Factors Associated With Onset-to-Door Time in Patients With Transient Ischemic Attack Admitted to Stroke Centers

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Background and Purpose—The aim of this study was to elucidate the factors associated with the time from symptom onset to arrival at a stroke center (onset-to-door time [ODT]) in patients with classically defined transient ischemic attack using data from a multicenter, retrospective study.

Methods—The subjects were patients with transient ischemic attack admitted to 13 stroke centers in Japan within 7 days of onset between 2008 and 2009. A total of 464 patients registered (292 men, 68.5±13.2 years old), and 421 of them (268 men, 68.8±13.1 years old) were included in the analyses. ODT was classified into the following 5 categories: <3 hours, 3 to 6 hours, 7 to 12 hours, 13 to 24 hours, and >24 hours.

Results—There were 233 patients (55.3%) who visited a stroke center within 3 hours of symptom onset. Multiple ordinal logistic regression analysis revealed that motor weakness, speech disturbance, and duration of symptoms >10 minutes were independently associated with a short ODT. Furthermore, a history of transient ischemic attack and hypertension and a referral from another medical facility were independently associated with a long ODT. Patients with a higher ABCD² score were likely to arrive at a stroke center more quickly.

Conclusions—We identified several factors that were positively and negatively associated with the ODT in patients with transient ischemic attack. (Stroke. 2014;45:611-613.)

Key Words: ischemic attack, transient ▪ stroke

A transient ischemic attack (TIA) is a medical emergency associated with a high risk of early recurrent stroke. Urgent assessment and management of patients in a dedicated TIA clinic were found to decrease the 90-day stroke risk by ≈80%. Immediate medical attention is essential to reduce the risk of stroke after TIA. Although the behavior of patients after stroke has been studied extensively since the advent of thrombolysis and other potential treatments, little information is available on the behavior of patients after TIA, except for the Oxford Vascular Study.³⁻⁵

We investigated the factors associated with the time from symptom onset to arrival at a stroke center (onset-to-door time [ODT]) in patients with TIA admitted to stroke centers using data from a multicenter, retrospective study.

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The ODT category was considered an ordinal variable, and ordinal logistic regression analyses were performed to identify the associations between the study variables and ODT. Variables that showed $P<0.1$ in univariate analyses were used in multiple ordinal logistic regression analysis, and this was performed using a cumulative logit model. The ABCD² score was excluded from the multivariable model because of confounding factors.

Results

Table 1 shows the characteristics of patients according to ODT. Patients with symptoms on arrival at stroke centers, motor weakness, speech disturbance, and duration of symptoms >10 minutes were more likely to arrive at stroke centers quickly than those without. Patients with a history of TIA and hypertension and those referred from another medical facility were more likely to have a delayed arrival at a stroke center. We found that patients with a higher ABCD² score were more likely to arrive at a stroke center quickly. Multiple ordinal logistic regression analysis revealed that motor weakness, speech disturbance, and duration of symptoms >10 minutes were independently associated with a short ODT. Furthermore, a history of TIA and hypertension and a referral from another medical facility were independently associated with a long ODT (Table 2).

Subsequent ischemic stroke occurred during hospitalization in 4 (1.7%) of 233 patients who visited a stroke center within 3 hours, 1 (1.5%) of 65 within 3 to 6 hours, 0 (0%) of 43 within 7 to 12 hours, 1 (3.3%) of 31 within 13 to 24 hours, and 1 (2.0%) of 49 after 24 hours. Events and ODT were not significantly associated.

Discussion

Our study revealed that motor weakness, speech disturbance, and long duration of symptoms were associated with a short ODT. Patients with a higher ABCD² score were more likely to arrive at a stroke center quickly. The results of our study are consistent with those of previous studies. Two reports using data from the Oxford Vascular Study demonstrated that patients with motor weakness, speech disturbance, and symptom duration >60 minutes were less likely than other patients to delay in seeking medical attention. Patients with a higher predicted stroke risk were more likely to act quickly due apparently to the influence of weakness and prolonged symptom duration on behavior, although there was no association between the recognition of symptoms and the urgency of action.

We found that a history of recent TIA and hypertension, both known risk factors for stroke after TIA, was associated with delayed arrival at a stroke center. These relationships were not found in a study by Chandratheva et al. They reported that prior stroke and atrial fibrillation tended to be associated with less delay. We also showed that a referral from another medical facility was associated with a longer delay in arrival at a stroke center. A systematic review found that there

<table>
<thead>
<tr>
<th>Table 1. Comparison of Characteristics According to Onset-to-Door Time</th>
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<tbody>
<tr>
<td>Overall</td>
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<tr>
<td>--------</td>
</tr>
<tr>
<td>Age, y (mean±SD)</td>
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<tr>
<td>Men, %</td>
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<tr>
<td>Symptoms, %</td>
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<tr>
<td>Motor</td>
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<tr>
<td>Sensory</td>
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<tr>
<td>Speech</td>
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<tr>
<td>Visual</td>
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<tr>
<td>Presence of symptoms on arrival, %</td>
</tr>
<tr>
<td>Duration of symptoms &gt;10 min, %</td>
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<tr>
<td>History, %</td>
</tr>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>TIA</td>
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<tr>
<td>Hypertension</td>
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<td>Diabetes mellitus</td>
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<td>Atrial fibrillation</td>
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<tr>
<td>Median ABCD² score, (IQR)</td>
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<td>Referral from another medical facility, %</td>
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</table>

IQR indicates interquartile range; and TIA, transient ischemic attack.
was an association between delay in seeking medical attention and referral from a general physician in patients with TIA or minor stroke. The finding that patient factors are related to delayed arrival at stroke centers might be important insofar as action that could mitigate these factors. The present findings suggest that educating the general public and general physicians about TIA as a medical emergency and stroke risk factors, including hypertension, is essential to minimize the delay in arriving at a stroke center.

The present study has several limitations. First, there was a selection bias in this study because only patients with TIA admitted to a stroke center were enrolled. Second, this study had a retrospective design, and there were missing data on some baseline characteristics. Third, we were unable to investigate substantially an association between ODT and stroke risk because of the small number of patients who had stroke after TIA. Whether the hyperacute stroke treatment aphorism, time is brain, is applicable to TIA remains unclear.

In conclusion, we identified several factors that were positively and negatively associated with ODT in patients with TIA admitted to stroke centers. Further study is needed to clarify whether the same patterns of behavior after TIA would be observed in other populations.

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### Disclosures

None.

### References

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