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Flow Diverter Treatment of a Persistent Trigeminal Artery Sidewall Aneurysm

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CASE REPORT

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ABSTRACT

The persistence of the primitive trigeminal artery (PTA) is the most common embryological anatomical variation connecting the posterior circulation to the internal carotid artery (ICA). Aneurysms associated with this artery are rare, especially when located on the lateral wall of the persistent artery rather than at the junction with the ICA. Lateral wall aneurysms of the PTA are infrequent, and their management should be individualized. The utilization of flow diverters in these cases presents an effective and safe treatment option, particularly when preservation of the persistent artery is essential.

KEYWORDS

persistent trigeminal artery, lateral wall aneurysm, flow diverter

The persistence of the primitive trigeminal artery (PTA) is a rare anatomical variation, reported in approximately 0.1–0.6% of cases. Aneurysms associated with this artery are also uncommon, especially those occurring in the lateral wall of the PTA instead of at the junction with the internal carotid artery (ICA).[1–4]

A 44-year-old female patient with persistent headaches after physical exercise was reported. Brain magnetic resonance imaging (MRI) and MR angiography (MRA) were performed, revealing a right PTA with an associated aneurysm on its lateral wall. This finding was confirmed by cerebral angiography (Figure 1). Due to the importance of preserving the PTA, flow diversion was selected as the treatment approach.

Elective treatment of the PTA aneurysm was performed using a Pipeline Vantage flow diverter stent (4×12 mm). The procedure was conducted under general anesthesia with full systemic heparinization (5 000 IU). A triaxial system was employed, including a 90-cm Neuromax 088 sheath in the right ICA, Phenom Plus distal access catheter, Phenom 21 microcatheter, and a 0.014-inch Transend microguidewire. Selective catheterization to the posterior cerebral artery was achieved using the microcatheter and microguide in J-tip support, enabling deployment of a 4×12 mm Pipeline Vantage stent (**Figure S1**). The flow diverter stent was deployed within the PTA (see Figure 2). The procedure was completed without complications.

In the immediate postoperative period, a cone-beam computed tomography (CBCT) confirmed the proper positioning of the flow diverter stent (see Figure 3). The patient was maintained on dual antiplatelet therapy with aspirin 100 mg and prasugrel 10 mg, initiated 7 days prior to the procedure and continued for 6 months thereafter, after which prasugrel was discontinued. No additional vessel wall imaging was performed, as the patient remained asymptomatic. Routine postoperative MRI showed no significant changes (**Figure S2**). Nonetheless, we acknowledge the importance of considering perforator safety perforation using complementary imaging of the vessel wall whenever available in the service, especially in symptomatic cases.[5]

The patient remained asymptomatic and was discharged on postoperative day 2. A follow-up angiogram performed 6 months post-procedure demonstrated complete aneurysm occlusion.

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Patient consent

The authors should confirm that written informed consent has been obtained from the involved patient.

Contributors

LPM, BM and JL: wrote the main manuscript text. All authors reviewed the manuscript.

Conflicts of interest

The authors report no conflict of interest.

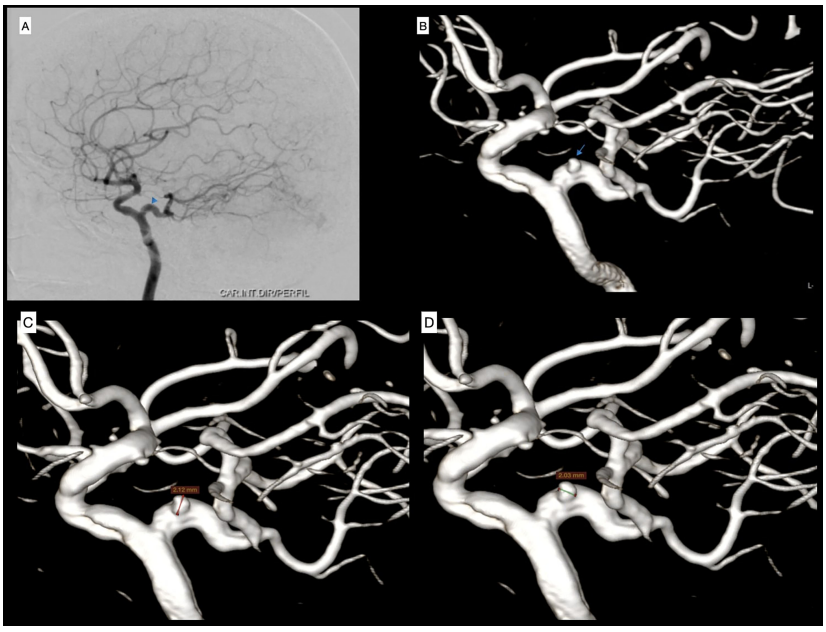

FIGURE 1. Intracranial digital subtraction angiography images in lateral view (A AND B) showing the right primitive trigeminal artery (arrowhead) and an incidental saccular aneurysm on its lateral wall (arrow). The aneurysm is further detailed in the three-dimensional (3D) reconstruction (B). The lateral wall aneurysm has a wide neck, with largest diameters approximately 2.12 and 2.03 mm (C AND D).

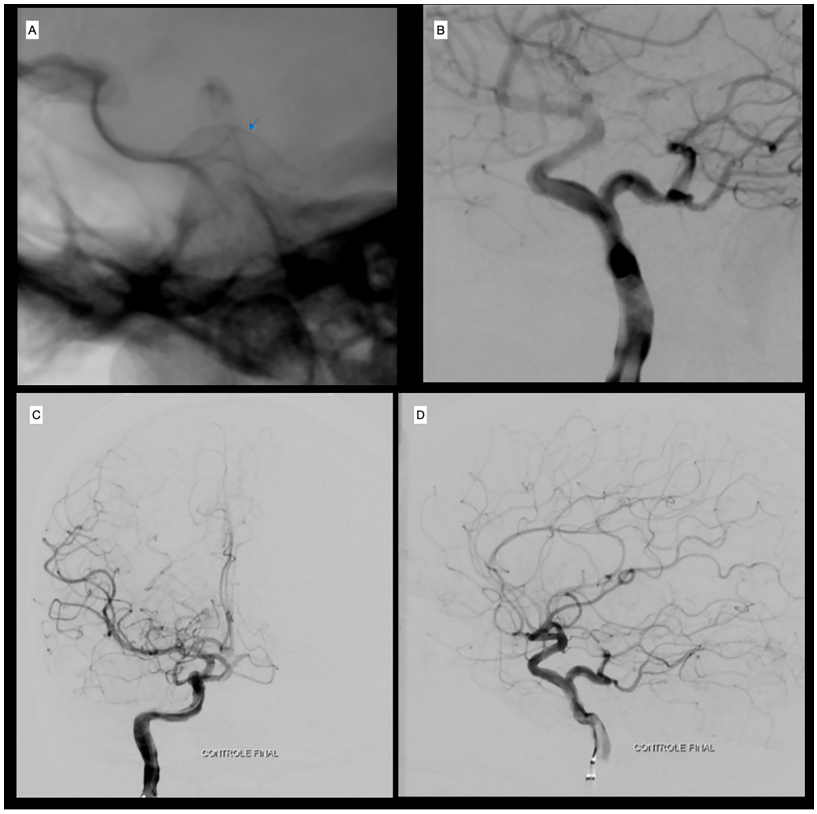

FIGURE 2. Intracranial digital subtraction angiography images in lateral view (A AND B) demonstrating the deployment of the Pipeline Vantage flow diverter stent (4×12 mm) within the primitive trigeminal artery (arrow). Immediate postoperative angiography confirms proper stent placement (B). Follow-up angiograms in anteroposterior (C) and lateral (D) views of the internal carotid artery show no evidence of distal embolization.

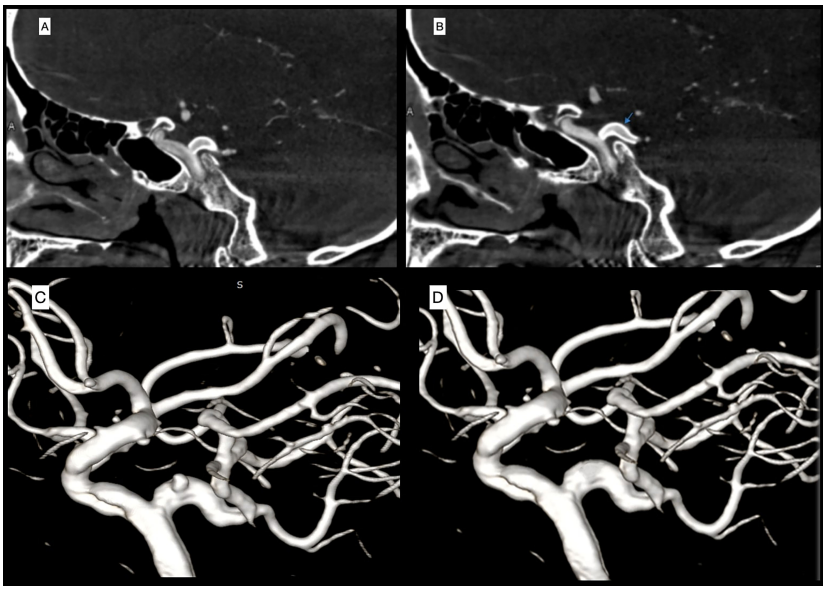

FIGURE 3. Cone-beam computed tomography images in lateral view (A AND B) demonstrating the correct positioning of the flow diverter stent within the persistent trigeminal artery (arrow). Preoperative three-dimensional (3D) angiographic reconstruction illustrating a lateral wall aneurysm of the persistent trigeminal artery (C). Six-month postoperative 3D angiography confirming successful aneurysm occlusion (D).

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Ethics Approval

Ethical approval was obtained prior to the commencement of the research. The patient provided informed consent, and the confidentiality of data was maintained throughout the study.

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