

## Case Report

# Ruptured Total Intrameatal Anterior Inferior Cerebellar Artery Aneurysm

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Among the distal anterior inferior cerebellar artery (AICA) aneurysms, a unique aneurysm at the meatal loop inside the internal auditory meatus is extremely rare. The authors report a case of surgically treated total intrameatal AICA aneurysm. A 62-year-old female patient presenting with sudden bursting headache and neck pain was transferred to our department. Computed tomography and digital subtraction angiography showed subarachnoid hemorrhage at the basal, prepontine cistern and an aneurysm of the distal anterior inferior cerebellar artery inside the internal auditory meatus. Surgery was performed by retrosigmoid craniotomy with unroofing of the internal auditory meatus. The aneurysm was identified between the seventh and eighth cranial nerve in the meatus and was removed from the canal and clipped with a small straight Sugita clip. After operation the patient experienced transient facial paresis and tinnitus but improved during follow up.

**Key Words :** Intrameatal AICA aneurysm · Microsurgery · Facial nerve · Vestibular nerve.

## INTRODUCTION

Among the rare distal anterior inferior cerebellar artery aneurysms, which comprise approximately 0.1–0.5% of all intracranial aneurysms<sup>5)</sup>, the aneurysm of the meatal loop inside the internal auditory meatus is extremely rare; such an aneurysm can cause seventh and eighth cranial nerve dysfunction. Because of its unusual location and presentation, it can be misdiagnosed; therefore, careful examination and differential diagnosis is required. The authors report a rare case of ruptured intrameatal anterior inferior cerebellar aneurysm.

## CASE REPORT

A 62-year-old woman was transferred to the emergency department with the chief complaint of sudden bursting headache and neck pain. No neurological deficit was identified. Computed tomography (CT) scan showed subarachnoid hemorrhage (SAH) at the basal cistern and the right prepontine cistern area, with a small intraventricular hemorrhage in the fourth ventricle. CT angiography showed an approximately 6 mm meatal loop aneurysm on the distal anterior inferior cerebellar artery (AICA). Enhanced CT indicated that the aneurysm was located

in the internal auditory meatus. Digital subtraction angiography was performed to confirm the location and size of the aneurysm (Fig. 1, 2).

Surgery was performed by using conventional right retrosigmoid approach with the patient in the park bench position. After dissection and identification of the seventh and eighth cranial nerve complex and AICA around the internal auditory canal (IAC), the posterior surface of the IAC was unroofed with a diamond drill for about 5 mm and dura was incised. The aneurysm was identified between the seventh and eighth nerves in the meatus. Temporary clips were applied to the proximal and distal AICA, and the aneurysm was dissected from the nerves, removed from the canal, and clipped with a small straight Sugita clip (Mizuho, Tokyo, Japan) (Fig. 3). Intra-operative Doppler ultrasonography was performed to confirm the preservation of blood flow in the distal AICA.

Postoperatively, the patient showed mild facial palsy and a complaint of tinnitus; therefore, a steroid was administered for 3 days. During the follow up, the facial palsy and tinnitus improved completely. Postoperative follow-up diffusion magnetic resonance imaging and angiography confirmed secure clipping of the aneurysm without brain injury (Fig. 4).

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**DISCUSSION**

AICA aneurysms are very rare. Gonzalez et al.<sup>4)</sup> reported that among 3500 surgically treated aneurysms, only 1.7% arose from the AICA. Bambadikis et al.<sup>1)</sup> classified this aneurysm into 3 types : proximal, meatal, and distal. Meatal aneurysms are subdivided into 3 types according to Yamakawa's classification system : type I (remote type : aneurysm away from the meatus, 56%), type II (plugged : aneurysm partially buried in the meatus, 30%), and type III (buried : entirely buried in the meatus,

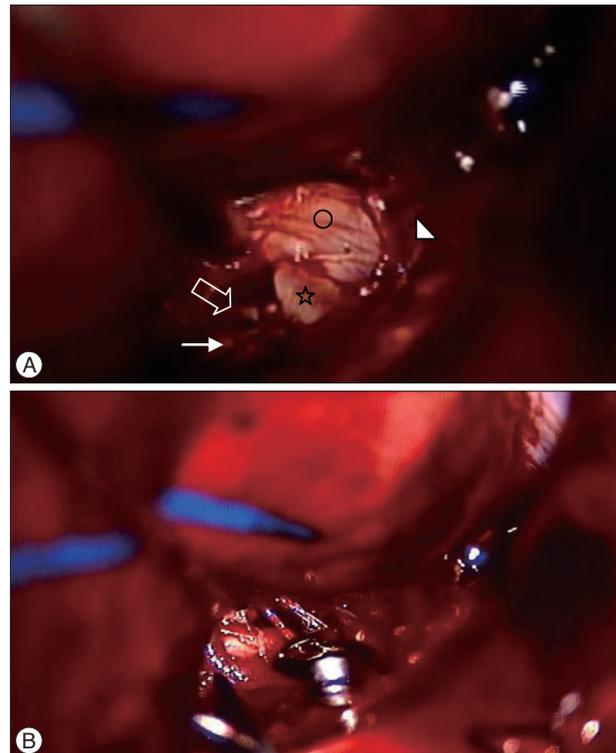
14%). Total intrameatal aneurysms are type III meatal aneurysms and are extremely rare; only 17 cases have been reported in the literature as of 2012<sup>3)</sup>. This group of aneurysms has certain features : 1) SAH occurs in most cases because of aneurysm



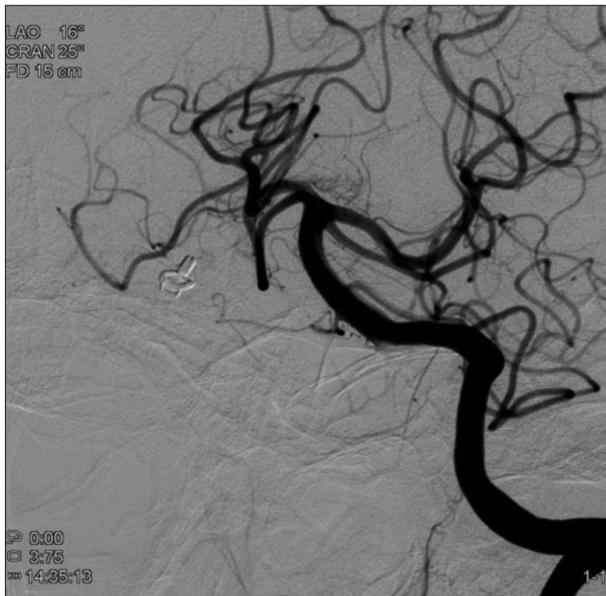
**Fig. 1.** A : Non-contrast computed tomography showing subarachnoid hemorrhage at right basal, prepontine cistern and intraventricular hemorrhage in the 4th ventricle. B : Contrast enhanced computed tomography showing a right intrameatal enhancing aneurysm (arrow).



**Fig. 2.** Preoperative angiography showing a distal meatal loop anterior inferior cerebellar artery aneurysm.



**Fig. 3.** A : After applying temporary clips to proximal and distal anterior inferior cerebellar artery (white arrow), aneurysm (star) was dissected from between seventh (open white arrow) and eighth (circle) cranial nerve in internal auditory meatus. B : Aneurysm was moved from original position to above eighth cranial nerve as shown in A and clipped with straight clip (white arrowhead; opened internal auditory canal).



**Fig. 4.** Postoperative angiography showing disappearance of aneurysm.

rupture; 2) tight adhesion to the surrounding structures including the nerve complex; and 3) postoperative hearing function is likely to be seriously impaired<sup>9</sup>). Interestingly, most of the reported cases, including the current case, occurred in women without any known explanation. The pathological nature of this aneurysm is also unclear<sup>3</sup>. Some reports suggested that hemodynamic stress caused by AVM, hemangioblastoma, or vascular anastomosis could be a mechanism for the development of distal AICA aneurysm<sup>8</sup>.

Most patients who have had SAH showed seventh and eighth cranial nerve deficits. Furthermore, none of the cases with preoperative eighth cranial nerve deficit showed improvement after surgery<sup>10</sup>). A possible explanation for this deficit may be nerve manipulation during surgery or internal auditory artery injury<sup>9</sup>). During the operation, we found that the aneurysm was tightly adhered to the nerves as described in other reports<sup>6,9,10</sup>). Therefore, during the dissection the eighth nerve was manipulated. Because of the small space, *in situ* clipping was impossible. The internal auditory artery, the location of which may vary, was not identified during surgery.

Because of its unusual location, an unruptured aneurysm on an enhanced CT is sometimes misdiagnosed as the more common intracanalicular vestibular schwannoma<sup>2</sup>). Therefore, this aneurysm should be considered in the differential diagnosis of intrameatal masses. Three-dimensional CT angiography or magnetic resonance angiography is useful for diagnosing these lesions.

As for treatment, microsurgical direct clipping is considered to be the first line of treatment<sup>6,10</sup>). Endovascular treatment is not

considered as the primary treatment because of difficulty in catheter navigation and the possibility of parent artery occlusion, but is used for elderly patients and those in poor general condition<sup>7</sup>). Trapping can be considered a relatively safe treatment for this aneurysm, but for certain cases with a wide vascular territory of the parent artery or poor anastomotic channel to the distal circulation, an occipital artery to AICA bypass with microsurgical trapping can be used<sup>3</sup>).

## CONCLUSION

We report an extremely rare case of intrameatal AICA aneurysm. Because of its unusual location and manifestations, careful diagnostic evaluation is needed when a SAH patient with seventh and eighth nerve deficits shows an intrameatal lesion. During surgery, tight adhesion of the aneurysm to the nerves should be anticipated, and preparations for careful dissection and temporary clipping must be made.

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