



## Superior ophthalmic vein thrombosis, a grave complication of orbital cellulitis: A case report

### KEYWORDS

Superior ophthalmic vein, orbital cellulitis, chemosis

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**ABSTRACT** *In this antibiotic era, the complications of orbital cellulitis are uncommon but can be potentially sight and life threatening. The progression from orbital cellulitis to its complications can be quite rapid. A 40 year old, male patient initial presented as a case of orbital cellulitis secondary to skin infection. Systemic antibiotics were commenced. However there was worsening of the condition with increase in proptosis, restriction in ocular movements, severe chemosis, with other signs of venous congestion. MRI orbit with gadolinium enhancement was done which showed findings consistent with the diagnosis of unilateral superior ophthalmic vein thrombosis. Along with intravenous antibiotics, anticoagulant therapy was initiated which led to improvement with no residual deficits within 5 days. This case report signifies the importance of recognition of this rare entity and its implications on management and prognosis.*

### Introduction:

Apart from retinal vein occlusion, venous disease of the orbit is a rare occurrence. <sup>(1)</sup> Superior ophthalmic vein thrombosis (SOVT) is usually found in cases of orbital congestion such as orbital cellulitis, idiopathic orbital inflammation, vascular malformation, tumors like meningioma, thyroid-related orbitopathy, drug intake. <sup>(2-7)</sup> Unilateral thrombosis usually occur due to local infection from the orbit itself or from the adjacent paranasal sinuses. <sup>(3,4)</sup> Many cases have been shown to resolve without any permanent effect on vision, but some cases have shown visual loss due to orbital edema associated with venous congestion resulting in optic nerve compression or occasionally the central retinal artery occlusion. <sup>(2,8)</sup>

### Case report:

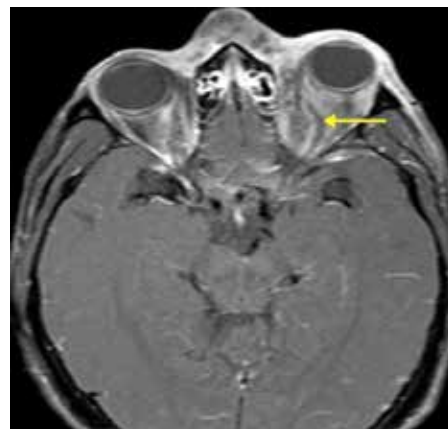
A 40 year old, male patient presented in Ophthalmology department with left eye pain and left sided periorbital swelling since 6 days with associated malaise and fever. Patient was vitally stable except for mild tachycardia and low grade fever. There was no significant abnormality on systemic examination. No evidence of otitis media and sinusitis was elicited. A furuncle over the nose was noted. On ocular examination, there was left sided lid edema, erythema, tenderness with proptosis. Patient's visual acuity was 6/6 in both eyes. There was significant conjunctival chemosis and dilatation of episcleral veins with mild restriction of ocular movements in all directions. Ocular bruit and pulsations were absent. Intraocular tension was not raised. No other cranial nerve deficits were noted. Fundus examination showed no evidence of papilloedema or retinal hemorrhages.



**Figure 1:** clinical picture showing proptosis, chemosis, prominent engorged veins over forehead and restriction of ocular movement.

Patient was started on empirical intravenous antibiotics for coverage of gram positive and gram negative and anaerobic organisms. Vitals and visual acuity pupillary reaction were closely monitored. Within 24 hours, deterioration in general condition was noted. Patient was toxic and irritable with altered sensorium, high grade fever, nausea and vomiting. On examination, prominent engorgement of veins over forehead was noticed. There was increase in proptosis, chemosis and restriction of ocular movements in all direction with vague complain of blurring of vision (fig.1).

Clinical diagnosis of cavernous sinus thrombosis was suspected. CT brain showed no abnormality. Contrast MRI orbit was performed (contrast done with IV gadolinium). MRI findings showed non-filling, large caliber, tortuous left superior ophthalmic vein consistent with the diagnosis of superior ophthalmic vein thrombosis (fig2). No cavernous sinus involvement noted. After the confirmation of the diagnosis, patient was started on subcutaneous low molecular weight heparin along with antibiotics. Within 5 days there was marked improvement and with only conjunctival congestion present.



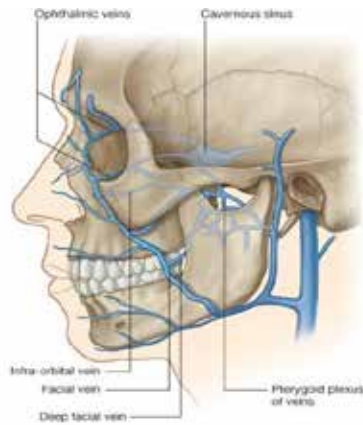
**Figure 2:** Contrast enhanced MRI with gadolinium; Arrow showing dilated non-filling left superior ophthalmic vein.

### Discussion:

Orbital cellulitis is an infection of the soft tissues behind the orbital septum. Most commonly, the infection originates from sinuses, eyelids or face. Other causes include distant spread

of infection through hematogenous route, after trauma or post surgery.<sup>(9,10)</sup> Orbital cellulitis presents with any combination of severe pain, erythema and lid swelling, chemosis, proptosis, displacement of globe limited ocular motility and diplopia.<sup>(10,11)</sup> Orbital cellulitis can cause many grave complications such as orbital abscess, orbital vein thrombosis, cavernous sinus thrombosis, meningitis, brain or subdural abscess, carotid occlusion and death.<sup>(12)</sup>

The orbital infection may extend to the brain due to the valveless communication of facial vein and ophthalmic veins to the cavernous sinus.<sup>(13)</sup> (fig. 3) Therefore delay in diagnosis and treatment of orbital infection can lead to orbital vein thrombosis which can cause blindness due to ischaemia. In superior ophthalmic vein thrombosis and cavernous sinus thrombosis the signs and symptoms can develop suddenly, representing acute compromise to the venous drainage system.



**Figure 3: venous drainage of dangerous area of face**

A patient presenting with periorbital swelling, proptosis and conjunctival congestion with or without restriction of ocular movements or visual impairment include many differential diagnosis such as orbital cellulitis, cavernous sinus thrombosis, carotico-cavernous fistula (CCF) and rarely superior ophthalmic thrombosis.<sup>(1)</sup> As clinical features are overlapping, imaging modalities can be very helpful in confirming the diagnosis. Superior ophthalmic vein can be thrombosed with or without involvement of cavernous sinus thrombosis.

Cavernous sinus thrombosis is a rare but extremely serious complication. It should be highly suspected when there is evidence of bilateral involvement, rapidly progressive proptosis and congestion of the facial, conjunctival and retinal veins. Additional features include abrupt progression of clinical signs associated with prostration, severe headache, nausea and vomiting.<sup>(10)</sup> However, The signs are unilateral to start with, but the other eye eventually becomes involved. Before the antibiotic era, cavernous sinus thrombosis resulted in death. The mortality rate since the availability of antibiotics has been reduced to 30%.<sup>(12)</sup> However there is significant high morbidity and complete recovery is rare. Roughly one sixth of patients

are left with some degree of visual impairment, and one half have cranial nerve deficits.<sup>(14)</sup>

#### Management of the patient:

In developing countries, most patients of orbital cellulitis will sought treatment later in the course of their disease. Hence hospitalization and prompt management is needed.

First step includes history taking and clinical examination in detail. Thorough skin, ENT examination should be done to elicit the etiology. Intravenous antibiotics are usually started once the diagnosis of orbital cellulitis is suspected. Broad-spectrum antibiotics that cover most gram positive, gram negative bacteria and anaerobes should be selected. Antibiotic recommendations are based on the most common causative microorganisms such as *S. aureus*, *S. epidermidis*, *Streptococci*, and *Haemophilus* species.<sup>(15)</sup> Careful monitoring of the clinical course is mandatory. Pupillary reactions, visual acuity, colour vision and light brightness appreciation should be checked every 4 hourly for optic nerve dysfunction.<sup>(10)</sup> Ocular movements and cranial nerves should be assessed in frequent intervals. Despite proper treatment, if deterioration in general condition along with increase in chemosis and proptosis is observed, complications should be highly suspected.

#### Investigations and treatment:

Routine blood investigations will show leucocytosis.

CT scan is considered the modality of choice for diagnosis of orbital infection and its extension into the cranium. It has a good resolution for the orbital soft tissues, and integrity of lamina papyracea and its involvement by subperiosteal abscess. Contrast-enhanced CT and MR images will demonstrate filling defects within the superior ophthalmic vein, often with associated enlargement of superior ophthalmic vein.<sup>(15)</sup> CT scan is comparatively a cheaper modality, however post gadolinium enhanced fat suppression MRI is amongst the most sensitive techniques for evaluation of orbital infections. It can show stages of thrombus formation. Acute thrombus (upto one week) appears isointense in T1-weighted images and hypointense in T2-weighted images. Subacute thrombus shows hyperintensity in both T1- and T2-weighted images.<sup>(1)</sup> Orbital color Doppler imaging also allows noninvasive confirmation of superior ophthalmic vein thrombosis.<sup>(6)</sup>

Intravenous antibiotics are the treatment of choice for orbital cellulitis. When thrombosis is found anticoagulant ideally is started early in the management if no contraindication exist.<sup>(12)</sup> Walker et al<sup>(16)</sup> in their review of superior ophthalmic vein thrombosis due to orbital cellulitis discussed the benefits and risks of anti-coagulating these patients. Corticosteroids are usually not recommended for venous thrombosis of infective origin. The use of steroids and anticoagulation for this condition is still debated.

#### Conclusion:

Superior ophthalmic vein thrombosis is a rare entity but can be a harbinger of cavernous sinus thrombosis. A high index of suspicion, early detection and adequate management is the key to avoiding cavernous sinus thrombosis.

#### REFERENCE

- Lai P and Cusimano M. (1996). The Spectrum of Cavernous Sinus and Orbital Venous Thrombosis: A Case and a Review. *Skull Base Surgery*; 6(1): 53- 59. | 2. Nagarajan K and Sundararajan S (2012). Bilateral superior ophthalmic vein thrombosis in a case of viral meningo-encephalitis: A case report and review of literature. *Int J Med Biosci.* ; 1(3): 45 – 48. | 3. Rohana AR, Rosli MK, Nik Rizal NY, Shatriah I, Wan Hazabbah WH (2008); Bilateral ophthalmic vein thrombosis secondary to nasal furunculosis. *Orbit* 27(3): 215-7. | 4. Schmitt NJ, Beatty RL, Kennerdell JS (2005); Superior ophthalmic vein thrombosis in a patient with dacryocystitis- induced orbital cellulitis. *Ophthal Plast Reconstr Surg* 21(5): 387-9. | 5. Jaais F, Habib ZA (1994); Unilateral superior ophthalmic vein thrombosis in user of oral contraceptives. *Med J Malaysia* 49: 416–418. | 6. Vyas S, Das PJ, Gupta SK, Kakkar N, Khandelwal N (2011). Superior and inferior ophthalmic veins thrombosis with cavernous sinus meningioma. *Middle East Afr J Ophthalmol* 18(3): 256-8. | 7. Murias E, Villota E, Saiz A, Gily A, Calleja S (2009). Sinus pericranii associated to spontaneous thrombosis of the ophthalmic vein: neuroimaging studies. *Radiologia* 51(3): 307–312. | 8. Hsu J, Ibarra MS, Jacobs D, Galetta SL, Brucker AJ (2004). Combined central retinal vein and artery occlusion associated with an isolated superior ophthalmic vein thrombosis. *Retina* 24(3): 452-4. | 9. Intiaz A, Chaudhry, Waleed Al-Rashed et al. (2012) The Hot Orbit: Orbital Cellulitis. *Middle East African journal of ophthalmology.* 19(1); 34-42. | 10. Jack J, Kanski, Brad Bowling (2011). *Clinical Ophthalmology: A Systematic Approach*; 7TH Edition; Pg 90-91. | 11. Jerry Allen Shields, Carol L. Shield (2008). *Eyelid, Conjunctival, and Orbital Tumors: An Atlas and Textbook.* 2nd edition Pg 454. | 12. Richard G. Topazian et al (2002). *Oral and maxillofacial infection.* 4th edition; Pg 336. | 13. Mitchell R, Kelly J, Wagner J (2002). Bilateral orbital complications of pediatric rhinosinusitis. *Arch Otolaryngol Head Neck Surg*; 128: 971-4. | 14. R. Ahmad, R. Salman, S. Islam, A. Rehman (2010). Cavernous Sinus Thrombosis As A Complication Of Sphenoid Sinusitis: A Case Report And Review Of Literature. *The Internet Journal of Otorhinolaryngology.* Vol: 12(1). | 15. Christina A. LeBedis and Osamu Sakai (2008). Nontraumatic Orbital Conditions: Diagnosis with CT and MR Imaging in the Emergent Setting. *RadioGraphics*; 28: 1741-1753. | 16. Walker JC, Sandhu A, Pietris G (2002). Septic superior ophthalmic vein thrombosis. *Clin Experiment Ophthalmol.* ; 30(2): 144-6.