

# Case report: Thrombosed giant cavernous carotid artery aneurysm secondary to cervical internal carotid artery dissection: An unusual entity

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## Abstract

Spontaneous thrombosis of a giant intracranial aneurysm with parent artery occlusion is known. The exact mechanism is however unclear and various theories have been proposed. We present an unusual case of an angiographically documented cervical internal carotid artery (ICA) dissection, which led to total occlusion of the ICA distal to the dissected site, with acute cessation of forward blood flow. This resulted in acute upstream thrombosis of the giant cavernous carotid artery aneurysm and an acute cavernous sinus syndrome-like presentation.

**Key words:** Cavernous carotid artery; dissection, giant aneurysm; internal carotid artery; thrombosis

## Introduction

Spontaneous thrombosis of a giant cavernous carotid artery aneurysm with parent artery occlusion is rare, with only a few anecdotal case reports in literature.<sup>[1-6]</sup> We present the case of a 50-year-old woman who came with complete ophthalmoplegia and was diagnosed to have ipsilateral cervical internal carotid artery (ICA) dissection, with thrombosis of a giant cavernous ICA aneurysm.

## Case Report

A 50-year-old woman presented with sudden-onset severe headache and vomiting associated with dull aching pain

in the right eye, followed by diplopia, drooping of the right eyelid, and numbness over the right half of the face. These symptoms had evolved over a period of 2 days. On evaluation, she had complete ophthalmoplegia on the right, with subtle sensory loss in the right V1 and V2 trigeminal nerve distribution. Vision was preserved. She had no focal deficits. CT scan of brain [Figure 1A, and 1B] and MRI of brain [Figures 1C and 1D and 2A and 2B] revealed a well-defined, 2.6×2.7×2.7-cm lesion in the right paracavernous region, extending from the superior orbital fissure up to the petrous apex, suggestive of a cavernous carotid aneurysm. She underwent digital subtraction angiography (DSA) [Figure 2C], which revealed a flame-shaped right cervical ICA dissection, with occlusion of the entire carotid artery 1.5 cm distal to its origin and nonfilling of the aneurysm. The ipsilateral ophthalmic artery was seen filling through the middle meningeal artery, and good cross-circulation was seen on left ICA injection through the anterior communicating artery. In view of the thrombosed aneurysm and the arterial dissection, she was treated with an antiplatelet agent (aspirin). At the last follow-up, her eye pain had subsided but the cranial nerve and ocular deficits persisted.

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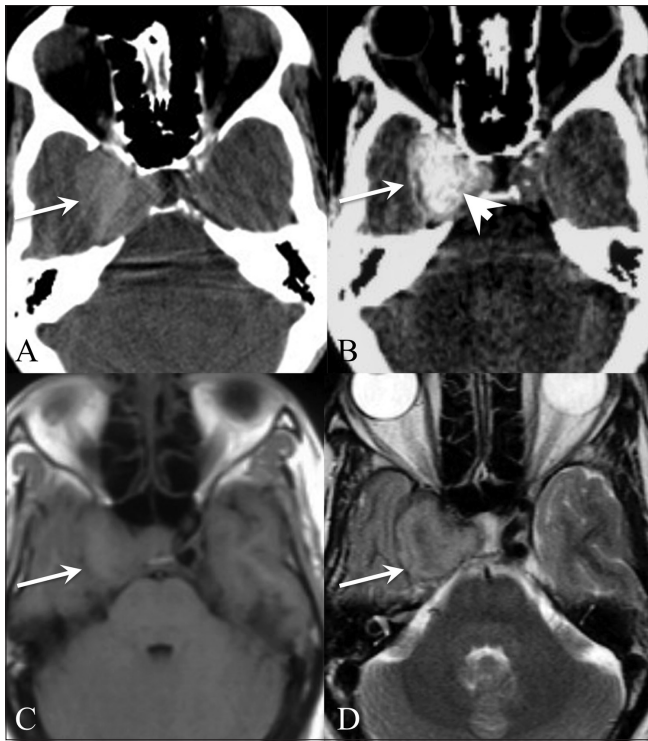


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## Discussion

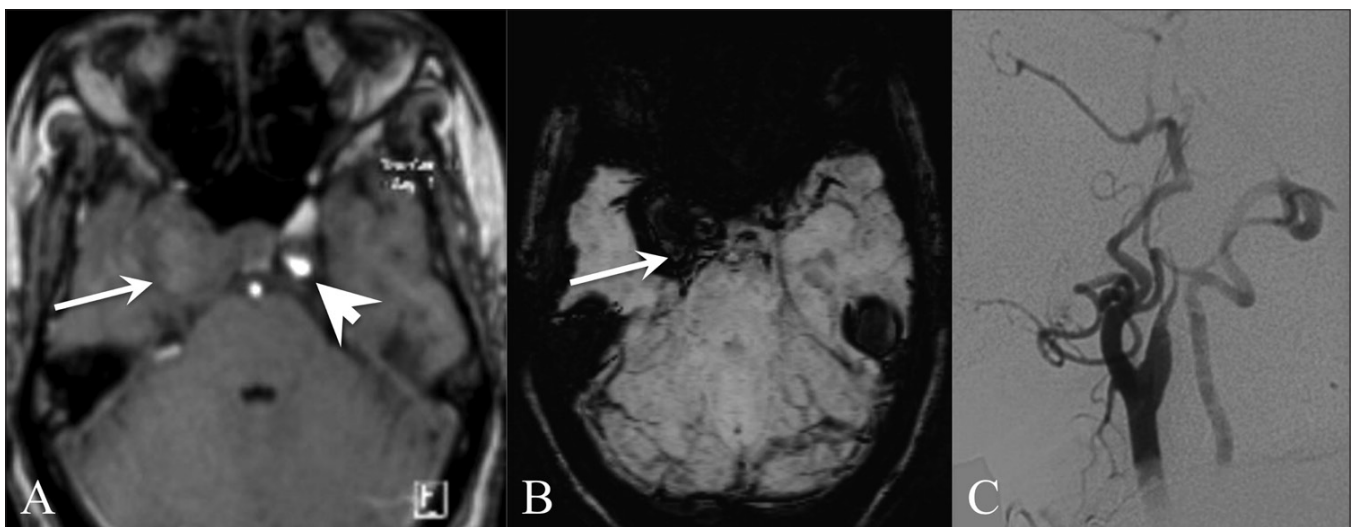
Thrombosed cavernous carotid artery aneurysms generally



**Figure 1 (A–D):** Axial plain (A) and contrast-enhanced (B) CT scans of the brain show an isodense-to-hyperdense lesion (arrow) in the right cavernous sinus region, with central filling (arrowhead in B) after intravenous contrast. Axial T1W (C) and T2W (D) MRI images of the brain show partial thrombosis (arrow) of the right giant cavernous carotid aneurysm

present with anterior cavernous sinus syndrome due to mass effect. Aneurysmal growth occurs following recurrent hemorrhage into the thrombus and aneurysmal wall or due to slow expansion of the true aneurysmal wall.<sup>[7]</sup> Spontaneous total thrombosis of a giant intracranial aneurysm occurs in 13%–20% of the cases,<sup>[1]</sup> and associated thrombosis of the parent vessel has been well reported.<sup>[2–6]</sup> Factors that precipitate thrombosis are related to the ratio of aneurysm volume to the orifice size, the age of the aneurysm, and the hemodynamics within the parent artery.<sup>[1]</sup> Dissection as a precipitating factor for upstream thrombosis of a giant cavernous ICA aneurysm has not been reported so far.

Our case is unusual for multiple reasons. The initial event in our patient was the dissection of the right carotid artery, probably at the cervical segment. The acute ocular presentation might have been due to the sudden intraluminal hemorrhage and thrombosis of the giant cavernous segment aneurysm that she incidentally had. We postulate that the dissection of the cervical ICA led to the total occlusion of the ICA distal to the dissected site, with acute cessation of forward blood flow. This resulted in an acute total thrombosis of the giant cavernous ICA aneurysm and an acute cavernous sinus syndrome-like presentation. The reverse mechanism, i.e., progression from aneurysm thrombosis to parent vessel occlusion, has also been documented.<sup>[5,6]</sup> Parent vessel occlusion in the presence of a thrombosed giant carotid artery aneurysm is possibly due to direct distortion, stretching, and compression of the parent artery due to the growth of the aneurysm<sup>[1,4]</sup> and consequent compression of the surrounding structures.<sup>[4]</sup> Alternatively, it may due to sudden expansion of the aneurysm causing



**Figure 2 (A–C):** Axial time-of-flight (TOF) MRI image (A) shows absence of flow (arrow) in the right cavernous carotid artery. Note the normal flow in the left carotid artery (arrowhead). Axial susceptibility-weighted MRI image (B) shows susceptibility artifacts (arrow) in the right cavernous carotid aneurysm. Lateral view of a digital subtraction angiogram (C) demonstrates the 'string sign' (arrowhead) in the cervical ICA, with occlusion of the internal carotid artery 1.5 cm distal to its origin (arrow), and nonfilling of the aneurysm. The ipsilateral ophthalmic artery (long arrow) is filling through the middle meningeal artery (double arrow)

compression of the parent artery and resulting in slow flow, with resultant retrograde thrombus formation originating from the aneurysm and extending into the parent vessel.<sup>[5]</sup> However, in our case, the angiogram was characteristic of a dissection – as evidenced by the presence of the so-called ‘string sign,’ a long segment of narrowed lumen due to lumen occlusion.<sup>[8]</sup> Hence, we strongly feel that the thrombosis was antegrade rather than retrograde.

## Conclusion

Dissection of the cervical ICA leads to total occlusion of the carotid artery distal to the dissected site. Acute cessation of forward blood flow results in upstream thrombosis of a giant cavernous carotid artery aneurysm and therefore an acute cavernous sinus syndrome is likely to result.

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**Cite this article as:** Baldawa SS, Pendharkar H, Menon GR, Nair SR. Case report: Thrombosed giant cavernous carotid artery aneurysm secondary to cervical internal carotid artery dissection: An unusual entity. *Indian J Radiol Imaging* 2011;21:225-7.

**Source of Support:** Nil, **Conflict of Interest:** None declared.

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