CASE REPORT

Frequent Ischemic Events Related to Varying Middle Cerebral Artery Stenosis

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Abstract

We herein present the cases of two patients with multiple ischemic events, presumably due to varying degrees of middle cerebral artery (MCA) stenosis. The first patient was treated medically, and the symptoms and degree of MCA stenosis varied over several months. The second patient received emergent bypass surgery and experienced no further events, although the MCA stenosis progressed over four months. Emergent intracranial bypass surgery is an option for preventing further ischemic events in patients with symptomatic MCA stenosis.

Key words: acute ischemic stroke, intracranial stenosis, surgical treatment


Introduction

Patients with severe stenosis of the middle cerebral artery (MCA) sometimes experience persistent recurrent symptoms. There is no consensus regarding surgical intervention in such cases. We herein present the cases of two acute stroke patients who were treated differently for symptomatic MCA stenosis.

Case Reports

Case 1

A 59-year-old man who had developed recurrent episodes of transient left hemiparesis visited the emergency room (Day 0). The patient was a smoker and had a history of thyroidectomy. On admission, his blood pressure was 126/81 mmHg and his pulse rate was 59/min and regular. Diffusion-weighted imaging (DWI) showed a new lacunar lesion in the right putamen, although no abnormalities were observed on magnetic resonance angiography (MRA; Fig. 1A, G). Treatment with cilostazol was started. On Day 60, the patient experienced another recurrent episode of transient left hemiparesis. DWI demonstrated a new ischemic lesion in the right putamen and multiple spotty lesions in the cortex and subcortical white matter in the right MCA territory (Fig. 1H). MRA showed subtle narrowing of the right MCA (Fig. 1B). Conventional angiography did not reveal any other additional findings suggesting a separate mechanism, such as arterial dissection or vasculitis. Transesophageal echocardiography disclosed no potential sources of emboli. Aspirin was added to cilostazol. On Day 81, the patient experienced another episode of transient left hemiparesis, and the right MCA stenosis was found to have progressed (Fig. 1C). The antiplatelet agents were switched to clopidogrel. The degree of MCA stenosis appeared to vary (Fig. 1D, E) on repeated imaging examinations performed over several weeks. The patient again experienced transient left hemiparesis with a new area of lacunar infarction in the right corona radiata on Day 98 (Fig. 1I), and atorvastatin was added. After that event, the recurrent spells ceased for over three years, and the MCA stabilized with residual mild stenosis (Fig. 1F).

Case 2

A 46-year-old man with no medical problems experienced headaches several times over four weeks before presenting...
to the hospital. One afternoon (Day 0), he suddenly noticed right hand weakness. Upon transfer to the emergency room, his blood pressure was 90/60 mm Hg and his heart rate was 60/min and regular. He exhibited mild aphasia and right hemiparesis. DWI demonstrated a small hyperintense spotty lesion in the left frontal cortex, and MRA showed severe stenosis in the left MCA (Fig. 2A, E). Edaravone, intravenous heparin and warfarin were administered. On Day 2, the patient’s condition deteriorated, as his aphasia and hemiparesis progressed. DWI demonstrated new spotty lesions in the left parietal lobe (Fig. 2F), while the stenosis of the left MCA appeared to have worsened (Fig. 2B). The cerebral blood flow to the left hemisphere was severely decreased on single photon emission computed tomography (SPECT) using 123I-IMP without acetazolamide: the regional cerebral blood flow (rCBF) of the frontotemporal cortex at the level of the basal ganglia was 29.87 mL/min/100 g in the affected hemisphere (61.4%) vs. 48.61 mL/min/100 g in the contralateral hemisphere. Superficial temporal artery-to-MCA (STA-MCA) anastomosis was performed on Day 4. No episodes of recurrence of symptoms were observed either clinically or radiographically following the procedure. On MRA performed on Day 15, the stenosis of the left MCA was less marked (Fig. 2C). In addition, 123I-IMP SPECT demonstrated an improvement in the rCBF of the left cerebral cortex. The patient’s symptoms gradually improved over several weeks, and he was discharged with continued warfarin. Four months after discharge, MRA again showed worsening of the left MCA stenosis (Fig. 2D). However, he did not experience any neurological symptoms during this time. We further investigated the structural characteristics of the MCA stenosis using three-dimensional-first asymmetric spin echo (3D-FASE) imaging; however, no additional findings were detected.

**Discussion**

We herein presented the cases of two patients with acute ischemic events due to varying degrees of MCA stenosis, for which the pathogenesis could not be determined. Arterial dissection of the MCA was a plausible cause in both cases. Although there was no direct radiographic evidence, dy-
The efficacy of STA-MCA anastomosis in the acute phase of ischemic stroke remains controversial. Only small studies have demonstrated its safety and efficacy in patients with occlusive disease of the MCA (6). Most reported cases of MCA stenosis due to focal dissection have been treated medically; however, some patients who received STA-MCA anastomosis achieved favorable outcomes (1-4). Surgery was performed in Case 2 because the patient was young and had aphasia and hemiparesis, which could have severely affected his quality of life. As a result of the surgery, the patient did not develop further neurological symptoms, despite the progression of MCA stenosis after several months of follow-up.

The lacunar infarcts in the basal ganglia in Case 1 likely resulted from the occlusion of a perforating artery. In contrast, the corticosubcortical stroke observed in both cases may have been caused by a combination of microembolism and decreased perfusion pressure due to the presence of the stenotic lesions in the MCA (7). Although the efficacy of STA-MCA anastomosis in such situations is unproven, this procedure is nevertheless an option for preventing further ischemic events.

**Figure 2.** Changes in magnetic resonance angiography (A-D) and diffusion-weighted imaging (DWI; E and F) findings during the clinical course in Case 2. Severe stenosis of the left middle cerebral artery (MCA) is observed on Day 0 (arrow; A). Two days later, a decreased signal in the distal portion of the left MCA indicates progression of the stenosis (arrow; B). Following anastomosis, the inflow from the left superficial temporal artery to the MCA is patent; the stenotic lesion of the left MCA has improved (arrow; C). On Day 138, stenosis of the same portion has again progressed (arrow; D). DWI performed on admission shows a faint, hyperintense lesion in the left frontal cortex (arrowhead; E). On Day 2, other spotty hyperintense lesions are observed in the left parietal lobe (F).
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References


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