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Accessory middle cerebral artery associated with an unruptured aneurysm at its origin

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Abstract

Background: An aneurysm originating from the junction of the A1 segment of the anterior cerebral artery and accessory middle cerebral artery (Acc-MCA) is markedly rare. We report a rare case of an Acc-MCA aneurysm, and discuss the clinical course and management of this rare condition.

Case Description: A 64-year-old man with a past history of cerebral infarction was revealed to have a left Acc-MCA and an aneurysm at its origin. The aneurysm was clipped via a transsylvian approach. Due to its location and projectile direction, the neck of the aneurysm was left partially unclipped.

Conclusion: Although an Acc-MCA aneurysm is very rare, it has a potential risk of rupture. Therefore, radical treatment is necessary for such aneurysms.

Key Words: Accessory, aneurysm, anomaly, anterior cerebral artery, middle cerebral artery

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INTRODUCTION

Some anomalies of the middle cerebral artery (MCA), such as an accessory MCA (Acc-MCA) and a duplicated MCA have been reported.[6-8] An Acc-MCA arises from the A1 segment of an anterior cerebral artery (ACA) and runs along with the MCA in the Sylvian fissure. The incidence of Acc-MCAs has been reported to be 0.3–4%.[4,5,10] An aneurysm originating at the junction of an ACA and Acc-MCA is extremely rare. To our knowledge, only 12 cases have been reported.[4,10] In this report, we describe the case of an unruptured Acc-MCA aneurysm and discuss the radiological findings and management of this rare aneurysm.

CASE REPORT

A 64-year-old man with a past history of diabetes mellitus, hypertension, and cerebral infarction experienced dysarthria. Diffusion-weighted magnetic resonance imaging showed a small fresh cerebral infarction in the left corona radiata. Three-dimensional computed tomography angiography [Figure 1a] and angiography [Figure 1b] demonstrated an anomalous artery originating from the left A1 of the ACA. It ran parallel to the main trunk of the left MCA to the lateral side. An aneurysm at the origin of the anomalous artery was also detected. The anomalous artery was revealed to be an Acc-MCA, and it was accompanied by an aneurysm at its origin. Seven months after the episode of cerebral infarction, the aneurysm was clipped via a left transsylvian approach. The aneurysm was found to project supramedially to the ACA [Figure 1c]; therefore, the neck was relatively difficult to observe and remained partially unclipped [Figure 1d]. His postoperative course

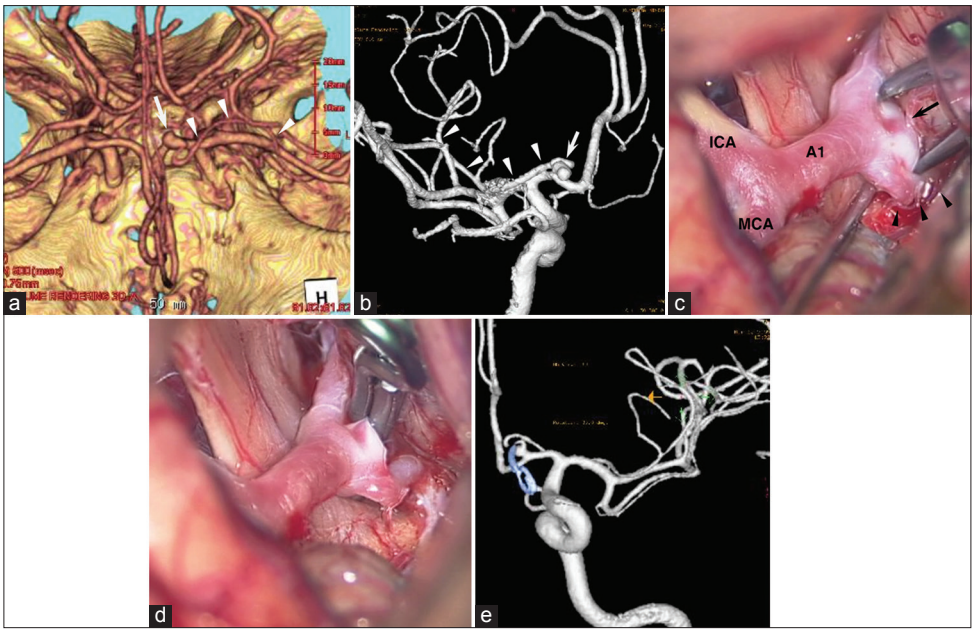

Figure 1: (a) Three-dimensional computed tomography angiography showing an aneurysm (arrow) at the origin of an accessory middle cerebral artery (arrowheads). (b) Angiography demonstrating an aneurysm (arrow) at the junction of A1 of the anterior cerebral artery and accessory middle cerebral artery. The accessory middle cerebral artery (arrowheads) runs laterally along with the middle cerebral artery. (c) An intra-operative photograph showing an aneurysm (arrow) at the origin of the accessory middle cerebral artery (arrowheads). The aneurysm is projecting medially. (d) An intra-operative photograph showing that the aneurysm is clipped. (e) Follow-up angiography obtained 27 months after the operation, showing a small residual neck of the aneurysm

was uneventful. He was discharged without deficit on the 17th postoperative day. Follow-up angiography [Figure 1e] performed 27 months after the operation showed no recurrence or enlargement of the aneurysm.

DISCUSSION

An aneurysm with an Acc-MCA origin was first reported by Waga *et al*. in 1977.[9] To date, only 12 cases of Acc-MCA aneurysms have been reported in the literature.[4,10] This is the 13th case of such an Acc-MCA aneurysm. Among them, 10 cases were ruptured aneurysms. Our case is the third reported unruptured Acc-MCA aneurysm.

As for the direction of the aneurysm, most Acc-MCA aneurysms project medially.[2] Fujiwara *et al*.[1] summarized 10 cases of Acc-MCA aneurysms and reported the direction of the aneurysm dome. According to them, four aneurysms are directed inferomedially, and four are directed supramedially. They concluded that hemodynamic stress is the important factor in the development of aneurysms at this location. The direction of blood flow in the Acc-MCA is recurrent to that in the parent ACA.[1] The blood flow is directed toward the aneurysm dome, and hemodynamic stress is loaded on a medially projecting Acc-MCA aneurysm.[1,2] Lame *et al*.[3] reported that the presence of an Acc-MCA is associated with a high risk of developing intracerebral aneurysms. Due to hemodynamic stress, the Acc-MCA aneurysm might be prone to rupture. Therefore, if an unruptured aneurysm is detected at this location, radical treatment is mandatory.

In our case, the aneurysm was directed medially. This direction was opposite to the operator. In the operation, the neck of the aneurysm was relatively difficult to observe. The Acc-MCA aneurysm is deeply located in front of the optic nerve. Therefore, careful intraoperative observation and dissection of the aneurysm neck are necessary for direct clipping. The subfrontal approach might be useful to observe the aneurysm. As for treatment, 12 cases including ours were clipped. Recently, a case which was embolized with platinum coils was reported.[4] If the size and shape are suitable, endovascular embolization with platinum coils is a favorable treatment option for medially-directed Acc-MCA aneurysms.

CONCLUSIONS

Although an Acc-MCA aneurysm is very rare, it has a risk of rupture due to hemodynamic factors. Therefore, radical treatment for an unruptured Acc-MCA aneurysm is necessary.

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