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Giant cavernous carotid artery aneurysm mimicking a fungal granuloma and presenting with massive epistaxis

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Summary

A 42-year-old man presented with frequent minor nasal bleeds since 1 month. He was undergoing chemotherapy for pulmonary tuberculosis. MRI brain revealed a space occupying lesion in the right cavernous sinus extending to sphenoid sinus, with T2 inversion. An initial diagnosis of fungal granuloma was made and endoscopic trans-nasal biopsy was attempted. During surgery, a pink pulsating mass was seen in the sphenoid sinus and the procedure was abandoned. A cerebral CT-angiography done subsequently revealed a giant right cavernous segment internal carotid artery (ICA) aneurysm. He was then referred to our centre and upon admission he collapsed secondary to a major bout of epistaxis. An emergency cervical carotid artery ligation resulted in transient control of epistaxis. Owing to recurrence of bleed, trapping of the aneurysm was done resulting in cure. The present case shows that a giant cavernous ICA aneurysm can occasionally be erroneously diagnosed as fungal granuloma.

BACKGROUND

Giant aneurysms of the cavernous segment of the internal carotid artery (c-ICA) often erode the medial wall of the cavernous sinus and extend into sphenoid sinus.¹⁻⁴ A giant aneurysm in this location may undergo partial thrombosis and be mistaken for a tumour or granuloma, especially if there are confounding clinical findings. There are a few case reports of c-ICA aneurysms being mistaken for skull-base tumours.⁵⁻⁸ We discuss a patient with a giant c-ICA aneurysm presenting with massive epistaxis. A mistaken diagnosis of fungal granuloma had been made. We also briefly review the management of such lesions.

CASE PRESENTATION

A 42 year old man had developed chronic cough and fever leading to a diagnosis of pulmonary tuberculosis (PTB) 4 months back. He had been started on antitubercular therapy (ATT). The diagnosis had been made on the basis of chest x-ray and clinical symptoms. He now presented with multiple episodes of minor nasal bleed (<10 ml) since 1 month. He also complained of a dull aching headache and intermittent fever over the same duration. There was no history of vomiting, visual disturbances or cranial nerve palsy. On examination (*at another hospital*), he was found to be pale and emaciated; he had no focal neurological deficits.

INVESTIGATIONS

Glucose tolerance was borderline impaired. MRI brain revealed a lesion in the sphenoid sinus extending to the right cavernous sinus (figure 1A,B) with destruction of the right lateral wall of sphenoid sinus (figure 1C,D). The lesion was isointense on T1-weighted images (WI) and hypointense on T2 WI (T2 inversion or shortening,

figure 1A). Heterogenous enhancement was noted on gadolinium administration. Chest x-ray and CT thorax showed infiltrative lesions in the mid-zone of the right lung (figure 2).

Diagnostic workup

Considering the clinical and radiological features, a diagnosis of fungal granuloma was made. Endoscopic transnasal, trans-sphenoidal biopsy of the mass was attempted. During surgery, a pink pulsating mass was seen in the sphenoid sinus and the procedure was abandoned. He was then investigated with CT angiogram and digital subtraction angiography of brain that revealed a large partially thrombosed right c-ICA aneurysm which was eroding the lateral wall of the sphenoid sinus and extending into the sella and sphenoid sinus (figure 3). He was referred to our centre for further management.

TREATMENT

Immediately following admission in our centre, he had a major bout of epistaxis (>1 litre) and collapsed due to hypovolemic shock. He was resuscitated with intravenous fluids and blood transfusion. Intermittent manual compression of the right cervical ICA was performed and he was taken up for emergency surgery. Owing to the severe hypovolemic shock, it was logistically not feasible to perform a digital subtraction angiogram and balloon test occlusion (BTO) of the right ICA. Under local anaesthesia, the right ICA was exposed in the neck and a temporary aneurysm clip was applied. The patient was monitored on-table for the next 30 min; he did not develop any fresh neurological deficits and the epistaxis subsided. A permanent clip was replaced on the right cervical ICA. He remained stable for the next 72 h. He then had a recurrence of massive epistaxis. He underwent an

Figure 1 Preop MRI (A and B) and CT (C and D). (A) T2-weighted image showing a hypointense lesion in the right cavernous sinus. (B) Gd-contrast-enhanced image showing the lesion to be enhancing. Both cavernous sinuses are enhancing as well, this is normal. (C) Contrast CT image showing the lesion extending from the cavernous sinus into the sphenoid sinus. (D) Bone window demonstrating the erosion of the lateral wall of the sphenoid sinus on the right side.

Figure 2 CT (A) and x-ray (B) of the thorax showing the infiltrative lesions in the mid-zone of the right lung.

Figure 3 Preop angiogram. (A) digital subtraction angiography image showing the medially projecting aneurysm, (B) CT angiogram, axial view, (C) CT angiography coronal and (D) CT angiography sagittal views of the aneurysm.

emergency right supraciliary mini frontal craniotomy and clipping of the right supraclinoid ICA, thus completing the trapping of the aneurysm. Postoperative period was uneventful and there were no further episodes of epistaxis.

OUTCOME AND FOLLOW-UP

At 6-week follow-up a CT angiogram revealed no filling of the aneurysm and good collateral circulation from the left ICA (figure 4). At 6-month follow-up he remained asymptomatic and had completed ATT.

DISCUSSION

Aneurysms of the c-ICA constitute 1–2% of all intracranial aneurysms.⁹ The majority of them present with either symptoms attributable to mass effect or cranial nerve paresis.⁹ Giant aneurysms in this location tend to have an intraluminal thrombus which may partly or completely fill the lumen; thus they may be misdiagnosed as skull-base tumours.^{5–8} The frequency of haemorrhage from these aneurysms is reported to be very low and they rarely cause subarachnoid haemorrhage.¹⁰ However, there are a few case reports of epistaxis secondary to ICA aneurysms in this location.^{11–13} The majority of them are secondary to head trauma and there are very reports of spontaneous epistaxis from

an ICA aneurysm.^{14–16} The lateral wall of the sphenoid sinus that forms the medial bony cover of the c-ICA is less than 1 mm thick along almost 66% of the vessel's course. In about 4% of the population, the c-ICA will be entirely devoid of any bony covering medially.¹⁷ Thus, aneurysms of the c-ICA can easily erode through the lateral wall of the sphenoid sinus and extend into the sinus and sella. Once the aneurysm ruptures, there is no tissue in the sphenoid sinus to provide tamponade and hence this can result in massive epistaxis.

In the present instance, a combination of clinical factors (such as poor nutritional status, infiltrative lesions in the mid zone of the lung, impaired glucose tolerance test, the occurrence of minor epistaxis associated with fever) and the radiological demonstration of a lesion in the sphenoid sinus extending to the cavernous sinus with T2 inversion, resulted in an erroneous initial diagnosis of fungal granuloma. It should be noted that PTB would more often lead to lesions in the apical zones of the lungs on chest x-ray. The presence of mid-zone lesions taken in conjunction with all the other factors probably led to the diagnosis of a fungal lesion.

The radiological pattern of T2 shortening and peripheral enhancement on contrast sequences of either the lesion wall or sphenoid sinus mucosa creates diagnostic problems peculiar to lesions in this location. The low

Figure 4 Postop MR angiogram (A) and digital subtraction angiography (B) showing the absence of flow in the right internal carotid artery (ICA) from the bifurcation in the neck upwards. The aneurysm is completely eliminated from circulation. The right middle carotid artery and anterior carotid artery are now filled by the left ICA via the anterior communicating artery.

signal intensity on T2 WI seen in many granulomatous lesions (including those of fungal origin) is postulated to be due to the presence of paramagnetic-free radicals produced by macrophages.¹⁸ This T2 shortening may be combined with enhancement of the sphenoid sinus mucosa. Similarly, the intraluminal thrombus in an aneurysm also causes low signal intensity on T2 WI and the sphenoid sinus mucosa and/or the surrounding haematoma may show enhancement.¹⁸ Thus, similar radiological appearances may lead to a diagnostic dilemma. Although endoscopic decompression was attempted, the vascular nature of the mass was recognised at surgery and no attempt to biopsy it was made.

There are different modalities of managing c-ICA aneurysms. Direct clipping of the neck of the aneurysm (unlike in other intracranial saccular aneurysms) is often not possible due to the anatomical location.¹⁹ In patients who tolerate BTO of the ICA, a simple (Hunterian) ligation of cervical ICA would suffice. Approximately 15% of patients may develop neurological deficits despite tolerating a normotensive BTO. This can be circumvented by a hypotensive challenge during the BTO; this reduces the risk of developing fresh neurological deficits by 5%.²⁰ Occasionally, the aneurysm may continue to fill from cross-circulation across the anterior communicating artery of the circle of Willis as in the present case.¹¹ This would mandate trap ligation of the parent vessel by clipping the supraclinoid ICA in addition to Hunterian ligation of the cervical ICA. These patients can also be managed by endovascular techniques; these include coil embolisation of the aneurysm or occlusion of the parent vessel by the deployment of a detachable balloon.⁹ Stent-assisted coiling provides a better chance of preserving the parent vessel.¹ Flow-diverting stents may not be appropriate in the setting of acute aneurysmal rupture. It is generally thought that it would take up to 3 months for obliteration of an aneurysm after deployment of a flow diverter across the neck. Long-term results are not available as yet, making it inappropriate for aneurysms that have bled.²¹

Learning points

- ▶ Cavernous internal carotid artery (ICA) aneurysms can occasionally be erroneously diagnosed as fungal granulomas or other skull base lesions.
- ▶ A high index of suspicion can avoid fatal consequences.
- ▶ When in doubt, these patients should be investigated with non-invasive carotid CT/MR angiography.
- ▶ Once diagnosed, cavernous ICA aneurysms can be effectively managed by several techniques.

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