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POST-TRAUMATIC MIDDLE CEREBRAL ARTERY OCCLUSION —REPORT OF A CASE AND THE VALUE OF CT SCAN IN MANAGEMENT OF POST-TRAUMATIC MIDDLE CEREBRAL ARTERY OCCLUSION—

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Abstract

The prognosis of patients with post-traumatic middle cerebral artery (MCA) occlusion has been generally poor, but there are a few reports that the prognosis is favorable. As for the reason of this contraversy, adequate discussion on the prognosis has not been done in the literature. Since MCA occlusion occurs with head trauma, it is easily considered that associated brain injury may have a great influence on the prognosis.

In this paper, the authors report a case of MCA occlusion associated with cerebral contusion and emphasize an usefulness of a serial of CT scan to estimate the associated cerebral lesion and prognosis of post-traumatic cerebral artery occlusion.

CASE REPORT

A 58-year-old unconscious right handed woman was admitted to the emergency department of Kawasaki Medical School one and a half hours after a traffic injury. She has been in good health until she was knocked down on a street by a motor car. On admission, her blood pressure was 130/70 mmHg and pulse rate was 56/min. She was not communicative because of confusion, disorientation and speech disturbance. Bilateral nasal bleeding and right hemotympanum were observed. Neurological examination revealed a flaccid right hemiplegia including a right cranial nerve paralysis and bilateral positive Babinski responses. Pupil and optic fundi were normal.

There were neither biochemical nor sereologic evidences of systemic vascular disease. Electrocardiogram demonstrated infrequent premature atrial contraction.

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Electroencephalogram was abnormal with δ wave in bilateral fronto-temporo-parietal region. Lumbar puncture revealed a pressure of 250 mmH_2O over with grossly bloody spinal fluid. Plane roentgenograms of the skull and chest showed a linear fracture in the right temporal bone in the former and the right clavicular fracture in the latter. Left carotid angiogram on admission demonstrated complete occlusion of the left MCA at its origin (Fig. 1). Apparent atherosclerotic changes were not found in the intracranial artery nor in the extracranial arteries. A repeated angiogram on six days after admission showed no progressive changes.

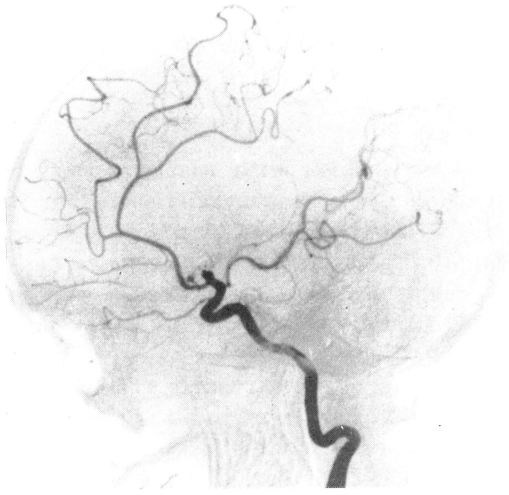

Fig. 1. Left carotid angiogram on the day of admission showed complete occlusion of the left MCA at its origin (subtraction film).

However, follow up angiogram on eighty-two days after the injury demonstrated partial recanalization of left MCA (Fig. 2). CT scan which was performed on six days after the injury, showed the lesion of reduced adsorption in the left temporal region and deviation of compressed anterior horn to the right. Above over, it demonstrated low density including high density (mottled like-appearance) in the frontal region (Fig. 3). These findings were considered as indicative of left MCA occlusion with cerebral contusion. There was slight displacement of midline structures to the right. The enhancement effect was not so eminent. The second CT scan, 18 days after the injury, showed disappearance of mottled like-change in the frontal region of reduced absorption lesion (Fig. 4). The third CT scan, 39 days after the injury, showed more reduced absorption lesion both in the frontal the temporal region (Fig. 5).

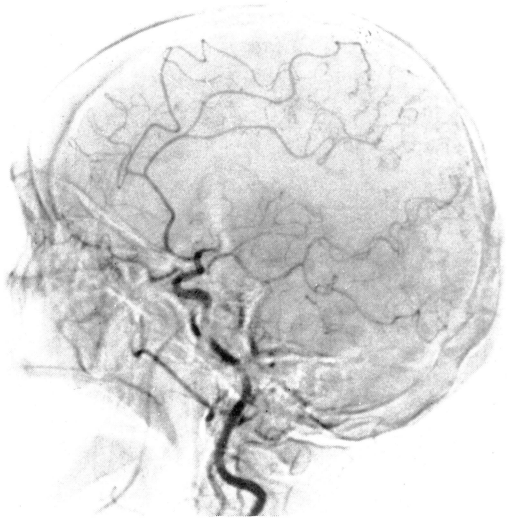

Fig. 2. Left carotid angiogram, 82 days after the injury showed partial recanalization of the MCA (subtraction film).

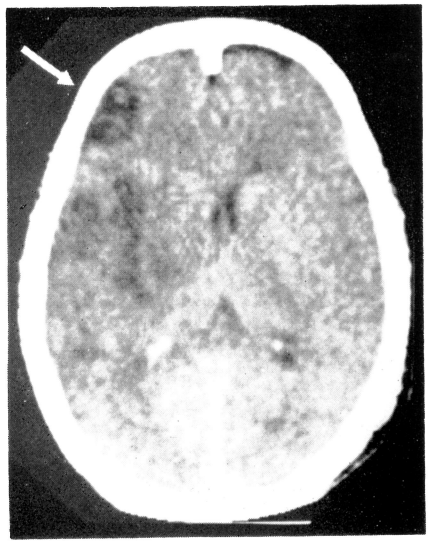

Fig. 3. CT scan, six days after the injury, showed reduced absorption lesion in the temporal and frontal region (white arrow) and deviation of compressed anterior horn to the right.

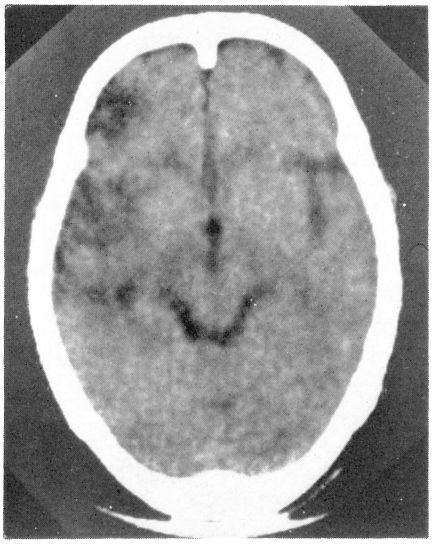

Fig. 4. CT scan, 18 days after the injury, showed disappearance of mottled like-change in the frontal region.

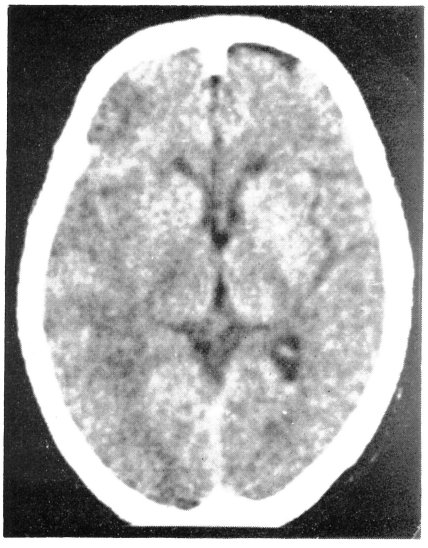

Fig. 5. CT scan, 39 days after the injury, showed more reduced absorption both in the frontal and temporal lesion.

RI scintigram, performed 17 days after the injury, showed a marked hot scan corresponding with the left middle cerebral arterial territory.

On the hospital course, her consciousness was recovered gradually, but right hemiplegia and motor aphasia were not changed even though six months after the injury. Four years after injury, she can speak a little and follow a few commands but has severe emotional incontinence.

DISCUSSION

In 1942, DeVeer and Browder[1] first reported a 42-year-old man who developed hemiplegia 12 hours after a closed head injury. And at present, 26 cases[1-14] of post-traumatic MCA occlusion have been adequately documented in the literatures. The pathogenesis of MCA occlusion following closed head injury has been frequently discussed. Five explanations were proposed including arterial spasm, dissecting aneurysm or intramural hematoma, emboli from the cervical portion of the internal carotid artery, thrombosis, and compression due to subdural hematoma. In the present case, repeated angiograms did not show arterial spasm nor typical atherosclerotic changes. Also, CT scan revealed no subdural hematoma. Thus, in our case, it is conceivable that the etiology of MCA occlusion might be dissecting aneurysm or intramural hematoma due to cerebral contusion.

In the literatures, there were postmortem examination in six cases[1,3,5,10,11,13] and surgical operation was performed in one case[12]. Of these, four cases were found to have other traumatic intracranial lesions with MCA occlusion. In one case, there was found to have associated cerebral swelling and brain stem hemorrhage with occlusion of the main stem of the left MCA[5]. Subdural hematoma and cerebral contusion with occlusion of the main stem of the right MCA were found in one case of Sakamoto and Sumikawa[11]. The patient of Takahashi and Honda[12] was found to have massive subdural hematoma at operation. In a case of Verbiest and Calliauw[13], there was left temporal lobe contusion with occlusion the right MCA at its origin. In the remaining three cases, there was only MCA occlusion without any other intracranial pathology.

These evidences suggest that not only occlusion of the MCA but also other traumatic intracranial lesion such as cerebral contusion, intracerebral hematoma, subdural hematoma, epidural hematoma, and cerebral edema may have a great influence upon clinical features, functional and vital prognosis.

To diagnose these associated lesions, CT scan in combination with cerebral angiography is effective, and a series of CT scans permits accurate assessment and observation of progress[15]. However, although cerebral angiography was performed in most cases, CT scan to know the associated intracranial lesions

was performed only a single case[2] in the literatures.

Fortunately, the authors had an opportunity to perform CT scan in a case of post-traumatic MCA occlusion, and could find cerebral contusion which is described as "mottled", or "salt and pepper" appearance[16,17], that is not clearly demonstrated by cerebral angiography. These findings enabled to estimate the clinical course and prognosis of this patient. Therefore, it is important to perform CT scan in combination with angiography to know other associated lesions and prognosis of post-traumatic cerebral artery occlusion.

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