

## Aneurysm of Superior Branch of Anterior Choroidal Artery Mimicking Carotid Bifurcation Aneurysm – Case Report

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### Summary

Aneurysm of the superior branch of anterior choroidal artery is very rare. We report this rare case with unique angiographic findings mimicking an internal carotid bifurcation aneurysm.

A 35-year-old woman was admitted to our hospital because of severe headache. Lumbar puncture disclosed numerous red blood cells. Computed tomography revealed an enhanced circular area in the left basal cistern with moderate hydrocephalus. Cerebral angiography showed a saccular aneurysm near the left internal carotid bifurcation. During operation, the aneurysm was not found at the internal carotid bifurcation, but located deeper budding from the superior branch of the anterior choroidal artery. The aneurysm was successfully clipped. The postoperative course was favourable without any neurological deficit.

The postoperative angiogram showed that the aneurysm was clipped well with preservation of the main trunk of the anterior choroidal artery. Computed tomography of the brain did not show any infarction area, 3 months after the surgery. The uniqueness of this case is the favourable outcome after sacrificing the superior branch of the anterior choroidal artery. The role of collaterals of the anterior perforating substance is emphasized.

*Keywords:* Aneurysm; anterior choroidal artery; subarachnoid haemorrhage.

### Introduction

Anterior choroidal artery aneurysms have been reported to account for 2 to 4 percent of intracranial aneurysms [6]. They generally arise at the origin of the anterior choroidal artery [13]. Rare cases are located at the distal part of the anterior choroidal artery [7]. In this special case, the aneurysm is located neither at the proximal part nor distal portion of the anterior choroidal artery. As the unique angiography showed, it is located below the carotid bifurcation, budding from the superior branch of anterior choroid-

al artery. The aetiology and strategy of treatment are discussed.

### Case Report

A 35-year-old lady experienced sudden onset of severe headache 12 days before admission. She had persistent headache and neck stiffness thereafter, but did not have focal neurological symptoms or signs.

Examination on admission revealed a blood pressure of 120/70 mmHg and mild neck stiffness, but no focal neurological signs. Routine haematological and biochemical examinations did not show any abnormalities. Lumbar puncture 12 days after the ictus disclosed 40500 red blood cells and 18 white blood cells per cubic millimeter. Culture of the cerebrospinal fluid was negative.

Computed tomography demonstrated an enhanced “nodule” in the left basal cistern and bilaterally dilated temporal horns (Fig. 1). Cerebral angiography revealed a saccular aneurysm measuring 5×5 mm near the left internal carotid bifurcation (Fig. 2). Pre-operative findings led to the diagnosis of recent rupture of the left carotid bifurcation aneurysm.

Seven days after admission, with the patient under general endotracheal anaesthesia and with pre-operative antibiotic and dexamethasone coverage, a left pterional craniotomy was performed. The dura mater was opened in a semilunar fashion. Under the microscope the sylvian fissure was dissected widely for better visualization of the aneurysm. The carotid cistern was opened to allow cerebrospinal fluid to escape. First, the internal carotid artery, then the middle cerebral artery and the anterior cerebral artery were dissected free, with great care to preserve all perforating branches (Fig. 3). There was no aneurysm, but some blood clots at the carotid bifurcation. During deeper dissection, the aneurysm was found to arise from the superior branch of the anterior choroidal artery. Due to the small lumen of the parent artery, it was difficult to preserve the patency of the parent artery when clipping the neck of the aneurysm. We had to clip the aneurysm, sacrificing the superior branch of the anterior choroidal artery.

The postoperative course was satisfactory without any neurological deficit. The postoperative angiogram showed that the aneu-



rysm was clipped well with preservation of the main trunk of the anterior choroidal artery (Fig. 4). The patient was consequently discharged 10 days after the surgery. She returned to work 1 month after operation. Computed tomography of the brain did not show any area of infarction 3 months later. She has remained in good health during the period of a 6 months follow-up.

## Discussion

Anterior choroidal artery aneurysms have been reported to account for 2 to 4 percent of intracranial aneurysms [6]. Most of the anterior choroidal artery aneurysms are located at the proximal segment near the origin [13]. Rare cases of the anterior choroidal artery aneurysms beyond the proximal carotid cistern have been reported in the literature [7]. The aetiology and treatment of the distal anterior choroidal artery aneurysm are different from those proximally situated [4, 7].

Intracranial aneurysms can be classified based on various aetiological factors. The most common are the congenital saccular or berry aneurysms located at major intracranial arterial bifurcations. Less common are atherosclerotic, infectious, traumatic, or vasculitic aneurysms, often located at a distance from the main arteries. Only 19 reported cases of distal anterior choroidal artery aneurysms can be found in the literature [1–5, 7, 8, 10]. With the reported cause, 12 cases were associated with moyamoya disease [3, 5, 7, 11]. Aetiological factors other than moyamoya disease were atherosclerosis in two cases [4, 8], arteriovenous malformation in one case [1] and trauma in one case [2]. There were three cases of idiopathic origin reported in the literature [7, 10]. Our patient had neither lesions like moyamoya disease or arteriovenous malformation, nor any history of trauma. Atherosclerosis, neoplasm and infection had also been eliminated in the pre-operative studies and operative findings. This case was assumed to be an idiopathic aneurysm.

Yasargil stressed the danger of sacrificing the anterior choroidal artery in aneurysm surgery [13]. He experienced one poor result among 21 cases with anterior choroidal artery aneurysms, which was related to occlusion of the anterior choroidal artery by a clip with resultant infarction [13]. Hemiplegia, hemianaesthesia and hemianopsia are frequent symptoms of occlusion of the anterior choroidal artery [12].

For treatment of the distal anterior choroidal artery aneurysms, clipping or excision of the aneurysms with sacrificing of the distal artery was performed in five of the six operated cases in the literature [1, 3, 4, 7, 8, 10]. Only two of the recent operated cases had no

neurological deficit [4, 7]. In the remaining patients, two died, one had sequelae of hemiplegia and aphasia, and one had homonymous hemianopsia [2–4, 7]. The inconstant symptoms and infarction following anterior choroidal artery occlusion are attributed to collateral circulation through anastomoses with the posterior communicating and the posterior cerebral arteries [7, 12].

In our case, the aneurysm was located neither at the proximal part nor at the distal portion of the anterior choroidal artery. Actually, the aneurysm was budding from the superior branch of anterior choroidal artery, just below the carotid bifurcation (Fig. 3). The superior branch of the anterior choroidal artery is not found in every case [9]. In Rosner's work, it was detected in one-half of the 50 hemispheres. The superior branch of the anterior choroidal artery exclusively furnished the perforating arteries to the anterior perforating substance. Not only the superior branch of anterior choroidal artery, but also the perforators from the internal carotid, the middle cerebral and the anterior cerebral arteries supply the anterior perforating substance [9]. Therefore, it is not surprising that the patient remains having a good quality of life after clipping the aneurysm with sacrifice of the superior branch of the anterior choroidal artery. The postoperative computed tomography of the brain also verified our assumption.

*In conclusion*, we report this unique aneurysm of the superior branch of the anterior choroidal artery mimicking a carotid bifurcation artery aneurysm in the angiograms. Sacrificing the parent artery without any neurological deficit may be attributed to the abundant collaterals to the anterior perforating substance.

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### Comment

This is a case report about a very rare aneurysm. I think I have seen only 1 (perhaps 2) among the 2000 aneurysms I have handled.

*H. Normes*

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