Clinical Report

An atypical presentation of cavernous sinus thrombosis

Ramanand. Y. • Sidhu T.S. • Jaswinder. K • Nishi Sharma

Abstract

In a typical presentation of cavernous sinus thrombosis there are palsies of IIIrd, IVth and VIth cranial nerves along with disturbance of ophthalmic division (V1) of trigeminal nerve. In this manuscript we report a case of unilateral cavernous sinus thrombosis for its atypical presentation. Atypical features in this case were presence of ipsilateral lower motor neuron type facial nerve palsy and involvement of maxillary (V2) and mandibular (V3) branches of trigeminal nerve along with other nerve palsies. The VIIth nerve palsy in cavernous sinus thrombosis has not been reported in the literature.

Key words Cavernous sinus thrombosis • Facial nerve palsy

Introduction

The cavernous sinus thrombosis is a distinctive and frequently life threatening disorder. Cavernous sinus thrombosis is typically a complication of a facial, orbital or paranasal sinus infection. It typically presents as orbital or orbital swelling; proptosis; chemosis, fever; ophthalmoplegia. It can be caused by infection, autoimmune diseases, trauma, tumour or could be idiopathic. Sepsis spreads through superior and inferior ophthalmic veins from face and nose or via emissary veins from sphenoid & ethmoid sinuses. In uncontrolled diabetics and immunocompromised hosts fungal infection can also be responsible, particularly in mucormycosis.

Case Report

A 31-year-old patient was admitted to our department with complaints of ulcers on upper & lower lips since 7 days, fever since 2 days, facial swelling on right side & orbital pain right side since 1 day. Patient was apparently asymptomatic 7 days back when a boil appeared over his upper lip and he squeezed it. Subsequently he developed the symptoms as mentioned above.

Ramanand. Y (✉)
Senior Resident Doctor
Dept. of Otorhinolaryngology
Dr. Ram Manohar Lohia Hospital
New Delhi, India
Ph: +91 98180 84104 Fax: +91-11-23747592
e-mail: drramanandyadav@yahoo.co.in

Sidhu T.S.
Consultant and Head of the Dept.

Jaswinder. K
Senior Specialist

Nishi Sharma
Senior Specialist

Dept. of Otorhinolaryngology
Dr. Ram Manohar Lohia Hospital
New Delhi, India

Fig 1 Photograph of the patient at the time of admission

Fig. 2 Post gadolinium MRI, axial cut showing thrombosis in rt cavernous sinus

Fig. 3 Post gadolinium MRI, coronal cut showing cavernous sinus thrombosis

Fig. 4 Diagram of left cavernous ICA, showing inferolateral trunk and its branches anastomosing with branches of internal maxillary artery. ILT, (Inferolateral trunk). Single large arrowhead, recurrent meningeal branch of middle meningeal artery; small arrowheads, artery of the foramen rotundum; arrow, foramen ovale with accessory meningeal artery; double large arrowheads, middle meningeal artery (via foramen spinosum); FL, foramen lacerum.

Fig. 5 Photograph of the patient the time of discharge from hospital

On admission patient was running high grade fever with multiple ulcers on upper & lower lips. Right side of face and upper eye lid was swollen. The patient had exophthalmos, ptosis, conjunctival chemosis and complete ophthalmoplegia (IIIrd, IVth & VIth nerve palsy) on right side. Pupil was dilated and not reacting to light in right eye. Patient developed complete loss of vision two days after admission. Hypoaesthesia was present on right side of the face (area supplied by V1, V2, V3 branches of Vth cranial nerve) and there was lower motor neuron type facial nerve palsy on the same side (Fig. 1). Trismus was also present in this case. Both ears were normal.

MRI with gadolinium revealed a hypodense area within the right cavernous sinus on T₁ weighted images, reflecting cavernous sinus thrombosis (Fig. 2, 3).

Patient was HIV I & II positive and was having pulmonary Koch's and developed pleural effusion.

High doses of antibiotics including crystalline Penicillin, Cloxacillin, Metrogyl, Amikacin with anticoagulant and steroids were given for 7 weeks. ATT was added to his treatment after 3 weeks of admission once diagnosis of pulmonary tuberculosis was established from pleural tap. Patient's general condition improved, facial edema and fever subsided, but complete ophthalmoplegia with facial

hypoesthesia and 7th nerve palsy had not recovered at the time of discharge from hospital.

Discussion

Infections of the face, orbit and paranasal sinuses (sphenoid sinus) spread along the angular, ophthalmic and emissary veins to reach the cavernous sinus. In this case infection had spread from upper lip to cavernous sinus. *Staphylococcus aureus* (70%) *Streptococcus* sp. (22%) and *Staph. albus* (5%) are the important organisms responsible for the infection of cavernous sinus^{1,2}. *Staph. aureus* was the causative organism in this case, detected on blood culture. Rhinocerebral mucormycosis is an important differential diagnosis^{3,4}.

Typical symptoms are because of venous obstruction, cranial nerve involvement and general sepsis. Symptoms of venous obstruction are exophthalmos, chemosis and edema of eye lids and nose. Cavernous sinus thrombosis involves cranial nerves IIIrd, IVth, VIth and branches of Vth cranial nerves. Cranial nerves involvement is denoted by ptosis, pupillary dilatation, complete ophthalmoplegia, hypo or hyperesthesia in the distribution of ophthalmic division of trigeminal nerve and rarely trismus⁵.

In this patient there was complete paralysis of IIIrd, IVth, VIth cranial nerves and all the three branches of Vth nerve

(V1, V2, and V3) were involved. Trismus, a rare symptom was present which was due to involvement of V3 branch. Lower motor neuron type of facial nerve palsy was also present in this case which is a feature not described in the literature.

Cavernous sinus is a narrow compartment bounded by a rigid dural envelope. With increasing pressure venous drainage from the nerves is impeded, with alteration of neural physiology and production of nerve paresis. With more increasing pressure arterial supply to the nerves is interrupted with consequent complete nerve deficits⁽⁵⁾.

Three vascular systems play a role in the vascularisation of all cranial nerves⁵. First is the infero lateral trunk (ILT) which arises from the lateral aspect of the intracavernous carotid artery in 90% of population and has a specific vascular distribution to cranial nerves III, IV, VI and first division of trigeminal nerve (V1). Second system is the middle meningeal artery which arises from the internal maxillary artery and perfuses V2, V3 and VIIth cranial nerves. Third system is ascending pharyngeal artery which distributes blood to cranial nerves IX to XII⁵.

De la Torre and Netsky and later Lasjaunias and coworkers have described many anomalies in the branches of cavernous ICA. Branches of cavernous ICA (i.e., inferolateral trunk) form potential anastomoses with branches of maxillary artery (middle meningeal artery, accessory meningeal artery, artery of foramen rotundum & recurrent meningeal branch of middle meningeal artery) and ascending pharyngeal artery (Fig 4). Anomalies of vessels in this region can be understood as persistence or enlargement of one anastomosing branch with regression of other. It has been described in the literature that middle meningeal artery can take an anomalous origin from cavernous internal carotid artery^{6,7,8,9,10,11,12,13,14}, which has been explained by the anastomoses between a branch of cavernous ICA and middle meningeal artery. In this case involvement of V₂, V₃ and VIIth cranial nerves, can be explained on the basis of anomalous origin of middle meningeal artery from cavernous internal carotid artery.

It has been demonstrated that the cavernous sinus will recover and recanalise after thrombosis¹⁵. Improvement in the nerve deficit is unpredictable and often requires months. This patient in three months follow up has not shown any improvement in cranial nerve deficits. With earlier detection

and more potent chemotherapeutic agents there will be continued improvement in outcome of such cases.

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