Kissing Aneurysms of the Internal Carotid Artery: Case Report

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Kissing aneurysms pose various problems when neck clipping of them because they often partially adhere to each other. On the other hand, it is not easy to treat a patient suffering from subarachnoid hemorrhage (SAH) with a serious vasospasm.

A 41-year-old female presented with SAH due to a ruptured aneurysm originating from the left internal carotid-posterior communicating artery (IC-PcomA). She also had an unruptured aneurysm arising from the bifurcation of an ipsilateral internal carotid–anterior choroidal artery (IC–AchA). Intraoperative findings revealed that these were kissing aneurysms. An intentionally delayed operation (neck clipping of aneurysms) was performed due to her symptomatic vasospasm. She was discharged with right hemiparesis.

In this paper, we would like to emphasize the rarity of kissing aneurysms and the difficulty in diagnosis and management of such cases.

(Received March 26, 2001: accepted July 26, 2001)

Key words: kissing aneurysms, intentionally delayed operation, premature rupture, vasospasm


Introduction

Kissing aneurysms of the internal carotid artery (ICA) are rare. We encountered a patient with subarachnoid hemorrhage (SAH) of kissing aneurysms arising from bifurcations of left internal carotid–posterior communicating artery (IC–PcomA) and internal carotid–anterior choroidal artery (IC–AchA). The size of the former that appeared to rupture was much larger than that of the latter. During the operation, premature bleeding of the unruptured IC–AchA aneurysm occurred but not the ruptured IC–PcomA aneurysm while dissecting the adhesion between two aneurysms. A temporary clip was applied for approximately 30 minutes. Angiography performed before the operation revealed serious vasospasms in the main trunks of her left anterior cerebral artery (ACA) and middle cerebral artery (MCA) because 16 days had already passed from the onset of a headache. Various factors are considered to contribute to her poor neurological outcome. Appropriate diagnosis of and treatment for these patients with a serious vasospasm are discussed.
Case Report

A 41-year-old female suddenly developed a headache and came to our institute on day 16 after the onset. Features of the episode were not known in detail. She was alert but manifested slight right hemiparesis and facial palsy. Computed tomography (CT) and magnetic resonance imaging (MR imaging) on admission revealed slight SAH mainly in her left sylvian fissure (Fig. 1). Angiography showed IC-PcomA and IC-AchA aneurysms on the left. The former was much larger than the latter (Figs. 2, 3).

Her preoperative condition according to the Hunt and Hess classification was grade 2. Surgery to clip the aneurysms was carried out on day 21. It
was suggested that the IC–PcomA aneurysm was the origin of bleeding based on its shape and size before clipping\(^2\). The two aneurysms were partially adhered to each other around their domes despite the angiographic cleavage (Fig. 4). While we were dissecting the adhesion between two aneurysms, premature bleeding of the unruptured IC–AchA aneurysm occurred. Therefore, it was clipped first. It took about 30 minutes to control the bleeding and clip this aneurysm completely with temporary occlusion of the proximal ICA. Then, the ruptured IC–PcomA aneurysm was clipped without any significant difficulty. However, this patient developed serious right hemiparesis postoperatively. Angiography performed postoperatively did not demonstrate the left AchA at all although we did confirm of the blood flow of this artery intraoperatively (Fig. 5). She was discharged with serious neurological deficits in spite of intensive courses of rehabilitations.

**Discussion**

Kissing aneurysms of ICA are rare\(^4\)–\(^7\). Firstly in this study, we stress the rarity of kissing aneurysms of this area. To our knowledge, only 14 cases have been reported including the present case (Table 1).

Secondly, we discuss the difficulty in diagnosing of these aneurysms. As various reports described, it is not easy to diagnose these aneurysms correctly before the operation because they appear to be multiloculated angiographically. Therefore, we must consider the possibility of kissing aneurysms preoperatively in the case of a multiloculated aneurysm\(^5\)\(^(9)\)\(^10\).

Regarding the kissing aneurysms of IC–PcomA and IC–AchA, it was worth noting that they are predominant in females and the SAH is commonly due to rupture of the former\(^1\)\(^11\). In most cases, this aneurysm is larger than the IC–AchA aneurysm\(^8\). Indeed, these findings may be merely incidental but our findings are consistent with previous reports. However, in some series the unruptured IC–AchA aneurysms were larger than the ruptured IC–PcomA aneurysms\(^8\). Anyway, it is important to identify the aneurysm responsible for
<table>
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<tr>
<th>Author</th>
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<th>Sex</th>
<th>Location</th>
<th>Symtoms</th>
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<th>Bleeding site</th>
<th>Preservation</th>
<th>Treatment</th>
<th>Outcome</th>
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<td>Wrapping</td>
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<td>GR</td>
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<td>Respectively</td>
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<td>SAH</td>
<td>IC-AchA</td>
<td>Both unruptured</td>
<td>yes</td>
<td>Clip and coating</td>
<td>MD</td>
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</table>

Larger AN: larger one of the kissing aneurysms
Preservation: preservation of the significant perforators

SAH before the operation as accurately as possible.

Multiplicity (more than two) of aneurysms is one possible sign of kissing aneurysms, therefore a thorough angiography is indispensable. The present case also had an aneurysm of the left middle cerebral artery (MCA) which was clipped intraoperatively.

Thirdly, we would like to emphasize the difficulty in treating the patients with ruptured kissing.
aneurysms. Particularly in patients with serious vasospasms of the parent artery of these aneurysms, we must exercise extreme attention to their management during the operation. Preoperative evaluations of cerebral blood flow (CBF) may be necessary in some cases\(^1\). However, we did not perform these evaluations, on which we should reflect. In these cases, endovascular intervention may be available because it is not necessary to dissect aneurysms in the neck\(^3\)\(^4\)\(^5\). However, to our knowledge, we could not find reports of cases treated using endovascular procedures which are not performed at all the institutes including ours. This is why we chose the direct open surgery.

As the result of our management, this patient manifested severe neurological deficits. We speculate that two factors described below may be closely related to the poor neurological outcome of the present patient. One is presumably the occlusion of the AchA. Neck clipping of each aneurysm may be the best treatment for kissing aneurysms\(^3\)\(^5\). However, we sometimes encounter premature rupture of one of the aneurysms while dissecting the arachnoid membranes around these aneurysms\(^6\). Permanent neurological deficits may occur because of occlusion of the AchA when we use the temporary clip to control the intraoperative bleeding from aneurysms\(^6\). In the present case, the premature bleeding of the unruptured ICA-AchA aneurysm occurred, but not that of the ruptured ICA-PcomA aneurysm. It took approximately 30 minutes to control the bleeding. This procedure which may have resulted in occlusion of AchA due to some technical errors was probably the main causative factor of her right hemiparesis postoperatively. Although we confirmed the patency of this artery intraoperatively, a kinking of this artery resulting in its occlusion may have occurred postoperatively. Postoperative CT revealed low-density areas that the left AchA irrigates and the occlusion of this artery was revealed by angiography (Figs. 5, 6). The precise mechanism underlying its occlusion remains unknown.

The other factor of her poor outcome is thought to be associated with deterioration of the vasospasms mentioned above. The postoperative CT revealed not only the occlusion of the left AchA but also diffuse low-density areas are considered to be vasospasms in the left frontoparietal lobes (Fig. 6). Our technical errors were considered to be the causes of the poor neurological outcome of this patient. In order to avoid this poor outcome, meticulous dissection of the aneurysmal necks and preservation of the blood flow in the AchA and other perforated arteries originating from the PcomA are the most important procedures to follow\(^3\)\(^4\)\(^6\)\(^10\).

Fig. 6 Postoperative computerized tomography (CT) scans revealing the low-density areas in both left frontotemporal lobes and the territories that AchA irrigates (arrowhead).
内頸動脈kissing aneurysmsの1例
今井 邦英

2例の動脈瘤が相接して生じるいわゆるkissing aneurysmsの報告例は稀である。特に同一内頸動脈に発症したものは、遲発し得るかぎり14例であった。

kissing aneurysmsにおいて手術前の血管撮影では、確定診断を得ることは必ずしも容易ではなく、
多方向の1例の動脈瘤と誤認をする場合がしばしばある。また、いずれの報告においても、動脈瘤同士の巻きみられ、その刺離に際し高頻度に術中破裂をきたしている。
特に脳血管撮影を呈している場合、術中破裂に伴う視網膜の遮断は術後の高度な神経脱落症状の原因となり得るため、前脳血管脱離の必要性を指摘し報告した。

要旨

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