

◆ CASE REPORT ◆

“Kissing Aneurysms” of the Anterior Communicating Artery Treated With Coil Embolization

Hiroaki Matsumoto, MD; Akihiko Takechi, MD; Kanehisa Kohno, MD; and Ushio Sasaki, MD

Department of Neurosurgery, Ehime Prefectural Central Hospital, Ehime, Japan.

Purpose: To present a case of kissing aneurysms of the anterior communicating artery treated with endovascular coil embolization and discuss the advantages and disadvantages of this technique compared with neck clipping.

Case Report: A 48-year-old man became drowsy and was admitted to the hospital; he had right hemiparesis and aphasia. Computed tomography revealed diffuse subarachnoid hemorrhage; diagnostic angiography identified an aneurysm at the left A1-A2 junction of the anterior communicating artery and another in the distal anterior cerebral artery (ACA). Endovascular coil embolization was performed on the same day. During the procedure, the 3-mm-diameter junctional aneurysm was successfully packed with coils, but an additional aneurysm was suspected; right carotid angiography following embolization of the left aneurysm clearly showed a mirror image aneurysm of the right A1-A2 junction. The right aneurysm was treated using the same technique. The broad-necked ACA aneurysm was unsuitable for embolization, so neck clipping was performed 5 weeks later. The patient was discharged to his home following complete recovery 7 weeks after the coil embolization.

Conclusions: Kissing aneurysms are a rare and specific type of multiple aneurysms that require caution in diagnosis and surgical management. Endovascular treatment may be suitable because it does not involve dissection around the aneurysms.

J Endovasc Ther 2005;12:750-754

Key words: anterior communicating artery, subarachnoid hemorrhage, kissing aneurysms, endovascular therapy, coil, embolization

The term “kissing aneurysms” refers to two anatomically adjacent aneurysms with different origins and partially adherent walls. In the intracranial circulation, these aneurysms are quite rare, with only several dozen cases reported to date. All were treated with neck clipping, except one, which underwent endovascular treatment.¹⁻¹³

We describe a case of subarachnoid hemorrhage (SAH) due to kissing aneurysms that originated from both ends of the anterior communicating artery (AcoA). The lesions were treated with coil embolization, and we

discuss the advantages and disadvantages of this therapy compared with neck clipping.

CASE REPORT

A 48-year-old man suddenly became drowsy and visited our hospital immediately. On admission, he was drowsy, with right hemiparesis and aphasia. Computed tomography (CT) revealed diffuse SAH (Fig. 1A), while diagnostic angiography identified an aneurysm at the left A1-A2 junction of the AcoA and another in the distal anterior cerebral artery

The authors have no commercial, proprietary, or financial interest in any products or companies described in this article.

Address for correspondence and reprints: Hiroaki Matsumoto, MD, Department of Neurosurgery, Ehime University, Shitsukawa, Toon, Ehime, Japan 791-0295. Fax: 81-89-960-5340; E-mail: hiroaki@m.ehime-u.ac.jp

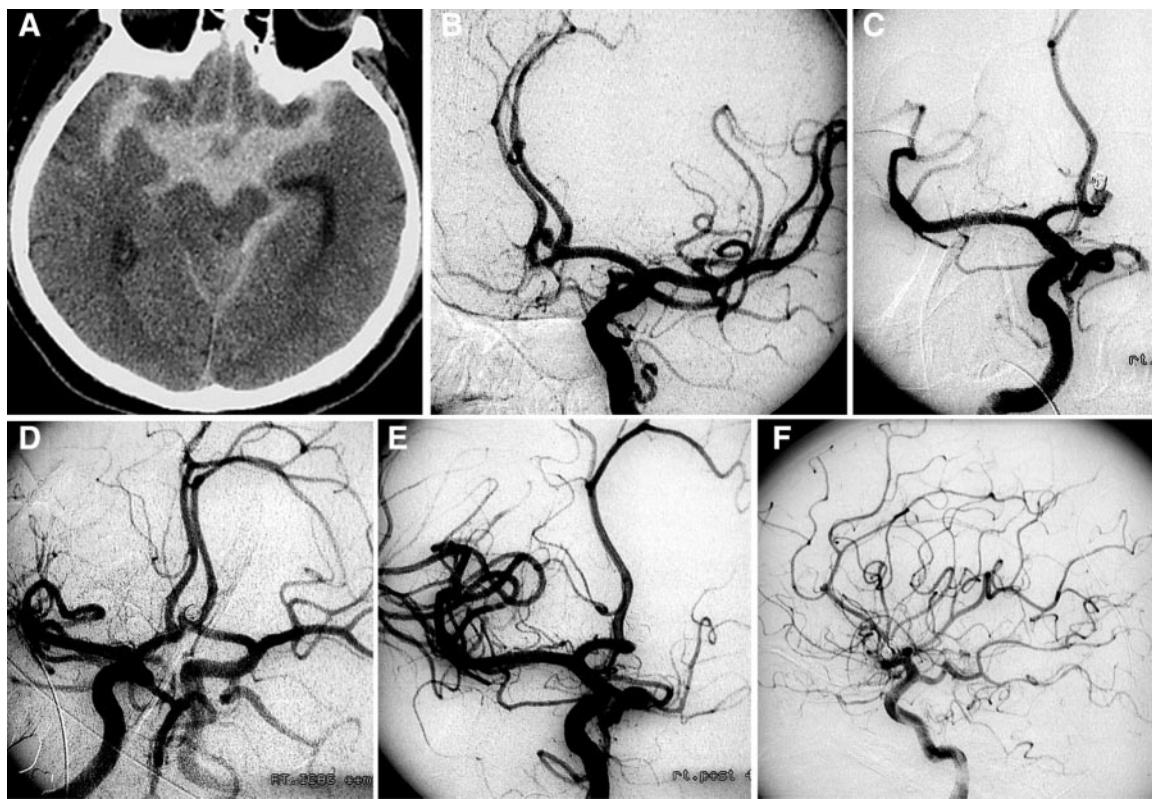


Figure 1 ♦ (A) Computed tomography on admission showing diffuse subarachnoid hemorrhage in the basal cistern. (B) The preoperative oblique left carotid angiogram shows the A1-A2 junctional (arrowhead) and distal ACA (arrow) aneurysms. (C) Intraoperative right oblique carotid angiogram after coil embolization of the left-sided aneurysm; the right A1-A2 junctional aneurysm (arrow) is clearly seen. (D) The intraoperative right oblique carotid angiogram with compression of the left ICA shows bilateral symmetrical A1-A2 junctional aneurysms (arrow). The two domes appear to overlap. (E) The postoperative right oblique carotid angiogram taken immediately after the embolization procedure shows total occlusion of both aneurysms. (F) Postoperative left lateral carotid angiogram taken immediately after the embolization procedure showing the small-diameter (2 mm), broad-necked distal ACA aneurysm on the left callosomarginal-pericallosal bifurcation (arrow).

(ACA) (Fig. 1B). The initial diagnosis was SAH originating from a left A1-A2 junctional aneurysm. He was classified as a Hunt and Hess grade 4; endovascular coil embolization was therefore performed on the same day.

Under general anesthesia and systemic heparinization (2000 units), a 6-F sheath was placed in the right femoral artery. A 6-F guiding catheter (Medikit, Tokyo, Japan) was placed in the left internal carotid artery (ICA), and a 3-F microcatheter (FasTracker-18MX; Boston Scientific/Target, Fremont, CA, USA) with a 2.5-F distal tip was placed within the left aneurysm using a 0.016-inch microguidewire (Radifocus Guidewire M, Terumo, To-

kyo, Japan). The 3-mm-diameter aneurysm was successfully packed with Guglielmi detachable coils (GDC 10; Boston Scientific/Target). After the guiding catheter and the microcatheter were removed, an additional aneurysm was suspected, so repeated right carotid angiography following embolization of the left aneurysm clearly revealed an aneurysm of the right A1-A2 junction. This aneurysm, which was 4 mm in diameter, overlapped that on the left, and the two were in contact at their domes (Fig. 1C,D). Rotational digital subtraction angiography (DSA) more clearly revealed the relationship between the kissing aneurysms and the AcoA complex.

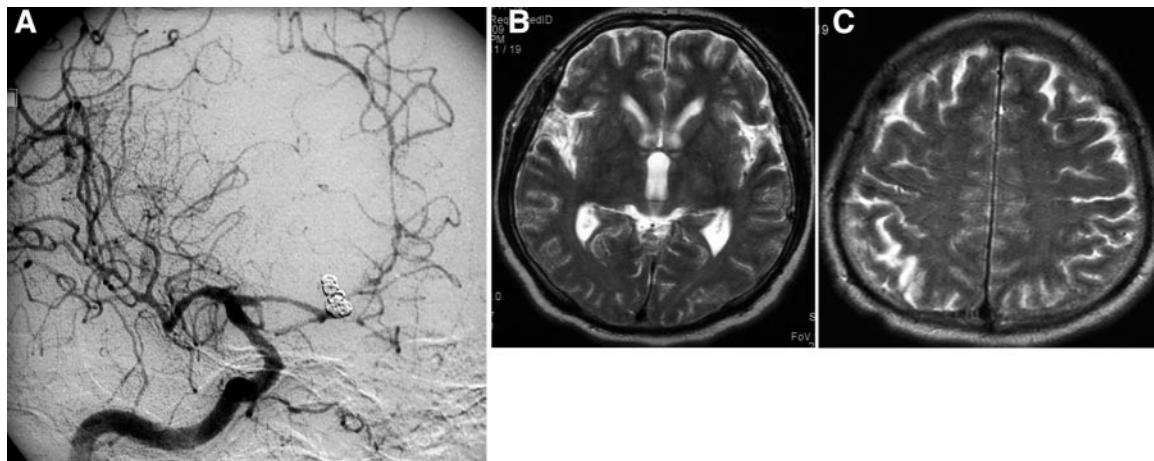


Figure 2 ♦ (A) Right oblique carotid angiogram 10 days after coil embolization; cerebral vasospasm is seen, especially of the anterior cerebral artery. (B,C) T₂-weighted magnetic resonance imaging 21 days after coil embolization; no cerebral infarction resulted from the cerebral vasospasm.

The diagnosis was changed to mirror image kissing aneurysms because each aneurysm definitely originated from an A1-A2 junction.

The right aneurysm was treated using the same type of equipment (microcatheter, microguidewire, and GDCs) via a 6-F guiding catheter placed in the right ICA. Angiography performed immediately after the procedure revealed complete occlusion of both aneurysms (Fig. 1E). The distal ACA aneurysm, which we diagnosed as unruptured due to the SAH distribution on the CT, could not be treated with coil embolization due to its small diameter (2 mm) and broad neck (Fig. 1F).

Systemic heparinization was performed for 3 days following the procedure. To prevent cerebral vasospasm, continuous spinal drainage and hypervolemic therapy were performed with systemic fasudil hydrochloride hydrate. Although mild vasospasm was detected angiographically (Fig. 2A), neither symptomatic vasospasm nor cerebral infarction was detected on magnetic resonance imaging (Fig. 2B,C).

Surgery to clip the distal ACA aneurysm was performed 5 weeks later; the aneurysm was found to be unruptured. Postoperative angiography (Fig. 3) revealed both complete occlusion of the kissing aneurysms and clipping of the distal ACA aneurysm. The patient was discharged to his home following com-

plete recovery 7 weeks after the coil embolization.

DISCUSSION

Kissing aneurysms are an unusual and relatively rare type of multiple aneurysms. Yasar-gil¹ reported the incidence of kissing aneurysms as only 2 (0.2%) in 1012 patients. Although they are usually situated within the internal carotid system, kissing aneurysms have been located in the AcoA in 2 cases.^{2,3} They often pose problems with respect to both diagnosis and treatment.

Although conventional angiography can be used to diagnose kissing aneurysms, they are often misinterpreted as the bleb of an aneurysmal dome or a single multiloculated aneurysm.²⁻⁸ Harada et al.² reviewed 23 cases in the literature and found that 13 (57%) had not been recognized as kissing aneurysms preoperatively. In our case, we did not diagnose kissing aneurysms, and instead treated the patient for a single aneurysm of the left A1-A2 junction. It was not until coil embolization of this aneurysm was complete that the second aneurysm was identified. Because it is relatively difficult to diagnose kissing aneurysms preoperatively, additional 3-dimensional CT angiography, rotational DSA, and mag-

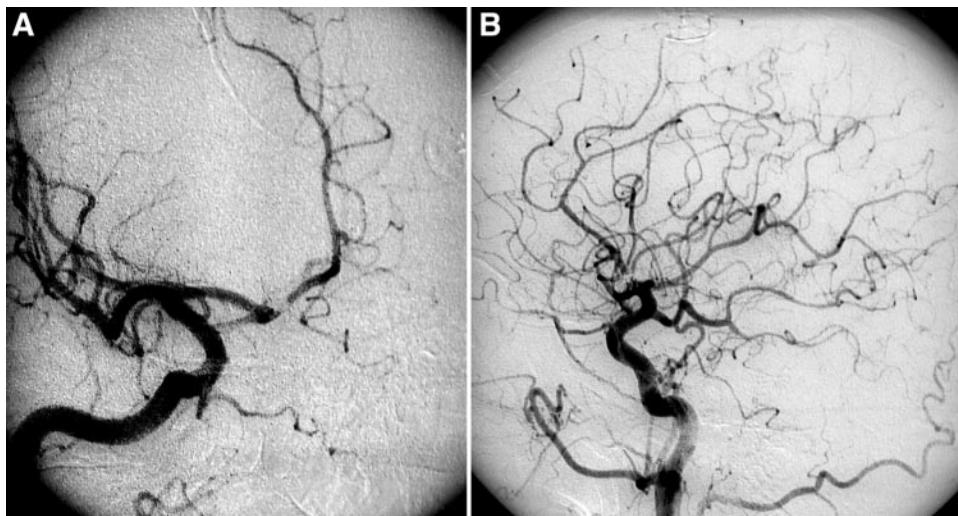


Figure 3 ♦ (A) Right oblique carotid angiogram after neck clipping of the distal anterior cerebral artery (ACA) aneurysm; there is persistent total occlusion of the kissing aneurysms and recovery from cerebral vasospasm. (B) Left lateral carotid angiogram after successful neck clipping of the distal ACA aneurysm.

netic resonance angiography may be useful in their diagnosis.^{2,3,5,7-9}

Neck clipping of each aneurysm is standard treatment for kissing aneurysms. However, as Yasargil¹ emphasized, dissection and clipping of these aneurysms is very challenging due to adhesion between the aneurysms, known as the "kissing point," and the narrow working space around each aneurysmal neck.^{1-6,8,10} Moreover, in the case of SAH, it is difficult to determine which aneurysm has bled and which should be clipped first.^{4-6,10} If neck clipping of the unruptured aneurysm is performed first, traction on the other ruptured one may occur, causing premature secondary rupture. In our case, had we chosen open surgery, it might have been difficult to clip the aneurysms, and there would have been the potential for premature rupture due to the lack of preoperative diagnosis of kissing aneurysms.

Although endovascular treatment of intracranial aneurysms with detachable coils has developed into a widely used and successful technique,¹⁴ to our knowledge only one case of kissing aneurysms treated with coil embolization has been reported.¹³ Imai⁴ recommended endovascular treatment of kissing aneurysms based on the potential for premature rupture of one of the aneurysms dur-

ing dissection of adhesions between the aneurysms. Compared with neck clipping, endovascular treatment of kissing aneurysms reduces the risk of premature rupture since dissection of the aneurysm neck is unnecessary. Moreover, with endovascular treatment, decisions concerning the order of treatment are unnecessary since the untreated aneurysm is not exposed to retraction. Coil embolization may thus be especially useful for kissing aneurysms that originate very close together from the same parent artery, such as those of the internal carotid-posterior communicating artery, internal carotid-anterior choroidal artery, or AcoA.

There are, however, disadvantages to endovascular treatment of kissing aneurysms. If one of the aneurysms ruptures during the procedure and the microcatheter is not in or near the bleeding aneurysm, the bleeding will be uncontrollable. Certain intracranial kissing aneurysms, e.g., those of the distal ACA, tend to have small domes or broad necks that might be unsuitable for coil embolization. Because we did not diagnose the kissing aneurysms in our patient before treatment, we placed guiding catheters in the ICAs separately. However, we should have placed guiding catheters in the ICAs bilaterally, as well as microcatheters in or near both aneurysms si-

multaneously, since immediate hemostasis would not have been feasible if bleeding from the opposite aneurysm had occurred.

Conclusions

Kissing aneurysms are a rare and specific type of multiple aneurysms that require caution in diagnosis and surgical management. Endovascular treatment may be suitable because it does not require dissection around the aneurysms.

REFERENCES

1. Yasargil MG. Internal carotid artery aneurysms. In: Yasargil MG, ed. *Microneurosurgery*, vol 2. New York City: Thieme Stratton, Inc.; 1984:33–123.
2. Harada K, Orita T, Ueda Y. Large kissing aneurysms of the middle cerebral artery: a case report. Classification of kissing aneurysms [in Japanese]. *No Shinkei Geka*. 2004;32:513–517.
3. Wanifuchi H, Shimizu T, Higa T, et al. Kissing mirror image anterior communicating artery aneurysms—case report. *Neurol Med Chir (Tokyo)*. 2001;41:29–32.
4. Imai K. Kissing aneurysms of the internal carotid artery: case report. *Jpn J Neurosurg (Tokyo)*. 2001;10:801–806.
5. Kanai H, Yamada K, Yamashita N, et al. So-called kissing aneurysms on the same internal carotid artery: report of two cases [in Japanese]. *Jpn J Neurosurg (Tokyo)*. 1999;8:349–354.
6. Matsumori Y, Kayama T, Kokubo Y, et al. A case of non-junctional posterior communicating artery aneurysm forming kissing aneurysms with an IC-PC aneurysm [in Japanese]. *Surg Cereb Stroke*. 2003;31:365–369.
7. Mori T, Fujimoto M, Shimada K, et al. Kissing aneurysms of distal anterior cerebral arteries demonstrated by magnetic resonance angiography. *Surg Neurol*. 1995;43:497–499.
8. Wanifuchi H, Tanikawa T, Iseki H, et al. Kissing aneurysms between the internal carotid artery and the anterior communicating artery: a case report [in Japanese]. *Jpn J Neurosurg (Tokyo)*. 1998;7:694–698.
9. Date I, Ogihara K, Tamiya T, et al. “Kissing” bilateral large carotid-ophthalmic aneurysms. A case report. *Neurosurg Rev*. 1998;21:281–283.
10. Ide M, Hagiwara S, Tanaka N, et al. Bilateral ophthalmic segment “kissing” aneurysms presenting with subarachnoid hemorrhage—case report. *Neurol Med Chir (Tokyo)*. 2002;42:427–430.
11. Jefferson A. The significance for diagnosis and for surgical technique of multiple aneurysms of the same internal carotid artery. *Acta Neurochir (Wien)*. 1978;41:23–37.
12. Komiya M, Yasui T, Tamura K, et al. “Kissing aneurysms” of the internal carotid artery. *Neurol Med Chir (Tokyo)*. 1994;34:360–364.
13. Saatci I, Cekirge HS, Karcaaltincaba M, et al. Endovascular treatment of kissing aneurysms at the fenestrated basilar artery: case report with literature review. *Surg Neurol*. 2002;58:54–58.
14. Molyneux A, Kerr R, Stratton I, et al. International Subarachnoid Aneurysm Trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomized trial. *Lancet*. 2002;360:1267–1274.