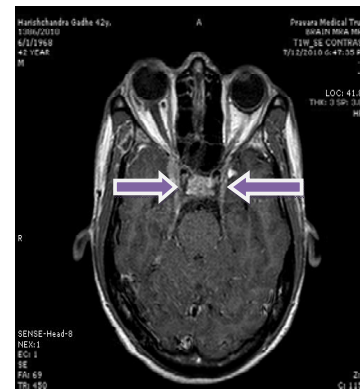
test, and HbsAg were negative. Blood culture was sterile. Cerebrospinal fluid (CSF) analysis was within normal limit. Chest x-ray was within normal limit. MRI brain was also within normal limit.

Ophthalmic examination revealed grossly diminished vision in both eyes (finger counting 3 metres). There was diffuse periorbital swelling on right side with diffuse lid oedema and excoriation of lid margins. There was mild proptosis (Figure 1). Both eyes showed gross inward deviation with restricted movements. Diplopia was present in all directions of gaze. Right eye showed conjunctival congestion and chemosis. Corneal sensations of both eyes were reduced. Pupils were central, circular and 2 mm in size with sluggish reaction. Fundus examination showed venous engorgement in both eyes.



**Figure 1 Small cut wound with crust formation and swelling over right side of upper lip and lid edema, excoriation of lid margins, conjunctival chemosis and congestion of right eye with inward deviation of both eyes**

Based on history, general and ophthalmic examination a clinical diagnosis of septic cavernous sinus thrombosis was made. To confirm the diagnosis, MR venography brain was advised. It revealed cavernous sinus thrombosis in form of lateral convex bulge on both sides (Figure 2), optic nerve oedema (Figure 3) and multiple acute infarcts involving right parieto-occipital region and centrum semiovale bilaterally (Figure 4). Intravenous Ceftriaxone 1gm 12 hourly, Gentamicin 80mg 8 hourly, Metronidazole 100cc 8 hourly and Dexamethasone 8mg 8 hourly were started. Lubricant eyedrops were started to prevent exposure keratitis.



**Figure 2 Lateral convex bulge of cavernous sinus of both sides on post contrast T1W images**

Occlusion of eye to prevent diplopia was also advised. His condition started showing improvement within 24 hours.

At the time of discharge, patient's vision was 6/9 in both eyes. Proptosis, conjunctival congestion and chemosis completely subsided and corneal sensations became normal. Fundus examination was within normal limit. Right eye esotropia became less and partial motility of eye was restored. Left eye position remained unchanged.

## Discussion

Blood from brain is drained by a complex system of veins and dural sinuses into internal jugular vein. The most important dural sinuses are cavernous sinuses, sagittal sinus and sigmoid sinus which are all interconnected. A small quantity of blood from brain also get drained by diploic and emissary veins of skull, which form anastomosis with branches of external jugular vein draining blood from face, nose, teeth, paranasal sinuses, scalp, cervical and mastoid region<sup>[1]</sup>. All these channels are valveless and blood can flow in any direction.<sup>[1]</sup> This fact makes these sinuses most vulnerable for spread of infection from above mentioned sites leading to septic thrombosis. Infection of middle third of the face is the most important source<sup>[2]</sup> as is evident in our case also. Staphylococcus and streptococcus are the most commonly incriminated organisms.<sup>[3]</sup> Since the introduction of antibiotics, septic cavernous sinus thrombosis has become a relatively infrequent. Among 38 cases of angiographically proven venous sinus

thrombosis evaluated by Bousser et al., only 4(10.5%) were septic.<sup>[4]</sup> CST can also occur due to aseptic causes like blood disorders causing increased viscosity, dehydration, cachexia, pregnancy, oral contraceptives and systemic malignancies.<sup>[3]</sup> Pregnancy and puerperium account for approximately 20% cases among aseptic causes.<sup>[5]</sup> In addition to the features of primary cause and systemic features like fever and headache, clinical manifestations of CST are due to hampered blood drainage from brain. This leads to cerebral oedema, cerebral ischemia and cerebral infarction as was seen in our case on MRI brain with venography. The other cause is increased intracranial pressure due to impaired absorption of CSF.<sup>[2]</sup> These changes lead to headache, altered sensorium, convulsions, motor and sensory deficits. Venous occlusion also causes orbital congestion, lid oedema, conjunctival congestion, chemosis, proptosis, diminished ocular motility and retinal vein engorgement. Appearance of sixth nerve palsy in the other eye within 48 hours is generally the first indication of bilateral involvement of cavernous sinus.<sup>[5]</sup> Pupil may be dilated or remain normal in size due to simultaneous oculomotor-sympathetic paresis.<sup>[1]</sup>

Based on the history and clinical picture, diagnosis is usually not difficult. However differential diagnosis of cerebral malaria, meningitis or meningo-encephalitis must be kept in mind. MRI brain with venography may help in confirming the diagnosis and is considered the investigation of choice.<sup>[3]</sup>

Management of CST is an emergency. High doses of broad spectrum antibiotics covering gram positive, gram negative and anaerobes are given for 3-4 weeks. Anticoagulant therapy is a subject of controversy. Early institution (within 5-7 days)<sup>[5]</sup> may help in reducing morbidity but delayed use provides no benefits. The use of corticosteroids too is controversial. However there are evidences that it helps in reducing orbital and cerebral oedema and also helps in reducing cranial nerve inflammation. Though, the prognosis of septic CST has improved from near 100% mortality to 20-30% with the availability of good broad spectrum antibiotics.<sup>[6-7]</sup> Serious complications like septic pulmonary embolism, meningitis, carotid thrombosis, subdural empyema and brain abscess may occur.<sup>[8,9]</sup>

Residual neurological deficits in form of squint and numbness and paraesthesia in the region of fifth nerve supply have been noted.<sup>[10]</sup> Recurrence of CST also has been reported as late as 8 months.<sup>[11,12]</sup>

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