Single Case – General Neurology

Inner-Ear Symptom May Herald Basilar Artery Occlusion

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Keywords

Inner ear · Labyrinthine artery · Anterior inferior cerebellar artery · Basilar artery

Abstract

A 75-year-old Japanese man suddenly experienced right cochlear and vestibular dysfunction. Basilar artery occlusion and silent right cerebellar infarction were identified 3 days later. These were treated with intravenous ozagrel (an antiplatelet agent) and edaravone, a free-radical scavenger. The patient did not develop cerebello-brainstem signs. His first sign most probably reflected a right labyrinthine artery occlusion that heralded, or occurred together with, the basilar artery occlusion. This case highlights the possibility that a sudden inner ear dysfunction may herald a basilar stroke. Clinicians should therefore initiate appropriate therapy to prevent life-threatening brainstem complications.

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Introduction

Retinal artery occlusion (sudden visual loss in one eye) may herald a hemispheric stroke [1], since the central retinal/ophthalmic artery bifurcates from the internal carotid artery. Similarly, labyrinthine artery occlusion (sudden deafness and vertigo in one ear) may herald a basilar stroke [2], since the labyrinthine artery bifurcates from the anterior inferior cerebellar artery (AICA) originating from the basilar artery [3]. Here, we provide the case of an elderly

man who most probably first experienced a labyrinthine artery occlusion, which heralded his basilar artery occlusion and cerebellar infarction.

Case Report

A 75-year-old Japanese man with hypertension, dyslipidemia, diabetes, and renal dysfunction that were being treated by a diabetologist suddenly experienced right deafness (right cochlear dysfunction) with vertigo and nystagmus to the left direction (right vestibular dysfunction). He was confirmed to have no otitis media or other organic etiologies by a local otol-ogist. Three days after the onset of his inner-ear symptoms, he was referred and admitted to our hospital. A 3T MRI examination showed complete occlusion in the basilar artery (Fig. 1a, arrow) and no lesion in the right pons.

We initiated treatment with intravenous ozagrel (an antiplatelet agent) and edaravone, a free-radical scavenger. The next day, silent, small punctate high-signal foci at the right cerebellum of the right AICA/posterior inferior cerebellar artery (PICA) area appeared (Fig. 1b, arrows), but no pontine lesion was observed. Thin-slice MRI of the mastoid bone including the inner-ear organ did not visualize laterality. We did not perform gadolinium-enhancement MRI because of the patient's renal dysfunction. Soon after that examination, his right deafness and vertigo disappeared completely without the development of apparent cerebellar ataxia or coma.

Discussion

Regarding stroke, it is known that because the blood supply to the inner ear originates from the vertebrobasilar system, a vertebrobasilar ischemic stroke can present with vertigo and hearing loss due to infarction of the inner ear (i.e., a labyrinthine infarction). Sometimes, vertigo and hearing loss are warning symptoms of an impending vertebrobasilar ischemic stroke (mainly in the anterior inferior cerebellar artery territory) [2, 4]. It is known that among the vascular causes, ischemic stroke in the territory of the AICA is the leading cause of acute audiovestibular loss. The acute audiovestibular loss is usually associated with other neurological symptoms or signs, but can rarely occur in isolation (i.e., as a labyrinthine infarction) [5].

Although we could not directly visualize the inner-ear ischemia/occluded labyrinthine artery [6, 7] in our patient's case, we speculate that in light of his clinical course, his first symptoms (right cochlear and vestibular dysfunction) most probably reflected the right labyrinthine artery occlusion that heralded – or occurred together with – his basilar artery occlusion, which was followed by the right cerebellar infarction (which was clinically silent). Once a sudden inner ear dysfunction is encountered in a patient at risk of stroke (atherosclerosis risks, aging, etc.), clinicians should conduct further neurological examinations and neuroimaging and then start the appropriate therapy to prevent life-threatening brainstem complications.

In conclusion, a sudden inner ear dysfunction may herald a basilar stroke; clinicians should therefore initiate appropriate therapy to prevent life-threatening brainstem complications.

Statement of Ethics

We have obtained written informed consent from the patient for the publication of this case report and any accompanying images.

Conflict of Interest Statement

We have no conflicts of interest.

Funding Sources

We have no sponsors.

Author Contributions

Y. Aiba participated in the acquisition, analysis, and interpretation of data. R. Sakakibara participated in the study concept and design, acquisition of data, analysis and interpretation of data, and preparation of the manuscript. T. Yamaguchi participated in the acquisition of data. F. Tateno participated in the acquisition of data.

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Fig. 1. MRI of the patient, a 75-year-old male. **a** On admission, 3T MRI revealed complete occlusion in the basilar artery (arrow). **b** On the day following the patient's admission, silent, small punctate high signal foci at the right cerebellum of the right AICA/PICA area appeared (arrows) but no pontine lesion was observed.