Subarachnoid hemorrhage secondary to an aneurysm of the ascending pharyngeal artery

Case report

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The authors report a patient presenting with subarachnoid hemorrhage (SAH) secondary to one of two saccular aneurysms arising from the dural branches of the ascending pharyngeal artery. The aneurysms were obliterated by surgery without complications. Satisfactory visualization of the aneurysms required selective external carotid angiography with magnification and subtraction. This case emphasizes the need to include the external carotid system in conventional four-vessel angiography for evaluation of patients with SAH.

KEY WORDS • intracranial aneurysm • subarachnoid hemorrhage • external carotid artery • ascending pharyngeal artery • cerebral angiography

The dural branches of the ascending pharyngeal artery may participate in a number of intracranial pathological processes. However, intracranial aneurysms arising from these arteries have not heretofore been reported. We present a patient with subarachnoid hemorrhage (SAH) secondary to aneurysms arising from these dural branches.

Case Report

This 54-year-old right-handed woman was transferred to Georgetown University Hospital on September 21, 1978, with a diagnosis of SAH. Two days before, she had the abrupt onset of a severe occipital headache while participating in a yoga exercise class. This was followed by photophobia, nausea, diplopia, neck stiffness, and paresthesias in all four extremities, especially the upper extremities. She did not lose consciousness. She was admitted to a local hospital where a lumbar puncture confirmed the diagnosis of SAH.

The general physical examination was within normal limits: blood pressure 140/80 mm Hg, pulse 68/min, respirations 20/min, and temperature 98.4°F. She was alert, oriented, and appropriate in her answers. Speech was normal. The cranial nerves were normal and intact except for bilateral sixth nerve paresis. The ocular fundi showed sharp disc margins with no hemorrhages and good venous pulsations. She had no motor or sensory deficit in the extremities. Cerebellar examination was normal. There was marked neck stiffness with Kernig and Brudzinski signs.

On the day of admission, computerized tomography scan was normal. A four-vessel cerebral angiogram was interpreted as showing normal vascular anatomy without evidence of abnormality. A lumbar puncture revealed an opening pressure of 310 mm H₂O. The cerebrospinal fluid (CSF) was blood-tinged and contained 300,000/cu mm red blood cells, 90% crenated, and 13,000/cu mm white blood cells.

Over the following 7 days, the headaches subsided and the sixth cranial nerve paresis improved. The patient never developed evidence of a focal neurological deficit. A second angiogram on the 10th hospital day was interpreted as demonstrating a possible aneurysm, 3 × 5 mm in size, arising from an external carotid artery branch in the region of the foramen magnum. To rule out the possibility of an intraspinal
Ruptured ascending pharyngeal artery aneurysm

![Fig. 1. Lateral subtracted selective external carotid angiography showing the aneurysmal dilatations (arrows). Upper Left: Lateral view. Upper Right: Anteroposterior view. Lower: Oblique view showing the ascending pharyngeal artery (asterisk).](image)

source of bleeding, a myelogram was performed. This study, including examination of the foramen magnum, showed no pathology. A third angiographic study, with selective injections of the external circulation, was performed on the 13th day after the admission, and confirmed the presence of two aneurysmal dilatations arising from the right ascending pharyngeal artery and projecting over the craniocervical junction close to the foramen magnum (Fig. 1).

**Operation.** The patient underwent a posterior fossa craniectomy with removal of the posterior arch of C-1. The inner aspect of the dura, underlying arachnoid, and the surfaces of the right cerebellar tonsil had xanthochromic staining indicative of recent hemorrhage. On upward retraction of the cerebellar tonsil, a 4-mm aneurysm came into view. The parent dural artery emerged from the jugular foramen. The location of the sac was at the level of the foramen magnum immediately lateral to the medulla. From a dural branch beyond the spinal accessory nerve, a second aneurysm was found along the side of the medulla. After careful dissection, this second aneurysm was clipped, and the first aneurysm obliterated by coagulation.

**Postoperative Course.** The postoperative course was uneventful. An angiogram on the 8th postoperative day showed no evidence of the aneurysms.

**Discussion**

The ascending pharyngeal artery divides near the base of the skull into two meningeal rami. One enters the anterior condyloid canal (hypoglossal ca-
nal) and the other enters the jugular foramen.¹ Both branches nourish the adjacent ninth through 12th cranial nerves and the dura in the region of the foramen magnum and cerebellopontine angle. They anastomose with the meningeal branches of the occipital artery, the middle meningeal arteries, dural branches of the internal carotid artery and muscular branches of the vertebral artery.²⁻⁷ The ascending pharyngeal artery has been described as a feeder of dural arteriovenous malformations of the posterior fossa, meningiomas, acoustic schwannomas, glomus jugulare tumors, sarcomas of the base of the skull, and occipital bone tumors.¹⁻⁷ It also participates in external carotid-cavernous sinus fistulas.³⁻⁵,¹⁰,¹¹ Branches of the external carotid artery have been involved in false traumatic aneurysms, but a review of the literature has revealed no previous report of a nontraumatic aneurysm arising from this artery.

The incidence of normal cerebral angiography in patients with proven SAH has been reported as high as 22% to 27% in some series.⁴⁻⁸,¹² Undoubtedly, thrombosis of the responsible vascular lesion or associated vasospasm account for many of these negative studies. Repeat angiography after an internal carotid study occasionally discloses a lesion missed on the first angiogram, but the incidence of this is only about 2%.⁴⁻⁸ Recognition of the fact that SAH can occur with aneurysms in the external carotid territory requires that this system must be carefully studied in all cases. Aneurysms at the base of the skull may be difficult to delineate, and magnification and subtraction may be necessary.

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References


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