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Case Report

Subarachnoid hemorrhage due to middle cerebral artery dissection mimicking aneurysm - Case report [☆]

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ABSTRACT

We report a case of subarachnoid hemorrhage due to a dissecting middle cerebral artery that was misdiagnosed as saccular aneurysm. A 74-years old female patient presented with headache and neck pain for 4 days. Brain magnetic resonance imaging revealed subarachnoid hemorrhage in both Sylvian fissures. A ruptured left middle cerebral artery bifurcation saccular aneurysm and unruptured basilar tip aneurysm were diagnosed. The patient was treated surgically using the transsylvian approach. However, no saccular aneurysm was found during the surgery, and the diagnosis was corrected for middle cerebral artery dissection. We treated the dissected segment of the middle cerebral artery and performed clip reinforcement. We experienced a case of middle cerebral artery dissection with no neurological deficit, which was misdiagnosed as a saccular aneurysm. If the stump of the occlusion is conical, dissection should be suspected. High-resolution magnetic resonance imaging and angiography should be performed for a differential diagnosis if dissection is suspected.

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Introduction

Dissections of the intracranial artery is a relatively rare cause of stroke and subarachnoid hemorrhage (SAH) [1]. It has been reported more frequently in recent years. Intracranial dis-

section is recognized as a cause of stroke and subarachnoid hemorrhage because of the developed diagnostic tools and the recognition of dissecting aneurysms [1–3]. Middle cerebral artery (MCA) dissections are classically rare and severe, presenting mostly as large MCA infarcts, SAH, or intracerebral hemorrhage [3]. The angiographic characteristics of dis-

Abbreviations: SAH, subarachnoid hemorrhage; MCA, middle cerebral artery; MCAB, middle cerebral artery bifurcation; MRI, magnetic resonance image; CTA, computed tomographic angiography; ACA, anterior cerebral artery; TCD, transcranial doppler, DSA, digital subtraction angiography.

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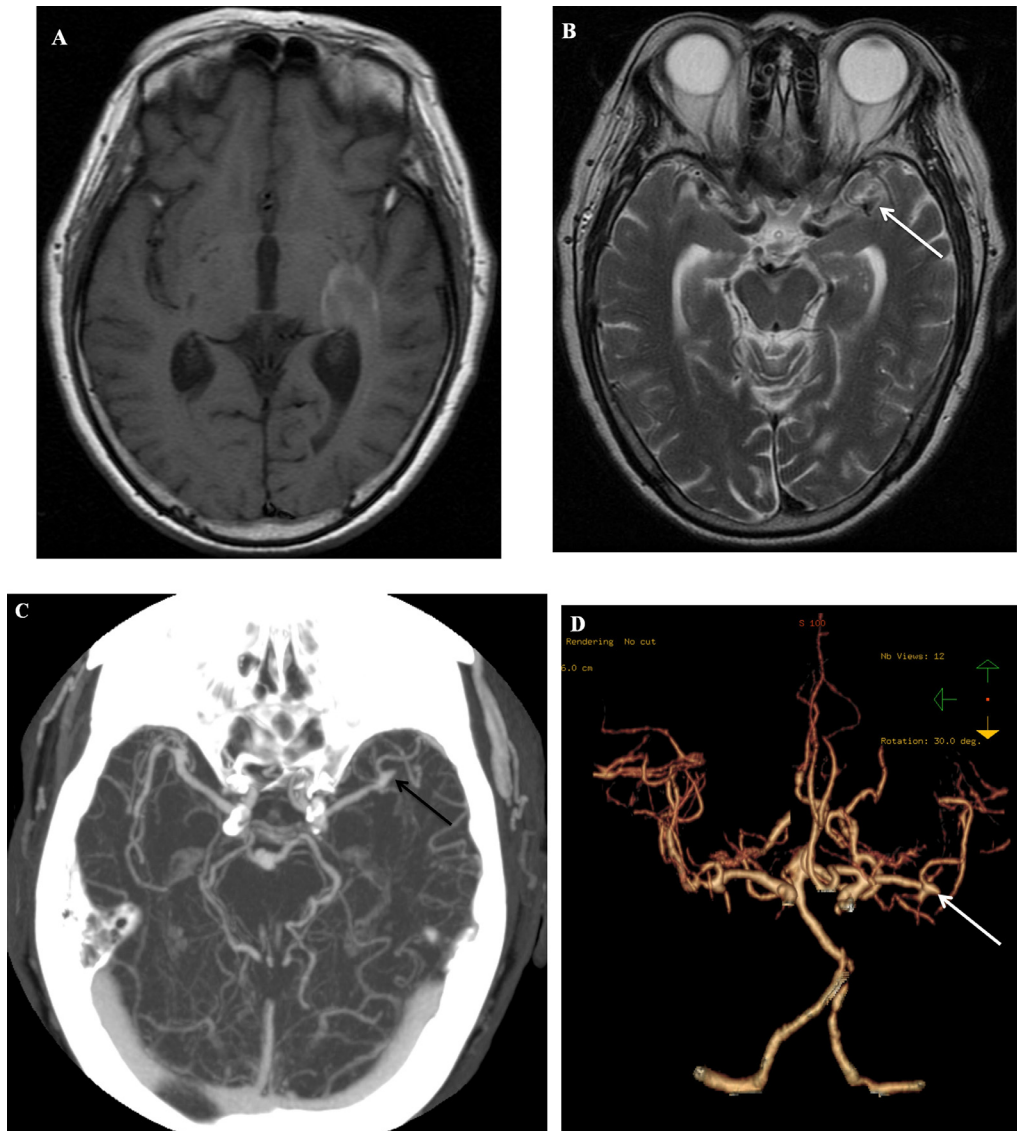


Fig. 1 – Preoperative brain MRI showed a scant subarachnoid hemorrhage on T1-weighted (A) and T2-weighted images (B). CTA revealed a dissected MCA aneurysm (arrow), which was misdiagnosed as saccular aneurysm (C, D).

secting aneurysms include the pearl and string sign, narrowing, fusiform, dilatation, and occlusion, however, these are not specific [2,3]. The diagnosis of intracranial dissecting aneurysms is difficult, even with angiography and brain MRI [2]. The treatment of MCA dissection and saccular aneurysmal rupture is extremely different. Therefore, the diagnosis must be accurate. We present a case of MCA dissection with SAH and total occlusion of the dissected segment, which was misdiagnosed as a saccular aneurysm.

Case presentation

A 74-old female presented with severe headache and neck pain for 4 days. Initial brain MRI showed a subarachnoid hemorrhage in the left Sylvian fissures and no newly developed

infarction. The Glasgow Coma Scale score was 15/15, and the SAH grade was II, according to the Hunt and Hess grading system. The other neurological symptoms were unremarkable. Brain CT and CTA showed 5 mm sized ruptured left middle cerebral artery bifurcation (MCAB) conical-shaped aneurysm and a 3 mm sized unruptured basilar tip saccular aneurysm (Fig. 1). Therefore, surgical clip is recommended. Other investigations were normal, including electrolyte levels, blood cell counts, prothrombin and coagulation tests, and cholesterol levels. The patient underwent surgery via a transsylvian approach. The intraoperative findings differed from our initial diagnosis; they showed MCA dissection and severe atherosclerotic changes in the involved segment (Fig. 2). Intraoperative transcranial Doppler revealed that the dissected segment of the MCA had no blood flow. The small distal branch of the dissected segment showed scant blood flow. The dissected segment was wrapped, and clip reinforcement was performed

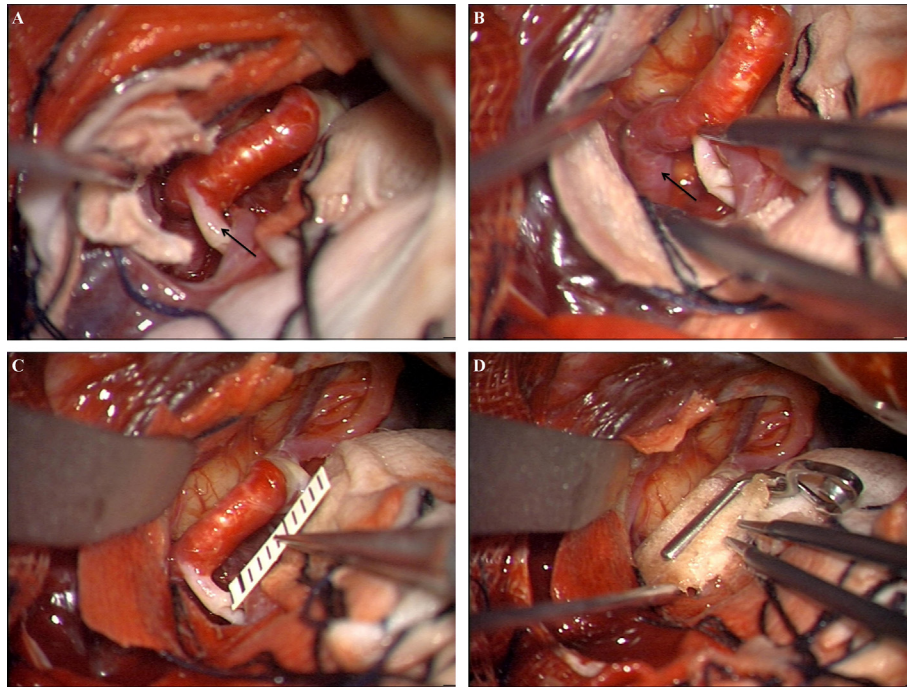


Fig. 2 – Intraoperative views showed the dissecting aneurysm in the left MCA., (A) Dissected MCA aneurysm without blood flow, and a small branch (arrow) with scant blood flow. (B) TCD applied to the distal segment (arrow) of the dissecting MCA; there is no blood flow. (C) The photo shows a 9 mm dissected MCA aneurysm with atherosclerotic change (D) Dissected aneurysm was wrapped, and clip reinforcement was done.

(Fig. 2). The postoperative neurological symptom was transient right leg weakness. However, the patient completely recovered. Postoperative follow-up digital subtraction angiography revealed no changes in the dissected MCA segment (Fig. 3).

Discussion

We report a case of SAH due to dissection of the MCA that was misdiagnosed as a saccular aneurysm.

Intracranial artery dissection has become an important cause of stroke [1]. Patients with dissected aneurysms may present with subarachnoid hemorrhage, cerebral infarction, or both [4].

Dissections of the carotid and vertebral arteries usually arise from intimal tears [1]. The intramural hematoma is located within the layers of the tunica media, but it may be eccentric, either toward the intima or adventitia [3]. A Subintimal dissection tends to result in stenosis of the arterial lumen, whereas subadventitial dissection may cause aneurysmal artery dilatation [4]. The incidence of symptomatic dissection aneurysms is thought to be much lower in the carotid system, than in the vertebrobasilar system, particularly, in the MCA [1].

The supraclinoid segment of the ICA is the most common intracranial site for aneurysms with occasional extension into the MCA and/or ACA [4]. After dissection, a variety of lesions can develop including pseudoaneurysms, variable narrowing of the lumen, and occlusion of the vessel [4]. Therefore, follow-

up angiography is important for the correct diagnosis when a dissecting aneurysm is suspected [2,5].

The diagnosis of intracranial dissecting aneurysms is difficult, even with angiography and brain MRI [1,4]. The angiographic characteristics of dissecting aneurysms include the pearl and string sign, narrowing, fusiform, dilatation, and occlusion, however, these are not specific [4]. The pathognomonic sign for dissecting aneurysms may be double-lumen sign, but this is infrequently found [1,3,6]. The optimal surgical procedure has not yet been established, however, surgical methods such as trapping with or without bypass surgery, ligation, or wrapping for ruptured MCA dissecting aneurysms have been reported [7]. In our case, there was no luminal narrowing, double lumen sign, the pearl and string sign, fusiform, and dilatation. If MRA or CTA reveals luminal narrowing, vascular occlusion, or a non-saccular aneurysm in a patient with SAH, dissecting aneurysm of the carotid system should be considered a likely cause of hemorrhage and infarction. In our case, SAH was limited to the dissected MCA lesion. Therefore, we did not perform further workup because we thought that the cause of the SAH was saccular aneurysmal rupture rather than dissection. Recently, high-resolution MRI can detect the wall structure of the MCA including intimal flaps and pseudo-lumens in patients with MCA dissection [8–10]. However, diagnosis of MCA dissections was not easy [4]. So, suspicion is important.

Hemorrhage from a dissecting aneurysm may be unrecognized or misdiagnosed as an unexplained SAH because of the difficulty in angiographic diagnosis [7,9]. The proximal part of the occluded MCA segment can mimic a

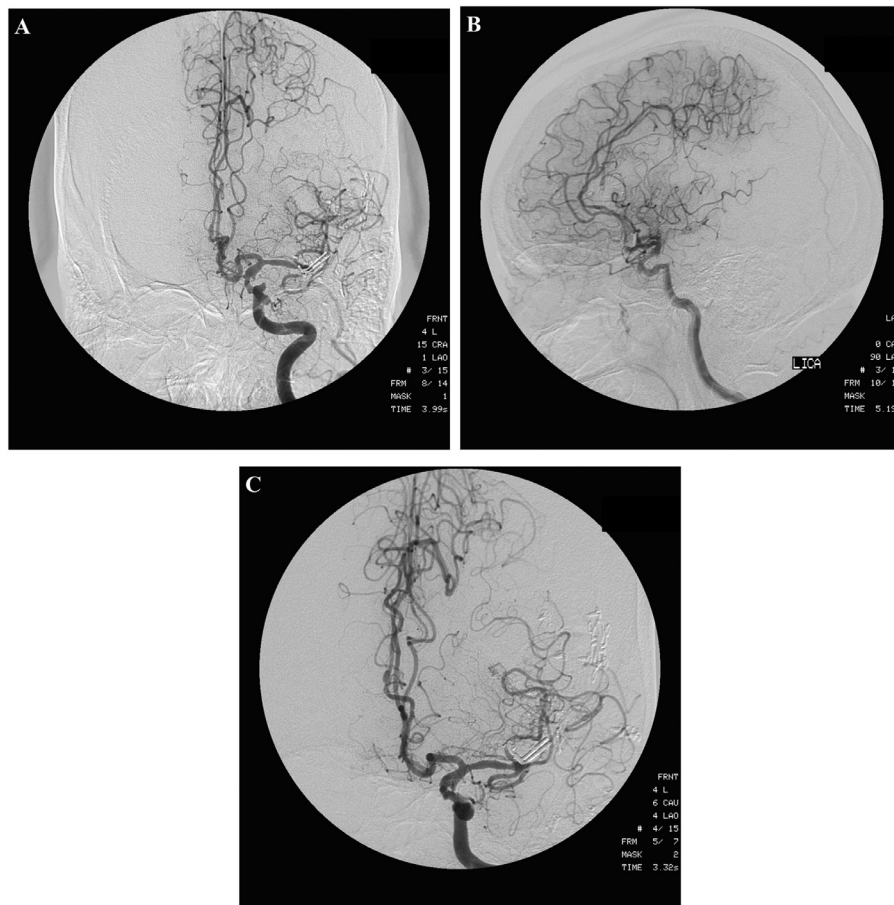


Fig. 3 – Postoperative left carotid angiogram on day 14, arterial phase, anteroposterior view, showing wrapping evidence and total occlusion of dissected segment (A), The lateral view (B) and the oblique view (C) show the same findings.

saccular aneurysm, and it influences treatment modalities [9,11].

Two authors showed that the proximal stump of the occluded MCA dissection could mimic a saccular aneurysm [9,11]. The shape of the proximal stump mimicking a saccular aneurysm was conical [9,11]. Khattar et al. showed an occluded MCA dissection stump misdiagnosed as a ruptured MCA saccular aneurysm [9]. They performed follow-up angiography, and found subtle retrograde filling of a distal MCA branch, and diagnosed MCA dissection mimicking a saccular aneurysm [9]. Lee showed that a conically shaped occluded MCA dissection could mimic a saccular aneurysm [11]. In our case, the aneurysm on CTA and MRA had a conical shape rather than a saccular aneurysm, similar to candle frame appearance.

In our case, MCA dissection was misdiagnosed as saccular aneurysm. Despite complete obstruction of the superior branch of the MCA, the patient showed no neurological deficits. Initial brain magnetic resonance imaging (MRI) revealed no newly developed acute cerebral infarction, and postoperative brain CT showed the same findings. There were two reasons for this finding. First, abrupt occlusion synchronized with progressive severe atherosclerotic occlusive disease. Second, the patient could sustain collateral blood flow above the

infarction threshold. Therefore, despite total occlusion of the dissected segment, the patient presented with only severe headache without neurological symptoms during the preoperative period. Postoperatively, the patient experienced transient right leg weakness without acute infarctions. The patient was discharged without neurological deficits.

Conclusion

We experienced a case of MCA dissection with no neurological deficit, which was misdiagnosed as a saccular aneurysm. Dissection should be suspected if the occlusion stump is conical. Dissection and saccular aneurysm should be differentially diagnosed. High-resolution MRI and angiography should be performed for a differential diagnosis if dissection is suspected.

Patient consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. This

study was conducted in accordance with the principle of the Declaration of Helsinki.

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