

Unusual right internal carotid artery supraclinoid segment fenestration associated with multiple aneurysms treated with flow diversion and coiling

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DESCRIPTION

The supraclinoid (carotid-ophthalmic) segment of the internal carotid artery (ICA) under the Bouthillier classification is defined as the segment between the ophthalmic and posterior-communicating arteries.¹ We describe an unusual congenital anomaly of the supraclinoid internal carotid artery characterised by a large fenestration of its carotid-ophthalmic segment, associated with multiple aneurysms.

A 60-year-old female patient underwent investigation for persistent headaches and was found to have what appeared to be irregular fusiform dilatation of the intracranial right internal carotid artery on 1.5 T magnetic resonance angiography (MRA) time-of-flight imaging. Cerebral digital subtraction angiography (DSA) performed to further characterise this abnormality demonstrated two discrete aneurysms, one measuring 5 mm and the other

2 mm, arising from the posterior limb of a supraclinoid ICA fenestration ([figure 1A](#)).

We proceeded with early endovascular treatment of these aneurysms as the dysplastic ICA vessel combined with its high haemodynamic stress could lead to rapid enlargement of the aneurysms over time. We planned to coil occlude the aneurysm rather than primarily flow divert. This was due to concerns that if flow diversion failed then the aneurysm would be locked out for treatment.

The patient was pre-medicated with aspirin 100 mg daily and clopidogrel 150 mg daily for 7 days with a preoperative platelet reactivity of 141 platelet reactivity units. Following general anaesthesia, an 8 Fr right common femoral artery sheath was inserted under ultrasound guidance and an 8 Fr Neuron MAX Catheter (Penumbra, Alameda, California, USA) was negotiated into

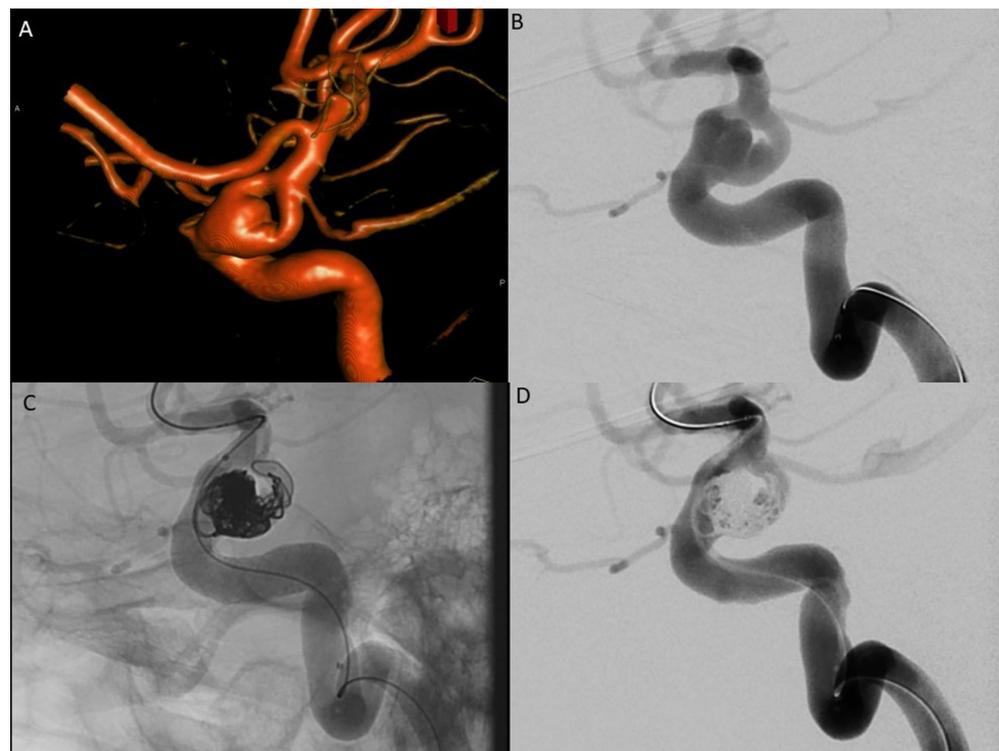


Figure 1 (A) Three-dimensional reconstruction of a rotational digital subtraction angiogram (DSA) demonstrating the supraclinoid right internal carotid artery (ICA) fenestration. Two aneurysms arise from the posterior limb, one measuring 5 mm between the two limbs and another measuring 2 mm from the posterior limb. (B) Neuron MAX 8F catheter to right ICA. (C) Image showing guidewire, stent placement through the anterior limb and coiling of the interposed aneurysm with some coil in the posterior limb. (D) Final DSA image showing pipeline stent in the anterior limb.



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the petrous segment of the right ICA. Through the Neuron MAX, a Headway Duo micro-catheter (Microvention, Tustin, California, USA) was positioned in the posterior limb of the fenestration and a Marksman micro-catheter (Medtronic, Irvine, California, USA) placed in the proximal M1 segment via the anterior limb (figure 1B). A 4.75 mm × 20 mm Pipeline stent (Microvention) was deployed into the anterior limb of the fenestration through the Marksman micro-catheter jailing the Headway Duo in the aneurysms arising from the posterior limb. 83 cm of coils (Axium, Medtronic, Irvine, California, USA) were then deployed via the Headway Duo with satisfactory cessation of flow within both aneurysms (figure 1C). Coils were not deployed within the upper segment of the fenestration's posterior limb to preserve the posterior communicating artery (figure 1D). No intra-procedural or post-procedural complications were observed. The patient was discharged on day 2 post procedure and was to continue dual antiplatelet therapy for 6 months.

A fenestration is the segmental separation of a vessel into two channels, with typical intracranial locations being the anterior communicating artery and the anterior cerebral artery. Their aetiology is unknown but thought to be related to vasculogenesis and remodelling, with failure of fusion of small vasculogenic vessels.² The limbs of the fenestration are typically dysplastic and are prone to form aneurysms. Supraclinoid ICA fenestrations are extremely rare, with only 20 reported cases since 1984, and only 3 reports of endovascular management of fenestration associated aneurysms.³ This is the third case treated with stent

assisted coiling and only the second case to use a flow-diverting stent.

Learning points

- ▶ A supraclinoid internal carotid artery fenestration is a rare congenital abnormality that can be associated with aneurysms.
- ▶ Effective endovascular treatment of these aneurysms can be undertaken using flow-diverting stents in combination with coil embolisation.

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