Reminder of important clinical lesson

Ocular manifestations of cavernous sinus thrombosis

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Summary

A 17-year-old male presented with a 10-day history of symptoms of upper respiratory tract infection, headaches, photophobia and progressive swelling around both eyes.

Clinical examination revealed a temperature of 39°C and bilateral periorbital swelling which was worse on the left side. Initial ophthalmological examination revealed a dilated non-reactive pupil on the left side and a sluggish pupillary reflex on the right side.

The patient also had a lateral rectus palsy of the left eye. Fundoscopy showed bilateral papilloedema, and visual acuity on admission was 6/12 in the right and 6/18 in the left eye. Ear, nose and throat examination revealed a rhinitic nasal mucosa with thick mucus in the left middle meatus.

The patient required surgical intervention to drain his sinuses followed by long-term intravenous antibiotic therapy and anticoagulation. After 6 weeks of therapy and close observation, he recovered with minimal sequelae.

BACKGROUND

Despite the advent of antibiotics, cavernous sinus thrombosis (CST) is still associated with a high mortality and morbidity rate. A high index of clinical suspicion is required for the diagnosis and it is vital to differentiate it from other causes of periorbital swelling.

A review of the literature failed to identify any articles emphasising the ocular manifestations of CST. We have therefore included a diagram (figure 1) and also a table (table 1) highlighting the ocular manifestations of cavernous sinus thrombosis and their underlying pathology. Clinicians should have a good understanding of these pathological features to aid prompt diagnosis and help institute appropriate management.

CASE PRESENTATION

A normally fit and well young male presented with bilateral periorbital swelling, headaches and photophobia following an upper respiratory tract infection.

INVESTIGATIONS

- ▶ Bloods: full blood count, urea, electrolytes, creatinine, blood cultures, C reactive protein
- ▶ CT head and orbits
- ▶ CT angiogram
- ▶ CT paranasal sinuses.

DIFFERENTIAL DIAGNOSIS

- ▶ Periorbital cellulitis
- ▶ Intraorbital abscess
- ▶ Orbital apex syndrome
- ▶ Carotid-cavernous fistula.

TREATMENT

- ▶ Drainage of identifiable sources of infection
- ▶ Broad-spectrum parenteral antibiotics
- ▶ Anticoagulation for cases with no evidence of haemorrhagic intracranial complications.

Table 1 Ocular manifestations of cavernous sinus thrombosis and their underlying pathology.

Anatomic region	Signs	Pathology/involved structure
Eyelids and Orbit	Ptosis Chemosis Proptosis Orbital cellulitis Peri-orbital sensory loss	Oedema of upper eye lid +/- sympathetic plexus involvement through III CN Thrombosis of superior & inferior ophthalmic veins Involvement of V CN (ophthalmic/trigeminal divisions)
Cornea	↓ Corneal reflex Corneal ulcers	V CN involvement (ophthalmic division) Corneal exposure due to inability to close eyes.
Pupils	↓ or absent Pupillary response Dilated Small	Raised intraocular pressure or optic neuropathy causing afferent pupillary defect III CN (parasympathetic plexus) sympathetic plexus involvement (III CN) affecting iris and ciliary apparatus
EOM Movement	Lateral rectus palsy Complete Ophthalmoplegia	VI CN Dysfunction of CN III, IV & VI
Visual acuity	↓ visual acuity or blindness	Central retinal artery/vein occlusion secondary to ICA arteritis, septic emboli or ischaemic optic neuropathy

↓ Decreased, ICA internal carotid artery, CN cranial nerve, EOM extraocular muscle

Figure 1 Anatomy of the cavernous sinus: (1) third ventricle, (2) pituitary gland, (3) oculomotor nerve, (4) trochlear nerve, (5) internal carotid artery, (6) abducens nerve, (7) ophthalmic branch of the trigeminal nerve and (8) maxillary branch of the trigeminal nerve.

OUTCOME AND FOLLOW-UP

The patient recovered well with long-term intravenous antibiotics and anticoagulation (6 weeks). Visual acuity improved to 6/6 in the right eye and 6/9 in the left eye.

DISCUSSION

Over the years, antibiotics have revolutionised the management of CST. However, despite early diagnosis and aggressive management, current mortality is still around 20–30%. In patients who recover, long-term sequelae occur in up to 22%.¹ These include unilateral blindness, decreased visual acuity and hemiparesis. Management of CST involves dealing with the primary focus of infection such as sinusitis, dental abscess or facial cellulitis. Treatment should also be directed towards specific complications, for example, meningitis, intracranial abscess, subdural empyema, etc. The vast majority of cases are initially treated with a combination of a third generation cephalosporin, flucloxacillin and metronidazole.² Although there are no standards for the duration of antibiotic therapy, it is recommended that antibiotics should be given for at least 2 weeks beyond the clinical resolution of symptoms. This is due to the assumption that bacteria within thrombi may not be eradicated until the venous sinuses canalise.^{3,4} In cases where specific culture results are available, antibiotics should be modified accordingly.

Due to the rarity of this condition, there does not appear to be a consensus on the use of anticoagulant therapy in CST. However, a systematic review of case series on the use of anticoagulants showed a favourable outcome in those treated with anticoagulants and it was reported that anticoagulant therapy should be considered for cases of CST with no signs of haemorrhagic intracranial complications.⁵ Anticoagulant therapy appears to be particularly useful in reducing diplopia associated with cranial nerve involvement and neurological sequelae such as seizures, hemiparesis or hypopituitarism.

Direct surgical drainage of the cavernous sinus is virtually never performed and operative intervention for CST is usually directed towards the primary source of infection. In cases of a sinogenic cause of CST, drainage of sinuses should be performed promptly. Following the acute phase of infection, recovery is gradual and up to 50% of patients can have long-term neurological deficits in the form of decreased visual acuity, diplopia, cranial nerve deficits, hemiparesis, ataxia or epilepsy. The majority of reported cranial nerve deficits have involved the oculomotor and abducens nerves. Long-term follow-up of these patients is essential as relapses have been reported after apparent clinical resolution.⁶

Learning points

- ▶ Cavernous sinus thrombosis (CST) is a rare but potentially life threatening condition.
- ▶ It has high mortality and morbidity rates (30% and 50%, respectively).
- ▶ Knowledge of the ocular manifestations of CST is essential to differentiate it from other causes of periorbital swelling.
- ▶ Long-term parenteral antibiotic therapy is the mainstay of treatment, with anticoagulation for cases with no haemorrhagic intracranial complications.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Yarington CT Jr.** Cavernous sinus thrombosis revisited. *Proc R Soc Med* 1977;**70**:456–9.
2. **Armstrong D**, Cohen J. *Infectious Diseases*. First edition. St Louis, MO: Mosby-Wolf 1999.
3. **Shaw RE.** Cavernous sinus thrombophlebitic. A review. *Br Oral Surg* 1952;**40**:40–8.
4. **Karlin RJ**, Robinson WA. Septic cavernous sinus thrombosis. *Ann Emerg Med* 1984;**13**:449–55.
5. **Bhatia K**, Jones NS. Septic cavernous sinus thrombosis secondary to sinusitis: are anticoagulants indicated? A review of the literature. *J Laryngol Otol* 2002;**116**:667–76.
6. **Ivey KJ**, Smith H. Hypopituitarism associated with cavernous sinus thrombosis. *J Neurol Neurosurg Psychiatry* 1968;**31**:187–9.

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