

# The Relationship between Functional Outcome and Prehospital Time Interval in Patients with Cerebral Infarction

Soichiro Seno, MD,\*† Satoshi Tomura, MD,\* Kenichiro Ono, MD,‡  
 Shinji Akitomi, MD,\*† Yasumasa Sekine, MD,\*† Yuya Yoshimura, MD,\*†  
 Yoshihiro Tanaka, MD,† Hisashi Ikeuchi, MD,† and Daizoh Saitoh, MD\*†

---

*Background:* When symptoms of cerebral infarction are recognized in a patient, he or she should be transported to a hospital and should be started on the appropriate treatments. The effectiveness of delayed treatment of cerebral infarction with respect to the initial diagnosis or perception of the disease is still unclear. *Methods:* We retrospectively investigated whether the functional outcomes would improve if patients with cerebral infarction were transported to the hospital with minimum delay. One-hundred twenty-two patients who were transported to Mishuku Hospital from January 2012 to August 2015 were included. We conducted multiple regression analyses. The criterion variable included the BI at discharge, and the explanatory variables were age, sex, days of hospital stay, the Barthel Index (BI) on admission, time from symptom onset to hospital arrival, time from emergency medical service perception to hospital arrival, recombinant tissue plasminogen activator (rt-PA) treatment, and the occluded artery type. *Results:* In all 122 cases, the BI at the time of discharge was not related to onset time ( $P = .453$ ) but was significantly related to perception time ( $P = .026$ ). BI scores at discharge were high for young patients ( $P = .002$ ) and for patients with short hospital stays ( $P < .001$ ). In the rt-PA group (52 cases), BI scores at discharge were also high when the perception time was short ( $P = .036$ ). *Conclusions:* A short interval between perception and hospital arrival improves the functional outcomes for patients with cerebral infarction. Thus, patients with cerebral infarctions must be treated with minimal delay after diagnosis of the condition. **Key Words:** Transportation time—cerebral infarction—functional outcome—Barthel Index—rt-PA—perception time—onset time. © 2017 National Stroke Association. Published by Elsevier Inc. All rights reserved.

---

From the \*Division of Traumatology, Research Institute, National Defense Medical College, Tokorozawa, Japan; †Department of Neurology, Mishuku Hospital, Tokyo, Japan; and ‡Department of Traumatology and Critical Care Medicine, National Defense Medical College Hospital, Tokorozawa, Japan.

Received April 10, 2017; revision received June 22, 2017; accepted June 30, 2017.

Authors' contributions: S.S. is the primary investigator of this study and was thus responsible for all the study processes. S.T. contributed to the study design, data interpretation, and revision of the manuscript. K.O. contributed to the study design, data collection, and data interpretation. S.A., Y.S., and Y.Y. contributed to the study design and data interpretation. Y.T. contributed to the study design, data interpretation, and revision of the manuscript. H.I. contributed to the study design and data interpretation. D.S. contributed to the study design, statistical analysis, data interpretation, and revision of the manuscript, and provided final approval to submit the manuscript for publication. All authors have read and approved the final manuscript.

Address correspondence to Soichiro Seno, MD, Division of Traumatology, Research Institute, National Defense Medical College, 3-2 Namiki, Tokorozawa 359-8513, Japan. E-mail: [res310@ndmc.ac.jp](mailto:res310@ndmc.ac.jp).

1052-3057/\$ - see front matter

© 2017 National Stroke Association. Published by Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2017.06.059>

## Introduction

The outcome of treatment is influenced by a patient's condition with regard to the disease, prehospital care, and hospital treatment.<sup>1</sup> Due to prehospital evaluation, transportation, and differential diagnosis, emergency departments often take too long to initiate the appropriate treatment for patients with cerebral infarction.<sup>2</sup> To ensure a successful outcome of stroke treatment, it is necessary to secure reliable emergency procedures, including primary care in the stroke assistance chain.<sup>3</sup> The number of patients eligible for acute treatment may increase by shortening the interval from symptom onset to hospital arrival.<sup>4</sup>

In October 2005, insurance coverage for recombinant tissue plasminogen activator (rt-PA) treatment (0.6 mg/kg) for patients who develop cerebral infarction within 3 hours of onset was adopted in Japan based on the results of the Japan Alteplase Clinical Trial. The adoption was further expanded in August 2012 to within 4.5 hours of onset.<sup>5,6</sup> Time is critical in the treatment of acute ischemic stroke<sup>7</sup>; delays in treatment not only preclude patients from available therapies but also influence neurological outcomes.<sup>8,9</sup> When the symptoms of a cerebral infarction are recognized, the patient should be promptly transported to the hospital to receive rt-PA. The effect of delayed initiation of treatment on the treatment outcome of patients with cerebral infarction is still unclear.

In this paper, we focused on transportation time, which is one of the factors of prehospital care. We examined the relationship between transportation time and functional outcome. We evaluated data from a single hospital to determine whether the functional outcome was better with shorter transportation times for patients with cerebral infarction. We verified the functional outcomes using the Barthel Index (BI), which evaluates 10 items related to feeding, bathing, grooming, dressing, bowel and bladder continence, toilet use, transfers (bed to chair and back), mobility (on level surfaces), and stairs. The BI is reported to be relevant to the functional outcomes for patients with cerebral infarction.<sup>10</sup>

## Methods

We conducted a retrospective study involving 122 patients with cerebral infarction who were transported to Mishuku Hospital (Tokyo, Japan) from January 2012 to August 2015. The patients underwent rehabilitation during hospitalization or after discharge, and they were transferred to other hospitals within 3 months. Patients who died within 3 months were excluded. As the transportation method was limited to ambulances, we excluded patients who did not arrive at our hospital in an ambulance. None of the patients was transported via helicopter. We excluded patients whose emergency transport records were unavailable, as well as patients whose onset times

were unclear and those who had other symptoms such as palsy upon waking up in the morning. We also excluded patients who had symptoms of cerebral infarction upon waking up in the morning. The study design was approved by the ethics committee of our hospital. Written consent was obtained from all participating patients.

In our hospital, speech therapists usually employ the BI for patients who undergo rehabilitation to evaluate their activities of daily living (ADLs). The BI is evaluated using 10 items at the time of hospitalization or at discharge (including transfer to a different hospital), with a maximum score of 100 and a minimum score of 0 points. The BI score is segmented into intervals of 5 points. The BI score of a patient with independent ADLs is 100, while that of a patient fully dependent on assistance is 0. In our study, patients whose BI scores were not evaluated at the time of hospitalization or discharge (including transfer to a different hospital) were excluded.

Transportation records were available for patients who had been transported to the hospital via ambulance. We used 2 time intervals as statistical items. The first was transportation time from onset of symptoms to hospital arrival (onset time). The second was transportation time from emergency medical service (EMS) perception to hospital arrival (perception time). The perception and hospital arrival times were based on data recorded by the ambulance service, whereas the onset time was based on the testimony of the patient or people in the surrounding area.

Among the 122 patients evaluated, 52 (42.6%) were treated with rt-PA. At the beginning of the study period, we only prescribed rt-PA for patients treated within 3 hours of cerebral infarction onset. This was extended to within 4.5 hours of onset in August 2012 after the results of the Japan Alteplase Clinical Trial were released.<sup>5,6</sup>

Baseline data for all patients included age, sex, duration of hospital stay, BI on admission, BI at discharge, onset time, perception time, rt-PA treatment, stroke subtype, and the occluded artery type.

The National Institute of Neurological Disorders and Stroke has divided stroke into 4 subtypes: cardioembolic infarction, atherothrombotic infarction, lacunar infarction, and others.<sup>11</sup> As this study did not involve patients of the "others" subtype (e.g., paradoxical embolism), we divided the patients into 3 groups: those with cardioembolic infarction, those with atherothrombotic infarction, and those with lacunar infarction. Analysis was not performed based on stroke subtype because of the statistical methods used.

From the anatomical viewpoint, patients were divided into 4 groups depending on the site of arterial occlusion: the middle cerebral artery (MCA), anterior cerebral artery (ACA), internal carotid artery (IC), and posterior circulation. We performed our analysis by separating the cases into 2 groups based on the type of occluded arteries: anterior circulation (ACA, MCA, and IC) and posterior circulation (Table 1).

Download English Version:

<https://daneshyari.com/en/article/8596010>

Download Persian Version:

<https://daneshyari.com/article/8596010>

[Daneshyari.com](https://daneshyari.com)