

CASE REPORT

Cavernous sinus thrombosis after initiation of endodontic therapy – A case report

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Abstract

The cavernous sinus, one on each side is a large venous channel on each side of the body of the sphenoid bone. Any infections of the face, orbit, and nose can result in infection of this intracranial sinus by retrograde spread. Odontogenic infection leading to cavernous sinus thrombosis or infection of this sinus is rare and can lead to substantial morbidity and mortality as they are often neglected until the situations become grave. This case report describes a very rare and unique case of cavernous sinus thrombosis which occurred after initiation of endodontic therapy in an infected maxillary second molar on right which subsequently progressed to pansinusitis and cavernous sinus thrombosis.

Keyword: *Cavernous Sinus, Third Molar, Endodontic therapy, Pansinusitis*

Introduction

The cavernous sinus, one on each side is a large venous channel on each side of the body of the sphenoid bone. Any infections of the face, orbit, and nose can result in infection of this intracranial sinus by retrograde spread. Less common infections which can lead to infections of the sinus are Odontogenic infections which include carious teeth, facial space infections, dental abscess, etc. This infection due to Odontogenic infections is uncommon and can lead to substantial morbidity and mortality as they are often neglected until the situations become grave¹.

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Cavernous sinus thrombosis (CST) was first described in 1831 by Bright as a complication of epidural and subdural contamination. Due to its intimate neurovascular anatomic relationship, CST is the most complicated type of intracranial septic thrombosis. CST can result from any infections of the paranasal sinus or any of the anatomic structures drained by the cavernous sinus, including the mid-face, orbit, and oral cavity².

The occurrence of CST has always been low, with only approximately 200 case reports found in literature. The mortality rate from CST was effectively 100% prior to the advent of efficacious antimicrobial agents; the mortality rate presently is 30% despite medical advances. Dental infections are not a common source of CST, in spite of they can cause sinusitis, orbital cellulitis, parapharyngeal abscess, mediastinitis, and pericarditis³. There are very few reports of CST identified with periodontal disease or tooth extractions.

Case Report

A 35-year-old female patient reported to the department of the oral and maxillofacial surgery with

complaints of swelling on the right side of the face and right eye and inability to open her eye and watery discharge from it over the previous 7 days. There was a history of tooth ache of mild intensity and sensitivity to hot food in her right side maxillary posterior tooth for which she consulted a general dentist. She was diagnosed with irreversible pulpitis of right maxillary second molar and was advised for root canal therapy. Root canal therapy was started by the same dentist. The patient was feeling normal until she noticed the swelling on the right side of her face which was more prominent around the right eye, after 2 days of starting of her root canal, for which she again consulted the same dentist who prescribed her oral antibiotics (Co-amoxiclav 625 mg and Metronidazole 400 mg, three times a day) and analgesic (Aceclofenac 100 mg, two times a day), but the swelling kept on increasing and gradually progressed to its present size. Pain was associated with the swelling and was continuous and dull in nature. After the procedure, the patient again visited the practitioner with a complaint of pain and gradual increase in the swelling leading to inability to open her right eye and impaired vision. After the third day of starting of the endodontic therapy the patient was referred to the Department of Oral and Maxillofacial Surgery by the same dentist. The patient's medical history did not reveal anything significant.

Upon examination, there was marked periorbital edema more pronounced on the upper eye lid with necrotic tissues on the lower eye lid and proptosis in respect to the right eye and swelling on the ipsilateral side of face also. Swelling was tender, fluctuant, and extended superior-inferiorly from the superior orbital rim region to the ala of the nose and anteroposteriorly from the corner of the mouth to the angle of the eye. The patient also had dilated pupil, periorbital ecchymosis, loss of vision, and chemosis of the right eye. Intraorally, the maxillary second molar was restored with temporary cement [Fig 1a, 1b, 1c].



Fig 1a



Fig 1b



Fig 1c

Investigations done were MRI of the orbit and brain which revealed pansinusitis of paranasal sinuses on the right side and mild compression on right Cavernous Sinus and on the right orbital apex. Other findings include right sided proptosis with edema and abnormal enhancement of the muscles of right eye along with fat stranding.

Blood examination revealed a random blood sugar value of 140 mg/dL, total leucocyte count of 5100/ cubic millimeter of blood, and polymorph value of 71%. Vital signs included blood pressure 130/82 mmHg, pulse 84 beats per minute, temperature 39.3°C, and respiratory rate 12/min.

Other investigations were IOPAR [Fig 2] of right maxillary Molars and OPG [Fig 3], which revealed proximal caries in respect to 2nd molar.



Fig 2 IOPAR



Fig 3 Pre operative Orthopantomogram

Empirical intravenous antibiotics were started with Meropenam 1g every 12 hourly, Clindamycin 600 mg every 12 hourly, and Chloramphenicol 1 gm every 12 hourly. Along with these Methylprednisolone (Solu-Medrol) 500 mg, 12 hourly was also administered intravenously. Chloramphenicol was stopped after 3 days and rest of the medication was continued for next ten days. After ten days when the patient was switched to oral drugs she again started developing periorbital swelling. So the same regimen of the above mentioned drugs was continued for ten more days. After total 21 days of i.v. drug therapy, patient was switched to oral drugs and medications were stopped by gradual tapering of the dose when above mentioned signs and symptoms subsided [Fig 4].



Fig 4 Post Treatment

The above Neurological and ophthalmological consultation was also done with the conditions of the patient monitored by all the departments involved.

Discussion

CST is a rare condition in which blood clots form within the cavernous sinus, a large collection of thin-walled veins. CST is either an aseptic or septic condition. Aseptic CST usually results from surgery or trauma⁴. Septic CST may be caused by sinusitis,

otitis, odontogenic infection, or facial cellulitis. Staphylococcus accounts for approximately 70% of CST, and streptococcal species account for 20%. Other potential pathogens include pneumococcus, bacteroides, fusobacterium, proteus, haemophilus, pseudomonas, and corynebacterium. The most frequent cause of septic CST is sinusitis in the sphenoid or ethmoidal sinuses. Dental infections account for <10% of septic CST cases, and most of these cases are related to maxillary infection⁴. Eagleton proposed the following criteria for CST diagnosis⁵: 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)

The clinical symptoms of CST vary depending upon the anatomical structures involved. The most common symptoms are fever, proptosis, chemosis, and external ophthalmoplegia. 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 sinus⁶. Other symptoms of lethargy, headache, periorbital swelling, papilledema, and venous engorgement occur in 50%-80% of patients⁷. Decreased visual acuity, sluggish/dilated pupil, periorbital sensory loss, and decreased corneal reflex are less frequent symptoms that occur in <50% of patients. These symptoms occur when cranial nerve III or V is involved⁸. Early symptoms of orbital cellulitis are similar to those of CST and include periorbital swelling, proptosis, chemosis, fever and impaired vision⁹. CST is included in the differential diagnosis when the above symptoms present bilaterally or when there is sensory loss in the periocular area, papilledema, and pupillary dilation.

CT and MRI are the diagnostic modalities of choice for CST.

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