# Post-operative Superior Ophthalmic Vein Thrombosis Following Transsphenoidal Resection of Growth Hormone-Secreting Pituitary Adenoma

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## *Abstract*

Transsphenoidal surgery is the treatment of choice in the management of Growth hormone-secreting pituitary adenoma. Ophthalmic complications are infrequently seen following pituitary surgery but orbital complications have not been reported. We report the occurrence of unilateral superior ophthalmic vein thrombosis in the immediate postoperative period after a successful endoscopic transsphenoidal surgery and discuss its management and possible etiopathogenesis.

**Keywords:** Acromegaly; Venous thrombosis; Orbital cellulitis.

## Introduction

Surgical excision is the treatment of choice for growth hormone (GH) secreting pituitary adenomas.[1] Though visual and ophthalmoplegic complications have been reported infrequently after pituitary surgery,[2,3] orbital complications have not been reported. Pulmonary venous thromboembolisms and rarely cerebral venous thrombosis have been reported in ACTH and GH-secreting pituitary adenomas,[4,5] but orbital vein thrombosis has not been reported. We report a rare case of superior ophthalmic vein thrombosis (SOVT) occurring in the immediate post-operative period following ETS in a patient with acromegaly, it's possible etiology, and management.

## Case Report

A 35-year-old male was referred to the endocrinologist for management of newly diagnosed hyperglycemia. He was found to have clinical features of acromegaly. Laboratory evaluation revealed a GH level of 86.73 mIU/L (normal range: 0 – 7.41 mIU/L).

MRI of the pituitary showed a pituitary adenoma measuring 15.7x22.9x15.8mm displacing the stalk and pituitary gland to the left side with extension into the right cavernous sinus (Figure 1). Ophthalmology evaluation revealed normal visual acuity and visual fields.

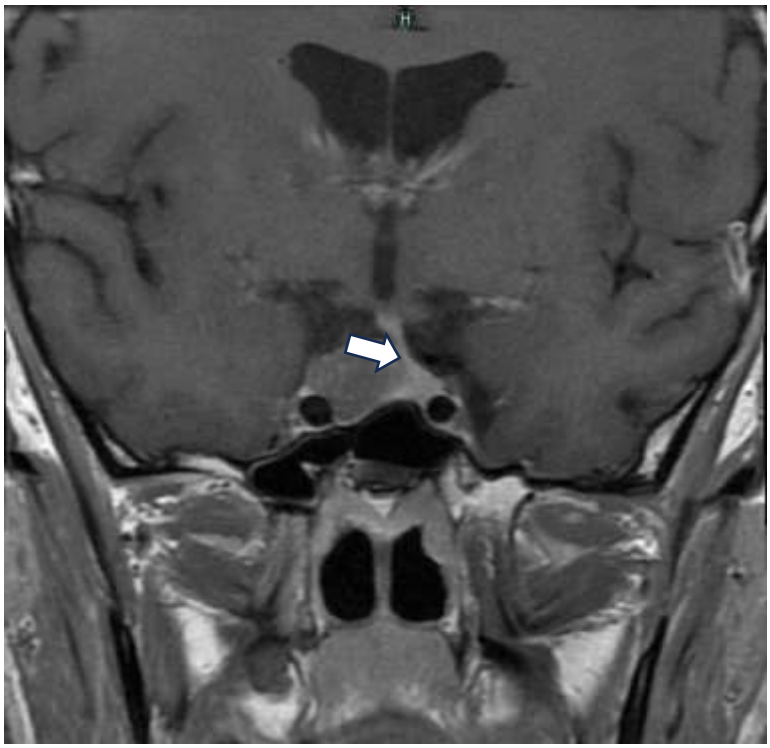

**Figure 1:** Post-contrast T1 FS axial MRI image showing pituitary adenoma (white arrow)

He underwent an endoscopic transsphenoidal resection of the adenoma. A gross total excision of the tumour was achieved including the cavernous sinus part with no untoward bleeding or leakage of cerebrospinal fluid. leak.

During the 3rd post-operative day, he experienced mild headache and bilateral eye pain with watery discharge from his right eye. On the fourth day, he had a low-grade fever, swelling, and redness in his right eye. Ophthalmology assessment revealed peri-orbital swelling, chemosis, and restricted eye movement with normal vision (Figure 2). A CT scan of the orbits was recommended in order to rule out orbital cellulitis. Contrast-enhanced CT of the orbits showed proptosis of the right eye with mild fat stranding, thickening of extraocular muscles, and a prominent right superior ophthalmic vein (Figure 3). MRI of orbits showed a thrombus in the right SOV with fat stranding and thickening of extra-ocular muscles and proptosis (Figure 4).

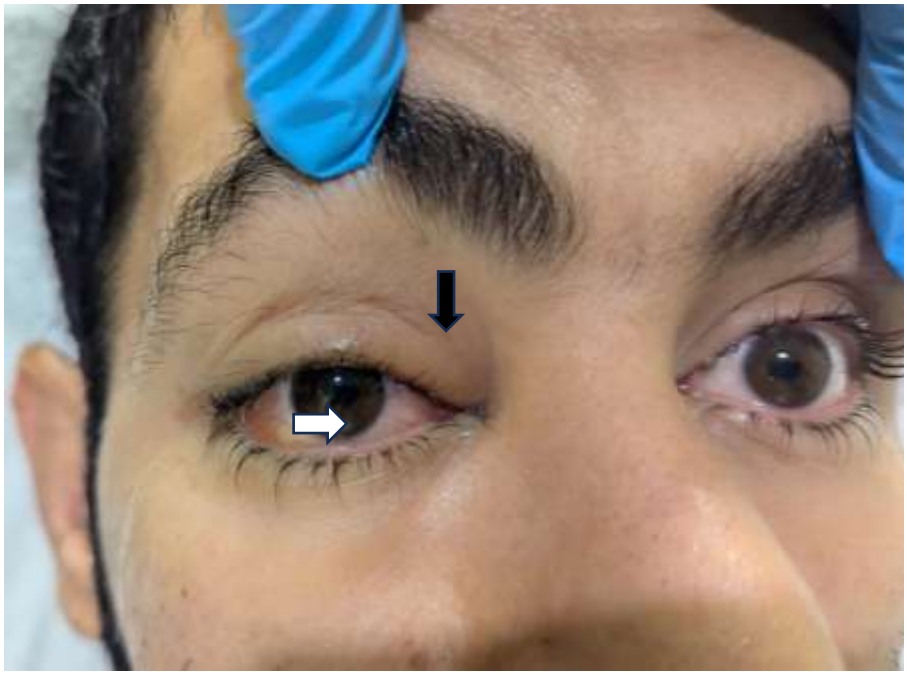

**Figure 2:** Right eyelid swelling (dark arrow) and chemosis (white arrow)

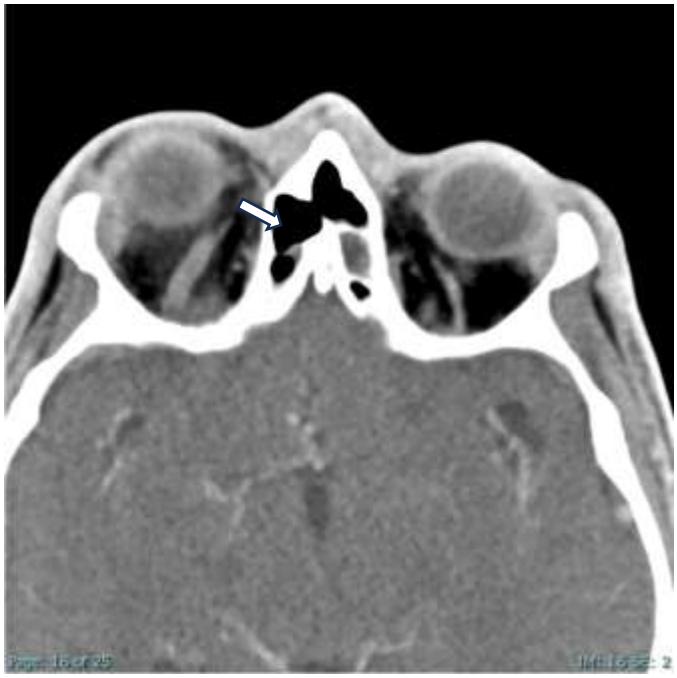

**Figure 3:** Contrast enhanced CT orbit showing prominence of Rt SOV (arrow)

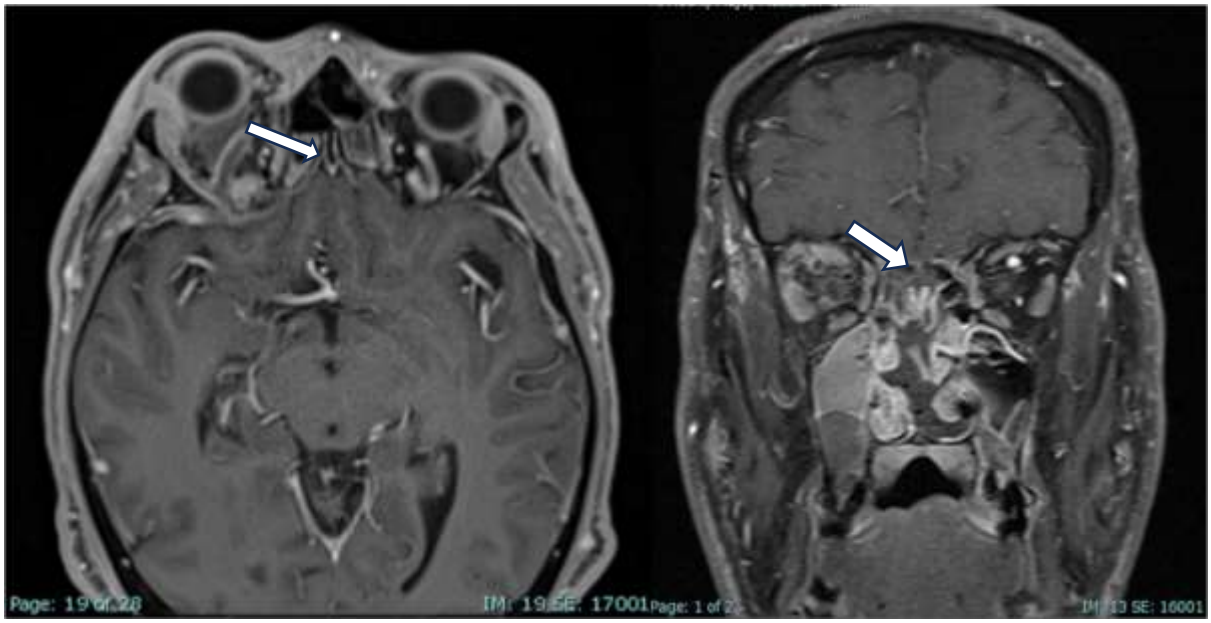

**Figure 4:** Post-contrast T1 FS axial and coronal MRI images showing SOV filling defects (arrows)

Inflammatory markers were not elevated and nasal endoscopy revealed no obvious infection. With the diagnosis of SOVT with probable septic origin from sinuses, the patient was started on empirical Tazocin and Clindamycin after consultation with the Infectious disease team and Enoxeparin 80mg after a hematologist's opinion. The eye swelling and redness regressed within 48 hours of treatment. After a week of parenteral antibiotics, he was discharged on oral antibiotics for 1 week and oral anticoagulants for 1 month.

## Discussion

Pituitary adenomas are common benign tumours of the central nervous system with a reported incidence of up to 17%.[6] GH-secreting secreting pituitary adenomas account for 8-11% of adenomas.[6] Surgery remains the treatment of choice for the management of GH-secreting adenomas.[1]

Eye complications are rare following transsphenoidal pituitary surgery and include visual deterioration (0.17%)[3] and ophthalmoplegia (1.42%)[2] and occur due to direct injury to the nerves in the supra-sellar or cavernous sinus region or due to hematomas or infarction of residual tumour. Orbital complications have not been reported after pituitary surgery but have been known to occur following other endoscopic sinus surgeries for sinusitis and include retrobulbar hematomas, eye muscle and nasolacrimal duct injuries.[7]

SOVT is an extremely rare but ophthalmologic emergency with potentially serious consequences if not recognized and managed promptly.[8] The superior ophthalmic vein (SOV) is a valve-less vein that is responsible for most of the venous drainage of the orbit. SOVT is caused by altered venous blood flow, which can result from stasis of blood flow, trauma to the vessel wall, or hypercoagulability disorders.[9]

It can arise secondary to septic or aseptic causes. Septic causes include transvenous spread from acute sinusitis, orbital cellulitis (OC) and retrograde spread from infective cavernous sinus thrombosis (CST). Aseptic causes include facial trauma, traumatic carotid-cavernous fistula, hypercoagulable state, orbital neoplasm, Tolosa-hunt syndrome or systemic inflammatory disorders.[8,9] In this patient, the symptoms occurred too early for sinus infection to set in - however, the fever, headache and eye pain could suggest early infection. The possibility of retrograde spread of thrombus from the cavernous sinus was considered in view of extension of the tumour and its removal from the cavernous sinus. However, there was no clinical evidence of ophthalmoplegia nor any radiological evidence of CST. Another possibility is a hypercoagulable state induced by acromegaly.[5] However, no relevant investigations were done to prove this.

The clinical presentation of SOVT can be explained by congestion of the orbit due to impaired venous drainage which includes pain, chemosis, eyelid oedema, proptosis, limited ocular motility and impaired visual acuity.[8,9]

These symptoms are similar to the symptoms of CST and OC, and virtually indistinguishable clinically. Moreover, SOVT, CST, and OC can occur together.

Neuro-imaging remains a critical part of establishing the diagnosis. On a contrast-enhanced CT scan, SOVT is characterized by a thickened SOV with a possible filling defect.[10] MRI of orbits is a better modality to demonstrate intra-luminal filling defects in the SOV.[8,10]

Complications of SOVT include visual loss, oculomotor palsies, especially with CST, and the spread of thrombosis into cortical and jugular veins, leading to venous infarctions and rarely death.[8]

Management of SOVT depends on the underlying etiology and includes antibiotic therapy, anticoagulants, steroids, and surgical drainage of any purulent collection. Although the use of anticoagulation is contested, they are increasingly being used with better outcomes reported. However, the optimal dose and duration are still not well defined.[10] In this case, empirical antibiotics were started first and the fever and headache responded immediately. Anticoagulation was subsequently added as the infective etiology was not clearly established

## Conclusion

SOVT after transsphenoidal pituitary surgery has hitherto been unreported in the English literature and could be due to post-operative infective spread from the paranasal sinuses or acromegaly-induced hypercoagulability. Early diagnosis and aggressive management are important in view of potential catastrophic complications.

## Disclosure

The authors declare that they have no conflict of interest. The patient has provided his informed written consent for the publication of the case report.

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