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Cavernous Sinus Thrombosis – Role of Fess in Early Stage

Medical Science

KEYWORDS : cavernous sinus thrombosis,periorbital cellulitis,lateral gaze palsy,endoscopic endonasal sinus surgery

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ABSTRACT

Cavernous sinus thrombosis is a dreaded complication of sinusitis and may prove to be fatal,once it develops. After antibiotic therapy fewer than 50 % of the patients recover completely,and mortality rate is approximately 30 %.We present a case of pansinusitis with cavernous sinus thrombosis in a 65 years old female.With timely detection of this complication followed by prompt endoscopic endonasal sinus surgery,we were not only able to prevent further catastrophy but also reverse the morbidity already sustained.

CASE REPORT

A 65 yrs. old female patient presented to ENT OPD with severe headache and giddiness since 3 days which was associated with generalized weakness and fatiguibility.

She had been a known case of diabetes mellitus and hypertension for the past 5 years ,on treatment.On examination,patient had left periorbital swelling.On ophthalmogical examination vision and ocular movements were normal on both sides.On anterior rhinoscopy ,purulent nasal discharge was seen on the floor of left nasal cavity. On palpation,left ethmoidal,frontal and maxillary sinus tenderness was present.On diagnostic nasal endoscopy,left middle meatus had purulent discharge .Osteomeatal complex was polypoidal in appearance.A CT scan of paranasal sinuses and brain was done which revealed left periorbital,perizygomatic and maxillary cellulitis ;left frontal,ethmoidal and maxillary sinus opacification with ostial block and no focal infarct/intracranial extension/bleed.On Lab investigations random blood sugar was 358 mg %,Total leukocyte count was 23,800 /cu.mm and ESR was 128 mm/hr.Patient was diagnosed as a case of left pansinusitis with periorbital cellulitis and started on intravenous antibiotics and appropriate dosage of antihyperglycemic medications after consultation with physician.

Fig 1 . photo of the patient on day 1 -left periorbital cellulitis

Fig 2. CT scan of the patient showing opacifiation of left nasal cavity,left maxillary and ethmoidal sinuses.

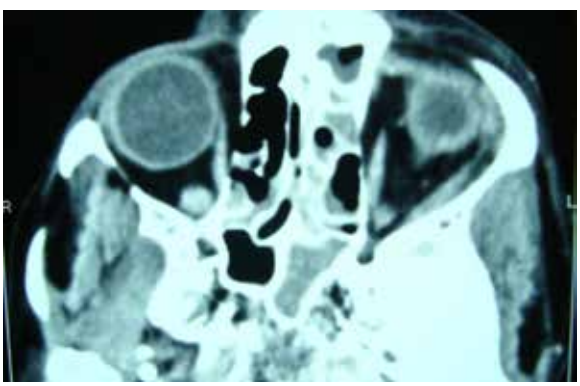

Fig 3. CT scan (axial view) of the patient shwing involvement of left periorbital region ,left nasal cavity and left ethmoidal air cells.

On the next day,patient had developed severe chemosis in the left eye associated with isolated left lateral gaze palsy.Urgent referral was send to ophthalmogist who started the patient on antibiotic eye drops.Considering the rapid progression of periorbital cellulitis to possible cavernous sinus thrombosis in view of an early abducens nerve involvement,decision was taken to do endoscopic sinus surgery quickly with the aim to halt morbidity and clear the ongoing pathology.

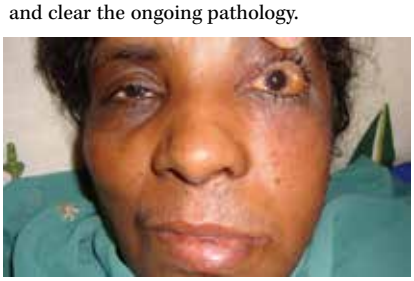

Fig 4. Photo of the patient depicting left eye chemosis

Fig 5. Photo of the patient depicting left lateral gaze palsy

In the perioperative course,polypoidal mass was emanating from left maxillary ostia and was subsequently removed.Left uncinectomy was done and left maxillary ostia located.View of left maxillary anturm was obtained which showed diffuse mucosal hypertrophy.Left maxillary antrum was curetted and hypertrophied mucosa was remoed.Left complete ethmoidectomy and sphenoidotomy was done.Post operatively patient was started on intravenous sulbactam and ceftriaxone

On post-op day 1 ,chemosis had drastically reduced.During the next few days,general condition of patient had improved.Patient was discharged after 1 week and was followed up on weekly basis till six months.Subsequent follow up of the patient revealed clearance of disease from paranasal sinuses and periorbital area and return of lateral gaze movement in the left eye to almost normal range.

Fig 6. Photo of the patient on post op day 1 showing marked reduction of chemosis

Fig 7. Photo of the patient 6 months post op- showing return of the left lateral gaze to almost normal range

DISCUSSION

The postmortem changes of septic cavernous sinus thrombosis were described by Duncan in 1821.[1]All of the initial attempts to treat the condition with surgery failed.[2,3]In 1936,Grove reviewed 400 cases and reported a mortality rate of 100 %.4One year later,Mc neal and Carvallo described the first survivor after using sulfonamides and antistrepotococcus serum.[5]

The cavernous sinuses,located at the base of the skull superolateral to the sphenoid sinus,are valveless venous channels within the leaves of the dura.The right and left cavernous sinuses communicate through the intercavernous sinuses,which pass anteriorly and posteriorly to the sella turcica and the pituitary gland.The oculomotor nerve,trochlear nerve,and the ophthalmic and maxillary branches of the trigeminal nerve course along the lateral wall of the cavernous sinus.The internal carotid artery,sympathetic plexus , and the abducens nerve traverse the centre of the cavernous sinus near its medial wall.Thrombophlebitis of this sinus may affect all of these anatomic structures.

Infections of the medial third of the face ,including the nose,orbit,tonsils,and soft palate,were the most common causes of the cavernous sinus thrombosis in the past.[6,7] bacteria can enter the facial or pterygoid plexus and reach the cavernous sinus by the superior or inferior ophthalmic veins.After antibiotics were introduced ,sinusitis involving the sphenoid and ethmoid air sinuses became a more frequent antecedent condition.Of the eight patients reviewd by Southwick and colleagues7,all had sphenoid or ethmoid sinusitis before cavernous sinus thrombosis developed.

The predisposing infection my spread from the air sinuses by small emissary veins , the sphenoid vein,or directly from the sphenoid sinus.Infrequently ,infections of the ear spread by the way of emissary veins to the sigmoid sinuses and reach the cavernous sinus through the inferior petrosal sinuses.

Most patients have spiking fever and chills.Other signs of toxemia include nausea,vomiting,confusion ,delirium .Headache may occur in 50 % of the patients who eventually have development of cavernous sinus thrombosis.8the first signs of venous obstruction are eyelid edema and chemosis,followed by proptosis,ptosis,and edema of the bridge of the nose.Periorbital edema occurs in approximately 75% of these patients.It is initially confine to one side ,but it often progresses to involve the contralateral eyewithin 2 days.

Diplopia and photophobia are uncommon early complaints. Ophtalmoplegia secondary to orbital congestion,dilatation,and possibly thrombosis of the facial vein may develop.Limitations of the extraocular muscles can be demonstrated at some point in most patients.Lateral gaze palsy may be an isolated early neurological finding because the abducens nerve is the only cranial nerve that traverses the cavernous sinus.Involvement of the ophthalmic and maxillary branches of trigeminal nerve can lead to paresthesia of the upper two thirds of the face ,which can exacerbate headache and obliterate the corneal reflex.More than half of the patients exhibit changes in neural status .Meningismus occurs in a few patients.As the thrombophlebitis extends through the intercavernous sinuses,the signs and symptoms become bilateral ,and the toxic manifestation increase.[9]

The diagnosis of cavernous sinus thrombosis is usually based on clinical findings.According to Price et al[10],five criteria are required to make the diagnosis of cavernous sinus thrombosis.

Diagnostic Criteria for Cavernous Sinus Thrombosis
Bilateral involvement or sequential progress to the contralateral eye
Proptosis,chemosis of conjunctiva,eyelid edema
Limitation of extraocular movement
Meningismus,may include CSF pleocytosis
Residual cranial nerve palsy of III,IV or V after arrest of process

The diagnosis is further confimed by roentgenographic and laboratory studies.[11]Computed tomography with enhancement is the best available radiological tool.Coronal CT scans of the sinuses can demonstrate any sinus sinus disease,and a contrast enhance CT scan of the brain may help in diagnosing cavernous sinus thrombosis.[12,13]Although a CT scan may fail to demonstrate the occlusion of cavernous sinus,it may reveal provocative findings,such as thrombosed superior ophthalmic vein,cortical venous infarcts,or an orbital abcess.The diagnostic yield can be improved by infusion of higher doses of contrast material fol-

lowed by rapid sequential views of the cavernous sinus and by employing thin sections with multiple relationships and direct coronal scanning.

Radionuclide brain scans usually impart nonspecific findings ,but magnetic resonance imaging can aid the diagnosis.Leukocutosis,elevated protein level in cerebrospinal fluid,pleocytosis,and normal glucose level are usually detected among the laboratory findings.Blood cultures are usually positive.

The mainstay of therapy in cavernous sinus thrombosis is high doses of intravenous antibiotis.A combination of antibiotis effective against gram-positive,gram-negative,and anaerobic organisms should be instituted before the results of cultures and sensitivity studies are available.Staphylococcus aureus is documented in more than 67 % of these patients.Pneumococci and other streptococcal species for most of the remaining cases.

A pencillinase resistant penicillin,such as naficillin,and a third generation cephalosporin,such as ceftazidine or cefotaxime provides good initial combination therapy.Medical treatment should be continued for 2 to 4 weeks after local and general signs of infection have subsided.The use of heparin is controversial,but it can benefit patients with early unilateral manifestations of cavernous sinus thrombosis.Anticoagulation can prevent further spread of thrombosis and may prevent septic emboli to other venous sinuses.It may also contribute to recanalization and dissolution of the clot,allowing the antibiotic to reach the infected thrombosis more readily.

Intravenous corticosteroids may sometimes serve as adjunctive therapy,especially if there is a lack of response to high dose antibiotics.Corticosteroids are occasionally used to decrease orbital congestion,and they may prevent addisonian crisis if the septic thrombosis has spread to the pituitary.14Therapeutic hypothermia is sometimes employed to control fever and decrease cerebral edema.[15]

In cases of cavernous sinus thrombosis,surgery is indicated to drain the primary site of infection.Surgical intrusion into the cavernous sinus is difficult and not not recommended.If sphenoid or ethmoid sinusitis is docuemented by CT scans,surgical drainage of theses infected pockets should be performed promptly.Functional endonasal sinus surgery is a quick and effective procedure for these patients.[16]The procedure restores the sinuses to their normal physiological state by providing adequate aeration and restoring normal mucociliary flow though patent sinus ostia.[17]FESS adequately drains the infected sinuses with little morbidity.If the patient cannot withstand general anesthesia,FESS can be performed under local anaesthesia. With the increasing evidence of sinusitis as he principal source of infection in cavernous sinus thrombosis,FESS may prove to be an essential step in the treatment of these patients.Rapid improvement occurred in all three patients who underwent debridement of the sphenoid sinus in the series of southwick et al.

CONCLUSION

Sinusitis has increasingly become the primary source of infection leading to cavernous sinus thrombosis.We believe that the dramatic improvement in outcome effected by antibiotics can be significantly augmented by skillfully executing FESS in the treatment of cavernous sinus thrombosis.

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