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Case Report

A Case of Subarachnoid Hemorrhage in Which the Bleeding Source was Identified Six Months after Disease Onset

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Abstract

We report a case of subarachnoid hemorrhage in which the hemorrhage source was unidentified by cerebral angiography in the acute phase but was diagnosed via magnetic resonance imaging (MRI) six months later.

A 37-year-old man with sudden posterior cervical pain and vomiting was admitted to our emergency clinic. A computed tomography (CT) scan of the head revealed subarachnoid hemorrhage. The 3-dimensional CT angiography was performed on the same day of admission, and cerebral angiography was performed the next day. However, the hemorrhage source could not be identified. MRI was performed on the fourth day, and cerebral angiography was performed again on the 11th day; however, no diagnosis was made. Three weeks following the onset, the patient's symptoms improved. The patient was subsequently discharged from the hospital and followed up in an outpatient clinic. Six months later, a head MRI revealed a 4.8-mm long aneurysm in the right internal carotid artery, and rupture of a dissecting cerebral aneurysm was suspected to be the cause of the subarachnoid hemorrhage. In instances where the bleeding source is not identified in the acute phase, the diagnosis of a dissecting aneurysm should be considered a possibility and strict long-term follow-up is required.

Keywords: Subarachnoid Hemorrhage; Unknown Subarachnoid Hemorrhage Etiology; Dissection Aneurysm

Abbreviations

MRI: Magnetic Resonance Imaging; CT: Computed Tomography; SAH: Subarachnoid Hemorrhage

Introduction

Dissection of the internal carotid artery is relatively rare [1]. Hemorrhagic intracranial dissecting aneurysms have been reported to account for 1-10% of adult patients with subarachnoid hemorrhage (SAH) [1]. Rebleeding often occurs during the acute phase of disease onset and leads to poor prognosis [1]. Dissecting cerebral aneurysms are diagnosed based on cerebral angiographic results such as wall irregularity, double lumen, pearls, and strings [2], which may not be clearly detected. In some cases, an aneurysm may become apparent upon later examination, and treatment may be indicated [2]. Typically, morphological alterations in the cerebral vasculature do not occur after 2-3 months in dissecting cerebral aneurysms [3]. Herein, we describe a case in which an aneurysm became apparent six months following onset and was diagnosed as a dissecting aneurysm of the internal carotid artery.

Case Presentation

A 37-year-old man with a sudden headache and vomiting was admitted to our hospital for emergency care. When the patient arrived at the hospital, the consciousness was clear and no other symptoms of neurological deficits were observed. The patient exhibited no significant medical history. Computed tomography (CT) of the head showed a Fisher group 3 subarachnoid hemorrhage from the basilar cistern to the bilateral Sylvian fissures (Figure 1A). A three-dimensional (3D) CT angiography (Figure 1B) revealed no obvious hemorrhage source. Cerebral angiography was performed on the day following admission; however, no obvious bleeding source was identified (Figure 1C, D). Head magnetic resonance imaging (MRI) on the fourth day of admission (Figure 2A, B) and a second cerebral angiogram on the eleventh day (Figure 2C, D) failed to identify an obvious hemorrhage source. Three weeks following admission, the patient was discharged from the hospital without any neurological deficits and was followed up as an outpatient two months later. MRI revealed no abnormalities. Six months later, an MRI revealed a suspected aneurysm in the right internal carotid artery (Figure 3A), which was confirmed by cerebral angiography. The aneurysm was not situated at the vascular bifurcation. Based on the clinical course, a dissecting cerebral aneurysm was suspected. (Figure 3B, C). The aneurysm was saccular in shape, with an approximately 2.9 mm neck diameter and a 4.8 mm longitudinal diameter. Six months had elapsed since the aneurysm onset, and the wall of the aneurysm was considered stable. Subsequently, coil embolization was performed. The patient's postoperative course was good, and one week after the operation, the patient was discharged from the hospital without any new neurological deficits.

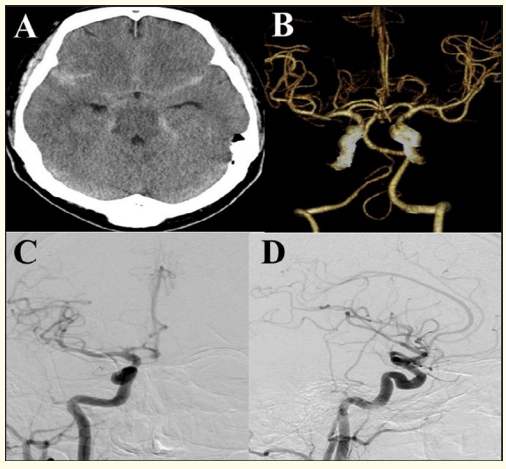

Figure 1

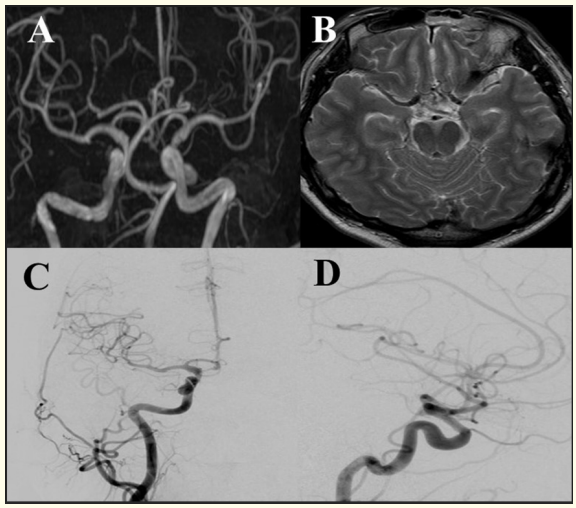

Figure 2

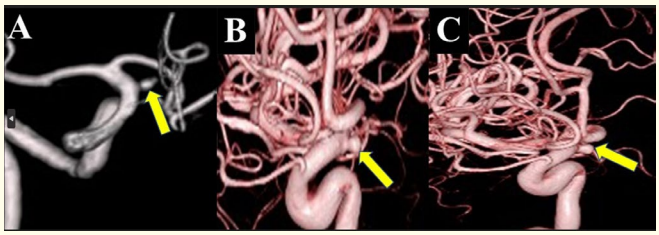

Figure 3

Discussion

In 10%-20% of subarachnoid hemorrhage cases, the hemorrhage source is not apparent on cerebral angiography [4,5]. The following possibilities have been reported as the reasons why the source of hemorrhage is unclear in cerebral angiography [4,5]. (a) When a cerebral aneurysm cannot be adequately contrasted because of the narrowing of the parent artery due to cerebral vasospasm. (b) When the aneurysm is under pressure due to a surrounding hematoma. (c) When a thrombus is formed within an aneurysm, it prevents contrast of the aneurysm. (d) When the aneurysm is extremely small. In this case, the true mechanism was unknown; however, thrombosis was speculated to have occurred in the aneurysm because of compression caused by a subarachnoid hemorrhage.

The present case involved juvenile-onset vasculitis and no autoantibodies associated with vasculitis were detected. No

congenital or acquired coagulopathy was observed. The patient had no history of trauma. Furthermore, the patients had no evidence of moyamoya disease [6], fibromuscular dysplasia [7], Marfan syndrome [8], or Ehlers-Danlos syndrome [9], which are fundamental diseases associated with cerebral arterial dissection. Thus, this case was considered to be an idiopathic cerebral artery dissection.

Treatment includes craniotomy using a direct approach or endovascular surgery. Craniotomy includes wrapping and trap + bypass [10,11] and direct approach or endovascular surgery includes coil embolization with or without a stent [12,13]. Both approaches have demonstrated surgical usefulness and favorable surgical results, respectively [10-13]. A previous report has compared the results of direct craniotomy and endovascular surgery for the treatment of dissecting internal carotid artery aneurysms [14]. The results of endovascular surgery revealed favorable outcomes (mRS0-2) of 67.4% and 78.9% for direct craniotomy, indicating that endovascular surgery is more favorable [14]. However, determining the best method for each case based on neurological symptoms and radiological results is necessary. In the present case, six months had passed since the disease onset, the cerebral vascular wall was stable, and the patient demonstrated no neurological symptoms. Therefore, we chose endovascular surgery because the patient was eager to undergo it.

The rebleeding rate of dissecting cerebral aneurysms is as high as 40% within 24 h of onset [1], and the mortality rate of rebleeding is as high as 50% [1]; therefore, immediate surgery is desirable to prevent rebleeding. One month after onset, the re-rupture rate is approximately 10%, and the risk of re-rupture almost disappears after two months [15]. A report on morphological alterations over time using cerebral angiography of dissecting aneurysms revealed no changes after 2-3 months [3], suggesting the importance of strict observation of patients whose morphological alterations are consistent with re-rupture. The present case is a rare one in which no change was noted even after two months, and an MRI at six months revealed obvious alterations. Although the aneurysm became apparent late in the disease course, this is attributed to the patient's young age of 37 years. Additionally, the patients exhibited no hypertension and had no predisposition to atherosclerosis; however, further cases are expected to be accumulated to determine the true cause.

Conclusion

We report a case in which a dissecting aneurysm of the internal carotid artery was identified six months following subarachnoid hemorrhage onset. The aneurysm became apparent six months following onset, and strict long-term follow-up is required.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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