Persistent hypoglossal artery associated with superior cerebellar artery aneurysm

Case report

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An aneurysm at the origin of the superior cerebellar artery in a patient with a primitive hypoglossal artery is reported. Selective catheterization of the primitive artery is described with a brief discussion of the embryogenesis of carotid-basilar anastomoses. Associated findings in previously reported cases of persistent hypoglossal artery are briefly reviewed.

KEY WORDS • hypoglossal artery • carotid-basilar anastomoses • superior cerebellar artery aneurysm

Persistence of primitive communications between the carotid and basilar systems is an uncommon finding in cerebral angiography (0.1% to 0.2% of the cases). Persistence of the hypoglossal artery is quite rare (24 reported cases), and its occurrence in a patient with subarachnoid hemorrhage from an aneurysm of the superior cerebellar artery seems worthy of notation.

Case Report

This 60-year-old man was admitted to The Hospital of St. Raphael with a 20-hour history of severe intermittent occipital headache. The only positive neurological finding was neck rigidity. Lumbar puncture showed grossly bloody cerebrospinal fluid (CSF) with an initial pressure of 320 mm H2O. On the second day following admission, right carotid and right vertebral angiography demonstrated a small fusiform aneurysm involving the origin of the right superior cerebellar artery. The right vertebral artery was hypoplastic. The left common carotid artery could not be catheterized. Immediately after arteriography, the patient was stable but he had a second hemorrhage 4 days later; the lumbar puncture again revealed grossly bloody CSF. Two weeks after the first angiogram a second study was undertaken to visualize the aneurysm more clearly for possible surgical intervention. Because of difficulty in catheterizing the left vertebral artery, an arch injection was done to define the anatomy. This injection revealed a hypoplastic right vertebral artery and absence of the left vertebral artery (Fig. 1). Injection in the left carotid artery demonstrated a large vessel arising from the posterior wall of the internal carotid artery at the level of
C1–2, passing through the hypoglossal canal to reach the clivus where it continues as the basilar artery (Fig. 2). A fusiform aneurysm was noted arising at the origin of the right superior cerebellar artery (Fig. 2 right).

**Discussion**

In the 4 mm embryo, two parallel arteries develop along the base of the brain which later fuse to form the basilar artery. At this stage, three anastomotic channels supply blood from the carotid artery to the paired neural arteries. Normally these vessels become obliterated; if they persist, they become carotid-basilar anastomoses (Fig. 3). The trigeminal artery is the most common carotid-basilar anastomosis followed infrequently by the hypoglossal and otic arteries.

Lie⁵ has proposed four variations for the anatomical and angiographic definition of the primitive hypoglossal artery: 1) the artery arises from the internal carotid artery at C1–3; 2) the artery enters the skull via the anterior condyloid foramen (the hypoglossal canal); 3) the basilar artery is filled only beyond the point where the hypoglossal artery enters it; and 4) the posterior communicating artery is absent.

Usually, the vertebral artery is either absent on the ipsilateral side and hypoplastic on the opposite side, or hypoplastic on both sides. However, Oertel⁶ has described a case with a normal vertebral artery on the homolateral side.

A review of previously reported cases indicates no consistent symptoms or signs that would suggest the anomaly, which is usually an incidental finding during arteriography. There have been reports of associated aneurysms of the anterior cerebral artery,⁶ internal carotid artery,⁴ intracranial carotid bifurcation⁴ and the hypoglossal artery itself.⁷ However, this is the first reported case of an aneurysm of the origin of the superior cerebellar artery in association with a primitive hypoglossal artery.

**References**


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Primitive hypoglossal artery with aneurysm

Fig. 2. Left: Lateral view of the left common carotid injection demonstrating the bifurcation of the internal carotid and the hypoglossal arteries. Arrowhead points to fusiform aneurysm of right superior cerebellar artery. 1 = hypoglossal artery; 2 = internal carotid artery; 3 = basilar artery; 4 = posterior cerebral artery. Right: Magnified anteroposterior view demonstrating the fusiform aneurysm at the origin of the right superior cerebellar artery (arrowheads). The right posterior cerebral artery is denoted by the arrow.

Fig. 3. Diagrammatic representation of types of persisting carotid-basilar anastomoses. 1 = internal carotid artery; 2 = basilar artery; 3 = hypoglossal artery; 4 = otic artery; 5 = trigeminal artery; 6 = posterior communicating artery; 7 = posterior cerebral artery.

4. Lie TA: The arteria hypoglossica primitiva. Paper read at the 124th Anniversary Meeting of the Neurosurgical Department of the St. Elizabeth Ziekenhuis, Tilburg, 1963

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