

CASE REPORT

Traumatic Internal Carotid Artery Aneurysm with a Concomitant Carotid Cavernous Fistula

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ABSTRACT

Post-traumatic sphenoid sinus pseudoaneurysm arising from the cavernous segment of the internal carotid artery (ICA) is rare, and even rarer occurrence is an associated carotid-cavernous fistula (CCF). Here we present the case of a young male patient presenting with intractable epistaxis due to a post-traumatic sphenoid sinus pseudoaneurysm of the internal carotid artery and a simultaneous carotid-cavernous fistula.

Keywords: Aneurysm, Carotid-Cavernous Fistula (CCF), Internal Carotid Artery (ICA).

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Introduction

A rare complication of head injury is the development of a pseudoaneurysm of the intracranial part of ICA, representing fewer than 1% of all cerebral aneurysms¹ with a high mortality rate of up to 50%.² Very rarely, it may present with recurrent episodes of epistaxis.³ Carotid-cavernous fistula is a distinct intracranial vascular pathology with an incidence of 0.2% in patients with head trauma.⁴ Most commonly presenting as pulsating tinnitus, headache, proptosis, and reduced visual acuity on the affected side. Their concomitant occurrence is less documented in the literature.⁵

Case Report

A 37 years old male patient presented to the emergency department with recurrent, profuse epistaxis for last one month. History revealed that he sustained a head injury about 40 days ago in a car accident. At the time of injury he underwent a non-enhanced CT scan brain which showed a fracture of the roof of the left sphenoid sinus with hemosinus in the bilateral sphenoid and ethmoid sinuses. He remained admitted for 15 days and was later

discharged. Over time he developed left-sided reduced visual acuity along with repeated episodes of nosebleeds. Nasal packing and electric cauterization were done for intractable epistaxis, however, it remained resistant to treatment. Detailed physical examination revealed left sided proptosis, diplopia, chemosis, and congestion along with left sided ocular bruit and reduced visual acuity in the left eye. He underwent CT angiography head (figure 1) which revealed an



Fig 1: CT angiography showing direct fistulous communication of the left internal carotid artery with cavernous sinus as well as aneurysmal bulge into left sphenoid sinus. Early draining of left ophthalmic veins with proptosis and prominent collaterals on left temporal region of the scalp

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aneurysmal sac measuring 16x5mm arising from the cavernous part of the left internal carotid artery projecting into the left sphenoid sinus through the fractured roof of left sphenoid sinus. Moreover, abnormal fistulous communication between the cavernous part of the left internal carotid artery and the left cavernous sinus with subsequently dilated and tortuous left superior ophthalmic vein is seen (figure 2), representing a direct carotid-cavernous fistula formation. Digital subtraction angiography was done, which confirmed the radiological findings. The patient underwent successful coil embolization of CCF and endovascular clipping of the internal carotid artery aneurysm.



Fig 2: CT angiography shows early venous drainage into left superior ophthalmic vein with proptosis

Discussion

Intracranial pseudoaneurysms occurring post-traumatically comprise only 0.15% to 0.40% of all intracranial aneurysms.⁵ They may arise from petrous, cavernous, or supraclinoid segments of ICA. Pseudoaneurysm arising from a cavernous segment of ICA projecting in the sphenoid sinus is a very rare complication of blunt or penetrating head trauma. Presentation is typically delayed, with 50%–80% of the patients presenting by three to four weeks. The main presenting complaints are either massive epistaxis after aneurysmal rupture through the sphenoidal recess or ophthalmic symptoms such as monocular blindness due to local mass

effect. Cerebral angiography is the diagnostic procedure of choice.

Carotid-cavernous fistula is a separate well known intracranial vascular pathology representing an abnormal communication between arteries and veins within the cavernous sinus and is classified as either direct or dural. Post-traumatic CCF are usually direct fistulas characterized by direct communication between ICA and cavernous sinus. It accounts for 0.2 to 0.3% of total traumatic head injuries. Presenting symptoms of CCFs may include exophthalmos, bruit, diplopia, chemosis, ocular foreign body sensation, blurred vision, tinnitus, and headache. Digital subtraction angiography remains the gold standard for diagnosis and is both diagnostic and therapeutic. It also characterizes the drainage pattern of the fistula as anterior via the superior ophthalmic vein, posterior via the inferior petrosal sinus, or a combination of both.

A cavernous ICA aneurysm with concomitant CCF presents a diagnostic challenge, with symptoms of both the vascular pathologies being part of clinical manifestations of the condition. It requires a more complicated treatment approach as both need to be resolved. In addition to embolization or stenting of an aneurysmal sac, embolization using an intravenous or intraarterial approach is necessary to treat CCF.⁶

Conclusion

Post-traumatic sphenoid sinus pseudoaneurysm arising from the cavernous segment of the internal carotid artery is a rare lesion and more challenging with an associated carotid-cavernous fistula requiring urgent treatment. Embolization or stenting of an aneurysmal sac, embolization using an intravenous or intraarterial approach, is necessary to treat the accompanied carotid-cavernous fistula.

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