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Case Report

Spontaneous resolution of isolated dissecting aneurysm on the posterior inferior cerebellar artery

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Summary

The authors report a rare example of an isolated dissecting posterior inferior cerebellar artery (PICA) aneurysm with spontaneous resolution. A 41 year-old male suffered sudden dizziness, nausea and vomiting. An angiogram and magnetic resonance imaging (MRI) detected an isolated PICA dissection. The patient was treated conservatively and recovered without any apparent neurological deficit. MRI detected the self-resolution of the dissecting aneurysm. Dissecting PICA aneurysms, especially non-haemorrhagic lesions, have the possibility of spontaneous resolution resulting in a favorable outcome. The treatment strategy for this vascular lesion may be decided based upon neuroradiological changes on careful follow-up.

Keywords: Dissecting aneurysm; posterior inferior cerebellar artery; cerebellar infarction; magnetic resonance imaging.

Introduction

Intracranial dissecting aneurysms more commonly occur in the posterior circulation and cause subarachnoid haemorrhage (SAH) and/or cerebellar infarction [5, 33]. Although an increasing number of reports have been published in recent years, isolated dissecting aneurysms on the posterior inferior cerebellar artery (PICA) still belong to a rare entity, and their pathophysiology and natural history remain unclear. Therefore, the issue of optimal treatment for the disease is controversial [25]. We herein report a patient with isolated dissecting aneurysm on PICA with spontaneous resolution, and discuss the characteristic feature of this vascular disorder and the problems of deciding on its treatment.

Case report

A 41 year-old man, who had been previously healthy, noticed a mild left occipital headache for a week until he suffered sudden dizziness, nausea, and vomiting, and was admitted to our hospital. He was alert, well-orientated, and muscle weakness and sensory impairment were not detected, although a dizzy sensation and nausea were present. The arterial blood pressure was normal. Diffusion-weighted magnetic resonance imaging (MRI) at onset revealed infarction in the left cerebellar hemisphere (Fig. 1a). A cerebral angiogram detected irregular narrowing of the anterior medullary segment of the PICA, indicating a spontaneous dissecting aneurysm (Fig. 1b). No abnormal changes were found in the left vertebral artery. Magnetic resonance angiography (MRA) and T2-weighted MRI detected fusiform dilatation of

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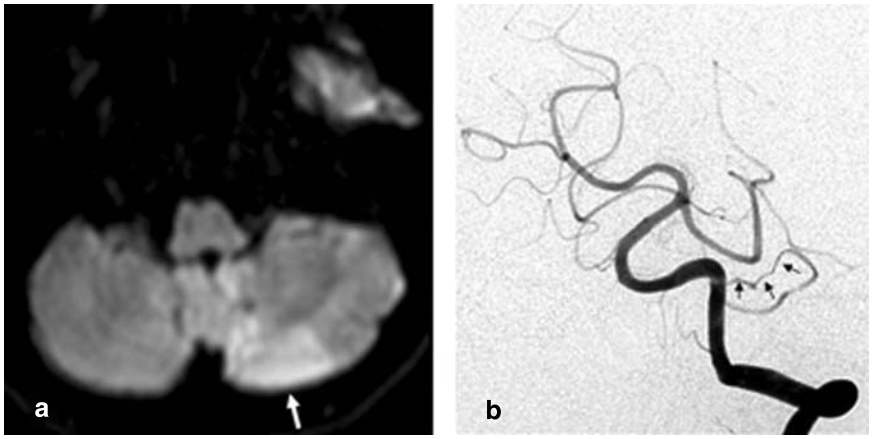

Fig. 1. Diffusion-weighted MRI at presentation showing cerebral infarction in the left cerebellar hemisphere (a: *arrow*). Left vertebral arteriography (antero-posterior view) revealed irregular stenosis of the anterior medullary segment of the left PICA (b: *arrows*)

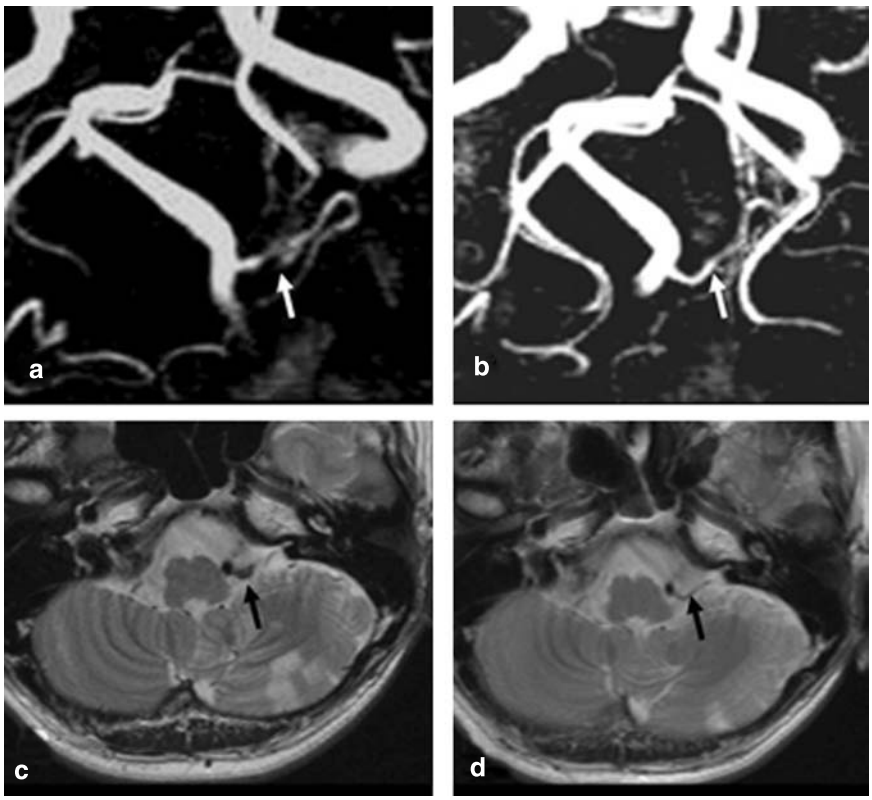

Fig. 2. MRA at one month after the onset showed fusiform dilatation of the proximal segment of the PICA with an intimal flap (a: *arrow*). Similar findings were detected in T2-wighted MRI at 2 weeks after onset (c: *arrow*). Spontaneous resolution of the dissecting aneurysm was shown by MRA at 10 weeks after onset (b: *arrow*). T2-weighted MRI at 5 months after onset detected no recurrence of the aneurysm (d: *arrow*)

the anterior medullary segment of the PICA with an intimal flap within it, leading us to the diagnosis of isolated dissecting PICA aneurysm (Fig. 2a and c). A CT scan revealed no evidence of intracranial haemorrhage. He was treated conservatively with intravenous infusion of edaravone and oral administration of ibudilast. Follow-up MRI and MRA 10 weeks later indicated spontaneous resolution of the PICA dilatation and disappearance of the intimal flap (Fig. 2b). The symptoms improved gradually and he returned to work 3 months later with slight persistent dizziness. MRI at 5 months after onset (Fig. 2d) confirmed that the lesion had not recurred. A second angiogram has declined by the patient.

Discussion

So far, 56 reports of isolated dissecting PICA aneurysm have been previously published in the literature, as summarized in Table 1 [1–24, 26–33]. The mean age at

Table 1. *Summary of isolated dissecting PICA aneurysms reported in the literature*

No. of patients	56
Age (y)	
Mean	46.1
Range	(22–71)
Gender	
Male	34
Female	22
Side involved	
Left	32
Right	14
Both	1
Unknown	9
Presentation	
SAH	37
Ischaemia	12
SAH + Ischaemia	4
Vascular mass	1
Unknown	2
Location	
am	21
lm	15
tm	5
tt	5
cort	7
Unknown	3
Treatment	
Surgery	34
Endovascular	14
Conservative	3
Others	5
Outcome	
Favourable	48
Dead	4
Unknown	1

Numbers of cases are given for each item except for age.
am Anterior medullary segment; *lm* lateral medullary segment; *tm* tonsillomedullary segment; *tt* telovelotonsillar segment; *cort* cortical segment.

onset was 46.1 years old (ranging from 22 to 71), and 34 patients were male. A history of hypertension was documented in only 11 patients. SAH and cerebral infarction occurred in 41 and 15 patients, respectively. Interestingly, most of the dissecting aneurysms were located in the anterior and lateral medullary segments. The left side was most commonly involved. Surgical treatment for the dissecting aneurysms, such as proximal occlusion, trapping, and resection of the aneurysm with or without anastomosis, was noted in 34 patients, while endovascular treatment was applied in 14 patients. Most had a favorable outcome, while 4 deaths with SAH were also described.

Surgical treatment is generally recommended for haemorrhagic lesions to prevent rebleeding. On the other hand, surgery for ischaemic dissections is usually chosen only when the lesion shows progression [25]. Although about three-quarters of ischaemic events reported in the literature underwent surgery, this fact does not indicate that surgical treatment is necessary for the majority of ischaemic dissections. There may be more unpublished examples with an ischaemic presentation, conservative treatment, and a good outcome, as in our patient. In addition, dissecting PICA aneurysms presenting as ischaemia may be misdiagnosed as infarction caused by atherosclerosis, embolism, or other reasons, because some lesions are difficult to detect by routine neuroradiological assessments [23, 25].

Among PICA dissecting aneurysms previously reported in the literature (Table 2), 8 lesions underwent neither surgical management nor endovascular treatment, but were treated conservatively or underwent exploration, cerebrospinal fluid shunt, or external decompression [4, 19, 22, 28, 31, 32]. Four lesions among them were confirmed to be restored in 4 to 8 months, and another lesion showed reduction in size 9 weeks later. These and the present example support the idea that spontaneous PICA dissection with ischaemic presentation may be treated not with surgical or endovascular intervention, but with careful observation. For this purpose, MRI is non-invasive and quite useful, as suggested by our experience. On the other hand, one patient with cerebellar infarction who was treated conservatively and died due to subsequent SAH provides an important warning [22]. Difficulty in deciding on treatment for this vascular disorder is caused by lack of our knowledge on the natural history of dissecting PICA aneurysms, especially regarding the bleeding rate of ischaemic dissections. Yamakawa described that dissecting aneurysms on the distal portion of the PICA caused haemorrhage more often than on the proximal portion [30]. This finding may be helpful to consider the risk of haemorrhage, although it is quite difficult to estimate the possibility of future haemorrhage by neuroradiological examinations. Since, so far, only a small number of patients have been reported, systematic analyses of more reports with conservative treatment is necessary to resolve this problem.

In conclusion, we herein report a rare example of an isolated dissecting PICA aneurysm with spontaneous resolution. MRI is a useful tool to detect the changes of these lesions. The treatment strategy for dissecting aneurysms of the PICA, especially non-haemorrhagic lesions, should be determined in consideration of the possibility of spontaneous healing.

Table 2. *Dissecting aneurysms of PICA with conservative treatment in the literature*

Ref.	Age/ gender	Symptoms	SAH	Ischaemia	Side	Location	Surgery	Spontaneous resolution	Time to resolution	Outcome
[32]	47/m	headache, vomiting, vertigo, disturbance of consciousness	no	yes	left	am	shunt	size reduction	9 weeks	normal
Comoy (1992)	36/f	neck pain, vertigo, nausea, diplopia, hypertension	yes	no	right	?	exploration	not assessed		favourable
	58/m	headache, nausea, disturbance of consciousness	yes	no	left	?	shunt	not assessed		favourable
[19]	38/f	headache, vomiting, disturbance of consciousness	yes	no	left	tt	exploration	yes	5 months	normal
	44/f	headache, vomiting, vertigo	yes	no	left	lm	no	yes	4 months	normal
[22]	47/m	vertigo, headache, vomiting	yes	yes	both	am	no	no		dead
[31]	34/m	headache, vomiting, disturbance of consciousness	no	yes	left	lm	external decompression	yes	8 months	good
[28]	32/m	headache, vertigo, numbness	no	yes	left	am	no	yes	7 months	uneventful
Present case	41/m	vertigo, headache, vomiting	no	yes	left	am	no	yes	10 weeks	favourable

am Anterior medullary segment; *lm* lateral medullary segment; *tm* tonsillomedullary segment; *tt* telovelotonsilar segment; *cort* cortical segment.

References

1. Ali MJ, Bendok BR, Tawk RG, Getch CC, Batjer HH (2002) Trapping and revascularization for a dissecting aneurysm of the proximal posteroinferior cerebellar artery: technical case report and review of the literature. Neurosurgery 51: 258–263
2. Berger MS, Wilson CB (1984) Intracranial dissecting aneurysm of the posterior circulation. J Neurosurg 61: 882–894
3. Dinichert A, Rüfenacht DA, de Tribolet N (2000) Dissecting aneurysms of the posterior inferior cerebellar artery: report of four cases and review of the literature. J Clin Neurosci 7: 515–520
4. Fransen P, de Tribolet N (1994) Dissecting aneurysm of the posterior inferior cerebellar artery. Br J Neurosurg 8: 381–386
5. Friedman AH, Drake CG (1984) Subarachnoid haemorrhage from intracranial dissecting aneurysm. J Neurosurg 60: 325–334
6. Hashimoto T, Kanki T, Abe S, Nakamura K, Nakamura N (1992) Dissecting aneurysm of the vertebro-basilar system. Surgical treatment in cases with brain stem ischaemia. Jpn J Stroke 14: 355–360
7. Jafer JJ, Kamiryo T, Chiles BW, Nelson PK (1988) A dissecting aneurysm of the posterior inferior cerebellar artery: case report. Neurosurgery 43: 353–356
8. Kagawa K, Hotta T, Yoshioka H, Ito Y, Kinoshita Y, Ohba S, Kiura Y, Kurisu K (2005) Dissecting aneurysm of the posterior inferior cerebellar artery: a case report. Jpn J Neurosurg (Tokyo) 14: 407–412
9. Kanou Y, Arita K, Kurisu K, Ikawa F, Eguchi K, Monden S, Watanabe K (2000) Dissecting aneurysm of the peripheral posterior inferior cerebellar artery. Acta Neurochir (Wien) 142: 1151–1156
10. Kawaguchi S, Sasaki T, Kamada K, Iwanaga H, Takehashi K, Tsujimoto M (1993) Dissecting aneurysm of the posterior inferior cerebellar artery. Case report. Neurol Med Chir (Tokyo) 33: 634–637
11. Komiya H, Saeki N, Iwadate Y, Sunami K, Yamaura A (1988) Posterior inferior cerebellar artery dissecting aneurysm presenting with Wallenberg's syndrome. Neurol Med Chir (Tokyo) 28: 404–408
12. Kopera M, Majchrzak H, Ladziński P, Stech W, Maliszewski M (1992) Dissecting aneurysm of the posterior inferior cerebellar artery. Neurol Neurochir Pol 26: 897–901
13. Lefkowitz MA, Teitelbaum GP, Gionnotta SL (1996) Endovascular treatment of a dissecting posterior inferior cerebellar artery aneurysm: case report. Neurosurgery 39: 1036–1039
14. Lewis SB, Chang DJ, Peace DA, LaFrantz PJ, Day AL (2002) Distal posterior inferior cerebellar artery aneurysms: clinical features and management. J Neurosurg 97: 756–766
15. Maimon S, Saraf-Lavi E, Rappaport ZH, Bachar G (2006) Endovascular treatment of isolated dissecting aneurysm of the posterior inferior cerebellar artery. AJNR 27: 527–532
16. Mizushima H, Sasaki K, Kunii N, Nishino T, Jinbo H, Abe T, Shimazu M, Matsumoto K (1994) Dissecting aneurysm in the proximal region of the posterior inferior cerebellar artery presenting as Wallenberg's syndrome. Case report. Neurol Med Chir (Tokyo) 34: 307–310
17. Nagahiro S, Goto S, Yoshioka S, Ushio Y (1993) Dissecting aneurysm of the posterior inferior cerebellar artery: case report. Neurosurgery 33: 739–742
18. Nishino A, Sakurai Y, Niizuma H (1991) Dissecting aneurysm of distal posterior inferior cerebellar artery. Case report and review of the literature. Brain and Nerve (Tokyo) 43: 381–386
19. Piske RL, Darwich R, Campos CMS, Fonseca NC, Oliveira E, Souza A (1998) Spontaneous resolution of a ruptured dissecting PICA aneurysm. Intervent Neurorad 4: 287–292
20. Serizawa T, Komiya H, Tanaka M, Ohsato K, Yamaura A (1991) Dissecting aneurysm of the distal posterior inferior cerebellar artery presenting subarachnoid haemorrhage. A case report. Curr Practical Neurosurg (Tokyo) 1: 51–56
21. Seyama H, Nishida T, Yamamoto M, Mori H, Satow T, Yamada J, Nakajima N, Takahashi JC, Iihara K, Murao K, Miyamoto S (2006) Therapeutic strategy for isolated dissecting aneurysm of the distal posterior inferior cerebellar artery: report of three cases and review of literature. Neurol Surg (Tokyo) 34: 1001–1006
22. Shinoda S, Murata H, Waga S, Kojima T (1998) Bilateral spontaneous dissection of the posterior inferior cerebellar arteries: case report. Neurosurgery 43: 357–359
23. Sorimachi T, Fujii Y, Nashimoto T, Harada A, Ito Y, Takeuchi S (2004) Postangiographic 3D CT findings of a thrombosed dis-

secting aneurysm of the posterior inferior cerebellar artery. AJNR 25: 973–974
24. Takahashi I, Takamura H, Gotoh S (1992) Dissecting aneurysm of the posterior inferior cerebellar artery: a case report. Neurol Surg (Tokyo) 20: 277–281
25. Tawk RG, Bendok BR, Qureshi AI, Getch CC, Srinivasan J, Alberts M, Russel EJ, Batjer HH (1997) Isolated dissections and dissecting aneurysms of the posterior inferior cerebellar artery: topic and literature review. Neurosurg Rev 18: 936–938
26. Tikkakoski T, Leinonen S, Siniluoto T, Koivukangas J (1997) Isolated dissecting aneurysm of the left posterior inferior cerebellar artery: endovascular treatment with a Guglielmi detachable coil. AJNR 18: 936–938
27. Ueki K, Teraoka A, Yoshida S (1987) Dissecting aneurysm of the posterior inferior cerebellar artery. A case report. Neurol Surg (Tokyo) 15: 1215–1219
28. Wakamoto H, Orii M, Miyazaki H, Ishiyama N (2002) A dissecting aneurysm of the posterior inferior cerebellar artery was reduced spontaneously during conservative therapy: case report. Neurol Surg (Tokyo) 30: 425–429
29. Wetjen NM, Link MJ, Reimer R, Nichols DA, Giannini C (2005) Clinical presentation and surgical management of dissecting posterior inferior cerebellar artery aneurysms: 2 case reports. Surg Neurol 64: 462–467
30. Yamakawa H, Kaku Y, Yoshimura S, Ohkuma A, Sakai N (2005) Two cases of dissecting aneurysm of the distal posterior inferior cerebellar artery: possible involvement of segmental mediolytic arteriopathy in the pathogenesis. Clin Neurol Neurosurg 107: 117–122
c31. Yamashita Y, Hayashi S, Saitoh H, Teramoto A (2001) Dissecting aneurysm of the posterior inferior cerebellar artery. Studied by serial angiography. Neurol Surg (Tokyo) 29: 1057–1062
32. Yamaura A, Isobe K, Karasudani H, Tanaka M, Komiya H (1991) Dissecting aneurysms of the posterior inferior cerebellar artery. Neurosurgery 28: 894–898
33. Yamaura I, Tani E, Yokota M, Nakano A, Fukami M, Kaba K, Matsumoto T (1999) Endovascular treatment of ruptured dissecting aneurysms aimed at occlusion of the dissected site by using Guglielmi detachable coils. J Neurosurg 90: 853–856

Comment

The optimal treatment of dissecting aneurysms with ischaemic onset remains controversial. On the opposite, in haemorrhagic cases, the high rate of bleeding and consequent mortality in patients treated conservatively is in favour of the treatment in the acute phase (W. Y. Zhao, Acta Neurochir 149: 585–596). However, after 3 weeks to 1 month, conservative management is recommended if the abnormal lumen is not increasing. So if haemorrhagic transformation occurs at the site of an ischaemic dissecting aneurysm, surgical or eudovascular intervention should be considered immediately. So the treatment has to be individually tailored considering the reliability of self restoration. It means that usually a conservative treatment is adopted, generally recommended by the neurologists.

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