

Pathological Considerations for Unruptured Dissecting Aneurysm in the Posterior Inferior Cerebellar Artery: Case Report

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Because of the wide spread of magnetic resonance image (MRI), it may be increasing to find a dissecting aneurysm (DA) of the posterior inferior cerebellar artery (PICA) that causes headache without associated hemorrhage or infarction. Generally, surgical treatment might be considered in cases of DA with hemorrhage. However, the treatment of an unruptured DA with headache or infarction has not been well established. This is the first report regarding the pathology of an intact DA of the PICA that presents with headache only, and the pathological findings showed interesting figures. A 44-year-old man with an unruptured DA of the left PICA presented with sudden left occipital headache. MRI revealed no hemorrhage or infarction. Magnetic resonance angiography (MRA) showed growth of the DA 12 days after the onset of headache. Therefore, surgery was performed to prevent aneurysmal rupture. This DA aneurysm was trapped and removed after an occipital artery (OA)-PICA anastomosis was performed. The surgery was performed without complication. Pathological findings showed folding of the internal elastic lamina, and the true lumen was torn by the false lumen. The dissection reached the adventitia and the wall had numerous macrophages. Pathological findings might help understanding the etiology of DAs and inflammation might play an important role in DAs.

Keywords: headache, pathology, posterior inferior cerebellar artery, unruptured dissecting aneurysm

Introduction

Recent developments of diagnostic imaging studies including magnetic resonance image (MRI) have indicated more dissecting aneurysms in patients who present with only headache. However, the treatment of dissecting aneurysm (DA) with headache alone is still controversial. Expansion of the aneurysm may determine the surgical decision. However, there are some reports that observation of DA without hemorrhage should be considered because of the possibility of spontaneous healing.^{1,2} We present a patient with an unruptured DA and headache only. Due to rapid growth, this aneurysm was excised, and the parent artery of the lesion was reconstructed using occipital artery-posterior inferior

cerebellar artery (OA-PICA) anastomosis. And pathological findings were examined.

Case Report

A previously healthy 44-year-old man presented with sudden onset of left occipital headache with the sounds like broken balloons. He presented to our hospital 7 days after onset of symptoms. MRI revealed no hemorrhage or infarct (Fig. 1A, B). Magnetic resonance angiography (MRA) and digital subtraction angiography (DSA) showed a left DA in the PICA (Fig. 1C, D). After admission to the hospital, he was treated with strict control of blood pressure. Follow up MRA and DSA showed growth of the DA 12 days post onset of headache (Fig. 1E, F), although the headache had improved. Therefore, surgery was performed to prevent aneurysmal rupture.

This unruptured DA was trapped by aneurysmal micro clip and removed after OA-PICA anastomosis was performed. The aneurysmal wall was red and thin, and blood flow was observed through the wall (Fig. 2A). The aneurysm had a

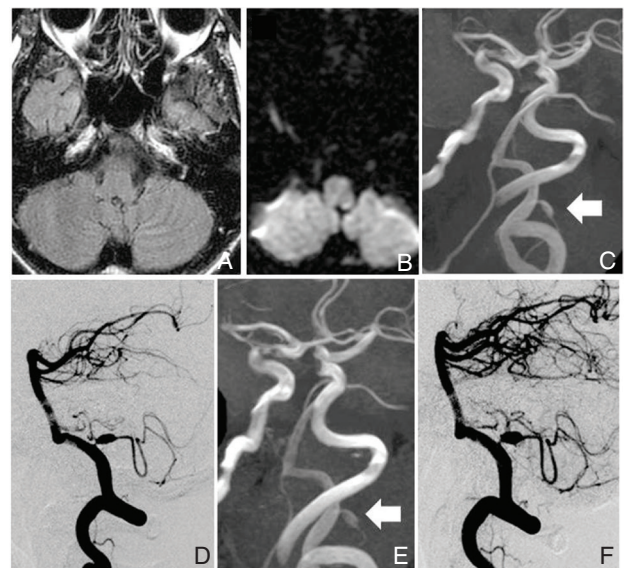


Fig. 1 Fluid-attenuated inversion recovery (A) and diffusion weighted magnetic resonance image (B) show no hemorrhage or infarction in this patient. MRA (C) and DSA (D) show unruptured dissecting aneurysm in the posterior inferior cerebellar artery 7 days post onset of headache. Follow-up MRA (E) and DSA (F) show growth of the aneurysm 12 days post onset of headache. MRA: magnetic resonance angiography, DSA: digital subtraction angiography.

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thrombus present (Fig. 2B). Postoperative MRI revealed no brain infarction, and MRA showed blood flow through the OA-PICA anastomosis (Fig. 2C, D). The patient was discharged from the hospital without any neurological deficit.

Discussion

It is not possible to diagnose the DA without suspecting a DA, although MRI is also spread widely. This patient complained of sounds like broken balloons. That kind of sounds may help the diagnosis of the DA.

Review of the cases showed 63 dissecting PICA aneurysms. The mean age was 47.8 years (ranging from 22 to 71), 61.9% (39 patients) were male, and 58.7% (37 cases) were left side lesion. Subarachnoid hemorrhage (SAH) was major type of diseases (65.1%). One case (14.3%) was died in 7 cases including SAH which were treated by conservative treatment.³⁻⁹⁾

Surgical treatment is generally recommended for hemorrhagic lesion and non-hemorrhagic lesion with expansion of the DA.^{1,4,5,10,11)} However, conservative treatment might be chosen for non-hemorrhagic lesion in consideration of spontaneous healing.^{1,2,7)}

In this case, pathological findings showed the internal elastic lamina was folded, the true lumen was torn by the false lumen, and the dissection reached adventitia (Fig. 3A-E). And this case is classified as a Yonas type 2 (type 2 occurs within the media or adventitia and tends to present with hemorrhage).¹²⁾ Previous reports in pathology showed hemorrhage dissected through and accumulated into the adventitia with inflammatory cells in part of SAH cases^{6,8,13,14)} and smooth muscle was remaining without inflammatory cells in infarct cases.^{3,4)} Takahashi et al. reported PICA ruptured DA from giant cell angiitis.⁶⁾ The adventitia had CD68 positive

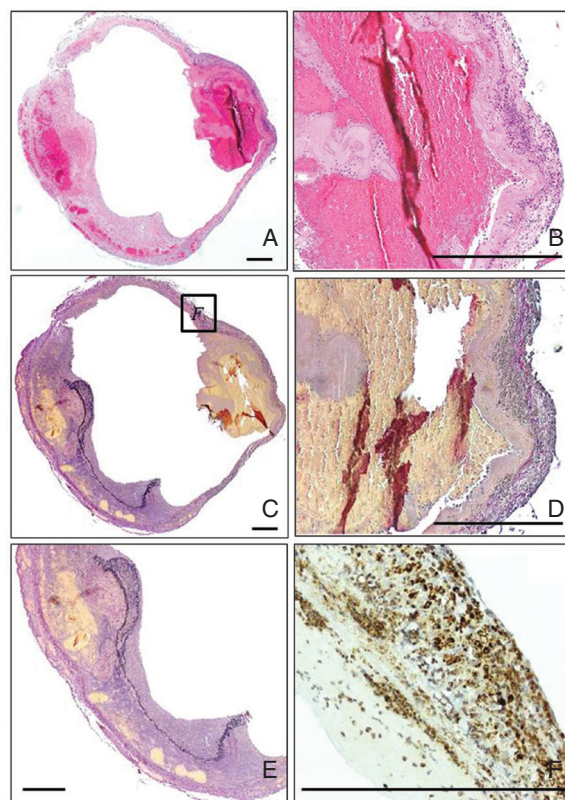


Fig. 3 A, B: Hematoxylin eosin staining. C-E: Elastica van gieson staining. Pathological finding (E) shows folds of the internal elastic lamina and collapses the true lumen. Furthermore, smooth muscle was missing, and the dissection reached the adventitia (B and D). F: CD68 staining shows the aneurysmal wall had numerous macrophages. Scale bars = 250 μm.

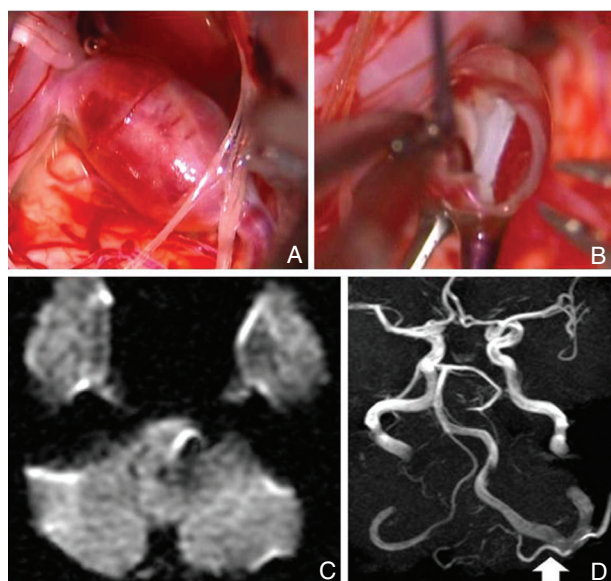


Fig. 2 A: The aneurysmal wall was red and thin. B: The aneurysm had thrombus present. C: Postoperative magnetic resonance image shows no infarct lesion. D: Magnetic resonance angiography shows flow of the occipital artery-posterior inferior cerebellar artery anastomosis.

macrophages in this case (Fig. 3F). Such an inflammatory cell might play a role of the cause or result of the dissection. Recently, some reports pointed out the relationship between inflammation and aneurysmal formation.¹⁵⁻¹⁷⁾ These findings may be a powerful information to support this knowledge.

Conclusion

This is the first report of the pathology of an unruptured DA in PICA that presented with headache alone. Pathological findings might help understanding the etiology of DAs. Inflammation might play an important role in DAs.

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Conflicts of Interest Disclosure

None to be declared. Author declared COI in the Japan Neurosurgical Society.

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