Early Diagnosis of Vertebral Dissecting Aneurysm: A Magnetic Resonance Angiography Study

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Abstract

We report a patient with dissecting aneurysm who presented with a sudden severe headache without any neurological symptoms. Although brain computed tomography (CT) scan and MRI were negative, magnetic resonance angiography (MRA) showed a pseudocavity in a segment of the left vertebral artery. In addition, the dissecting wall of the left vertebral artery was clearly visualized in the original images of MRA. Our findings indicate that brain CT, MRI or cerebral angiography alone are sometimes inadequate for the diagnosis of vertebral dissecting aneurysm, and that MRA and its original images are necessary to establish the correct diagnosis.

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Key words: dissection, aneurysm, vertebral artery, headache, magnetic resonance imaging, original image

Introduction

Patients with intracranial dissecting aneurysm present with a sudden severe headache associated with various neurological symptoms (1-3). The diagnosis of intracranial dissecting aneurysm is based on the demonstration of a dissecting vessel or double lumen (1, 2). In most instances, a definitive diagnosis is established by cerebral angiography but the demonstration of a dissecting vessel by magnetic resonance imaging (MRI) examination has been documented in recent years (4). However, brain computed tomography (CT) and MRI alone are not adequate for the correct diagnoses of intracranial dissecting aneurysms (1-3).

We present here a patient who presented with a sudden severe headache but without any neurological symptoms. The patient was early diagnosed as dissecting aneurysm by magnetic resonance angiography (MRA).

Case Report

The patient was a 55-year-old man with no clear past history. He felt a sudden severe pain in the occipital region after scuba diving on July 20, 2000, followed by nausea and vomiting. Physical examination at the outpatient clinic of the local hospital showed no paralysis or sensory disturbances and brain CT scan examination was negative. The severe headache lasted for about 3 days. As the headache, though mitigated, persisted, he visited our hospital on July 29. The general findings on the first visit were not remarkable except for mild hypertension (140/100 mmHg). In addition, there were no clear neurological abnormalities, and no findings in the follow-up brain CT scan. There was no head injury, shoulder stiffness or symptoms of infection at onset of the headache.

Generally, when we examine a patient with sudden severe headache with nausea and vomiting during effort, it is necessary to rule out cerebral aneurysm and intracranial dissecting aneurysm other than head injury and subarachnoid hemorrhage. It is known that brain MRI is useful for the diagnosis of subarachnoid hemorrhage and cerebral aneurysm. Therefore, we performed brain MR examination in this case on August 3, 2000 (using Siemens Magnetom Vision 1.5 tesla) in addition to brain CT examination. It revealed no abnormalities in the cerebral parenchyma, subarachnoid space or vertebral arteries on T2-weighted imaging (T2WI) (Fig. 1). The brain MRA (3-D time of flight; 3-D TOF) in a segment of the left vertebral artery demonstrated findings compatible with a pseudocavity (Fig. 2A). The dissecting wall of the left vertebral artery was clearly visualized in the original images of MRA for about 2 or 3 mm (Fig. 2B). After these examinations, cerebral angiography was performed, and left vertebral stenosis was observed in this case (Fig. 3). Based on these findings, he was diagnosed as a spontaneous intracranial dissecting aneurysm of the left vertebral artery. The patient was initiated on antiplatelet medi-
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Figure 1. T2-weighted image shows no abnormality in the cerebral parenchyma, subarachnoid space or vertebral arteries (TR 4,000 ms, TE 100 ms).

Figure 2. MRA (3-D time of flight, TR 36 ms, TE 7 ms, flip angle 20°, slice thickness 0.7 mm) shows dissection in the left vertebral artery (arrow) (A). The original image clearly shows the dissecting wall of the left vertebral artery (B).

Comments

Intracranial dissecting aneurysms generally manifest suddenly at onset and often give rise to cerebrovascular disorders such as cerebral infarction in the region supplied by the injured artery or subarachnoid hemorrhage (1–3). While intracranial dissecting aneurysms underlie less than 1% of unselected brain ischemic events, they may account for 5% or more of ischemic stroke in young adults without risk factors for cerebrovascular disorders (5). Furthermore, most cases (about 89%) have clinical complications such as cerebral infarction or subarachnoid hemorrhage, however 88% of the patients with intracranial dissecting aneurysm make a good recovery (6, 7). Development of a sudden severe headache in the occipital region warrants a complete work-up to exclude dissecting aneurysm of the basilar or vertebral artery, including cerebral angiography (2, 3). However, the patient is treated with an analgesic and observed for a period of time when neurological and hematological examinations are negative in cases presenting with sudden severe headache with nausea or vomiting alone, particularly after excluding cerebral or subarachnoid hemorrhage by brain CT and cerebrospinal fluid examination. In fact, the presence of headache alone without symptoms suggestive of cerebral infarction is inadequate for the diagnosis of intracranial dissecting aneurysm and only a few studies have reported the opposite (5, 6). In the present patient, severe headache occurred suddenly, such symptoms that causes subarachnoid hemorrhage were doubted, without clear symptoms of cerebral infarction or subarachnoid hemorrhage. Furthermore, the brain CT scan was negative and MRI examination revealed no abnormality in the cerebral parenchyma and subarachnoid space, and no abnormality of the vertebral artery due to a change in the flow void was demonstrated in T2WI. However, the presence of intracranial dissecting aneurysm of the left vertebral artery was suspected when the brain MRA was performed, and
MRA Findings of Dissecting Vertebral Aneurysm

Figure 3. Cerebral angiography shows stenosis of the left vertebral artery.

a double lumen characteristic of intracranial dissecting aneurysm was clearly confirmed in the original images of MRA. MRA can be performed easily by standard MRI equipment at many institutions. The acquisition of the original images does not necessitate special skills.

Early detection of intracranial dissecting aneurysm is considered helpful for prevention of subsequent complications, such as cerebral infarction and subarachnoid hemorrhage, which is highly likely to occur (5). The results obtained in the present case indicate that brain CT and MRI alone are not adequate in some patients with sudden severe headache, such symptom that causes subarachnoid hemorrhage to be doubted, and that analysis of MRA and its original images should establish the correct diagnosis.

Summary

We described a case of intracranial dissecting aneurysm that manifested itself in sudden headache and was diagnosed early with MRA. When examining patients with the complaint of sudden severe headache with nausea and vomiting, the differential diagnosis should include subarachnoid hemorrhage and intracranial dissecting aneurysm. In addition to brain CT and MRI and cerebrospinal fluid examination, MRA and its original images should be examined to establish the correct diagnosis, especially in young individuals without risk factors for cerebrovascular disorders. Since MRI is noninvasive and can be performed easily, it is quite suitable for the identification of cerebrovascular disorders. On the other hand, MRA and its original images provide more information that could be used for the early detection of vertebral dissecting aneurysms and the prevention of complications.

References