Introduction

Stroke is a state of cerebral dysfunction that is usually caused by obstruction of perfusion in cerebral vessels. Stroke can be divided into three patterns: embolic, thrombotic, and lacunar. It typically affects people with a heart disease or elderly people with multiple medical problems. Thrombolytic therapy has been proven to exhibit strong potency for the treatment of stroke. Thus, early diagnosis and proper use of thrombolytic agents have become key events for successful treatment of stroke. We present a 63-year-old male patient who had sudden onset of left-sided weakness and slurred speech. After a prompt diagnosis and thrombolytic treatment, the patient was quickly restored from his neurologic defects and discharged without disability. Relevant literature is reviewed and discussed in the report. [International Journal of Gerontology 2008; 2(3): 140–142]

Key Words: stroke, thrombolytic therapy

Case Report

A generally healthy retired 63-year-old male of average body weight presented at our emergency department (ED) with left-side hemiparesis and dysarthria. He was a retired bicycle salesman, who, except for his smoking (one pack per day for over 30 years) and hypertension, generally maintained healthy daily activities and lived independently. At 14:55 on the day of the stroke, he was giving his neighbor a haircut. All of a sudden, his neighbor realized that the patient was lying on his back. Soon, the patient found it difficult to talk clearly and move his left-side limbs. He was immediately sent to our ED.

The patient arrived at our ED at 15:29. The initial conscious status was clear, Glasgow Coma Scale was E4M5V6, and the tympanic temperature was 36.2°C. His initial vital signs were: heart rate, 82 beats per minute; respiratory rate, 18 breaths per minute; blood pressure, 193/91 mmHg. The initial serum biochemistry data were: hemoglobin, 15.9 g/dL; hematocrit, 44%; white blood cell count, 8.10 × 10^3/μL; platelets, 184 × 10^3/μL; serum glucose (ante cibum), 113 mg/dL; aspartate aminotransferase, 27 U/L; serum urea nitrogen, 19 mg/dL; creatinine, 1.2 mg/dL; potassium, 3.5 mEq/L; sodium, 137 mEq/L. Chest X-rays showed no significantly abnormal findings. Electrocardiogram
showed normal sinus rhythm. Brain computed tomography (CT) without enhancement showed no obviously abnormal findings. The left-side limbs were profoundly weak (muscle power gradient [MP], 1). Obvious slurred speech was present, but no sensation defects were found. A review of the patient’s history revealed no antiplatelet or anticoagulation medications. The initial NIHSS score was 11. After a full explanation of the risks, the patient agreed to undergo recombinant tissue plasminogen activator (rt-PA) treatment. At 16:55, the first 1/10 dosage of rt-PA was given by an intravenous (IV) push, followed by administration of the remaining 9/10 dosage of rt-PA by an IV drip within 1 hour.

- At 17:05, the patient could raise his left leg (anti-gravity), and the MP of the leg was 3.
- At 17:07, the patient could also elevate his left arm (antigravity), and the MP of the arm was 3. However, the systolic blood pressure was elevated to 200 mmHg at this time.
- At 17:40, there was more improvement of the left limb paresis, and the MP was 4–4+. The patient could move freely with a little difficulty.
- At 17:55, the rt-PA dosage was complete. The MP remained at 4–4+ in the left arm and leg.
- At 19:50 and 2 hours after completion of the rt-PA treatment, the NIHSS improved to 4.
- At 24 hours after completion of the rt-PA treatment, the NIHSS improved to 2.

After these emergency management procedures in our ED, the patient was admitted to an ordinary ward under the diagnosis of stroke for further treatment and observation.

During hospitalization, the patient received a stroke workup study. His carotid duplex showed a high resistant flow profile in the bilateral common carotid arteries and right vertebral artery. Heart echography showed mild pulmonary hypertension. Follow-up brain CT without contrast media showed a low-density area in the right basal ganglion and corona radiata. Some days later, the patient developed a fever. Urinalysis showed a mild infection, but it soon subsided after treatment. The highly elevated blood pressure was also decreased and controlled by medication.

After admission for 5 days, the patient was discharged and returned to his normal daily life without any significant sequelae. He maintained regular outpatient visits. At the latest visit, he appeared to be a healthy and independent individual.

Discussion

People with stroke may experience one-side limb weakness, slurred speech and other variable focal neurologic defects. These may cause multiple medical and economical problems. Embolic type stroke largely comes from atrial fibrillation, the thrombotic type arises from vessel atheroma, and the lacunar type arises in a distal vessel under a complex segmental arterial disorganization called lipohyalinosis.

In the case of this 63-year-old patient, cigarette smoking and hypertension may be the major risk factors that contributed to his stroke. Both factors can cause vessel atherosclerosis and represent the leading cause of ischemic stroke.

According to the patient’s history and neurology examination, stroke was our preliminary diagnosis. Because the patient arrived at the ED very quickly with an exact onset time and without any hemorrhage or cerebral defects on brain CT images, thrombolytic therapy was the most suitable medical treatment. Confirming the exact onset time is an important point for thrombolytic therapy. The time of onset has to be confirmed by a witness, and any challenged time cannot be trusted. This information is all-important, because thrombolytic therapy within 3 hours has the greatest benefit. Beyond this time limit, the advantages quickly decline and hemorrhage side effects occur instead. Under this concept, confirmation of the onset time should be the foundation of thrombolytic therapy. rt-PA, the key medication of thrombolytic therapy, has been proven to be effective for treating ischemic stroke. However, it also has a remarkable side effect of massive bleeding. The application of this medication should be strictly according to the guidelines designed for thrombolytic therapy. In Taiwan, we follow the guidelines published by the Taiwan Stroke Society. These guidelines provide a good and safe framework for launching thrombolytic therapy as long as they are strictly followed.

Brain CT images provide important information for performing thrombolytic therapy. First, brain CT can easily identify ischemic stroke from hemorrhagic stroke. Second, it can help us to detect early cerebral infarction, which may easily be confused in normal images.

Blood pressure control remains an essential issue once thrombolytic therapy has been launched. In the first hour, blood pressure should be monitored every 15 minutes during infusion, followed by every 30 minutes for the next 2 hours and hourly for another 5 hours.
It is important not only to monitor blood pressure frequently, but also to carry out hourly neurology observations. Neurology observations need to be carefully monitored, because any sudden elevation in blood pressure or change in the neurology conditions could indicate a massive intracranial hemorrhage, which may require brain CT for clarification and may lead to consideration of a further operation to relieve the crisis.

The NIHSS, which was developed by the National Institutes of Health to evaluate stroke severity in patients, has become a very good evaluation tool for stroke patients. According to its indications, stroke patients with scores under 6 do not need to undergo thrombolytic therapy, because their injuries are very mild. Furthermore, stroke patients with scores of more than 25 cannot undergo the therapy, because their injuries are too severe. Therefore, the NIHSS not only evaluates stroke severity but can also be considered as a prognostic index. In our case, it was obvious during the thrombolytic therapy that his NIHSS was improving as long as his clinical condition continued to improve.

From this case and the related literature, we conclude that stroke is the third leading cause of death of elderly people and the most severe cause of disability. Proper treatment of stroke should be the strategy, because it could reduce the burden of stroke and improve public health. Prevention of stroke is not only a medical problem but also an economic issue. Thrombolytic therapy has shown its importance in the treatment of acute stroke. Confirmation of the exact onset time, normal initial brain CT images, qualified NIHSS evaluation, and proper rt-PA usage can lead to successful thrombolytic therapy.

References