

Kissing Aneurysms at the Junction of the Internal Carotid Artery and the Ipsilateral Duplicate Anterior Choroidal Arteries

—Case Report—

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Abstract

A 45-year-old woman presented with kissing aneurysms located at the junctions of the internal carotid artery and the duplicate anterior choroidal arteries manifesting as acute subarachnoid hemorrhage. The aneurysms were clipped during temporary occlusion of the internal carotid artery. Surgery for kissing aneurysms requires special consideration including analysis of the anatomical relationship before clipping, control of premature rupture during clipping, and preservation of the patency of the two anterior choroidal arteries after clipping.

Key words: anterior choroidal artery, cerebral aneurysm, internal carotid artery, kissing aneurysms, operation, subarachnoid hemorrhage

Introduction

Kissing aneurysms can be defined as two anatomically adjacent aneurysms with separate origins and partially adherent walls. The incidence of kissing aneurysms is approximately 0.1–3% in large aneurysm series.^{2,4,12} The internal carotid artery (ICA) is the most common site of kissing aneurysms,^{2–4,12} followed by the bilateral carotid-ophthalmic arteries,¹ the anterior communicating artery (bilateral A₁-A₂ junctions),¹¹ the bilateral distal anterior cerebral arteries,^{5,9} and the fenestrated proximal basilar artery.⁷ All 14 previously reported cases of kissing aneurysms of the ipsilateral ICA consisted of an aneurysm located at the junction of the ICA and the posterior communicating artery, and another at the junction of the ICA and the anterior choroidal artery.^{2–4,12} We report the first case of kissing aneurysms both located at the junction of the ICA and duplicate anterior choroidal arteries.

Case Report

A 45-year-old woman presented to the emergency department 1 hour after acute onset of severe

headache, nausea, and vomiting. Computed tomography revealed subtle subarachnoid hemorrhage in the left sylvian fissure (Fig. 1). On admission, the diagnosis was World Federation of Neurological Surgeons grade II subarachnoid hemorrhage. Four-vessel cerebral angiography, performed the next day, showed two aneurysms of the left ICA and a small aneurysm of the anterior cerebral artery (Fig. 2A). Left internal carotid angiography showed two anterior choroidal arteries, but no posterior communicating artery. Both of the ICA aneurysms were located at the junction of the ICA and the duplicate anterior choroidal arteries.

The patient underwent surgery through a left pterional craniotomy. Two aneurysms with separate necks were observed to project posteriorly from the ICA (Fig. 3A). The proximal aneurysm was suspected to have ruptured because of the clot distribution. The anterior choroidal arteries were confirmed to originate from the medial necks of both aneurysms (Fig. 3B). No posterior communicating artery was observed. The anterior choroidal arteries were separated from the aneurysms without difficulty. The necks of the aneurysms were then separated. The aneurysm domes were adhered tightly together, and were not dissected. The proximal aneurysm was clipped with a Sugita number 73 clip. A temporary

Received October 14, 2004; Accepted July 12, 2005



Fig. 1 Computed tomography scan on admission showing subarachnoid hemorrhage in the left sylvian fissure.

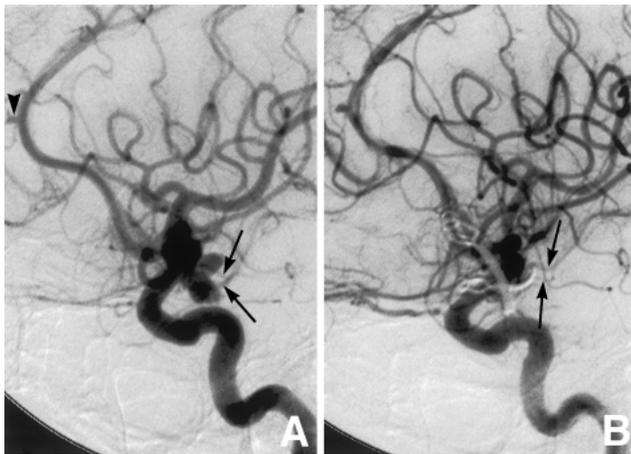


Fig. 2 A: Left internal carotid angiogram performed the day after the onset (lateral view) showing two anterior choroidal arteries (arrows), but no posterior communicating artery. The aneurysms originate from the junction between the anterior choroidal arteries and the internal carotid artery but appear as a single aneurysm with two blebs on this lateral view, because the necks of the aneurysms overlap. A small aneurysm is also shown in the genu of the anterior cerebral artery (arrowhead). B: Left internal carotid angiogram performed 14 days after the onset (lateral view) showing clipping of both aneurysms of the internal carotid artery. Both anterior choroidal arteries are preserved (arrows).

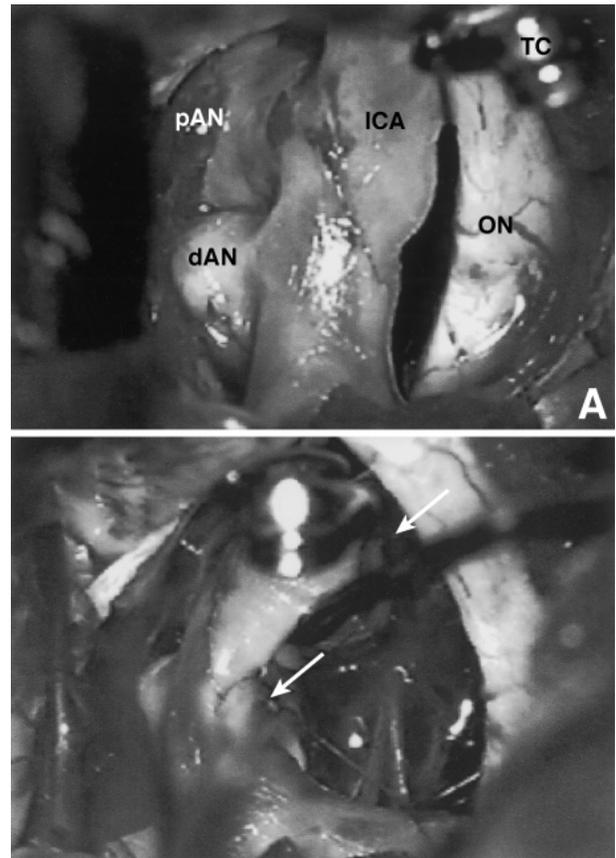


Fig. 3 A: Intraoperative photograph showing two aneurysms with separate necks projecting posteriorly from the internal carotid artery (ICA). pAN: proximal aneurysm, dAN: distal aneurysm, ON: optic nerve, TC: temporary clip. B: Intraoperative photograph and diagram showing anterior choroidal arteries originating from the medial necks of the aneurysms (arrows). pAChA: proximal anterior choroidal artery, dAChA: distal anterior choroidal artery.

clip was placed across the proximal ICA for 10 minutes during dissection and clipping of the aneurysm. Minor bleeding occurred from the adhered dome of the aneurysm during the neck clipping. Fifteen minutes after clipping of the proximal aneurysm, the distal aneurysm was clipped with a Sugita number 69 clip with temporary occlusion of the proximal ICA for 5 minutes. Parts of the medial necks of the aneurysms were preserved at the origins of the anterior choroidal arteries. Patency of both anterior choroidal arteries was visually confirmed after clipping of each aneurysm.

The postoperative course was uneventful. Angiography at 14 days after the onset demonstrated disappearance of the ICA aneurysms (Fig. 2B). Both anterior choroidal arteries were observed. One month after admission, the patient was discharged without neurological deficits and returned to her previous work. The unruptured aneurysm in the anterior cerebral artery was followed up using magnetic resonance angiography.

Discussion

Two anterior choroidal arteries were observed in the present case, but no posterior communicating artery. The posterior communicating artery connects the ICA and the posterior cerebral artery but may be small or absent.⁶⁾ The territory supplied by the anterior choroidal artery has a reciprocal relationship with that supplied by the posterior communicating artery.⁶⁾

Treatment of kissing aneurysms of the ICA requires special consideration of the preoperative evaluation of angiograms and surgery. Kissing aneurysms are sometimes recognized as a single multiloculated aneurysm, as seen on the lateral view of the angiography in this case. Kissing aneurysms of the ICA were misinterpreted preoperatively as a single aneurysm in three of the 14 previously reported cases.^{2-4,12)} During operation, clipping of the second aneurysm should be planned before the clipping of the first aneurysm, because clipping of the second aneurysm might be disturbed by the clip blade of the first aneurysm in the narrow working space. Fibrous adhesion is often observed at the kissing point, so temporary occlusion of the parent artery might be useful to control premature rupture during clipping of the aneurysms. Ischemic symptoms occurred in the anterior choroidal artery territory after operation in three of the 14 previously reported cases of kissing aneurysms of the ICA.^{2-4,12)} Perforators from the ICA, especially the anterior choroidal arteries, must be preserved during operation. Doppler sonography and motor evoked

potential monitoring could be used for more reliable confirmation of the patency of the anterior choroidal arteries than visual inspection.^{8,10)}

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