

Kissing Aneurysm of the Distal Anterior Cerebral Artery: Preoperative CT Angiography and Surgical Management: A Case Report

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We describe a patient with mirror-image aneurysms in the bilateral distal anterior cerebral artery (ACA). The larger aneurysm was clearly disclosed with digital subtraction angiography (DSA), but the smaller one could not be definitely identified. The bilateral aneurysms were confirmed with computed tomographic (CT) angiography, which showed the right ACA aneurysm to be hidden behind the left ACA aneurysm, likely buried in the cingulate gyrus. During surgery, the left ACA aneurysm was clipped first. The right ACA aneurysm was exposed by a small subpial resection of the cingulate gyrus, and the right ACA aneurysm, which strongly adhered to the surrounding tissue, was safely dissected. Multiple aneurysms associated with a distal ACA aneurysm are not rare. We conclude that further examination with CT angiography is important when kissing aneurysms are suggested by DSA.

Introduction

The prevalence of distal anterior cerebral artery (ACA) aneurysm is relatively low, and our personal experience in this area is rather limited^{1–5)}. Aneurysms of the distal ACA have some unique characteristics. They tend to bleed, irrespective of their size^{1–3)}. The incidence of multiple aneurysms is higher in cases of distal ACA aneurysms than in cases of other location, and additional aneurysms are not infrequently detected in the contralateral or same distal ACA^{1–4)}. The aneurysm in mirror position to the distal ACA aneurysm is not always identified preoperatively⁶⁾. We treated a patient in which computed tomographic (CT) angiography was helpful in the diagnosis and operative management of kissing aneurysms of the distal ACA.

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Case report

Magnetic resonance (MR) angiography in a 42-year-old woman suggested unruptured distal ACA aneurysms. The woman had undergone MR angiography for brain screening called “Brain Check-up”⁷⁾. She had no history of severe headache or other neurological symptoms. Digital subtraction angiography (DSA) clearly disclosed a distal ACA aneurysm at the origin of the right anterior internal frontal artery and suggested an aneurysm in mirror position on the left ACA (Fig. 1). Multiplanar reformatted (MPR) CT images clearly depicted two aneurysms and indicated that the larger right ACA aneurysm was located just behind the smaller left ACA aneurysm (Fig. 2). Surgery was performed via interhemispheric approach. The smaller aneurysm of the left ACA was explored, and its neck was dissected (Fig. 3, left) and clipped. The right ACA aneurysm was not yet apparent, but, based on the preoperative CT angiography, we thought that the right ACA aneurysm was buried in the cingulate gyrus, behind the left ACA aneurysm. A small subpial resection of the right cingulate gyrus was performed to safely expose the right aneurysm and right ACA (Fig. 3, right). After this exposure, the right aneurysm was clearly dissected from the left aneurysm and clipped. The postoperative course in this case was uneventful, and postoperative angiography confirmed complete obliteration of both aneurysms.

Discussion

Distal ACA aneurysms are sometimes accompanied by additional aneurysms on the same or the opposite artery. Laitinen found aneurysms bilaterally in 3 of 14 (21%) patients with distal ACA aneurysm⁸⁾. Sindou reported bilateral aneurysms in 2 out of 19 (11%) patients with distal ACA aneurysms⁹⁾. Other reported incidences are 10 to 39%^{4,10)}. But because the prevalence of distal

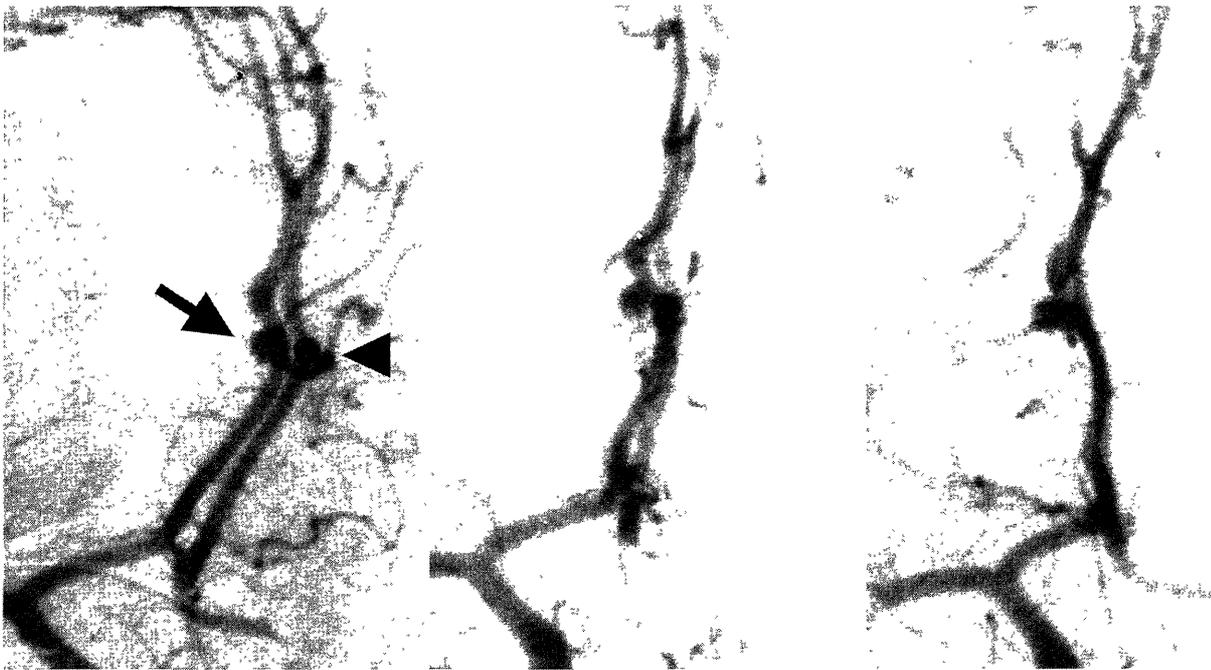


Figure 1. Right carotid angiogram, right oblique view (left), anteroposterior view (center), and left oblique view (right), clearly disclose the aneurysm (arrow) of the right distal anterior cerebral artery (ACA). An aneurysm in mirror position on the left distal ACA (arrowhead) is also suggested, but is not definitely diagnosed by angiography.

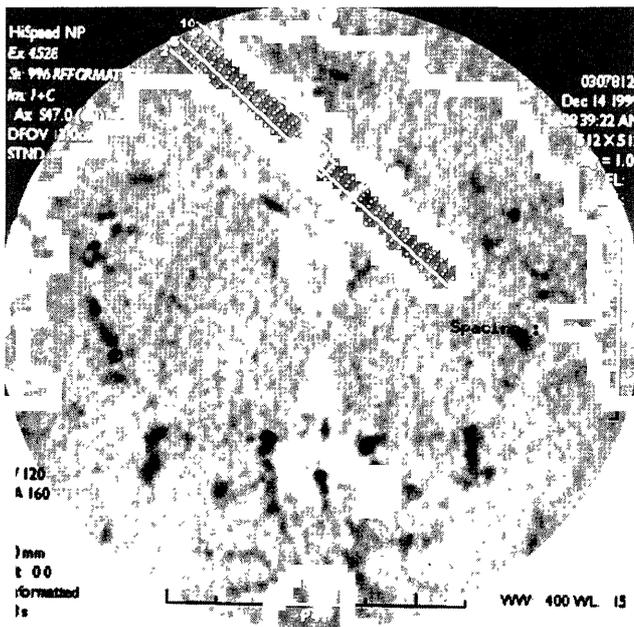


Figure 2A. The slice position for multiplanar reformatted (MPR) images.

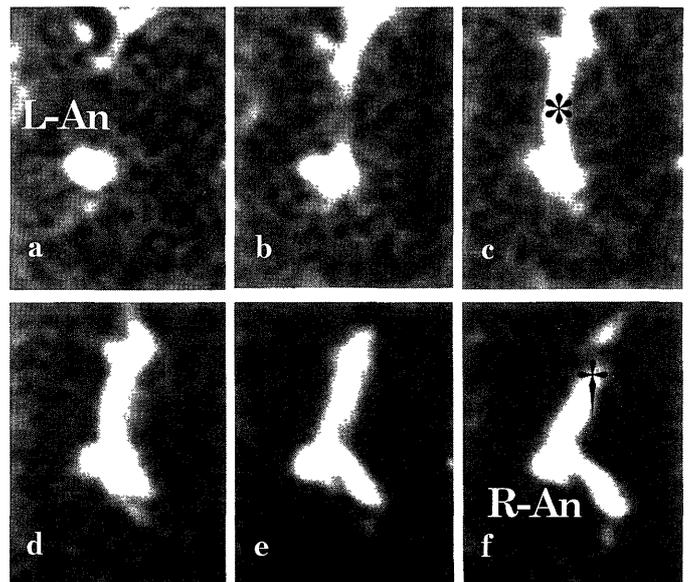


Figure 2B. MPR images (a to f: left anterior to right posterior) clearly show aneurysms in bilateral distal anterior cerebral artery (ACA). The spatial relation between these aneurysms is also demonstrated.

L-An = left aneurysm, R-An = right aneurysm, * = left anterior cerebral artery, † = right anterior cerebral artery

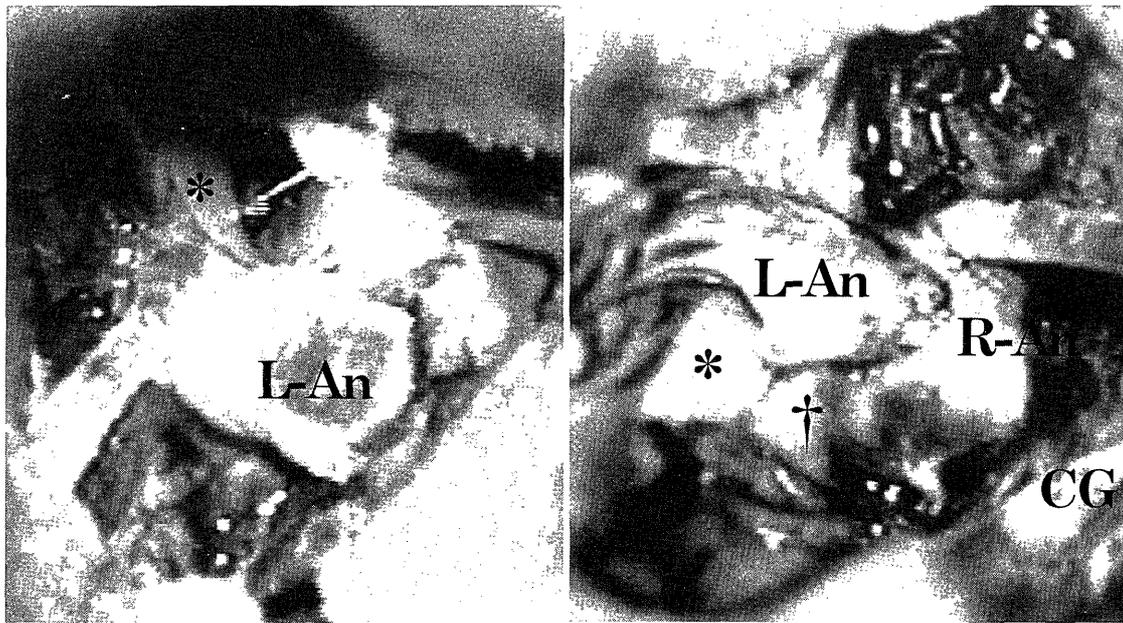


Figure 3. Intraoperative photograph. The aneurysm of the left ACA is exposed (left). After clipping the neck of the left aneurysm, subpial resection of the cingulate gyrus is performed, and the right ACA aneurysm, strongly adhering to the left ACA aneurysm, is exposed (right). L-An = left aneurysm, R-An = right aneurysm, * = left anterior cerebral artery, † = right anterior cerebral artery, CG = resected cingulate gyrus.

ACA aneurysms is low and is reported at 2.3% - 5.6%^{1,2,4,5}, most neurosurgeons have rather limited experience in this area.

Yasargil has indicated that the distal ACA aneurysm presents particular surgical problems, including a narrow working space in the interhemispheric fissure and callosal cistern, strong adhesion between the cingulate gyri, a broad-based aneurysmal neck, a hard-to-identify parent artery, and fixation of aneurysmal dome on the pial layer⁴. Ohno et al emphasized the technical difficulty in surgical treatment of the distal ACA aneurysm due to the broad neck configuration and coexistence of other aneurysms³. In the present case, MPR images obtained by helical CT clearly demonstrated the kissing aneurysms and their spatial relation. When we first clipped the left ACA aneurysm following dissection of the neck, we considered that retraction of the left aneurysm and left ACA without identification of the right lesion might injure the right aneurysm and induce its premature rupture. Thus, we performed subpial resection of the right cingulate gyrus around the left ACA aneurysm. Strong adhesion of the right ACA aneurysm to the left ACA aneurysm and left ACA was verified. The right ACA aneurysm was carefully and successfully dissected from the surrounding structures.

Careful angiographic examination is required in cases of distal ACA aneurysm to detect other aneurysms,

and CT angiography is useful in diagnosing the kissing aneurysms and evaluating their positional relation. The small subpial resection in lieu of retraction of a superficial aneurysm can be used to safely dissect the second aneurysm.

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