Case Report

Proximal Common Carotid Artery Stenosis Induced by Repetitive Mechanical Compression: A Case Report

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Objectives: Arterial branches and curvatures, such as the common carotid artery (CCA) origin and carotid bifurcation, are usual sites of atherosclerosis, which leads to carotid artery stenosis. Atherosclerosis may occur due to repetitive compression. Stenosis localized to the proximal segment away from the CCA origin and bifurcation is rare. Here, we describe the case of a patient with right proximal CCA stenosis induced by repetitive compression. *Methods:* We studied an acute stroke patient who worked for a long time as a geographical surveyor carrying a tripod on his right shoulder. We found severe eccentric stenosis composed of thick plaque in the right proximal CCA, away from the right CCA origin. However, there was no finding of CCA dissection or vasculitis. *Results:* The patient was diagnosed with ischemic stroke due to artery-to-artery embolization from the right CCA stenosis, which we believed was due to repetitive compression by the tripod. *Conclusions:* Repetitive mechanical stimuli can cause stenotic lesions at atypical vascular sites.

Key Words: Mechanical compression—common carotid artery—atherosclerosis—carotid artery stenting

Case Description

A 57-year-old man with hypertension, hypercholesterolemia, diabetes mellitus, and coronary artery disease who worked for 30 years as a geographical surveyor carrying a 5 kg tripod on his right shoulder (Fig 1A). He was admitted to our department with a complaint of transient dysarthria and left hemiplegia. Initial neurological examination showed only mild dysarthria; however, diffusion-weighted imaging revealed an acute, small infarct in the right frontal lobe (Fig 1B), while computed tomography angiography showed eccentric and severe stenosis of the right common carotid artery (CCA), confined to a site 4 cm from the right CCA origin and away from the carotid bifurcation (Fig 1C). Because the patient constantly carried a heavy tripod on his right shoulder, the surface of the neck from where the stenotic lesion was located 1.5 cm deep was compressed. The stenotic lesion was composed of thick plaque on the surface side (Fig 1D). There were no findings suggestive of arterial dissection or vasculitis on carotid ultrasonography and T1-weighted imaging, and no significant atherosclerosis was found in other parts of the carotid vasculature. The results of inflammatory markers in laboratory test were negative. The patient was diagnosed with ischemic stroke due to right CCA stenosis caused by repetitive compression by the tripod. He was treated with 100 mg/day aspirin and 75 mg/day clopidogrel for 2 weeks, followed by only 75 mg/day clopidogrel.

Four months later, the patient again developed transient left hemiplegia and acute infarcts in his right frontal lobe. Carotid ultrasonography confirmed aggravation of right CCA stenosis. He underwent CCA stenting and was discharged without disability.

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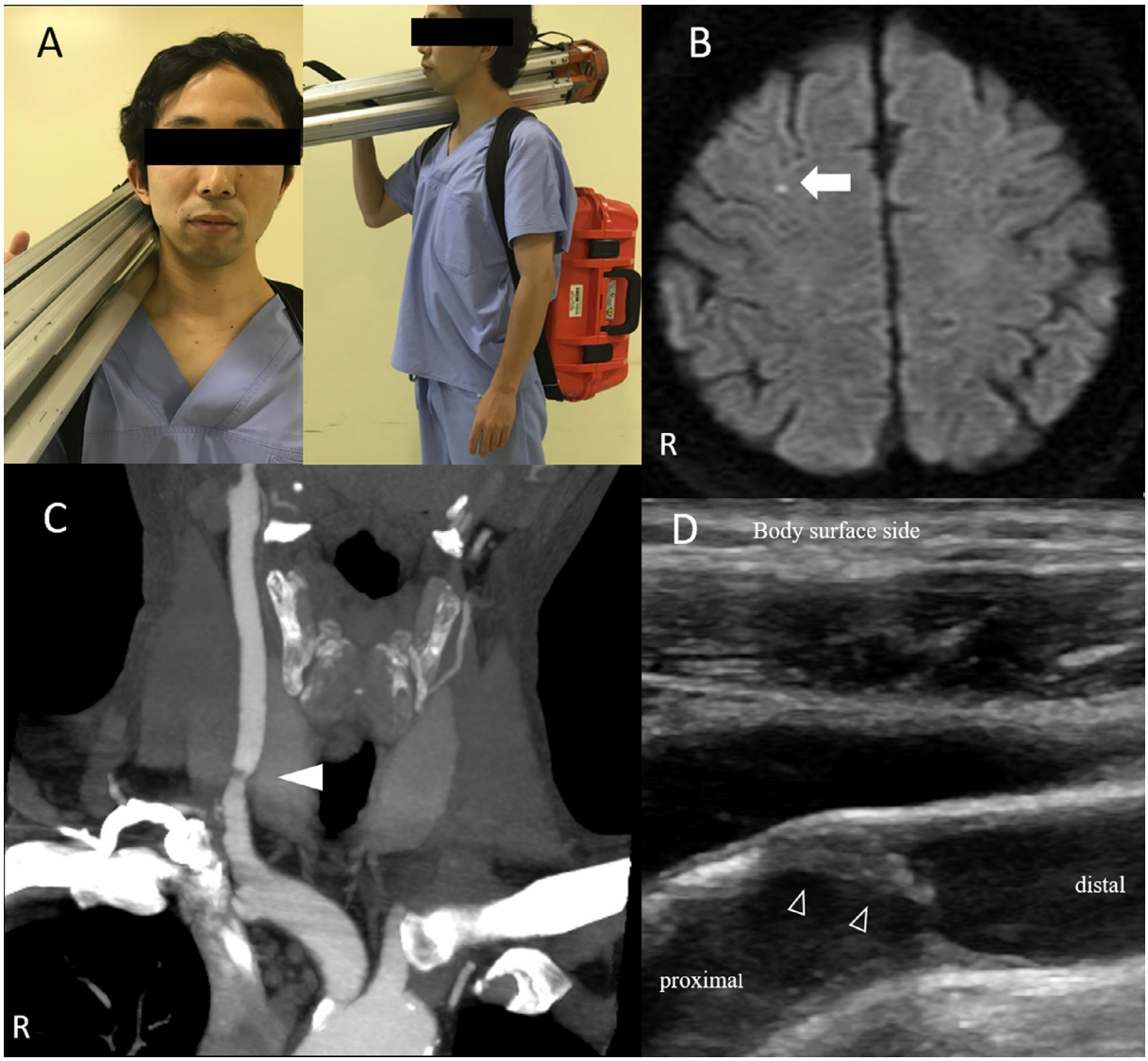

Figure 1. *Patient with ischemic stroke due to right CCA stenosis. (A) Reproduction view of the patient carrying a tripod for surveying. (B) Diffusion-weighted image on admission revealed a small infarct (solid white arrow). (C) Coronal view of CT angiography showed right CCA stenosis (solid arrowhead). (D) Carotid ultrasonography revealed thick plaque on the body surface side (open white arrowheads). Abbreviations: CCA, common carotid artery; CT, computed tomography.*

Discussion

Atherosclerosis preferentially develops at arterial branches and curvatures (eg, the CCA origin and carotid bifurcation). Disturbed blood flow and reciprocating shear stress induce sustained activation of numerous atherogenic genes in vascular endothelial cells and cause arteriosclerosis.[1]

CCA stenosis due to atherosclerosis localized in the proximal segments distant from the CCA origin is rare, and to the best of our knowledge, there have been no reported cases in the literature. In our case, CCA stenosis was confined to the proximal segment of CCA and distant from both the carotid bifurcation and CCA origin. Takayasu arteritis [2] is a representative disease that frequently occurs in CCA; however, in this case, there were no findings suggestive of Takayasu arteritis on blood test and ultrasonography. Meanwhile, some studies have reported that atherosclerotic carotid artery stenosis could be caused by repetitive compression by the hyoid bone.[3,4] Repetitive and mild carotid artery compression was assumed to have modified blood flow, leading to the formation of atheromatous plaque.[4] In our case, the stenotic lesion was located directly under the site of prolonged repetitive compression by a tripod. We could not determine whether the cause of the stenosis was inflammation or atherosclerosis because we could not obtain pathological findings; however, we assume that repetitive mechanical stimuli can cause stenotic lesions at atypical vascular sites, such as the proximal segment of CCA.

Conflicts of Interest

Dr. Saito received honorarium as a speaker from Daiichi Sankyo and Bristol-Myers Squibb.

Dr. Itabashi received honorarium for oral presentations from Bayer, Bristol-Myers Squibb, Tanabe-Mitsubishi Parma, Daiichi-Sankyo, Boehringer Ingelheim, Kowa Pharmaceutical Company, Sanofi, Pfizer, Stryker and Johnson and Johnson, and received research support not attributed in the manuscript from Tohoku Fukushi University.

Dr. Yazawa received honorarium as a speaker from Medtronic.

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