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3**A case study report – Cavernous sinus thrombosis caused by dental infection and right-side facial cellulitis****Kowsalya Devi.S*, Medona Judith.M**

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ABSTRACT: Cavernous sinus thrombosis (CST) was first reported by Bright. CST is an infectious disease that can potentially kill if not treated at the earlier stage. CST is a rare disease in which blood clots are formed within the cavernous sinus, large pools of thin-walled veins. CST is either an aseptic or septic condition. CST is a rare, life-threatening disorder that can complicate facial infection, sinusitis, orbital cellulitis, pharyngitis, or otitis or following traumatic injury or surgery, especially in the setting of a thrombophilic disorder. Early detection of cavernous sinus thrombosis which is often accompanied by fever, headache, eye findings such as periorbital swelling, and ophthalmoplegia, is critical for a good outcome. Despite modern treatment with antibiotics and anticoagulation, the risk of long-term sequelae, such as vision, diplopia, and stroke, remains significant.

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INTRODUCTION:

Cavernous sinus thrombosis (CST) was first reported by Bright [1]. If CST is not treated at an early stage, it may be fatal. CST is a rare, life-threatening disorder that can complicate facial infection, sinusitis, orbital cellulitis, pharyngitis, or otitis or following traumatic injury or surgery, especially in the setting of a thrombophilic disorder [2]. A good outcome is crucial to prompt recognition of cavernous sinus thrombosis, which can often present with fever, headache, eye manifestations such as periocular swelling and ophthalmoplegia [3,5]. In spite of modern treatment with antibiotics and anticoagulation, the risk of long-term sequelae, such as

Keywords: Cavernous sinus Thrombosis, Dental infection, Cellulitis, Pain, Infection.

vision, diplopia, and stroke, remains significant [4]. The mortality rate for CST was approximately 100 % prior to the development of antibiotics. In spite of the advances in health care, mortality remains at around 20 %. Furthermore, despite treatment, complications of CST such as cranial nerve dysfunction may remain. CST is not a common source of dental infections. There's very little information about CST regarding teeth extraction [6].

OBJECTIVES:

The objectives of the study are to analyze the case using relevant theoretical concepts and to describe an individual's clinical situation in detail.

Case presentation:

In the Female General medicine department – A 44-year-old female was admitted to the hospital with complaints of case of Pain and swelling on right side face for 3 months. History of Tooth extraction before 3 months back. Known case of Hypertension. After admission in the ward, the patient was undergone.

General physical examination:

General appearance of the patient was alert, awake, febrile, conscious, and oriented.

OTHER INVESTIGATION:

MRI brain scan:

- Tiny focal filling defect seen in Right Cavernous Sinus.
- Hyperintense signal noted in Right inferior, temporal white matter.

TREATMENT:

Initially the child was treated with injection cefotaxime, dose – 1 g, route – IV, frequency - BD, injection Heparin, dose–5000 IU, route – IV, frequency – Q8H, Tablet Acenocoumarol dose – 2 mg, route – IV, frequency - TDS given for 1 days. Tablet Paracetamol 500 mg oral BD, Tablet Serratopeptidase 1 g oral BD, Tablet Ranitidine 150 mg oral BD, Tablet Telmisartan 40 mg oral OD, injection Metronidazole 500 mg IV TDS, given for 7 days.

Outcome and follow-up:

Patient condition was stabilized with supportive management with more precaution. Patient was advised to review after 1 month in the Outpatient department.

DISCUSSION:

CST is a very rare disease in which the blood clots are formed within the cavernous sinuses, which are filled with an enormous collection of thin-walled veins. CST

has either aseptic or septic status. A septic CST usually results from surgery or trauma [7]. Sinusitis, otitis, odontogenic infection and oral cellulitis can cause the septic CST. Sinusitis with the sphenoid or Ethmoidal sinuses is the leading cause of septic CST. Dental infections account for < 10 % of septic CST cases, and most of these cases are related to maxillary infection [8].

Eagleton proposed the following criteria for CST diagnosis: a known site of infection; blood stream infection (sepsis); early obstructive signs (such as retinal vein fullness, proptosis, exophthalmos, and collateral venous circulation); ocular nerve paralysis (via lesions of cranial nerves III, IV, V, and IV); surrounding soft tissue abscesses (of the orbit, occiput, neck or nasopharynx); and symptoms of a complicated disease (such as headache, papilledema, and meningeal signs) [9].

Staphylococcus is usually responsible for about 70% of CST, while streptococcal species account for 20 %. Pneumococcus, bacteroides, fusobacterium, proteus, haemorrhages, pseudomonas and corynebacteria could be the other possible pathogens. As these veins do not have valves, the vesicular flow is bidirectionally in the cranium vein, emissary vein and dural sinus. Therefore, via a vein in the face or a pterygoid plexus, bacteria and thrombus from another section of the face can spread to the cavernous sinus [10].

Clinical symptoms are different depending on the anatomical structures in question. Fever, proptosis, chemosis, and external ophthalmoplegia are the most common symptoms. Ophthalmoplegia is extraocular muscle weakness that results (in CST) when cranial nerves III, IV, and/or VI are damaged due to their passage through the cavernous sinus [11].

Other symptoms:

In 50 to 80 % of patients Lethargy, headache, periorbital swelling, papilledema, and venous engorgement occur. Decreased visual acuity, sluggish/dilated pupil, periorbital sensory loss, and decreased corneal reflex are less frequent symptoms that occur in < 50 % of patients. If there is involvement of the cranial nerve III or V, these symptoms occur. The first signs of ocular cellulitis are also similar to CST symptoms such as periorbital swelling, proptosis, chemosis, impaired vision and fever [12].

If these symptoms occur bilaterally, or if there is loss of sensory sensation in the periocular area, periorbital and pupillary dilations, CST shall be considered as part of a differential diagnosis.

Table 1. The vital signs of the case study.

| Parameters | Observed value | Normal value |
|-----------------|----------------|--------------------------------------|
| Hemoglobin | 8.0↓ | 13-17 g/dl |
| Total RBC count | 3.8 ↓ | 3.8 – 4.8 millions /mm ³ |
| WBC count | 8000 | 4000 – 10000 cells / mm ³ |
| PCV | 34.1 % ↓ | 40 – 50 % |
| Platelet count | 3.4 | 2.0 – 4.0 lakhs /mm ³ |
| RBS | 90 | 70-140 mg/dL |
| Urea | 26 | 15 – 40 mg/dL |
| Creatinine | 0.7 | 0.5 – 1.2 mg /dL |
| Sodium | 140 | 135 – 150 mg/dL |
| Potassium | 3.6 | 3.5 – 5.0 mmol/L |
| Chloride | 107 ↑ | 95 – 105 mmol/L |

For CST, CT and MRI will be the diagnostics of choice in CST, coronal CT reveals that the lateral wall of the cavernous sinus is flat or convex instead of its normal concave shape. Moreover, there are frequent reports of irregular filling defects caused by thrombus and superior dilation of the eye veins.

MRI is useful when the CT images are not clear when the infection has spread to surrounding tissues including the brain and pituitary gland. In the past, cerebral angiography and orbital venography were used. These imaging techniques are no longer recommended because they increase the risks of the infection spreading and thrombosis [13].

Optimal therapy for CST includes the concomitant administration of nafcillin, metronidazole, and ceftriaxone/cefotaxime. Vancomycin may be administered if a suspected MRSA infection is present. If sinusitis or dental infections are the main cause of infection, surgical intervention is indicated. Direct surgical drainage of cavernous sinus may be considered in cases of serious infection, although this procedure is difficult and complications are likely to develop [14].

Corticosteroid therapy must be considered if adrenal insufficiency occurs due to cranial nerve dysfunction or pituitary necrosis. For instance, some studies have shown a reduction in mortality within seven days after CST when anticoagulation with heparin is used. Nevertheless, the use of anticoagulant therapy should be monitored with caution due to increased risk for Intracranial and/or Systemic Thrombocytopenia [15].

CONCLUSION:

If a thrombus forms in the cavernous sinus, CST can be fatal. It presents with Pain and swells in the right-side face caused by tooth extraction for 3 months. The mortality of CST has decreased as a result of the development of antibiotics. However, the mortality rate is still slightly higher at 14 to 30 %. There is a need for early diagnosis and proper treatment of this disease. Therefore, it is essential to maintain long term follow up of patients.

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