Tonic Convulsion as the Initial Sign of Acute Cerebral Ischemia in an Adult

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Abstract: A 69-year-old man returning home in a car driven by his wife after visiting our hospital due to complications of infection from an operation suddenly lost consciousness. He had right hemiparesis due to a brain stem infarction by atrial fibrillation at 58 years of age. When medical staff checked him at the front of the hospital, he had right tonic convulsion and was comatose. He was in a deep coma, and his systolic blood pressure was 168/116 mmHg, heart rate 96 beats per minute, respiratory rate 30 breaths per minute and SpO2 level 100% under room air. He received anti-convulsant. Electrocardiogram showed atrial fibrillation, and chest roentgen and cardiac sonography findings were negative. Head computed tomography (CT) revealed an old cerebral infarction at the brain stem. As he remained in a coma, further examinations using head magnetic resonance imaging (MRI) were performed. MRI demonstrated left fronto-temporo-parietal ischemia, and MR angiography revealed occlusion of the left middle cerebral artery. He underwent urgent aspiration thrombectomy, but cerebral ischemia developed into infarction. He was transported to another medical facility for rehabilitation. We herein report a rare case of convulsion as the initial sign of acute cerebral ischemia in an adult. A pre-existing inflammatory condition or brain stem infarction may have affected the rare occurrence of convulsion preceding cerebral ischemia in the present patient. Further studies are warranted to determine whether or not a patient with their first convulsion needs to receive urgent MRI after the confirmation of no significant lesions on CT.

Keywords: Convulsion; acute cerebral ischemia; diagnosis

INTRODUCTION

The typical initial signs of cerebral ischemia, such as facial hemiparesis, limb hemiparesis and/or dysphagia/dysarthria, are used for screening purposes in prehospital settings[1-3]. However, the onset of convulsion following hemiparesis is well known as Todd’s paralysis and it can sometimes be misdiagnosed as a cerebral ischemic attack [4, 5]. A patient with hemorrhagic stroke or juvenile cerebral ischemia may demonstrate convulsion as an initial symptom; however, it is rare in adult-onset cerebral ischemia. We herein report a case of tonic convulsion as the initial sign of acute cerebral ischemia in an adult.

CASE PRESENTATION

A 69-year-old man returning home in a car driven by his wife after visiting the Department of General Thoracic Surgery at our hospital due to complications of infection from an operation suddenly lost consciousness. He had right hemiparesis due to a brain stem infarction by atrial fibrillation at 58 years of age, and a duodenal ulcer and lung cancer had been removed 1 month earlier. When medical staff checked him at the front of the hospital, he had right tonic convulsion and was comatose. He was transported via stretcher to the emergency room.

He was in a deep coma, and his systolic blood pressure was 168/116 mmHg, heart rate 96 beats per minute, respiratory rate 30 breaths per minute and SpO2 level 100% under room air. He remained in right tonic convulsion with right conjugated deviation and received an infusion of 10 mg of diazepam, after which the tonic convulsion and abnormal ocular position subsided. He also received an infusion of fenitoin. A venous gas analysis revealed combined acidosis with an increased lactate level (8.1 mmol/l). Electrocardiogram showed atrial fibrillation, and chest roentgen and cardiac sonography findings were negative. Head computed tomography (CT) revealed an old cerebral infarction at the brain stem without intracranial hemorrhaging (Figure 1). The main findings of a blood analysis were a white blood cell count of 14,300/mm3 and C-reactive protein of 9.6 mg/dl.

As he remained in a coma, further examinations using head magnetic resonance imaging (MRI) were performed. MRI demonstrated left fronto-temporo-parietal ischemia (Figure 2), and MR angiography revealed occlusion of the left middle cerebral artery. He underwent urgent aspiration thrombectomy, but cerebral ischemia developed into infarction. He was transported to another medical facility for rehabilitation.

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DISCUSSION

This is the rare adult case demonstrating convulsion as the initial sign of cerebral ischemia. The juvenile brain is immature and highly susceptible to seizure, so convulsion as an initial sign of cerebral ischemia is not very rare in young patients [6-8]. While cerebral ischemia has also been reported as a risk factor of convulsion in adults [9-11], only a few case reports have described convulsion as the initial sign of cerebral ischemia [12-14].

Regarding why this case demonstrated the rare initial sign of cerebral ischemia of ‘convulsion’, Arboix et al. examined ischemic stroke of unusual cause and found that the etiologies included hematological disorders, migraine stroke, cerebral infarction secondary to venous thrombosis and inflammatory causes. Independent predictors of ischemic stroke of unusual cause included younger age, seizures, headache, hemianopia and occipital lobe involvement. The present patient had had a pulmonary infection, so the threshold for cerebral ischemia triggering a convulsion might have been reduced. Our patient also had a history of brain stem infarction. The brain stem has the potential to both inhibit and facilitate the occurrence of convulsion [15-17]. This history may therefore have affected his unusual initial signs.

One issue associated with diagnosis is the timing of the MRI examination, as convulsion may be followed by status epilepticus. This results in a life-threatening situation that requires tracheal intubation [18]. As there are no guidelines concerning the timing of MRI, we usually perform such examinations the day after confirming the continuous ceasing of convulsion if initial CT does not reveal any significant lesions [19]. However, we missed the timing to administer tissue plasminogen activator in the present patient by selecting conservative management in the emergency room. Accordingly, further studies are warranted to determine whether or not a patient with their first convulsion needs to receive urgent MRI after the confirmation of no significant lesions on CT.

CONCLUSION

We herein report a rare case of convulsion as the initial sign of acute cerebral ischemia in an adult. A pre-existing inflammatory condition or brain stem infarction may have affected the rare occurrence of convulsion preceding cerebral ischemia in the present patient.

Conflict of interest

We do not have conflict of interest to declare.

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