

Short communication

Isolated limb sensory disturbance accompanied with sudden deafness from vertebral artery dissection: A case report

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Abstract

A 52-year-old male presented with right sudden deafness and left isolated limb sensory disturbance following posterior neck pain. An examination revealed a mild degree of right sensory neural hearing loss and decreased pain and thermal sensation in the left side below the L3 level. Brain MRI showed a small lesion in the midlateral portion of the right middle-rostral medulla. The combination of the image findings suggests a right lateral medullary infarction caused by a vertebral artery (VA) dissection. In our case, the fibers carrying the modalities of the lateral spinothalamic tract restricted to below the L3 level, sparing other sensations, suggest a selective involvement. This finding suggests that sensory dermatomal representation in the modality may be preserved at least up to the level of the medulla oblongata. Moreover, in our case, the small emboli originating from the dissected VA possibly caused a small selective cochlear infarction. This type of embolism may give rise to various combinations of symptoms depending on the branches involved. For patients with an acute onset of headache or neck pain who present with isolated limb sensory disturbance accompanied by sudden deafness, even without the classical brainstem signs, a VA dissection and medullary infarction should therefore be considered.

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1. Introduction

There have been many atypical lateral medullary infarctions detected by MRI [1–9]. Various patterns of distribution in pain and thermal disturbance have been observed. However, the pure sensory type without the classical brainstem sign rarely occurs [7,8]. Sudden hearing loss is a common sign of an anterior inferior cerebellar artery (AICA) infarction [10]. Regarding to the isolated symptoms associated with lateral medullary infarction, recently a few cases of unilateral sudden deafness have been reported [6,9]. We herein describe a patient with an unusual manifestation of isolated limb pain, thermal sensory disturbance, and sudden deafness in the medullary infarction caused by a vertebral artery (VA) dissection.

2. Report of a case

A 52-year-old male who had a history of hypertension for 5 years noticed a right-sided posterior neck pain which spread to the occipital region. He had no previous history of head or neck trauma. The intensity of pain increased daily and he encountered hearing loss and tinnitus in the right ear 5 days later. A clinical evaluation showed no abnormal neurological findings except for an occipital headache and sudden hearing loss. Brain CT revealed no abnormal findings. The condition was initially diagnosed as a tension-type headache and sudden hearing loss; he was prescribed NSAIDs and steroids. His symptoms did not improve and he noticed numbness in the left lower limb. Two days later, he visited the outpatient clinic of our department. A neurological examination revealed no neck stiffness, facial or limb weakness, diplopia or Horner syndrome. The Weber test was lateralized to the left. There was no hoarseness or dysarthria. Elevation of the soft palate was intact

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on phonation. His tongue did not deviate on protrusion. Pain and thermal sensation of the left lower limb decreased to below the L3 level, including the genital and perineal areas. Touch, vibration and joint sensation, as well as two-point discrimination, were preserved. The deep tendon reflexes were unremarkable; the plantar reflexes were flexor. There were no dysmetria on the finger-to-ear and heel-to-shin testing. A vestibular examination showed spontaneous horizontal-rotatory nystagmus. Audiometry showed a mild right sensorineural hearing loss with intact speech discrimination (Fig. 1A). The

findings of a vestibular caloric test were normal. The brainstem auditory evoked responses were normal bilaterally.

Brain MRI showed a small lesion in the midlateral portion of the right middle-rostral medulla with hyperintense T2-weighted imaging (Fig. 2A). Hypointense T2 signal with hyperintense T1-weighted images was revealed within the right vertebral artery (VA) (Fig. 2A, B), which highly suggests an intramural hematoma caused by a VA dissection. MR angiography (MRA) showed an irregular stenosis of the right VA, probably with a dissecting aneurysm (Fig. 2C). The combination of the image findings suggests a right lateral medullary infarction caused by a vertebral dissection. We continued the conservative treatment by strictly controlling his blood pressure and anti-platelet therapy by aspirin. Thereafter, the patient's headache and hearing disturbance gradually improved. Three weeks later, these symptoms were resolved completely (Fig. 1B). One month later, a three-dimensional CT angiography demonstrated an occlusion of the VA without atherosclerotic narrowing in other parts of the vertebrobasilar system. An MRI of the lumbar spine revealed no obvious disc hernia or canal stenosis. The results of a nerve conduction study and electromyography to exclude the possibility of a lumbosacral radiculopathy were normal. The sensory impairment in the lower limb remained.

3. Comments

In our case, the clinical features of sensory disturbance in the lower limb are thought to be due to spinothalamic modalities probably caused by a partial involvement of the lateral spinothalamic tract in the medulla. A previous case [7] had hypoalgesia and hypothermesthesia in a lower extremity due to compression of the medulla oblongata by an elongated VA, in which pattern of sensory disturbance is similar to our case. In this case, the VA was thought to behave compressed in the lateral spinothalamic tract. This pattern of sensory dysfunction was previously described in a lateral medullary infarction by Kim et al. [1]. However, there have been no reports due to medullary infarction without other classical medullary signs confirmed by MRI.

In our case, the lesion was restricted to the right mediolateral aspect of the medulla, which corresponded to the lateral spinothalamic tract, posterior to the inferior olivary nucleus. The lesion was similar to an infarction in the territory of the posterior inferior cerebellar artery (PICA), except that it did not extend to the posterolateral medulla to affect the ipsilateral descending tract and the nucleus of the trigeminal nerve. In the spinothalamic tract, the ascending fibers from the lower limb are located laterally on the outside while those from the upper limb are located on the inside [11]. In our case, the fibers carrying these modalities were restricted to below the L3 level, thus sparing other sensations, and thereby suggesting a selective involvement (Fig. 1E). This finding suggests that a sensory dermatomal representation in the modality may be preserved at least up to the level of the medulla oblongata.

In our patient, the unilateral sudden deafness was the only other brainstem sign probably caused by the vertebral

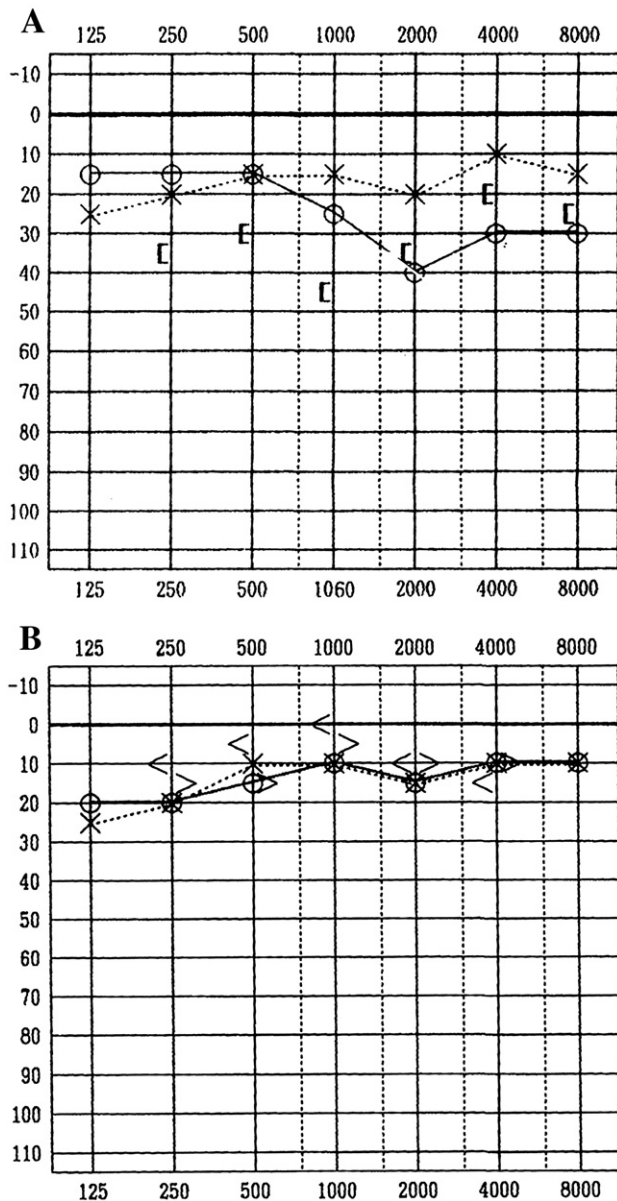


Fig. 1. Pure tone audiometry. (A) The patient's pure tone air condition audiogram demonstrates a mild sensorineural hearing loss in the right ear. (B) The hearing loss levels improved 3 weeks later. The hearing levels in decibels (dB) are plotted against stimulus frequency on a logarithmic scale. O: air condition on right side, x: air condition on left side, C: bone conduction on right side, Z: bone conduction on left side, [: bone condition (masked) on right side,] : bone condition (masked) on left side.

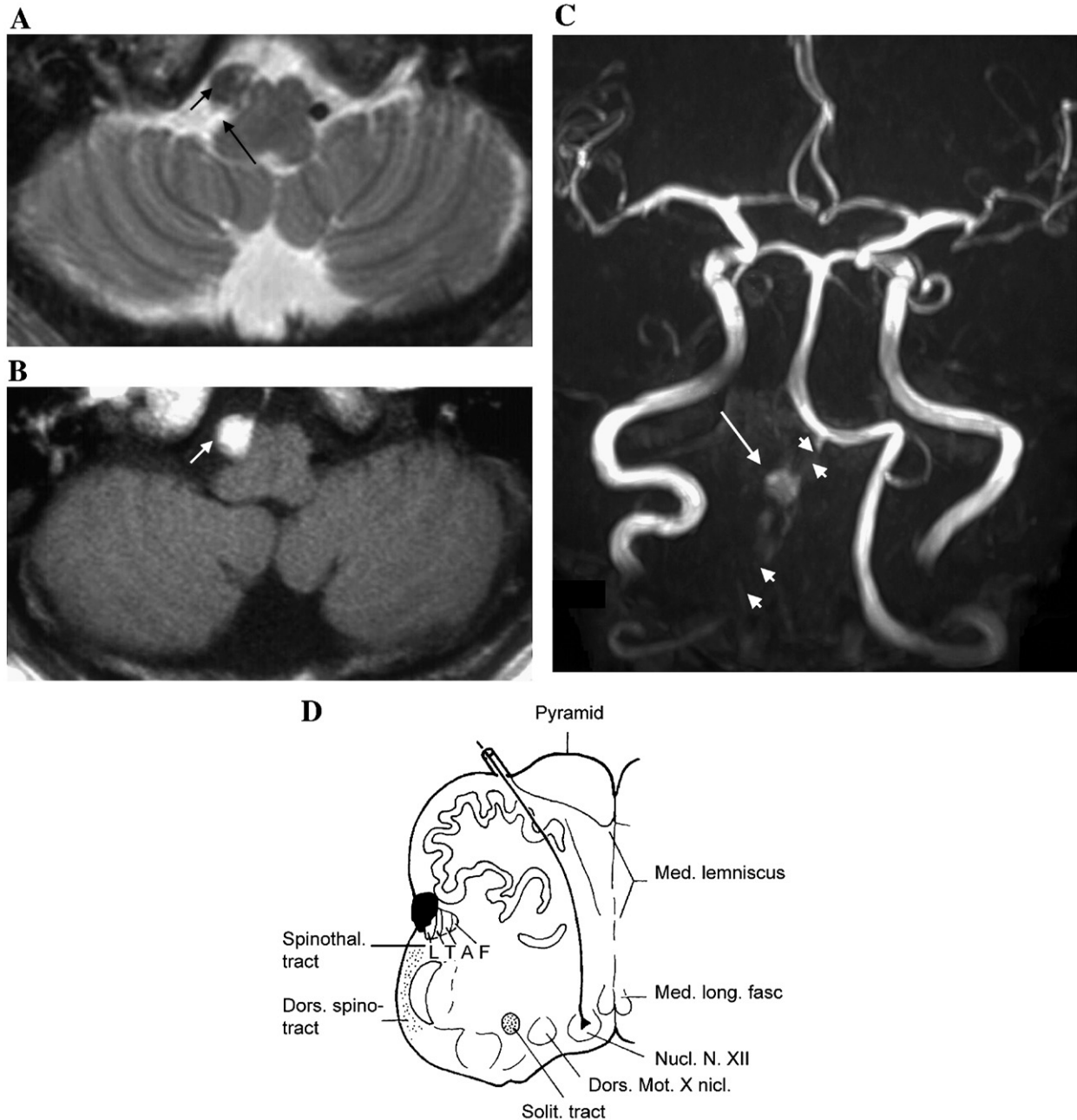


Fig. 2. (A) T2-weighted imaging shows a small infarction in the midline portion of the right middle-rostral medulla (arrow) with a replacement of hypointense signal imaging in the right vertebral artery (VA) (small arrow). (B) T1-weighted imaging shows a hyperintense signal with reduction of the central signal flow void of the right VA (small arrow). (C) MR angiography shows an irregular stenosis of the right VA (small arrow) probably with a dissecting aneurysm (arrow). (D) Sensory topography of the spinothalamic tract in the patient. The black area indicates the lesion; A, the area of arm dermatomal representation; F: face; L: leg; T: trunk.

dissection. Sudden hearing loss or deafness has been described in AICA infarctions [10,12,13]. Since the internal auditory artery, which supplies the inner ear, is a branch of the AICA and is an end artery with minimal collaterals from the other major arterial branches, a partial ischemia of the AICA may lead to isolated deafness or vertigo [12]. In our case, brain MRI showed an isolated lateral medullary infarction without any other infarction in the AICA territory in the brainstem or cerebellum. In most patients, the internal auditory artery originates from the

AICA, but in a few patients, it branches off from the PICA and the vertebral arteries. In our case, the occlusive disease which extended into the distal from the occlusion site probably caused an impairment of blood flow in the perforation arteries from the VA or the PICA.

Considering previous reports, small emboli originating from the dissection may be caused by a small selective ischemia of the cochlear and medullary infarction, sparing infarction in the AICA territory [6,9]. A mild degree of hearing loss, normal

speech discrimination and normal BAEP seem to indicate cochlear damage [14]. As reported by Choi et al. [10], in the case of a mild degree of sudden deafness, a small artery-to-artery embolism from the labyrinthine infarction is a possible mechanism of isolated vertigo or hearing loss.

The cardinal symptom of VA dissection is pain, most often in the posterior part of the neck or occiput. Dizziness, diplopia, and signs of lateral medullary or cerebellar infarction can radiate from the embolism or extension of the dissection to the intracranial VA [15]. In a series of sudden sensorineural hearing loss, the incidence of vertebrobasilar occlusive disorder was approximately 1.2% [16]. The embolism may give rise to various combinations of symptoms (isolated vertigo, isolated deafness or vertigo and deafness), depending on the branches involved [9]. For patients with an acute onset of headache or neck pain who present with isolated limb sensory disturbance accompanied with sudden deafness, even without the classical brainstem signs, a VA dissection and medullary infarction should thus be considered.

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