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Letter to the Editor

Decision-Making Support Using a Standardized Script and Visual Decision Aid to Reduce Door-to-Needle Time in Stroke

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Dear Sir:

Shortening the interval between hospital arrival and thrombolytic treatment is critical to improve the efficacy of the treatment because of its time-sensitive effect.[1] Decision-making by patients or their families is an essential step during the process of thrombolytic treatment. In an emergency situation, decision-making by patients or their families relies mostly on the physician's explanation concerning the benefits and risks of thrombolytic treatment. In this regard, a physician's concise, standardized, and easily understandable explanation of the thrombolytic treatment is important for the process of decision-making and for obtaining informed consent from patients or their family. We investigated how a protocol using decision-making support (DMS) for patients and their families could reduce door-to-needle time in acute stroke.

We have previously shown that quality improvement activity using a computerized physician order entry could reduce time from hospital arrival to evaluations and intravenous (IV) tissue plasminogen activator (tPA).[2-4] While performing continuous quality improvement activity to further improve the process, we have found that the most common reason of treatment delay was waiting informed consent.[5] Therefore, we developed a protocol for DMS using standardized scrip and visual decision aid. The standardized script was developed for physicians who are responsible for providing explanations regarding thrombolysis treatment and then obtaining informed consent from patients or their families. The visual decision aid (http://stroke.ucla.edu/workfiles/VDA-for-TPA.pdf) was used by physicians to help explain the benefits and risks of IV tPA treatment to candidates for this treatment. This protocol was implemented from January 2010.

All consecutive patients who visited the emergency department and were treated with IV tPA within the 3-hour time window were included in this study. The effect of DMS was investigated by comparing the door-to-needle time before (the pre-DMS group, January 2007–December 2009) and after (post-DMS group, January 2010–December 2012) the implementation of the DMS protocol. Demographic factors and time intervals were compared using the Mann–Whitney U test and the chi-square test. The possible reasons for delay were identified if the door-to-needle time was longer than 40 minutes. To determine factors associated with a door-to-needle time >40 minutes, multivariable logistic regression analysis was performed. Age, sex, and variables with $P<0.1$ in the univariable analyses were entered for multivariable analysis. Statistical significance was set at $P<0.05$. SPSS for Windows (version 17.0, SPSS Inc., Chicago, IL, USA) was used for statistical analysis.

Total of 2,172 and 2,078 patients with cerebral infarction were

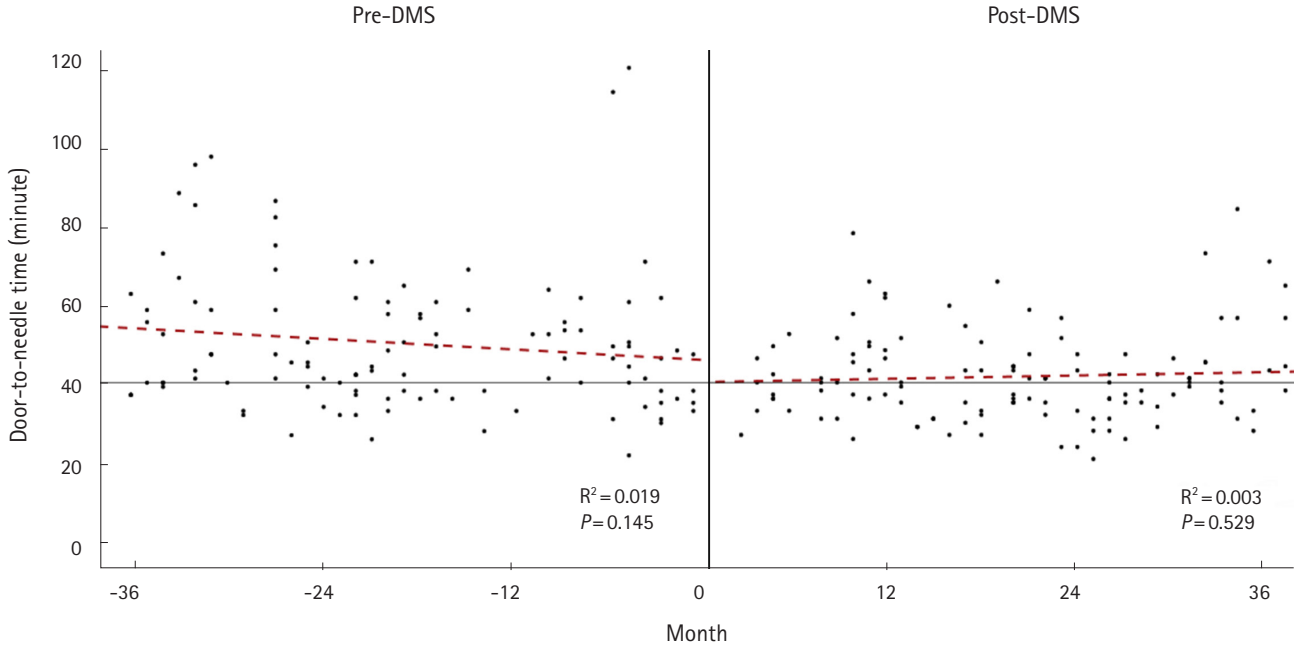

Figure 1. Door-to-needle time for intravenous tissue-type plasminogen activator before and after implementation of decision making support protocol. Door-to-needle time was reduced soon after the implementation of the decision-making support (DMS) protocol and maintained for the 3-year follow-up period.

admitted to the neurology department during the 3-year pre-DMS and 3-year post-DMS periods, respectively. Of them, 229 patients who were treated with IV tPA (the pre-DMS group 111 [5.1%], the post-DMS group 118 [5.7%], $P=0.412$) were included in this study. When comparing with the pre-DMS group, the post-DMS group more frequently had diabetes mellitus (36.4% vs. 21.6%, $P=0.014$) and less frequently had a history of previous cerebral infarction (9.3% vs. 18.9%, $P=0.036$). Baseline National Institute of Health Stroke Scale score was lower in the post-DMS group (median [interquartile range]: 13 [8-17] vs. 15 [9-20], $P=0.013$). Other demographic characteristics were not different between the groups. The median door-to-needle time was significantly reduced after the implementation of the DMS protocol (from 46 minutes [interquartile range 38-58] to 40 minutes [interquartile range 34-47], $P=0.001$). The proportion of patients who received IV tPA treatment within 40 minutes was greater in the post-DMS group (64/118 [54.2%]) than in the pre-DMS group (40/111 [36.0%], $P=0.006$). The reduction of door-to-needle time was observed soon after the implementation of the DMS protocol and was sustained for the 3-year follow-up period (Figure 1). Multivariate analysis showed that the implementation of the DMS protocol was independently associated with a door-to-needle time ≤ 40 minutes (adjusted odds ratio 2.13, 95% confidence interval 1.23-3.67). In the pre-DMS group, waiting for informed consent due to the indecision of family members was the most common reason for delay (23/71, 32.4%). After the implementation of DMS protocol, the delay due to waiting for informed consent was substantially reduced (8/54 [14.8%], $P=0.024$).

In this study, we demonstrated that door-to-needle time was significantly reduced in the post-DMS group that used a standardized script and visual decision aid for tPA treatment. Although many quality improvement initiatives and programs have been implemented to reduce any delay in reperfusion therapy in stroke,[3-9] there has been little concern regarding the decision-making process of patients or their family. We interviewed neurology residents who were primarily responsible for obtaining informed consent. We recognized that the explanations on the benefits and risks of IV tPA differed among residents, and might also be biased. Therefore, we provided standardized scripts containing key messages to explain. This script was helpful for standardizing the explanations, preventing potential bias, and shortening the time taken for providing the explanation and obtaining informed consent. We also used a visual decision aid that shows how many patients benefitted or experienced adverse consequences when they are treated with IV tPA within 3 hours after symptom onset. Patients and their family often have difficulties in understanding medical terms and the benefits and risks of reperfusion treatment despite the physician's explanations. The visual decision aid showing the benefits and risks of tPA treatment as a simple cartoon was helpful for our study population. Recent pooled analysis revealed that decision aids significantly improved people's knowledge regarding options, and reduced their decisional conflict,[10] which supports our findings.

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To reduce delay in thrombolysis treatment, efforts to improve the process should be multi-directional. Although the 6-minute reduction of door-to-needle time, by improving the patient's or family's decision-making, may not seem great, it was achieved by using a simple protocol that could be easily implemented in any hospital setting. In addition, the effect of the standardized script and visual decision aid seems to be immediate and sustainable. Therefore, more widespread implementation of this approach is warranted because it is simple and can be easily implemented.

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