

## Case Report

# A case of angiographically occult, distal small anterior inferior cerebellar artery aneurysm

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## Abstract

**Background:** A small aneurysm at an unusual location, such as a distal anterior inferior cerebellar artery (AICA) aneurysm, may conceal as a computed tomography angiography (CTA) and digital subtraction angiography (DSA)-occult aneurysm.

**Case Description:** We herein present the case of a patient suffering from a subarachnoid hemorrhage (SAH) with two aneurysms in which the AICA aneurysm was negative by CTA and DSA. CTA demonstrated a right anterior choroidal artery aneurysm, which was revealed to be an unruptured aneurysm after surgical exploration. A small distal AICA aneurysm was detected by 3D rotational angiography (3DRA). The patient fully recovered except for left-side hearing loss four months after the second operation.

**Conclusion:** We recommend a meticulous diagnosis by 3DRA in patients with SAH in which the distribution is not coincident with a typical aneurysmal location.

**Key Words:** Distal anterior inferior cerebellar aneurysm, diagnosis, subarachnoid hemorrhage, 3D rotational angiography, 3D computed tomography angiography

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## INTRODUCTION

A distal anterior inferior cerebellar artery (AICA) aneurysm is relatively rare, and is estimated to comprise approximately 1–2% of all intracranial aneurysms.<sup>[1-5,7,10,11]</sup> The standard examination for aneurysmal detection is converting digital subtraction angiography (DSA) into 3D computed tomography angiography (3DCTA), as an aneurysm is easily and less invasively depicted with 3DCTA. However, a small aneurysm in a peripheral location may commonly be missed on 3DCTA.<sup>[6]</sup> To our knowledge, this is the first report demonstrating that a distal AICA aneurysm that was invisible on 3DCTA and 2DDSA, and that was confirmed by 3D rotational angiography (3DRA).

## CASE REPORT

A 71-year-old male was transferred to our hospital with severe headache. A computed tomography (CT) scan showed subarachnoid hemorrhage (SAH), the distribution of which was dominant in the left side and relatively localized in the posterior fossa [Figure 1a]. CTA demonstrated a 4 mm aneurysm with blebs in the direction to the left side in the right anterior choroidal artery (AChA) [Figure 1b]. Based on a magnetic resonance image performed at a previous hospital, the AChA aneurysm was thought to be a ruptured aneurysm [Figure 1c]. The aneurysm was surgically explored, but was found to be an unruptured aneurysm. DSA and subsequent 3DRA were performed. A small

aneurysm measuring 1 mm in maximum diameter was depicted with 3DRA at the meatal segment of the left AICA [Figure 2a]. The AICA aneurysm was not noted by 2DDSA [Figure 2b]. The aneurysm was completely clipped, preserving the AICA main trunk, but the internal auditory artery that divided from the aneurysmal dome was difficult to preserve [Figure 2c and d]. The patient has improved without any complications due to vasospasm, except for postoperative deafness on the left side.

## DISCUSSION

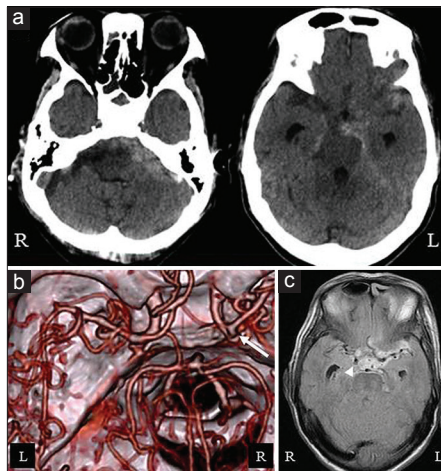
Although the incidence of distal AICA aneurysms varies,<sup>[1-5,7,10,11]</sup> because they are often described as a locational minority, more than 150 cases of distal AICA aneurysms have been reported in the literature since the first report described a distal AICA aneurysm in 1948.<sup>[8]</sup> Approximately 90 cases of distal AICA aneurysms were described until 2004, including large series and a review, with 56 cases reported in a review by Yamakawa *et al.*<sup>[10]</sup> and 34 cases in a review by Gonzalez *et al.*<sup>[2]</sup> As the radiological diagnostic technology has improved, particularly after the application of 3DRA or multi-row high resolution CT, the detection rate has increased dramatically, resulting in more than 60 reported aneurysms during past 10 years.<sup>[1,4,5]</sup> Peripheral aneurysms in the posterior circulation are therefore not as rare as was previously thought. Rodríguez-Hernández *et al.*<sup>[7]</sup> have described that distal AICA aneurysms were observed in 9 cases (22.5%) of all patients with peripheral aneurysms in the posterior fossa, but represented only

0.6% of the total of 1669 aneurysms. The opportunity to encounter a distal AICA aneurysm is still a relatively rare clinical experience.

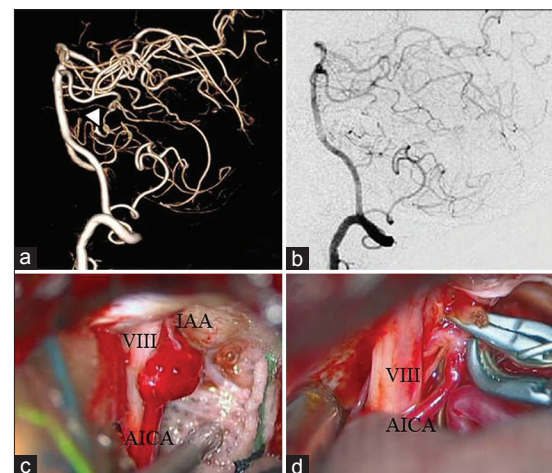
The diagnosis for a small peripheral aneurysm commonly requires careful investigation during radiological examinations. Especially if the aneurysm is small (<3 mm), the aneurysm may be defined as an angiographic occult aneurysm, or as a CTA-occult aneurysm.<sup>[6]</sup> Two cases of AICA aneurysms, both of which measured 6–7 mm in size, have been described as angiographic-negative aneurysms at the initial DSA procedure, and were subsequently revealed during second angiography study.<sup>[3,11]</sup> Even when the size of the aneurysm is not small, a DSA-occult aneurysm may be present at the peripheral AICA territory. In our case, both a 1.0 mm very small aneurysmal size and the rare distal AICA location contributed to misreading the ruptured site. Recent studies reported by van Rooij *et al.*<sup>[9]</sup> showed that 3DRA is a powerful modality to reveal small aneurysms. In the present study, 3DRA was retrospectively warranted after CTA, because the bleeding pattern was in concordance with an aneurysmal configuration.

## CONCLUSION

3DRA is desirable to detect a small peripheral aneurysm when the distribution of SAH is not in agreement with the aneurysmal location. A distal AICA aneurysm is a relatively rare aneurysm, but such a possibility has to be taken into consideration when making a differential diagnosis, especially if the SAH is observed in the posterior fossa.



**Figure 1:** (a) A CT scan taken on admission showed a subarachnoid hemorrhage (SAH) in the left cerebellopontine cistern, ambient cistern and sylvian fissure. (b) The 3D computed tomographic angiography depicted the right anterior choroidal artery (AChA) aneurysm (arrow). (c) Magnetic resonance fluid attenuated inversion recovery images demonstrated that the SAH was continuing from the AChA aneurysm (arrow head); L: Left, R: Right



**Figure 2:** (a) The 3D rotational angiography showed a small aneurysm (arrow head) on the left anterior inferior cerebellar artery (AICA). (b) The lateral view of the 2D digital subtraction angiogram failed to depict any aneurysms. (c) An intraoperative photograph. (d) Neck clipping of the aneurysm; VIII: Acoustic nerve, IAA: Internal auditory artery

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