

# Asymmetric Superior Ophthalmic Vein Thrombosis due to Sepsis Induced by a Deep Neck Infection

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## Abstract

Superior ophthalmic vein thrombosis is one of the early signs of cavernous sinus thrombosis. It is characterized by ipsilateral proptosis, ptosis, chemosis, limitations of ocular muscle movement and normal fundus findings. In this article, we present a case of bilateral asymmetric superior ophthalmic vein thrombosis due to sepsis developed from a deep neck infection from a parotid gland abscess.

A 49-year-old male patient presented to our emergency department with a history of progressive left neck swelling, ocular pain and conjunctival injection, ptosis, proptosis, and diplopia on his right eye. He had limitations of his extraocular muscle movement in all directions of his right eye, especially abduction and adduction limitations with no midline crossing. It was revealed that the patient was in a septic condition at the emergency department. The findings revealed a diffuse parotid gland abscess and left external carotid vein thrombosis. An incision was performed and drainage was done on next day of the ER visit. His bilateral cavernous sinus yielded a decreased enhancement on the CT scan signifying thrombophlebitis. His right superior ophthalmic vein was filled with a thrombus. The left superior ophthalmic vein was also filled with a thrombus. An orbital MRI also revealed both an ophthalmic vein engorgement due to the thrombus and an enhancement around the extraocular muscle with infiltration. A blood culture test concluded the presence of *Staphylococcus aureus*, a gram positive microorganism. The patient was maintained on intravenous antibiotics over his admission. After discharge, the proptosis and limited motion of the extraocular muscle dissipated. However, diplopia at the primary position remained.

Septic thrombosis of the cavernous sinus is rare but a potentially detrimental condition that demands careful consideration and suspicion when dealing with a patient with an acute neck inflammation. Early recognition and prompt administration of broad spectrum intravenous antibiotics is important because isolated septic superior ophthalmic vein thrombosis is rare.

## Keyword:

Superior ophthalmic vein thrombosis; Deep neck infection; Sepsis

## Introduction

Superior ophthalmic vein thrombosis is one of the early signs of cavernous sinus thrombosis. It is characterized by ipsilateral proptosis, ptosis, chemosis, limitations of ocular muscle movement and normal fundus findings [1]. Septic cavernous sinus thrombosis is a disease of high mortality. A prompt diagnosis and appropriate treatment of a septic condition are most important aspects for a successful outcome. If patients exhibit clinical findings of sudden onset ptosis with erythema of an eyelid, restriction of ocular movement progression, then a clinician should be highly suspicious of superior ophthalmic vein thrombosis with a cavernous sinus thrombosis. In order to prevent further morbidity, it is important to confirm the diagnosis from a radiologic evaluation and laboratory findings and to start antibiotic therapy immediately. Bilateral thrombosis of the superior ophthalmic vein is an uncommon condition in a septic condition. In this article, we present a case of bilateral asymmetric superior ophthalmic vein thrombosis due to sepsis developed from a deep neck infection from a parotid gland abscess.

## Case Report

A 49-year-old male patient presented to our emergency department with a history of progressive left neck swelling, ocular pain and conjunctival injection, ptosis, proptosis, and diplopia on his right eye.

He had sought consultation at an ophthalmology clinic when his visual acuity was 0.9(OD)/0.7(OS) and his intraocular pressure was in the normal range. There was right eyelid swelling with ptosis and both pupils were observed for direct and indirect reflex with isocoric processing (3 mm(OD)/3 mm(OS)). We checked that both pupils were reduced in size when he focused on a near object and constricted when exposed to bright light. Exophthalmometry yielded measurements of 20.0 mm (OD), 16.0 mm (OS), and BL=125 mm. A slit exam and funduscopic findings were not remarkable except injection with chemosis of his right eye. He had mild limitations of his extraocular muscle movement in all directions of his right eye, especially abduction, adduction. He also had limitation of extraocular muscle movement with no midline cross when infraduction of his right eye (Figure 1). His initial vital signs were unstable. Measurements for blood pressure, respiratory rate, and body temperature were 80/60 mmHg, 20/min, and 36°C, respectively and his mental status was drowsy. It was revealed that the patient was in a septic condition at the emergency department. There was a diffuse severe swelling over the

left parotid area along with contralateral exophthalmos exhibiting chemosis of his right eye. The patient was first seen by an otolaryngologist. Computed tomography of his neck was done at the emergency department. The findings revealed a diffuse parotid gland abscess and left external carotid vein thrombosis (Figure 2). An incision was performed and drainage was done on next day of the ER visit. A follow up neck CT was administered 5 days post incision and the drainage revealed a left, internal vein proximally located thrombotic occlusion. Spreading of the thrombosis was evident at the right proximal jugular vein and the left sphenoparietal sinus. His bilateral cavernous sinus yielded a decreased enhancement on the CT scan signifying thrombophlebitis. His right superior ophthalmic vein was filled with a thrombus. The left superior ophthalmic vein was also filled with a thrombus (Figure 3). Proptosis and an orbital fat infiltration were found at the patient's right eye. An orbital MRI also revealed both an ophthalmic vein engorgement due to the thrombus and an enhancement around the extraocular muscle with infiltration. However, the right ophthalmic vein enhancement was more prominent. Signal enhancement of the optic nerve central portion signified optic neuritis with retrobulbar involvement (Figure 4). A blood culture test concluded the presence of *Staphylococcus aureus*, a gram positive microorganism.

Following the above result, a spreading, deep neck infection developed into a bilateral superior ophthalmic vein thrombosis and a cavernous sinus thrombosis. The patient was maintained on systemic antibiotics ceftazidime+ciprofloxacin+metronidazole combination during his admission. We considered additional anticoagulation therapy, but septic embolisms have a tendency to makes high risk of hemorrhage. So we stick to systemic antibiotics combination therapy during his admission. After discharge, the proptosis and limited motion of the extraocular muscle dissipated. However, diplopia at the primary position remained.

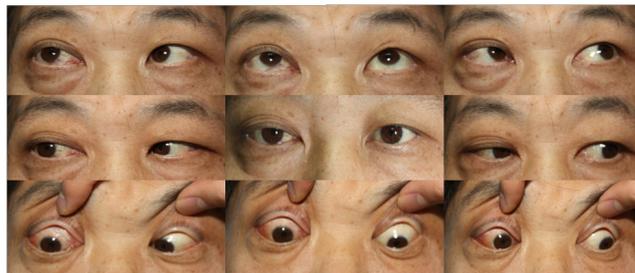


Figure 1: 9 cardinal movement: Mild limitation of ocular movement when abduction and adduction, No midline cross when infraduction of right eye.

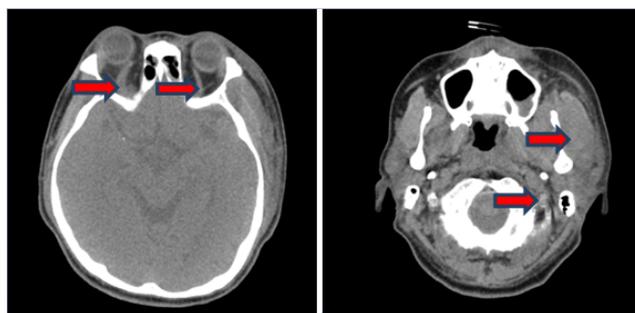


Figure 2: (A) Bilateral superior ophthalmic vein thrombosis and (B) Diffuse parotid gland abscess left external carotid vein thrombosis.

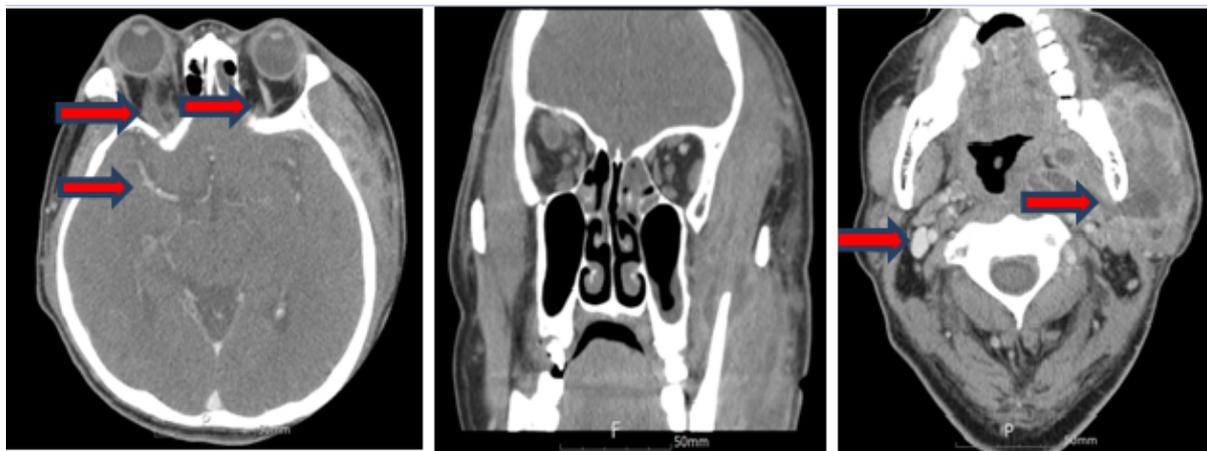


Figure 3: (A,B): Spreading of the thrombus left sphenoparietal sinus, Bilateral superior ophthalmic vein filled with thrombus. (C): Thrombosis of the right proximal jugular vein and parotid gland abscess.

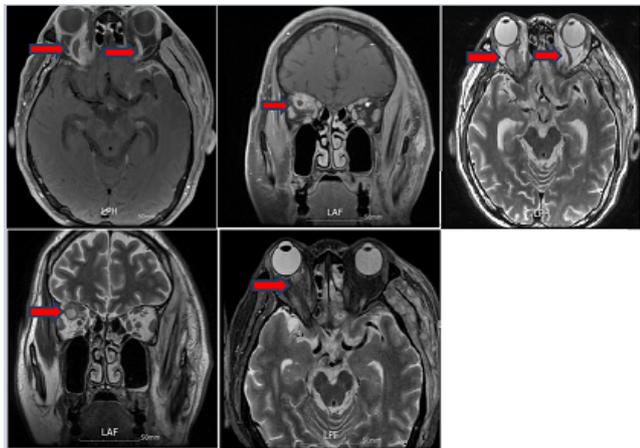


Figure 4: Both an ophthalmic vein engorgement due to the thrombus and an enhancement around the extraocular muscle with infiltration (A),(B):T1,(C),(D)T2 MRI images (E) Signal enhancement of the optic nerve central portion signified optic neuritis with retrobulbar involvement T2 MRI images.

## Discussion

Septic thrombosis of the cavernous sinus is rare but a potentially detrimental condition that demands careful consideration and suspicion when dealing with a patient with an acute neck inflammation. Early recognition and prompt administration of broad spectrum intravenous antibiotics is important because isolated septic superior ophthalmic vein thrombosis is rare. Clinical signs include unilateral chemosis, limited ocular movement, and an unremarkable fundus examination. Necrotizing fasciitis is a well-known complication of untreated and poorly treated cellulitis of skin and soft tissue infections [2]. In our case, necrotizing fasciitis of the left parotid gland area developed into a septic thrombus, and the thrombus occluded both the ophthalmic vein and cavernous sinus. Cavernous sinus thrombosis is a most commonly observed result from the spread of infections of the sinuses, especially around the sphenoid, ethmoid, and frontal sinuses, or infection of the middle third of the face. Generally, *Staphylococcus aureus* is one of the most common pathogen identified in superior ophthalmic vein thrombosis [3]. Prompt drainage of the primary infection site is important in most cases.

Traditional treatment of septic superior ophthalmic vein thrombosis includes aggressive antibiotic therapy. Theoretically, corticosteroids may reduce any inflammatory reaction. However, their use is not recommended. The role of anticoagulants is unclear and their effects have not been proved. There are no controlled studies of the use of anticoagulants in treating superior ophthalmic vein thrombosis [4]. The role of anticoagulants as an adjuvant to antibiotic therapy remains controversial, as the risk of intracranial bleeding and benefits in preventing further thrombotic proliferation need to be assessed.

Mortality due to cavernous sinus thrombosis has decreased from 80%~100% to 20% when using preantibiotics as stated in recent reports [5]. This significant decrease is due to early diagnosis, advances in imaging devices, and aggressive medical care. The signs of cavernous sinus thrombosis result from venous congestion due to impaired venous drainage from the orbit and the eye. A CT scan and MRI, especially MRI fulfill important information in a diagnosis and they expose the filling defect in the superior ophthalmic vein [6]. Superior ophthalmic vein thrombosis is relatively rare in combination with a case of deep neck infection. Clinicians should consider serious complications such as septic pulmonary embolism, meningitis, carotid thrombosis, subdural empyema, and brain abscesses because these complications often manifest through high morbidity and mortality [7].

## References

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