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Posterior inferior cerebellar artery originating from the cavernous internal carotid artery: A rare embryological variant identified during aneurysm evaluation

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The posterior inferior cerebellar artery (PICA) typically arises from the intracranial V4 segment of the vertebral artery.[1] However, its origin can exhibit considerable variation. Rare anatomical variants include origins from the basilar trunk, a common trunk shared with the anterior inferior cerebellar artery (AICA), meningeal branch of the vertebral artery, or even bilateral absence.[1,2] Exceptionally rare are cases where the PICA arises from the internal carotid artery (ICA), a configuration that has important clinical implications due to its involvement in both anterior and posterior circulations.

We report the case of a 77-year-old man who presented with acute-onset severe headache. Non-contrast computed tomography (CT) of the brain demonstrated interhemispheric hemorrhage. CT angiography subsequently revealed a distal anterior cerebral artery (DACA) aneurysm as the likely source of bleeding. To obtain detailed vascular anatomy and guide therapeutic planning, digital subtraction angiography (DSA) was performed prior to endovascular intervention.

During DSA, DACA aneurysm was seen, but also we incidentally identified an unusual vascular anomaly: the right PICA arising from the proximal cavernous segment of the right ICA (Figure 1a and b).

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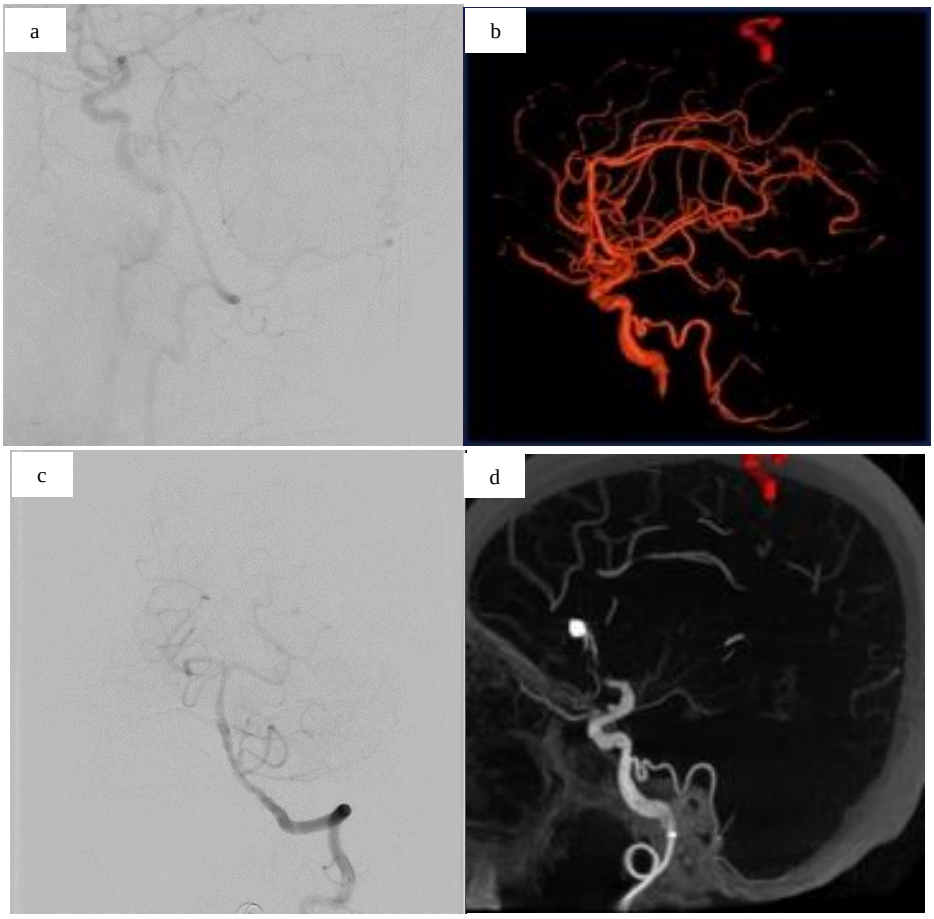

Figure 1. a) Lateral digital subtraction angiography (DSA) image of right internal carotid artery (ICA) showing right posterior inferior cerebellar artery (PICA) arising anomalously from a cavernous segment of right ICA, absent vertebral origin; b) Three-dimensional (3D) rotational reconstruction confirming PICA origin from ICA; c) DSA of the left vertebral artery demonstrating a normal origin and course of the left PICA from V4 segment of vertebral artery; d) Computed tomography (CT) angiogram showing coiled distal anterior cerebral artery (DACA) aneurysm and PICA arising from ICA

This aberrant vessel had no branching and directly supplied the PICA territory. The left PICA had a typical origin from the left vertebral artery (Figure 1c). The DACA aneurysm was treated with coil embolization, with no procedure-related complications (Figure 1d).

Anomalous origins of the PICA are rare, particularly from the ICA. To our knowledge, variants previously described include origins from the cervical ICA, petrous ICA, ophthalmic segment, and pre-cavernous ICA. Reports of a cavernous ICA-PICA connection are exceedingly uncommon, with only isolated cases documented in the literature. Our case, therefore, expands the spectrum of these variants by demonstrating a proximal cavernous ICA origin of the right PICA. Ahuja et al. in their report proposed that embryologic mechanism involved the persistence of a primitive pre-segmental communicating artery that normally regressed during development.[2] This vessel may provide a transient connection between the anterior and posterior circulations in early embryogenesis.[2,3] Failure of this regression can lead to anomalous connections between the anterior and posterior circulations, as in our case.

The clinical significance of this anomaly lies in the potential for posterior circulation ischemia secondary to emboli originating from the ICA.[4] In such cases, particular caution must be exercised during endovascular procedures to avoid catheter-related embolic events that could compromise the anomalous PICA. In our case, coil embolization of the DACA aneurysm was successfully performed without complications.

Recognition of rare vascular anomalies, such as a PICA arising from the ICA, is crucial during diagnostic and interventional procedures. Awareness of such variants aids in preventing complications and ensuring safe cerebrovascular management.

Conflict of Interests

The authors declare no conflict of interest in this study.

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