Basilar Artery Dissection Complicated with Infective Endocarditis

A Case Report and Literature Review

Akiko Kawano,¹ MD, Satoshi Masutani,¹ MD, Akitoshi Inui,² MD, Haruna Honma,³ MD, Tsuneo Igarashi,³ MD, Haruka Tsuneoka,³ MD, Wataru Sakamoto,¹ MD, Yoshio Sakurai,¹ MD, Tomohisa Dembo,⁴ MD and Kazuhito Imanaka,² MD

Summary

A 14 year-old boy developed infective endocarditis of the mitral valve caused by Methicillin-sensitive *Staphylococcus aureus* and became comatose. Isolated basilar artery dissection was initially observed on the 3rd day by magnetic resonance imaging (MRI), ie, it did not exist on day 1. He underwent successful urgent mitral valve repair on the 5th day because of highly mobile vegetations and a newly emerged brain infarction under optimal antibiotic administration. Postoperatively, he recovered well and the basilar artery dissection was found to have recovered on an MRI on the 25th day without any specific intervention. This clinical course indicated that intracranial artery dissection may occur as a complication of infective endocarditis and supports the importance of the careful evaluation of brain MRI in patients with infective endocarditis.

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Key words: Magnetic resonance imaging, Vegetation, *Staphylococcus aureus*, Surgery, Mitral valve

Infective endocarditis (IE) is known to cause various complications.^{1,2)} We treated an adolescent with IE accompanied by an intracranial artery dissection, which has not been recognized as a complication of IE.

Case Report

A 14 year-old boy with atopic dermatitis and without any history of heart disease had an abrupt onset of fever above 39.0 centigrade and became disoriented, and was taken to another hospital. Although his cerebrospinal fluid culture was negative, methicillin-sensitive *Staphylococcus aureus* (MSSA) were detected from the initial 2 and subsequent sets of blood cultures. Brain magnetic resonance imaging (MRI) on the 1st day of the illness was unremarkable with the exception of a tiny basilar artery fenestration which is an essentially harmless variation^{3,4)} (Figure 1A). Despite cefotaxime and meropenem administration, he suffered from severe headaches and subsequently became comatose on the 2nd day. On the 3rd day, he showed right hemiplegia and anisocoria, multiple brain infarction including the left pons, and new onset long-segment basilar artery dissection on brain MRI, and vegetations on the mitral valve on echocardiography (Figure 2A) despite no definite prolapse (Figure 2B) or abnormalities in the mitral valve. Infective endocarditis (IE) by MSSA with cerebrovascular complications was diagnosed.

He was transferred to our hospital and intubated upon arrival due to impaired respiration and consciousness disturbance. A repeat MRI on the 4th day of illness showed basilar artery dissection (Figure 1B) and fresh infarction in the right pons (Figure 3A) and worsening of the infarction of the left pons (Figure 3B). Due to persistent positive blood cultures and highly mobile large vegetations on the mitral valve that were approximately 1.5 centimeters, we performed urgent surgery on the 5th day although this young patient was almost unconscious and it was fairly early after the onset. Multiple vegetations (Figure 4) were resected and the valve was successfully repaired without prosthesis.

The patient regained consciousness, and was extubated on the 6th day. MRI on the 25th day showed the basilar artery was improving (Figure 1C) without any specific intervention. One month postoperatively, the mitral valve remained adequately competent with no stenosis or regurgitation, and he was transferred back to the previous facility to continue antibiotics and rehabilitation.

Discussion

This is the first report, to the best of our knowledge, of the occurrence and recovery of basilar artery dissection during IE. Dissection of the basilar artery in this case was initially observed on the 3rd day of illness (Figure 1B) al-

From the ¹Department of Pediatrics, Saitama Medical Center, Saitama Medical University, Saitama, Japan, ²Department of Cardiovascular Surgery, Saitama Medical Center, Saitama Medical University, Saitama, Japan, ³Takasaki General Medical Center, Gunma, Japan and ⁴Department of Neurology, Saitama Medical Center, Saitama Medical University, Saitama, Japan.

Address for correspondence: Kazuhito Imanaka, MD, Department of Cardiovascular Surgery, Saitama Medical Center, Saitama Medical University, 1981 Kamoda, Kawagoe, Saitama 350-8550, Japan. E-mail: imanakaz@saitama-med.ac.jp

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Figure 1. **A:** Unremarkable angiogram on admission, except for a tiny fenestration^{3, 4)} (arrowhead). **B:** Two days later, after the onset of grave neurological symptoms, basilar artery dissection was observed (arrows). **C:** Recuperating basilar artery 25 days later.

Figure 2. Echocardiography before surgery. **A:** Vegetation attached to the mitral valve (arrow). **B:** No mitral valve prolapse on the mitral valve closure (arrow).

Figure 3. **A:** Fresh infarction in the right pons (arrow). **B:** Advanced infarction in the left pons.

though there was no such lesion on the 1st day (Figure 1 A). Thus, we concluded that the onset of the dissection was between the 1st and 3rd day of illness. The dissection recovered within one month after the IE therapies (Figure

1C) without any specific intervention. This clinical course strengthens our belief that the dissection in this case was associated with the IE.

Dissection of an artery other than the aorta associated

Figure 4. A: Multiple large vegetations on the mitral valve. B: Successful valve repair without prosthesis.

with IE has rarely been reported. In our literature search of Pubmed and ICHUSHI (Japanese medical database) performed on May 4, 2020, only two cases of dissection of an artery other than the aorta associated with IE were found. One was a dissection of the pulmonary artery in a 10 year-old female with patent ductus arteriosus.⁵⁾ In this case, it was likely that dissection of the pulmonary artery occurred at the place where the vegetation existed.⁵⁾ In contrast, the other case was a 25 year-old male with a dissection of the middle cerebral artery that was angiographically diagnosed on a subarachnoid hemorrhage after recovery from his IE with vegetation on the mitral posterior leaflet and discharge from hospital.⁶⁾ This case was observed without specific intervention and recovered without suffering a brain artery aneurysm or infarction.⁶⁾ Our case was completely different from these reported cases in several aspects. We observed basilar artery dissection in the acute phase of IE. Our case has clear magnetic resonance evidence not only after onset of the dissection (Figure 1B and C) but also before onset of the dissection (Figure 1A). Therefore, we concluded that the dissection occurred in the acute phase (between 1-3 days of illness) of IE and we highly suspected a relationship between the dissection and IE.

The basilar artery is one of the arteries responsible for pons lesions. In this case, we observed a new onset infarction in the pons and basilar artery dissection. A dissecting artery is characterized by tearing of the internal elastic lamina and/or media.⁷⁾ We speculate that such vascular injury might be induced either by IE-related active cytokines and severe inflammation or by MSSA in the blood or by the adhesion of a transported vegetation, considering the highly mobile vegetation on the anterior leaflet of the mitral valve and the existence of multiple brain infarctions.

Basilar artery dissections are rare lesions and the estimated incidence is 1/400,000 person-years.⁸⁾ Although most cases with nonhemorrhagic spontaneous intracranial cerebral dissection may heal spontaneously only with medical treatment,^{7,9,10)} basilar artery dissections are associ-

ated with subarachnoid hemorrhage,⁸⁾ brain ischemia,^{4,8)} and brainstem compression,¹¹⁾ and significant morbidity and death.⁷⁾ Since basilar artery dissections are heterogeneous, case management has to be tailored to the patients⁸⁾ and requires great caution.⁷⁾

In conclusion, intracranial artery dissection may occur as a complication of infective endocarditis and brain MRI should be carefully evaluated in patients with infective endocarditis.

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Disclosure

Conflicts of interest: None.

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