Aneurysm on a Persistent Hypoglossal Artery

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With 3 Figures

Summary

The authors report a patient with saccular aneurysm on a left persistent hypoglossal artery who suffered subarachnoid haemorrhage from an aneurysm of the right distal anterior cerebral artery. A review of the literature emphasizes the rarity of the occurrence of an aneurysm on a persistent primitive hypoglossal artery itself.

Keywords: Cerebral aneurysm; cerebral angiography; carotid artery; vertebral artery; basilar artery.

The hypoglossal artery is one of the carotid-basilar anastomoses. The incidence has been reported to be 0.02 per cent, and there has been a preference for the left side without sex difference. There have been reports of associated intracranial aneurysm of the internal carotid artery, anterior cerebral artery, posterior cerebral artery, basilar artery, and superior cerebellar artery. There are, however, only six patients in the literature in whom the aneurysm was on the persistent hypoglossal artery itself (Table 1).

In this report we present a patient with saccular aneurysm on a left persistent hypoglossal artery who developed subarachnoid haemorrhage from an aneurysm of the right distal anterior cerebral artery.

Case Report

A 54-year-old female was admitted to the University Hospital on 18 May 1978 because of severe headache and weakness of the right lower limb for 4 days. Her past history included mild hypertension for 10 years. On admission the patient was alert, but disorientated and uncooperative, and complained of...
severe generalized headache. Examination revealed moderate nuchal stiffness and weakness of the right lower limb with hyperactive tendon reflexes. Her blood pressure was 170/90 mm Hg. Laboratory examinations were all within normal limits except for slight delay of renal phenolsulphophthalein excretion. Cranial CT scan demonstrated a left frontal intracerebral haematoma associated with interhemispheric subarachnoid haemorrhage.

Transfemoral angiographic studies disclosed an irregular aneurysm of the right anterior cerebral artery at the junction of the callosomarginal artery (Fig. 1). The left vertebral artery could not be catheterized. The left carotid injection demonstrated a persistent hypoglossal artery and a saccular aneurysm of this artery at its junction with the basilar artery (Fig. 2). The anomalous artery was found to be arising from the posterior aspect of the internal carotid artery at the level of the second cervical vertebral body, following a posterior and cephalad course, and entering the intracranial cavity through the anterior condyloid foramen. The artery then joined the basilar artery, and at this junction an aneurysm was demonstrated. The right vertebral artery was not catheterized.

A bifrontal free bone flap was reflected, and a saccular aneurysm arising from the junction of the right anterior cerebral artery and callosomarginal artery was obliterated by clipping. An intracerebral haematoma was evacuated. The postoperative course was complicated by urinary incontinence, marked disorientation, and gait disturbance. However, they all cleared slowly but steadily after a left ventriculo-peritoneal shunt. She refused further surgery.

Postoperative angiography was performed. The right vertebral injection demonstrated a hypoplastic right vertebral artery. It entered the skull through the foramen magnum, gave off the right posterior inferior cerebellar artery, and joined the basilar artery (Fig. 3). Left subclavian injection did not demonstrate the left vertebral artery. The posterior communicating arteries were not demonstrated on the angiograms.

Discussion

The embryology of carotid-basilar anastomoses has been reviewed by many investigators. The development of a persistent hypoglossal artery appears to be complex and not to be simply identical with its primitive precursor in the embryo. The primitive hypoglossal artery in the embryo passes medially and anteriorly to the roots of the hypoglossal nerve, and the persistent hypoglossal artery runs laterally and posteriorly to the nerve. The proximal portion of the persistent hypoglossal artery appears to derive from the primitive hypoglossal artery while the distal portion appears to derive from the primitive lateral anastomotic channel connected to the basilar artery through a transverse anastomotic channel.

Lie has proposed four criteria for the diagnosis of the persistent hypoglossal artery: 1. The artery arises from the cervical internal carotid artery at the level of C1 to C3; 2. the artery enters the skull through the anterior condyloid foramen; 3. the basilar artery is filled only beyond the point where the artery joins it; and 4. posterior communicating arteries are absent (not visible on the angiogram).