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Editorial

On the Recovery after Stroke: When and What Should We Focus on?

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Recently stroke mortality and recurrence rates have gradually decreased due to the development of acute treatments such as endovascular thrombectomy and aggressive risk factor control based on clinical guidelines. The mortality per 100,000 population for stroke has decreased from 58.9 in 2006 to 29.6 in 2015.[1] However, only about 58.8% of patients are able to recover sufficiently enough to resume their daily lives without assistance.[2] Average direct medical costs after ischemic stroke amount to 14.66 million won in the first year after a stroke.[3] In addition to these costs, the sequelae such as hemiparesis and aphasia reduce work capacity and lead to unemployment, resulting in significant losses in income.

Recovery mechanisms vary depending on the time period after the stroke.[4] Recovery within hours/days after onset may be due to reperfusion by endovascular thrombectomy or spontaneous recanalization of occluded arteries with embolism. Recovery in the weeks following a stroke may be associated with anti-inflammatory processes, diaschisis recovery, or reduced late neuronal death. Chronic recovery usually refers to recovery three months after a stroke, which is mediated by the reconfiguration of a neural network that employs functionally relevant brain regions.[5] Therefore, at each stage, appropriate therapeutic strategies are needed to strengthen or stimulate each of these recovery processes. This requires a thorough understanding of the factors that determine the prognosis for each period.

The Clinical Research Center for Stroke-5th division (CRCS-5) registry database is a prospective nationwide stroke registry that started in 2008, in Korea. It is supported by a grant of the Korea Healthcare Technology R&D Project, Ministry of Health & Welfare, Republic of Korea.[2] CRCS-5 has been building a clinical database of stroke patients who are within one week of onset. This database encompasses clinical information including demographics, vascular risk factors, index stroke characteristics, acute treatment modalities, immediate outcomes, 3-months and 1-year post-stroke functional outcomes, and mortality. By December 2017, over 60,000 stroke patients were included in the CRCS-5 registry. Through rigorous data auditing and outcome reporting, it provides clinically important data related to the quality of stroke care and other topics that are difficult to identify with randomized clinical trials.

In this issue, Jang et al.[6] reported the incidences and determinants of early recovery (improvement in stroke severity from admission to discharge) using the National Institutes

of Health Stroke Scale (NIHSS), and post-discharge late recovery (improvement in functional independence from discharge to 3 months after the onset of stroke) using the modified Rankin Scale (mRS) in 11,088 patients. In-hospital and post-discharge recovery occurred in 36% and 33%, respectively. Analysis showed that age, pre-stroke functional status, stroke severity at admission, and stroke subtype were associated with both in-hospital and post-discharge recovery. However, onset-to-admission time, blood glucose levels, and systolic blood pressure at admission, history of stroke, congestive heart failure, recanalization therapy, and prior statin use were associated only with in-hospital recovery. Sex and statin use at discharge were associated only with post-discharge recovery. The authors suggest that the post-stroke recovery occurs independently during each period and is associated with different clinical risk factors.

Attention should be paid to modifiable risk factors. The use of aspirin and statin is reported to reduce the initial stroke severity, thereby improving the final prognosis.[7] Onset-to-admission time is affected by pre-hospital delay, which can be prevented by enhancing public awareness and integrating a pre-hospital notification by emergency medical services system. Preventing delay increases the chance of receiving acute recanalization therapy.[8] Appropriate blood pressure and glucose controls can also improve early stroke prognosis. There is a relative lack of information on the outcome predictors after discharge, since the CRCS-5 registry did not collect information on post-discharge medical complications and care status. It should be noted that this study has limitations regarding the determinants of post-discharge recovery. In addition, cognitive decline and language disturbance may not be sensitively reflected by the mRS scores. Many of the efforts described above focus primarily on early recovery, and there is still a lack of understanding of the mechanisms to promote later recovery from stroke sequelae such as cognitive, language, and visual disturbances. Another limitation of this study is that the duration of hospitalization varied according to the participating centers. Follow-up studies with a fixed interval definition, such as defining 5–7 days from stroke as early recovery and 3 months as late recovery, may complement the findings of this study.

Despite these limitation, this study conveys clinically important information about areas where recovery efforts should be focused. Functional recovery after stroke is affected by independent factors at each stage, suggesting that appropriate intervention is necessary at each stage of stroke treatment. To improve the prognosis of stroke patients, it is necessary to collect information on post-discharge care that can address unmet needs while continuing with existing efforts.

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