

# Quality Assurance Monitoring of a Citywide Transportation Protocol Improves Clinical Indicators of Intravenous Tissue Plasminogen Activator Therapy: A Community-based, Longitudinal Study

Chihiro Atsumi, MD,\* Yasuhiro Hasegawa, MD,\* Kohtaro Tsumura, MD,†  
Toshihiro Ueda, MD,‡ Kazunari Suzuki, MD,§ Makoto Sugiyama, MD,||  
Hiroyuki Nozaki, MD,¶ Shinichi Suzuki, MD,# Makoto Nakane, MD,\*\*  
Goro Nagashima, MD,†† Takayuki Kitamura, MD,‡‡ Hirofumi Nikaido, MD,§§  
and Jinichi Sasanuma, MD||||

---

*Background:* Stroke-bypass transportation to the stroke center by paramedics is important to maximize the efficiency of intravenous tissue plasminogen activator (iv-tPA) therapy. To improve access to stroke thrombolysis, a citywide protocol was launched on January 2007 in Kawasaki City (population 1.4 million) using the Maria Prehospital Stroke Scale (MPSS), and quality assurance monitoring has been performed every 6 months. The aim was to identify whether the citywide quality assurance monitoring improves the process and outcome of iv-tPA therapy. *Methods:* All of the MPSS-based transportation data prospectively recorded by the Kawasaki City Fire Department and the associated clinical data in the 11 hospitals that accept stroke-bypass transfers were merged every 6 months for the quality assurance monitoring. Clinical indicators such as ambulance call-to-door time, onset-to-needle time, door-to-needle time, frequency of thrombolytic use, and outcome of thrombolytic therapy were analyzed. These clinical indicators were also compared between patients transferred on weekdays and on weekends. *Results:* A total of 2049 patients was registered from April 2009 to March 2013. Their mean age was  $70.4 \pm 13.2$  (range, 24-98) years, and 64.3% were male. Ambulance call-to-door time decreased gradually from  $37.5 \pm 12.5$  minutes to  $33.9 \pm 11.7$  minutes over 4 years ( $P = .000$ , analysis of variance with the post hoc Dunnett test). Onset-to-needle time and door-to-needle time were similar over the 4 years. Good outcome (modified Rankin Scale score  $<2$ ) after iv-tPA therapy increased from 24.1% to 35.3% ( $P = .045$ , 2010 vs. 2012). No deleterious effect of weekend admission was observed based on these clinical indicators. *Conclusions:* A citywide MPSS-based transportation protocol significantly decreased the delay in the ambulance call-to-door time. The implementation of standardized cross-institutional quality assurance programs

---

From the \*Department of Neurology, St. Marianna University School of Medicine; †Department of Neurosurgery & Neurovascular Center, Kawasaki Saiwai Hospital; ‡Department of Stroke, Stroke Center, St. Marianna University Toyoko Hospital; §Department of Neurosurgery, Ohta General Hospital; ||Department of Neurosurgery, Kanto Rosai Hospital; ¶Department of Neurology, Kawasaki City Hospital; #Department of Neurosurgery, Asao General Hospital; \*\*Department of Neurosurgery, Teikyo University School of Medicine, University Hospital Mizonokuchi; ††Department of Neurosurgery, Municipal Tama Hospital; ‡‡Department of Neurosurgery, Nippon Medical School Musashikosugi Hospital; §§Department of

Neurosurgery, Daiichi Hospital; and ||||Department of Neurosurgery, Shinyurigaoka General Hospital, Kawasaki, Japan.

Received June 29, 2014; revision received August 11, 2014; accepted August 13, 2014.

Address correspondence to Yasuhiro Hasegawa, MD, Department of Neurology, St. Marianna University School of Medicine, Sugao, Miyamae-ku, Kawasaki, Kanagawa 216-8511, Japan. E-mail: [shinnai@marianna-u.ac.jp](mailto:shinnai@marianna-u.ac.jp).

1052-3057/\$ - see front matter

© 2015 by National Stroke Association

<http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2014.08.013>

for acute stroke therapy may improve the process and outcome of iv-tPA therapy in the community. **Key Words:** Stroke-bypass transportation—plan-do-study-act cycle—stroke scale—alteplase.

© 2015 by National Stroke Association

Intravenous tissue plasminogen activator (iv-tPA) has been proven to improve stroke outcome when administered early to eligible patients.<sup>1,2</sup> Every effort should be made to minimize the onset-to-needle time because the benefits are highly time sensitive.<sup>3</sup> Although prehospital delay is a key modifiable factor, there are sparse data on the strategy for and the impact of shortening this type of delay. Stroke-bypass transportation to the stroke center by paramedics may be important to maximize the efficiency of iv-tPA therapy. We developed a new prehospital stroke scale, the Maria Prehospital Stroke Scale (MPSS), by simple modification of the Cincinnati prehospital stroke scale (CPSS) for emergency medical technicians (EMTs), to predict actual use of tPA after transportation.<sup>4</sup> The aims of this study were to investigate whether prehospital and hospital indicators for iv-tPA therapy were able to be improved by using this unique prehospital scale in a citywide transportation protocol and to examine whether a deleterious effect of weekend admission<sup>5-12</sup> would be observed in this urban area in Japan.

## Subjects and Methods

To improve access to stroke thrombolysis, a citywide protocol was launched in January 2009 in Kawasaki City (population of 1,431,094 people over an area of 142.7 km<sup>2</sup>) using MPSS-based stroke-bypass transportation, and quality assurance monitoring has been performed every 6 months since April 2009. These data of consecutive patients with suspected stroke prospectively collected by EMTs were analyzed. All of the MPSS-based transportation in Kawasaki City was recorded by the

Kawasaki City Fire Department, and the patients' clinical data were added to this file by the Kawasaki Stroke Network, which consists of 11 hospitals that accept stroke-bypass transfers. Age, sex, MPSS score, the time the ambulance call was received, and the arrival time to the hospital were recorded by EMTs, and the onset time was determined by attending physicians. All patients underwent computed tomography or magnetic resonance imaging. The National Institutes of Health Stroke Scale score was recorded at hospital arrival, 24 hours after injection of tPA, and 1 month after onset or at discharge. The Rankin scale score before onset and the modified Rankin Scale (mRS) score 1 month after onset or at discharge were recorded. The mRS score at 3 months after onset was not obtained because this study was conducted as quality assurance monitoring while adhering to fire laws in Japan, and informed consent was not obtained from the patients for a further follow-up survey because of the personal information protection law. Using this database, the Kawasaki Stroke Network hospitals and the fire department have continued quality assurance monitoring every 6 months.

In this study, annual changes in several clinical indicators for thrombolytic therapy, such as ambulance call-to-door time, onset-to-needle time, door-to-needle time, numbers given thrombolytic therapy, percentage of patients with significant improvement in the National Institutes of Health Stroke Scale score ( $\geq 4$ ) 24 hours after iv-tPA, and the percentage of patients with good outcomes (mRS score  $< 2$ ) at 1 month after thrombolytic therapy were analyzed. Whether a deleterious effect of weekends/holidays could be observed in these indicators was also evaluated in each year.

**Table 1.** The Maria Prehospital Stroke Scale evaluates facial palsy, arm weakness, and speech abnormalities

Facial droop	The patient shows teeth or smiles
<input type="checkbox"/> 0 Normal	<ul style="list-style-type: none"> <li>• Both sides of face move equally.</li> </ul>
<input type="checkbox"/> 1 Abnormal	<ul style="list-style-type: none"> <li>• One side of face does not move as well as the other.</li> </ul>
Arm drift	The patient closes the eyes and extends both arms straight out with palms up for 10 seconds
<input type="checkbox"/> 0 Normal	<ul style="list-style-type: none"> <li>• Both arms raised equally.</li> </ul>
<input type="checkbox"/> 1 Abnormal, not severe	<ul style="list-style-type: none"> <li>• One arm drifts down or pronates.</li> </ul>
<input type="checkbox"/> 2 Abnormal, severe	<ul style="list-style-type: none"> <li>• Only one arm raised or cannot complete request at all.</li> </ul>
Speech	Test this item by free talking or ordering to repeat a short phrase
<input type="checkbox"/> 0 Normal	<ul style="list-style-type: none"> <li>• The patient can speak without slurring of words.</li> </ul>
<input type="checkbox"/> 1 Abnormal, not severe	<ul style="list-style-type: none"> <li>• Slurred speech or not understandable speech.</li> </ul>
<input type="checkbox"/> 2 Abnormal, severe	<ul style="list-style-type: none"> <li>• Unable to speak.</li> </ul>
Total	

Download English Version:

<https://daneshyari.com/en/article/2710329>

Download Persian Version:

<https://daneshyari.com/article/2710329>

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