

Importance of coordination of regional stroke centers for acute ischemic stroke

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Abstract

Acute ischemic stroke (AIS) is a devastating disease all over the world, and intravenous thrombolysis is the gold standard treatment. Shortening the pre-hospital delay and optimizing the in-hospital process are important to improve stroke survival. Clinical evidence has demonstrated the positive impact of coordinated stroke centers and regional stroke networks on the clinical efficacy of intravenous thrombolysis in AIS patients. A coordinated stroke center and regional stroke network can significantly increase the efficacy of intravenous thrombolysis for AIS, shorten the pre-hospital delay time, and improve clinical prognosis.

Keywords: Regional stroke centers, stroke network, aging, acute ischemic stroke, intravenous thrombolysis, clinical efficacy

Stroke is the second leading cause of death after cancer, and 75% of patients develop varying degrees of disability, resulting in an enormous socioeconomic burden. According to a recent epidemiological investigation, more than 10 million Chinese are living with stroke, with 2.4 million new cases annually. Aging is the most robust non-modifiable risk factor for stroke, with the majority of strokes occurring after middle age. As the aging population continues to grow, the incidence of stroke is expected to increase, posing significant challenges for clinical intervention. Acute ischemic stroke (AIS) is the most common type of stroke, accounting for approximately 70% of all strokes. Shortening the pre-hospital delay and optimizing the in-hospital process are key points for improving the survival rate of stroke patients. Therefore, in recent years, China has made great efforts to establish regional stroke centers, on the basis that a coordinated system combining the pre-hospital first-aid scheduling system and the regional stroke network can effectively reduce the disability rate and improve the patient's quality of life.

Currently, intravenous thrombolysis is the mainstay of treatment for AIS. According to worldwide guidelines, re-

combinant tissue plasminogen activator (rt-PA) is the recommended first-line therapy. Cumulative clinical evidence has shown that intravenous thrombolysis with rt-PA can improve the clinical prognosis of AIS and reduce disability and mortality. However, there is a strict time window for the administration of thrombolytic agents. Shortening the pre-hospital delay is the most important issue in the treatment of AIS. As is known, "time is the brain"! It has been estimated that approximately 2 million neurons can lose activity per minute before recanalization, and every 15 minutes of the pre-hospital delay can increase the mortality rate by 5 percent. In addition, shortening the pre-hospital delay can effectively reduce the risk of hemorrhagic events after thrombolysis.

Nansha District in Guangzhou has a population of about 820,000 and a total area of 783.86 square kilometers. The strict time window limit of AIS indicates that stroke first aid should follow the principle of closest location, and patients with AIS should be transferred to the closest hospital for thrombolysis or endovascular treatment as soon as possible. Therefore, it is important to establish an efficient regional stroke rescue network and strengthen intra-regional cooperation to improve the survival rate of AIS patients. Since December 2017, we have established a coordinated stroke center (Nansha Central Hospital) and a regional stroke network (including 11 neighboring hospitals and an emergency medical rescue command center), and conducted studies to investigate whether this combined system improves the clinical efficacy of intravenous thrombolysis for AIS. Through years of clinical practice, the Stroke Network Alliance has made great efforts to disseminate information on the early detection and treatment

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of stroke.

Following the establishment of the coordinated Stroke Network Alliance, the time from onset to admission has been significantly shortened. On the one hand, interdepartmental cooperation has been improved and the green channel in the hospital and intravenous thrombolysis procedures have been optimized. On the other hand, the coordinated Stroke Network Alliance has significantly strengthened inter-hospital cooperation. Moreover, this alliance has focused on improving the understanding of stroke among patients and their families, thereby increasing the acceptance of intravenous thrombolysis.

Although the Stroke Network Alliance has significantly shortened the DNT and ONT of intravenous thrombolysis in the Nansha area, less than 50% of patients were able to reach the emergency department within 1 hour after the onset of AIS. Overall, there is still significant room for over-improvement in this system. In particular, the operational efficiency of the green channel in hospitals and the general knowledge of AIS detection and treatment can be improved in the future.

In summary, the coordinated stroke center and regional stroke network can significantly improve the effectiveness

of intravenous thrombolysis for AIS. Hospitals within the network cooperate and share medical resources in clinical practice and social popularization, enabling more people to prevent the vascular risk factors of stroke as early as possible. The establishment of the Stroke Network Alliance promotes regional cooperation and emergency referral. In addition, pre-hospital popularization and education can improve the detection rate of early stroke. However, there are still some limitations to this approach, and further improvements are warranted.

Declarations

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